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DANIEL B. STEPHENS & ASSOCIATES, INC.
ENVIRONMENTAL SCIENTISTS AND ENGINEERS

CLOSURE PLAN FOR ROSWELL COMPRESSOR STATION SURFACE IMPOUNDMENTS

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6020 ACADEMY NE • SUITE 100 • ALBUQUERQUE, NM 87109 • (505) 822-9400

DANIEL B. STEPHENS & ASSOCIATES, INC.
ENVIRONMENTAL SCIENTISTS AND ENGINEERS

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LIST OF ACRONYMS AND ABBREVIATIONS

ACL	Alternative concentration limit
B&C	Brown and Caldwell
B&R	Brown & Root Environmental
bgs	Below ground surface
BLM	Bureau of Land Management
BTEX	Benzene, toluene, ethylbenzene, and xylenes
CES	Cypress Engineering Services
DBS&A	Daniel B. Stephens & Associates, Inc.
DO	Dissolved oxygen
DQOs	Data quality objectives
EDAC	Earth Data Analysis Center
EPA	Environmental Protection Agency
FID	Flame ionization detector
Halliburton	Halliburton NUS Environmental Corporation
HLA	Harding Lawson Associates
HRMB	Hazardous and Radioactive Materials Bureau (NMED)
HWMR	Hazardous Waste Management Regulations
mL	Milliliter
MS/MSD	Matrix spike/matrix spike duplicate
NMED	New Mexico Environment Department
NMSHTD	New Mexico State Highway and Transportation Department
OCD	Oil Conservation Division
O.D.	Outside diameter
OVA	Organic vapor analyzer
PARCC	Precision, accuracy, representativeness, completeness, and comparability
PID	Photoionization detector
QA	Quality assurance
QAPP	Quality assurance project plan
QC	Quality control
PPE	Personal protective equipment
PSH	Phase-separated hydrocarbons
PVC	Polyvinyl chloride
RCRA	Resource Conservation and Recovery Act
RPD	Relative percent difference
SCT	Salinity-conductivity-temperature meter
SEO	State Engineer Office
SVE	Soil vapor extraction
TCA	1,1,1-trichloroethane
TCLP	Toxicity characteristic leaching procedure
TDS	Total dissolved solids
TNRCC	Texas Natural Resources Conservation Commission
TPH	Total petroleum hydrocarbons
Transwestern	Transwestern Pipeline Company
USGS	United States Geological Survey
VOCs	Volatile organic compounds

1. INTRODUCTION

At the request of Transwestern Pipeline Company (Transwestern), a wholly owned subsidiary of ENRON Operations Corporation, Daniel B. Stephens & Associates, Inc. (DBS&A) has prepared this Closure Plan for closure of former surface impoundments located at Transwestern's Compressor Station No. 9 (Roswell compressor station) near Roswell, New Mexico (Figure 1-1). The closure plan has been prepared for submission to the Hazardous and Radioactive Materials Bureau of the New Mexico Environment Department (NMED) in order to satisfy the requirements of the New Mexico Hazardous Waste Management Regulations (HWMR-7). Sections 1.1 through 1.3 provide information on the scope of work, objectives, and organization of the closure plan, along with a cross-reference to the relevant regulations.

1.1 Scope of Work

This closure plan addresses proposed activities for closure of several former surface impoundments located at the Roswell compressor station. The former surface impoundments were located in the northeastern corner of the compressor station. Initial operation began in approximately 1960 and may have continued until 1984, although the last impoundment was not backfilled until June 1986. Two impoundments are known to have existed at this location, and a third is suspected to have been present. No surface expression of the former impoundments is now visible at the site.

The impoundments served primarily to contain pipeline condensate, a hydrocarbon liquid that accumulates within natural gas pipelines. Pipeline condensate and other similar petroleum wastes are generally exempt from regulation under the Resource Conservation and Recovery Act (RCRA) by the petroleum exclusion. However, small quantities of RCRA-regulated spent halogenated solvents (F001 wastes) were also inadvertently released into the impoundments, along with miscellaneous non-hazardous solid wastes such as filters, engine parts, and office trash (Campbell, 1993). Therefore, NMED has requested that a RCRA closure plan be prepared to address the possible presence of RCRA hazardous wastes beneath the former impoundments.

The closure plan was prepared in accordance with the requirements of Part VI of HWMR-7, which incorporate by reference the federal requirements contained in 40 CFR Part 265. In addition, the closure plan is intended to address the list of required information requested by NMED in the Notice of Deficiency dated March 7, 1994, as well as that dated September 28, 1994 (Appendix A).

1.2 Closure Plan Objectives, Organization, and Amendments

The overall objective of this closure plan is to provide the basis for performing final closure of the former surface impoundments. Closure will be considered complete upon receipt of a signed Closure Certificate from NMED. As described in 40 CFR Part 265, the two available options for closure of surface impoundments include (1) clean closure and (2) landfill closure. Transwestern intends to attempt clean closure of the impoundments, whereby any hazardous wastes that may be present are removed to the extent that future threats to human health and the environment attributable to the facility no longer exist.

A phased approach will be used to achieve the clean closure objectives. This closure plan only addresses Phase I closure activities in detail. Scopes of work for subsequent phases will be prepared and submitted to NMED as amendments to this closure plan. In general, the objective of Phase I will be to characterize the nature of the subsurface wastes that remain immediately beneath and adjacent to the former impoundments. Thus the Phase I soil and ground-water assessments described here are confined to a relatively small area near the suspected contaminant sources. Following completion of Phase I, a second phase of investigation will be conducted to determine the lateral and vertical extent of impacted soil and ground water. Subsequent phases will address corrective actions that may be required to meet soil and ground-water cleanup criteria.

This closure plan is organized in the following manner. The site background and regulatory status of the former impoundments will be described first in Section 2 to provide a basis for the proposed closure activities. The results of all previous subsurface environmental investigations will then be summarized in Section 3. The proposed Phase I soil assessment and Phase I ground-water assessment plans are outlined in Sections 4 and 5, respectively. A quality assurance project plan is included in Section 6 to ensure that the data generated are of sufficient quality to support subsequent decisions. Finally, the proposed project schedule is included in Section 7.

1.3 Regulatory Requirements of 40 CFR Parts 264/265

The closure regulations in Subpart G of 40 CFR Parts 264/265 include a specific list of requirements that must be fulfilled. An attempt has been made to address each of these requirements in this closure plan.

In order to facilitate the review and approval of this closure plan by NMED, a closure plan checklist has been included in Appendix B. The format for the checklist was developed by the U.S. Environmental Protection Agency (U.S. EPA, 1987) for evaluation of surface impoundment closure plans and includes citations of the regulatory requirements outlined in Subpart G of 40 CFR Parts 264/265, along with reference to the sections or subsections of this closure plan containing the information that pertains to those requirements. The checklist can be used as a guideline to ensure that all relevant regulatory requirements have been adequately addressed.

In addition to the closure requirements (Subpart G), the ground-water monitoring requirements stipulated in 40 CFR Parts 264/265 Subpart F have been addressed in Section 5 of this document.

In accordance with the financial requirements of 40 CFR Parts 264/265 Subpart H, documentation of financial assurance for closure must be provided with this closure plan. As owner of the Roswell compressor station, Transwestern can demonstrate that it passes the financial test specified in Part 265.143(e). A letter from the chief financial officer of Transwestern documenting the results of the financial test is provided in Appendix C of this closure plan, along with several supporting documents. This information is the same as that previously submitted to NMED on July 1, 1993.

2. SITE BACKGROUND

The Roswell compressor station is located approximately 9 miles north of the city center of Roswell, New Mexico along the east side of U.S. Highway 285 (Figure 1-1). Sections 2.1 through 2.5 provide background information regarding the facility layout and operation, history of the former surface impoundments that are the subject of closure under this plan, as well as the regional geographic, geologic, and hydrologic setting.

2.1 Facility Description

The Roswell compressor station is situated on approximately 80 acres of land in Sections 21 and 28, Chaves County, New Mexico (Figure 1-1). The property is privately owned by Transwestern Pipeline Company, while the remainder of Sections 21 and Section 28 are State Trust Land (Glenn, 1993). Site access is via U.S. Highway 285, and the entire property is secured by a chain link fence. The following is a list of pertinent information regarding the facility:

Facility name	Transwestern Pipeline Company Compressor Station No. 9
Facility address	Transwestern Pipeline Company 6381 North Main Street P.O. Box 1717 Roswell, New Mexico 88202-1717
Telephone number	(505) 625-8022
EPA I.D. number	NMD 986676955
County and state	Chaves County, New Mexico
Property legal description	SW¼ of the SW¼ of Section 21, T. 9S. R. 24E. NW¼ of the NW¼ of Section 28, T. 9S. R. 24E.
Latitude/longitude of former impoundments	Pit 1: N33°30'54" / W104°30'55" Pit 2: N33°30'55" / W104°30'55" Pit 3: N33°30'55" / W104°30'56"
Site elevation	Approximately 3610 feet above sea level

The Roswell compressor station is one of numerous similar facilities located along the Transwestern natural gas pipeline that extends from Texas to California. Natural gas is received from the east through two 24-inch pipelines, the West Texas Lateral and the Panhandle Lateral, and leaves to the northwest through two 30-inch pipelines. The primary function of the compressor station is to boost the pressure of the natural gas stream by means of piston compressors powered by natural gas internal combustion engines. The facility also includes the district offices for Transwestern's New Mexico operations, along with other ancillary buildings including a warehouse and a repair shop (Figure 2-1). The compressor station has been in operation at this location since August 9, 1960.

The only environmental permit currently in force is Discharge Plan GW-52 with the New Mexico Oil Conservation Division (OCD). An RCRA Part A permit application was filed with NMED in January 1993 for closure of the former impoundments under interim status.

2.2 History and Operation of Former Surface Impoundments

Little information exists about the operational history of the surface impoundments. Much of what is known is based on the recollection of present or former Transwestern employees. The following discussion summarizes the available information regarding the locations, sizes, and periods of operation of the former surface impoundments.

As mentioned in Section 1, the primary function of the former impoundments was to contain pipeline condensate, a hydrocarbon liquid that accumulates during the periodic cleaning of the natural gas pipelines. Natural gas is composed mostly of alkane compounds, with methane being the most abundant (Eiceman, 1986). In addition, natural gas contains variable concentrations of heavier molecular weight hydrocarbons (C4+), which may condense due to changes in temperature and pressure within the pipelines. Besides the higher molecular weight hydrocarbons derived from the natural gas itself, pipeline condensate may also contain lube oil blow-by derived from upstream reciprocating engine gas compressors located at other compressor stations. The lube oil blow-by consists of crankcase lubricating oil that bypasses the compressor piston rings and enters the natural gas pipeline.

Pipeline condensate is periodically removed from the pipeline through "pigging" operations, which make use of a cylindrical piston-like device known as a "pig." The pig cleans the condensate from the interior pipeline wall by scraping and brushing as it is carried through the pipeline by the pressurized gas stream. The pig and the accumulated liquid condensate are removed from the pipeline at the "pig receiver" (Figure 2-1). Currently, all condensate is collected and stored in aboveground tanks. The condensate is then sold for use as fuel. Formerly, the condensate was stored in one or more unlined surface impoundments that are the subject of this closure plan. The impoundments have been variously referred to as the "disposal pit" or the "burn pits." The latter term refers to the reported practice of periodically burning the hydrocarbon liquids in the impoundment to reduce their volume (Campbell, 1993).

The first reported use of a surface impoundment at this location was in August of 1960, shortly following construction of the compressor station in 1960 (Campbell, 1993). However, no records are currently available showing the exact location or size of this surface impoundment or others that may have been used subsequently until the last remaining surface impoundment was backfilled in 1986. Correspondence among Transwestern, NMED, and OCD has generally referred to a single impoundment as "the disposal pit" (Campbell, 1992) or "the burn pit." However, the General Plan map for the Roswell compressor station (Transwestern, 1959) showed two surface impoundments located in the northeast corner of the facility, in the NE¼ of the SW¼ of the SW¼ of Section 21, T. 9S. R. 24E. The locations of the two former burn pits as previously shown on the General Plan were found to be incorrect, as discussed below.

Figure 3 of a report prepared by Metric Corporation (1991) indicated the possibility that three pits had existed in the northeast corner of the facility. This was reportedly based on discussions with a former compressor station supervisor who was able to recall the approximate locations of three former surface impoundments (Campbell, 1994). The three pits are designated in the Metric report (1991) as Pit 1 (southernmost), Pit 2 (northeast), and Pit 3 (northwest). The employee was said to have pointed out the approximate former locations of the pits to the Metric field staff. For the sake of consistency, these designations will be retained through this closure plan. However, it should be noted that the existence of Pit 3 is less certain than Pits 1 and 2, as described below.

Prior to the preparation of this closure plan, the location and number of former surface impoundments was not known precisely. In order to clarify the number and exact locations of the former impoundments, DBS&A obtained historical aerial photographs showing the compressor station. The following sources were contacted during this effort: the Earth Data Analysis Center (EDAC, Albuquerque), the Bureau of Land Management (BLM, Albuquerque), the New Mexico State Highway and Transportation Department (NMSHTD, Santa Fe), IntraSearch (Denver), and the United States Geological Survey (USGS) Earth Science Information Center (Denver). Several aerial photographs showing the compressor station were located, and contact prints were obtained for five different photographs taken on the following dates:

Date Flown	Approximate Scale	Source
07/28/61	1:23,000	EDAC-Albuquerque
10/10/72	1:25,000	NMSHTD-Santa Fe
06/21/73	1:32,000	BLM-Albuquerque
04/19/81	1:26,000	BLM-Albuquerque
08/05/82	1:19,000	NMSHTD-Santa Fe

The 1961 aerial photograph shows a single feature that appears to be a surface impoundment in the extreme northeast corner of the property. This impoundment corresponds to Pit 2 on Figure 2-1. This appears to be the first surface impoundment constructed at the compressor station.

The 1972 and 1973 photographs reveal two features that appear to be surface impoundments. In order to more clearly see these features, enlargements were made of the 1973 and 1981 BLM photographs to scales of 1:5340 and 1:4330, respectively. Examination of the 1973 photograph shows two surface impoundments (Pit 1 and Pit 2 on Figure 2-1), with a third feature that may represent a backfilled impoundment (Pit 3 on Figure 2-1). However, the existence of Pit 3 is by no means certain, and it is quite possible that no impoundment ever existed at this location.

In the 1981 and 1982 photographs, only Pit 1 remains visible (Figure 2-1). Pit 2 appears to have been backfilled prior to the April 19, 1981 flight, and the feature labeled as Pit 3 is no longer visible.

Pit 1 was reportedly taken out of service no later than 1984 and backfilled in June of 1986 (Campbell, 1993). No wastes of any type were received after that date. Based on the aerial photographs, the dimensions and approximate periods of operation of the three former surface impoundments were as follows:

Impoundment	Approximate Dimensions	Date Constructed	Date Backfilled
Pit 1	40' x 70' (rectangular)	After 7/61, before 10/72	6/86
Pit 2	70' diameter (circular)	Before 7/61	Before 4/81
Pit 3	50' diameter (circular)	After 7/61, before 10/72	Before 4/81

It is estimated that the impoundments were at most 10 feet deep. Therefore, the maximum volumes of Pits 1, 2, and 3 during their operational lifetimes were approximately 1000, 1400, and 700 cubic yards, respectively.

In addition to the pipeline condensate, trace quantities of chlorinated solvent wastes were inadvertently released into the impoundments. The solvents were primarily used as degreasers to remove oily deposits on engine parts during maintenance of the compressor engines. The quantity of solvents and the exact type of solvents used is unknown as no records that might indicate the quantity or type of solvent materials purchased are known to exist at the site or at any other Transwestern facility. In addition, most of the Transwestern employees who were employed during the period of operation of the surface impoundments have retired.

Discussions with the few remaining personnel who were employed during the period in question indicate that the most common solvent used was known by the trade name "TK-1." This solvent product contained 100% 1,1,1-TCA. The primary degradation product of 1,1,1-TCA is 1,1-DCA. Therefore, the presence of these two compounds in soil and ground water are most likely the result of the use of the "TK-1" solvent product. The source of PCE and PCA compounds that were also detected in soil samples collected from the surface impoundment area is unknown.

Discussions with the same Transwestern personnel further indicate that the last surface impoundment in use (Pit 1) did not receive any waste materials after mid-1984. This information is supported by examination of facility drawings which indicate that considerable facility piping and AST upgrades and installations were made during the latter half of 1983.

2.3 Regulatory Background

This section provides a brief history of prior communications and regulatory actions related to the former surface impoundments being closed under this closure plan. This information is included to facilitate an understanding of events pertinent to regulation and closure of the impoundments.

As discussed in Section 1, operations involving wastes generated during the production and transmission of natural gas are generally exempt from regulation under RCRA as a result of the petroleum exclusion. Thus Transwestern's Compressor Station No. 9, along with other compressor stations in New Mexico, have historically been regulated by the New Mexico OCD.

As discussed in greater detail in Section 3, chlorinated solvents were first detected in soil gas near the former surface impoundments during a soil vapor survey by Harding Lawson Associates (HLA) in 1991. The survey was conducted at the request of legal counsel in order to provide legal advice to Transwestern concerning environmental matters. The compound detected most frequently was 1,1,1-trichloroethane (1,1,1-TCA). Because chlorinated volatile organic compounds (VOCs) are not natural components of natural gas or pipeline condensate, and because spent halogenated solvents are classified as F001 "Listed Wastes" under RCRA, the NMED Hazardous and Radioactive Materials Bureau became involved.

Following a subsequent soil investigation by Metric Corporation completed in December 1991, Transwestern attended a series of meetings with NMED and OCD to discuss the potential corrective action at the former surface impoundments. Because it appeared possible that RCRA-regulated wastes had been inadvertently released into the impoundments, NMED requested that Transwestern submit a RCRA Part A permit application.

On November 30, 1992, Transwestern submitted the RCRA Part A application to NMED and OCD. During a joint meeting of NMED and OCD with Transwestern on December 10, 1992, NMED requested that the Part A application be resubmitted using the proper EPA forms. This was done on January 5, 1993.

On February 17, 1993, NMED requested that Transwestern submit a RCRA closure plan for the former impoundments in accordance with the New Mexico Hazardous Waste Regulations, Part VI, Section 40 CFR 265.112(a). Although the impoundments had in fact been physically closed since June of 1986, Transwestern prepared a closure plan, which was delivered to NMED on July 1, 1993. NMED rejected this closure plan on March 7, 1994, however, on the grounds that it was incomplete and requested that another closure plan be submitted at a later date. On April 8, 1994, Transwestern met with NMED to discuss the Notice of Deficiency. The NMED requested that an administratively-complete closure plan be delivered by June 1, 1994.

Meanwhile, Transwestern had begun interim corrective measures to recover free hydrocarbon product from monitor well MW-1. Three additional wells, MW-1B, MW-2, and RW-1, were subsequently connected to the product recovery system. Transwestern has continued to keep NMED and OCD informed of the results of all subsurface investigations, as well as the performance of the product recovery system.

In addition to the above summary, Appendix D of this closure plan is a detailed chronology of events and relevant communications between Transwestern and the regulatory agencies regarding the former surface impoundments. The chronology is included to document the events preceding the submission of this closure plan and is intended to aid the reviewer in understanding the context in which it was developed.

Transwestern continues to maintain that the hydrocarbon contaminants that originated from past disposal practices at the surface impoundments represent petroleum industry wastes, and nothing in this report is to be construed as an admission otherwise. Furthermore, Transwestern believes that the soil and ground water underlying the former impoundments are best addressed in a manner similar to other petroleum hydrocarbon spill sites, particularly since the concentration of halogenated hydrocarbon constituents is minute. However, in accordance with NMED's request, Transwestern has prepared this closure plan.

2.4 Geographic Setting

The Roswell compressor station is located approximately 6 miles west of the Pecos River within the Pecos Valley drainage basin. The entire area west of the Pecos River is generally referred to as the west Pecos slope (Kelley, 1971), which rises westward from elevations of about 3,300 feet at the Pecos River to over 10,000 feet in the Capitan Mountains some 50 miles to the west. Tributary surface streams drain west to east toward the Pecos River. Local topography is generally of low relief. The mean annual precipitation as measured at the Roswell Municipal Airport for a 23-year period was 9.82 inches. The majority of the precipitation occurs in July and August during frequent summer thunderstorms.

2.5 Regional Hydrogeology

The Roswell compressor station lies within the northernmost portion of the Roswell hydrologic basin. The basin is structurally controlled by eastward-dipping carbonate and evaporite sequences of Permian age which were uplifted during the Tertiary period during the development of the Sacramento and Guadalupe Mountains along the western margin of the basin (Kelley, 1971). Eastward flowing tributaries originating in the western highlands have deposited Quaternary alluvium over the Permian age rocks west of the Pecos River.

Because the average dip of the Permian rocks is greater than the slope of the land surface, progressively younger units are encountered eastward toward the Pecos River. Several prominent northeast trending ridges and hills interrupt the gently sloping plains near the site. These structures are narrow fault zones referred to as the Border Hills, Six-Mile Hill, and the Y-O faulted anticlines.

The stratigraphic units of importance with regard to water resources are, in ascending order, the San Andres Formation (Permian), the Artesia Group (Permian), and the undifferentiated Quaternary valley fill alluvium. Figure 2-2 shows the generalized stratigraphy in the vicinity of the site. Ground water is produced from both a shallow water-table aquifer (alluvium) and a deeper artesian aquifer that includes the two bedrock units (Welder, 1983). The deep bedrock aquifer is commonly known as the Roswell artesian aquifer. According to the State Engineer Office

(SEO), approximately 400,000 acre-feet of water are pumped annually from the two aquifers of the Roswell hydrologic basin (DBS&A, 1992). The two aquifers are separated by a semi-confining layer, but are connected where the carbonate aquifer rises structurally to meet the shallow aquifer. Both aquifers are recharged along surface exposures on the slopes to the west and are believed to discharge to the Pecos River at the eastern margin of the basin.

The following subsections describe each of the hydrostratigraphic units in the Roswell basin in detail.

2.5.1 San Andres Formation

The San Andres Formation consists primarily of a thick sequence of limestones, dolomitic limestones, and dolomites, with increasing quantities of interbedded anhydrite and gypsum to the north (Kelley, 1971). The formation is divided into three members, in ascending order: the Rio Bonito, the Bonney Canyon, and the Fourmile Draw members (Figure 2-2; Kelley, 1971). The average thickness of the formation is about 1,000 feet in the Roswell basin (Bean, 1949).

The Fourmile Draw member is the principal water-bearing unit within the San Andres Formation. High permeability has resulted from an irregular network of collapsed breccias, cavities, caves, and other interconnected open structures which were formed by dissolution of evaporite and carbonate beds. Gypsum beds become much more abundant in the Fourmile Draw member from Roswell northward (Kelley, 1971), and a well-developed karst surface is exposed where the unit is not covered by alluvium. In the northern portion of the basin the water-bearing zones of the San Andres Formation are approximately 400 to 600 feet thick and ground-water flow is primarily to the east-southeast toward the Pecos River.

In general, the lower boundary of the Roswell artesian aquifer, in general, is defined by low permeability zones that commonly occur within the Bonney Canyon member, which lies approximately 450 feet below the surface in the vicinity of the Roswell compressor station (Figure 2-2). SEO well records for wells near the site indicate that the upper boundary of the San Andres is approximately 92 feet below ground surface (bgs) in this area.

2.5.2 Artesia Group

The Artesia Group includes the following formations, in ascending order: the Grayburg, Queen, Seven Rivers, Yates, and Tansill Formations. In the vicinity of the Roswell compressor station, only the first three formations are present. The Artesia Group consists primarily of dolomite, sandstone, and gypsum units of Permian age. The sedimentary sequence represents a rapid lateral change in depositional environments from the southern massive reef complexes near Carlsbad to the northern clastic and evaporitic sequences representative of back reef and shelf environments (Kelley, 1971).

The Grayburg Formation unconformably overlies the San Andres Formation and ranges in thickness from 140 to 360 feet. The bottom of the Grayburg Formation provides a leaky confining bed that allows artesian ground water to move upward through the Artesia Group into the shallow alluvial aquifer. The thickness of this confining bed varies from 0 to 1,000 feet across the basin.

Drillers logs in the Roswell area indicate that discontinuous permeable units in the upper Artesia Group act as water-bearing zones (Welder, 1983). Fractures and cracks between fragments of collapsed breccia and solution-enlarged bedding planes and joints constitute the principal sources of permeability. These water-bearing zones generally occur in the upper quarter of the confining unit and may yield water to wells that tap both the upper Artesia Group and the shallow alluvium.

In most areas the Artesia Group is covered by a veneer of Quaternary alluvium west of the Pecos River. In the northwest portion of the basin, the bedrock confining unit is thin or absent, and the clay beds within the valley fill act as the confining bed for the lower confined carbonate aquifer. Historically, the lower carbonate aquifer discharged upward into the alluvium, but within the past 50 years, the vertical gradient across the confining bed has reversed because of ground-water pumping from the deep aquifer. This reversal has resulted in a downward gradient, causing ground water in the shallow aquifer to discharge to the deeper carbonate aquifer in some areas (DBS&A, 1992).

2.5.3 Quaternary Valley Fill

The Quaternary valley fill in the Roswell area was deposited by shifting streams flowing from the west toward the Pecos River. The valley fill consists of poorly to moderately consolidated deposits of gravel, sand, and clay which mantle the underlying Permian rocks. The thickness of alluvial sediments varies considerably from one locality to another because of the irregular bedrock erosional surface upon which the alluvium was deposited. In some areas the alluvial fill is moderately well cemented.

The thickness of the shallow alluvial aquifer is shown on Figure 2-3 for the northern portion of the Roswell Basin. Lyford (1973) developed the thickness (isopach) map after examination of drill cuttings from 225 wells penetrating the valley fill. Lyford's map indicates that the alluvium near the site is generally less than 50 feet thick. In other areas, however, the thickness can exceed 250 feet thick where the alluvium fills depressions in the underlying bedrock surface. Recent SEO well records indicate that the alluvium near the site is approximately 70 feet thick (DBS&A, 1992).

Lyford (1973) described three distinct units in the valley fill of the Roswell Basin. These units were termed the quartzose, clay, and carbonate gravels. The quartzose unit consists of sandstone, quartzite, quartz, chert, and igneous and carbonate fragments with varying degrees of calcium carbonate cemention. The quartzose unit in the vicinity of the Pecos River consists primarily of medium to coarse, uncemented quartz grains (Welder,1983). Silt and clay deposits occur as lenses overlying the quartzose unit. These lenses were deposited in small ponds and lakes that resulted from the dissolution and collapse of the underlying carbonate rocks. The carbonate-gravel unit overlies the other valley fill deposits and generally consists of coarse carbonate gravel with intermixed silts and caliche.

The alluvial sediments underlying the compressor station, as observed in borings drilled during several investigations (Section 3), consist predominantly of interbedded cobbles, gravel, sand, silt, and clay. The finer-grained zones form lenticular beds which appear to be discontinuous across the site. Some of the alluvial deposits are firmly cemented in some places. These lithologic descriptions are consistent with Lyford's descriptions of the valley fill.

The principal water-bearing zones of sands and gravels are separated by less permeable lenses of silt and clay. According to Welder (1983), one to five water-bearing zones exist within the valley fill, and in many areas the alluvium is hydraulically connected to the upper bedrock units of the Artesia Group. The perimeter of the shallow alluvial aquifer is generally bounded by a margin of less permeable alluvium.

Figure 2-4 shows the approximate elevation of the water table in the shallow alluvium, as determined from measurements of water levels in wells completed in the alluvium (DBS&A, 1992). The map indicates that the station lies slightly outside the mapped extent of the shallow alluvial aquifer and that ground-water flow is toward the Pecos River. Although a thin layer of saturated alluvium exists as far north as Arroyo del Macho, Welder (1983) did not include this area within the extent of the shallow alluvial aquifer as defined by him, primarily because the ground-water quality in this area is too poor to be used for water supply purposes (DBS&A, 1992). The poor water quality in the shallow alluvial aquifer from slightly south of the Roswell compressor station northward is due to the presence of gypsum beds of the Fourmile Draw member at the base of the alluvium.

Because of the poor water quality and the low yields, most wells completed in the shallow alluvium are used primarily as livestock water supplies. In general, the chloride content of water in the shallow aquifer increases from west to east and ranges from 20 mg/L to 3700 mg/L (Welder, 1983). The presence of gypsum beds results in objectionably high calcium and sulfate concentrations in the shallow alluvial aquifer in the vicinity of the Roswell compressor station and northward. Sulfate concentrations are typically in the range of 2,000 to 3,000 mg/L, which is approximately equal to the equilibrium saturation concentration for ground water in direct contact with gypsum ($CaSO_4 \cdot 2H_2O$). Thus, background sulfate concentrations in this area are four to five times above the New Mexico Water Quality Control Commission ground-water standard for sulfate of 600 mg/L. The poor water quality in the alluvium is consistent with the high total dissolved solids concentrations reported for ground water from the on-site monitor wells, as discussed further in Section 3.

2.6 Water Well Inventory

A survey was conducted to locate water supply wells within 2 miles of the Roswell compressor station. This survey was accomplished by searching a water well database created by DBS&A that is based on the USGS Ground-Water Sites Inventory database. The database contains the locations of all known water wells plus additional information regarding well construction, well use, and aquifer penetrated. The water well database was compiled by DBS&A for a ground-water modeling project conducted for the SEO.

A review of the database revealed that there are 18 wells within about 2 miles of the compressor station. Table 2-1 details the location, total depth, depth to water, use, and completion aquifer for each of these 18 wells, along with their distance from the compressor station, and Figure 2-5 shows the locations of the wells relative to the site.

On December 2 and 3, 1994 a field reconnaissance of the off-site wells was conducted, and the wells were accurately located using a Magellan GPS satellite navigator. In addition, the condition and current use of each well was noted. The results of the well inventory and field reconnaissance are described below.

The closest off-site well to the former surface impoundments is a shallow livestock well completed in alluvium to a depth of 58 feet (well 3 on Figure 2-5). This well, which is no longer in use, is located about a half mile due east of the impoundments in the direction that would presumably be downgradient. The well is completed with 8⅝-inch casing, and the depth to water measured in 1937 reportedly was 15 feet. The well is presently plugged and abandoned, and may have gone dry because of declining water levels in the Roswell area.

The next nearest well is a 352-foot-deep well (TW-1) located in the southwestern portion of the compressor station property (well 2 on Figure 2-5). This well was reportedly drilled in 1969 for use as a water supply well for the compressor station (Campbell, 1994). Following connection of the facility to the City of Roswell water distribution system, however, use of the well was turned over to the Pecos Valley Artesian Conservancy District for monitoring water levels in the Roswell bedrock aquifer. Based on comparison of the drillers' log with the local stratigraphy, the well is completed in limestone of the San Andres Formation. The well is cased with 9⅝-inch steel casing from the surface to a depth of 240 feet, and is open from 240 feet to the total depth of 352 feet. The depth to water as measured in December 1994 was 65 feet.

Several active and inactive irrigation and livestock wells are located between 1 and 2 miles east of the site (Figure 2-5). All of these wells are completed in the San Andres limestone aquifer. Given the distance to the downgradient wells and the presence of the aquitard between the alluvium and the bedrock aquifer, it is very unlikely that ground water from the compressor station could impact any of the active water supply wells.

3. PREVIOUS ENVIRONMENTAL INVESTIGATIONS

Several hydrogeologic investigations have been completed at the Roswell compressor station to characterize the extent of subsurface impacts near the former surface impoundments. The investigations have included (1) a comprehensive soil vapor survey and soil coring program by HLA, (2) a drilling and soil sampling program by Metric Corporation, (3) installation of a monitor well by Halliburton NUS Environmental Corporation (Halliburton), (4) installation of a product recovery pump in monitor well MW-1 by Cypress Engineering Services (CES), (5) a drilling and soil sampling program by Brown & Root Environmental (B&R), and (6) system operation and optimization by Brown & Caldwell.

The above investigations and the interim corrective action program have been undertaken in phases beginning in the spring of 1990 and continuing to the present. During this period extensive data have been collected regarding subsurface soils and ground-water conditions at the site.

Sections 3.1 through 3.5 provide an accounting of each of the field investigations conducted to date, and Section 3.6 summarizes the extent of subsurface impacts resulting from past surface impoundment operations. Table 3-1 provides a summary of the soil borings and monitor wells installed during each investigation. Analytical summaries of hydrocarbon compounds detected in soil and ground water are provided in Tables 3-2 through 3-6.

3.1 Harding Lawson Associates Shallow Subsurface Investigation (1990)

During the spring of 1990, a soil investigation was performed by HLA to investigate the presence of VOCs in the shallow subsurface in the vicinity of the former surface impoundments (HLA, 1991a). The HLA investigation included an extensive soil gas survey and a soil coring and sampling program.

During the soil gas survey, HLA collected a total of 812 soil vapor samples from the locations shown on Figure 3-1. Soil gas samples were collected from depths ranging from 2 feet to 36 feet by driving a soil vapor probe several feet ahead of the hollow-stem auger bit. Soil vapor samples were analyzed in a mobile laboratory by subcontractor Fahrenthold & Associates using a gas chromatograph equipped with an electron capture detector. Five target purgeable halocarbons were quantified, including 1,1,1-TCA, trichloroethene, perchloroethene, chloroform, and carbon tetrachloride. The laboratory results for the soil gas samples are provided in Appendix E of this document.

The highest VOC concentrations were measured near the surface impoundments located in the northeast portion of the facility. The most frequently detected compound was 1,1,1-TCA, which was also detected at the highest concentrations (up to 372 ppmv). The areal distribution of 1,1,1-TCA at the 10-foot depth, as determined by HLA, is illustrated in Figure 3-2. The mass of vapor phase 1,1,1-TCA within the plume is estimated to be approximately 18 kg, assuming that the concentrations at the 10 foot depth apply to all soils from the surface to the water table at a depth of about 60 feet. This is equivalent to a volume of liquid 1,1,1-TCA of only about 3.5 gallons.

Following completion of the soil gas survey, HLA undertook a program of continuous coring and soil sampling in order to validate the soil vapor survey results. A total of 11 borings were drilled to depths of up to 65 feet. Continuous 5-foot-long soil cores were collected using a hollow-stem auger drill rig. Figure 3-3 shows the location of each boring drilled by HLA. The soil samples were analyzed in the laboratory for a suite of selected VOCs, semivolatile organic compounds, total petroleum hydrocarbons (TPH), and toxicity characteristic leaching procedure (TCLP) metals. The results of these analyses are summarized in Tables 3-2 and 3-3, and the complete laboratory reports are provided in Appendix E.

Only a few of the HLA soil samples contained detectable concentrations of the target purgeable halocarbons. A soil sample collected from 35 to 37 feet deep in boring SB-9-07 near the surface impoundments contained the highest concentration of 1,1,1-TCA (2 mg/kg). This boring also contained somewhat higher concentrations of Freon-113, ethylbenzene, xylenes, and TPH.

In 4 of the 11 borings, HLA encountered perched water on top of a clay lens at approximately 30 feet bgs. The boreholes that contained water were near the utility garage and engine room (Figure 2-1). HLA postulated that the clay formed an aquitard with an undulating surface, thus allowing the water to pond within depressions in the upper surface of the clay. Water samples collected from these borings contained concentrations of 1,1,1-TCA below EPA drinking water MCLs.

3.2 Metric Corporation Shallow Subsurface Investigation (1991)

During July and November 1991, Metric Corporation drilled 20 additional soil borings to delineate the areal and vertical extent of the VOCs identified by HLA near the surface impoundments (Metric, 1991). The locations of borings drilled by Metric are shown on Figure 3-4. Soil borings were generally advanced to approximately 30 to 40 feet bgs in order to characterize soil type and to determine if VOCs were present above the uppermost clay unit. Only four soil borings were drilled to depths greater than 50 feet bgs (Table 3-1).

Metric collected soil samples using a continuous tube sampler, and each core was screened for the presence of VOCs using an organic vapor analyzer (OVA). Within a given soil core, the material with the highest concentration of organic vapors was submitted to the laboratory for analysis of the following constituents: TPH, benzene, toluene, ethylbenzene, and xylenes (BTEX); and purgeable halocarbons by EPA Methods 418.1, 8010, and 8020, respectively. The results of these laboratory analyses are summarized in Tables 3-2 and 3-4. Several of the borings contained VOC concentrations above the soil cleanup standards enforced by NMED and OCD.

Based on the analytical results, Metric estimated that the areal and vertical extent of VOC impacts extended approximately 240 feet east and approximately 100 feet north of the northeast property corner. The investigation further established that purgeable halocarbons are present to depths of at least 30 feet bgs near surface impoundments 1 and 2 (soil borings "Pit 1" and "Pit 2") and along the eastern fence line (soil boring SG 86). In addition, some soil samples contained TPH concentrations of 100 mg/kg, or greater, to depths exceeding 27 feet in soil borings "Pit 1," "Pit 2," SG 86, and OS BH-9.

Most borings drilled previously by HLA and Metric had penetrated a clay layer at approximately 30 feet bgs. However, clay was not encountered in soil boring "Pit 2" above about 68 feet bgs. This prompted Metric to conclude that a natural clay basin existed beneath the surface impoundments, with the sides sloping from the 30 to 40 foot depth around the perimeter, to approximately 70 feet bgs near the basin bottom.

However, subsequent drilling programs verified that the upper clay is, in fact, present at the 35 to 40 foot depth near the "Pit 2" soil boring, but is thinner and contains coarser sediments. The upper clay unit appears to grade laterally into a coarser zone of sandy clays near soil boring "Pit 2." Further, the clay unit identified at 67.9 feet bgs by Metric is actually part of the lower clay unit that underlies the entire site. This lower clay may lie near the contact between the valley-fill alluvium and the underlying Artesia Group Permian bedrock units (see Figure 2-2, Section 2.5).

Ground water was encountered at depths ranging from 37 to 57 feet bgs in 6 of the 20 borings drilled by Metric. Soil borings "Pit 2" and SG 361 (Figure 3-4) contained thin perched water zones (1 to 6 feet thick) above fine-grained sandy clays which correspond to the upper clay unit. Approximately 1-foot of water was measured at the bottom of soil borings OS BH-8 and OS BH-9 (Figure 3-4) at approximately 49 feet bgs. The water measured at the 49-foot depth may have migrated down the boreholes from the top of the upper clay unit. Finally, the ground water encountered at depths of about 55 feet bgs likely represents the water table of the uppermost aquifer, as these depths to water were generally reported in borings drilled to depths of approximately 70 feet bgs.

3.3 Halliburton NUS Corporation Monitor Well Installation (1992)

During July 1992, Halliburton installed one monitor well within the natural clay basin determined by Metric (Section 3.2) (Halliburton, 1992). The boring was drilled to a depth of 60 feet prior to sampling, at which point continuous samples were collected with a split-spoon sampler until a red clay layer containing very hard sulfate lenses was encountered at 68 feet bgs. Monitor well MW-1 was installed at the location depicted on Figure 3-5.

Following installation of MW-1, the well was developed by bailing and subsequently sampled for 8240 volatile and 8270 semivolatile organics, TPH, and total metals. The analytical results indicated that the ground water within monitor well MW-1 contained aromatic and halogenated hydrocarbons, as well as several semivolatile organic compounds. These results are summarized in Table 3-4.

3.4 Brown & Root Environmental Ground-Water Assessment (1993)

In April 1993, B&R, a division of Halliburton, completed a limited assessment of ground-water impacts resulting from disposal activities at the former surface impoundments (B&R, 1993). The investigation was undertaken to determine if two separate saturated zones existed within the alluvium and to establish ground-water quality beneath the former impoundments.

As part of their investigation, seven soil borings were drilled, and four of these were completed as monitor wells. Figure 3-5 shows the locations of soil borings and monitor wells installed by B&R. Soil samples were collected from each boring using a split-spoon sampler or continuous core barrel. The samples were screened for the presence of VOCs using an OVA. Unfortunately, the OVA was not functioning during the drilling of soil borings SB-4, SB-5, and SB-1C. Soil samples were collected above the two saturated zones and analyzed for TPH using EPA Method 418.1; the results are summarized in Table 3-4.

Perched water was not encountered above the upper clay unit during drilling of soil borings SB-1B, SB-2, SB-3, and SB-5 (Figure 3-5). However, phase-separated hydrocarbons (PSH) and water were encountered in soil boring SB-1A immediately above the upper clay layer at approximately 40 feet bgs. This boring was subsequently plugged and abandoned by B&R. Soil boring SB-4 encountered a small saturated zone in fractured limestone at approximately 47 feet bgs. This boring is located approximately 250 feet east of the property boundary, and the limestone probably corresponds to the top of the Artesia Group (Section 2.5).

B&R installed four monitor wells in the uppermost aquifer within soil borings SB-1B, SB-2, SB-3, and SB-5. The monitor wells, identified as MW-1B, MW-2, MW-3, and MW-5, were set at total depths ranging from 65 to 70 feet bgs (Table 3-1). The newly installed wells were then checked for the presence of PSH, developed, and sampled.

Approximately 4 feet of PSH was present on top of the water table in monitor wells MW-1B and MW-2. Ground-water samples were collected from the two monitor wells without PSH (MW-3 and MW-5) and analyzed for TPH (EPA Method 418.1), volatile organics (EPA Method 624 and 8240), and total dissolved solids (EPA Method 160.1). The results of these analyses are summarized in Tables 3-4 and 3-5.

B&R concluded that two water bearing zones were present in the alluvium and that both were impacted by VOCs. The two zones included (1) the upper thin zone of perched water on the upper clay unit (approximately 40 feet bgs) and (2) a deeper zone of saturated silty sand and sand at depths ranging from 55 to 65 feet bgs. During the drilling of soil borings SB-1B and SB-2, B&R identified zones of residual saturation and PSH above the upper clay unit. Following construction of monitor wells MW-1B and MW-2 in the uppermost aquifer, approximately 4 feet of PSH was measured in each well.

In June 1993 B&R returned to the site to install PSH recovery wells in the upper water-bearing zone above the upper clay unit. An additional seven borings were drilled near the surface impoundments, designated RB-1 through RB-7 (Figure 3-5). Only one of the seven additional borings contained perched liquids. The one boring which contained liquid (RB-7) was completed as recovery well RW-1 near monitor well MW-1 (Figure 3-5). Approximately 1.4 feet of PSH was measured in recovery well RW-1 following its construction.

On March 23, 1994, CES removed an inoperative recovery pump from MW-1 and collected ground-water samples from monitor wells MW-3 and MW-5. On April 15, 1994, B&R installed a pneumatic product recovery pump and skimmer in monitor well MW-1. At that time B&R measured the following depths to PSH and to ground water in the four wells containing free hydrocarbon product:

Well	Date	Total Depth of Well (feet)	Depth to PSH[1] (feet)	Depth to Water[1] (feet)	PSH Thickness (feet)
MW-1	04-15-94	68.0	53.30	61.54	8.24
MW-1B	04-15-94	65.5	58.42	61.30	2.88
MW-2	04-15-94	65.0	58.68	61.50	2.82
RW-1[2]	04-15-94	42.5	38.70	39.00	0.30

[1] Depth in feet below top of casing.
[2] Recovery well RW-1 is completed in the perched water zone.

3.5 Interim PSH Removal Program

On May 21, 1993, a recovery pump was installed in MW-1 by CES. During July 1993, B&R installed PSH recovery pumps in monitor wells MW-1B, MW-2, and RW-1. Since that time, PSH and water have been pumped from these wells and routed to an aboveground storage tank. Rollins Environmental Services then periodically transports the waste hydrocarbon liquid to Deer Park, Texas for incineration.

During the fall of 1993, Brown and Caldwell (B&C) installed skimmers on each recovery pump to reduce the volume of water recovered. Prior to the installation of the skimmers, B&C measured PSH levels and ground-water levels of approximately 58. 5 and 62 feet bgs in monitor wells MW-1B and MW-2, respectively. The depth to water was approximately 38.6 feet bgs in recovery well RW-1, which contained approximately 0.06 feet of PSH at the time of measurement. The interim PSH recovery system has successfully removed approximately 7300 gallons of PSH and 5800 gallons of ground water to date and is maintained by a local contractor.

3.6 Daniel B. Stephens & Associates, Inc. Subsurface Investigation (1994)

Following correspondence and discussions between NMED and Transwestern, DBS&A performed a limited field investigation during November and December 1994. Upgradient monitor well MW-6 was installed approximately 500 feet southwest of the location of the former surface impoundments (Figure 2-1). The MW-6 boring was drilled using a hollow-stem auger to a depth of 80 feet, and the well is screened from 60 to 75 feet bgs. Soil samples were collected at 5-foot intervals during drilling, and field headspace measurements using a PID did not detect the presence of VOCs in any of the soil samples.

The alluvial sediments penetrated during drilling of MW-6 were generally consistent with those observed in previous borings; that is, they consisted predominantly of sandy gravel and sand from the surface to a depth of 60 feet and silty clay and clayey sand from 60 to 75 feet. A gravelly sand of unknown thickness was penetrated at the 79-foot depth in this boring; however, the red plastic clay reported in previous borings was not encountered.

A ground-water sample from MW-6 and a soil sample from the same boring collected from a depth corresponding to the water table were submitted for laboratory analysis of VOCs and TPH. Both the soil and the ground-water sample exhibited no detectable concentrations of 8010/8020 VOCs or TPH determined by method 418.1. The results of these analyses are included in Appendix E.

In order to allow a better estimate of the ground-water flow direction and gradient within the shallow alluvium, the elevations and coordinates of all on-site monitor wells were resurveyed on December 1, 1994. The well locations and elevations based on this survey are provided in Table 3-6.

Depths to water were measured in on-site monitor wells MW-3, MW-5, and MW-6 on December 4, 1994 and again on December 22. These data are also shown in Table 3-6. Ground-water flow directions calculated for the two dates of measurement are N74E and N72E, respectively, indicating that ground water in the shallow alluvium flows to the east-northeast in the vicinity of the former impoundments. The flow direction is shown graphically on Figure 2-1. The dimensionless ground-water gradient calculated using the December 22 data is 0.009, which is typical of relatively permeable alluvial sediments of the type encountered during drilling.

In addition to the sampling and analysis of MW-6, ground-water samples were also collected from on-site deep well TW-1 (Figure 2-1) and off-site deep well #5 (Figure 2-5). Well #5 was selected as representative of background upgradient water quality within the San Andres bedrock aquifer. The ground-water samples from these two wells were analyzed for a modified Appendix IX suite of constituents, and the laboratory results for these analyses are included in Appendix E of this document.

These results indicate that both deep wells yield very hard ground water of relatively high salinity. Well #5 contains high concentrations of sulfate (768 mg/L), chloride (750 mg/L), and TDS (2420 mg/L). These values significantly exceed the New Mexico ground-water standards for sulfate (600 mg/L), chloride (250 mg/L), and TDS (1000 mg/L). The ground-water sample collected from Transwestern well TW-1, although of somewhat lower salinity, still exceeds the New Mexico standards for chloride and TDS, with reported concentrations of 631 mg/L and 1290 mg/L, respectively. In addition, deep well TW-1 also contained elevated concentrations of iron

(4.22 mg/L) and manganese (0.39 mg/L), which exceed the New Mexico ground-water standards for these elements of 1.0 mg/L and 0.2 mg/L, respectively.

The high salinity of the ground water from TW-1 and Well #5 is almost certainly natural and probably results from dissolution of soluble evaporite minerals within the upper Fourmile Draw Member of the San Andres Formation, as discussed in Section 2.5. The high salinity of the ground water in the bedrock aquifer in this vicinity may also account for the fact that many of the production wells are no longer in use.

Appendix IX VOC analyses of the ground-water samples collected from the two deep wells revealed no detectable concentrations of any of these compounds. In addition, the sample from TW-1 was analyzed for Appendix IX SVOCs, and the only compound detected was bis(2-ethylhexyl)phthalate (18 µg/L). The phthalate esters are well-known laboratory contaminants used as plasticizers in most flexible plastic products, such as the plastic beakers and tubing used in many laboratory applications. EPA has acknowledged this compound as a common laboratory contaminant (EPA 1988, 1991). Therefore, we conclude that the reported detection of this compound is probably the result of laboratory handling of the sample; it is almost certainly not present in the ground water, as no other organic compounds were detected in the sample.

3.7 Extent of Soil and Ground-Water Contamination

The investigations completed to date and described in Sections 3.1 through 3.5 have been conducted to characterize the subsurface hydrogeology and the distribution of VOCs in the soils and ground water beneath the former surface impoundments. Figure 3-6 shows the locations of all borings and monitor wells installed to date. The contaminants detected consist primarily of petroleum hydrocarbons that are typical components of pipeline condensate, which was formerly held in the surface impoundments. Tables 3-2 through 3-5 provide summaries of the organic and inorganic constituents detected in soils and ground water during each of the previous investigations.

Sections 3.7.1 through 3.7.3 summarize the findings of the investigations discussed above and provide an accounting of the subsurface distribution of constituents exceeding regulatory guidelines set by NMED and EPA.

3.7.1 Site Hydrogeology

The Quaternary sediments beneath the impoundments consist of interbedded cobbles, gravel, sand, silt, and clay to depths of approximately 70 feet bgs. The lithology of the alluvium is consistent with the descriptions provided by Lyford (1973). A generalized hydrogeologic cross section of the sediments underlying the impoundments constructed along a north-south line (Figure 3-6) is provided in Figure 3-7. Soil types in Figure 3-7 are defined using the Unified Soil Classification System. The hydrogeology underlying the site is as follows:

- From the ground surface to depths of approximately 30 to 35 feet bgs, brown gravelly sands and clays are present. Perched water is often encountered within the bottom few feet of this interval.

- At depths of approximately 35 to 60 feet, light brown to reddish-colored interbedded silts, sands, and clays are encountered. The fine-grained clay lenses serve as perching layers for the downward moving fluids and likely represent interfingering deposits of limited lateral extent.

- At depths of approximately 60 to 70 feet, saturated silty sands and sands are present. This zone is referred to as the uppermost aquifer.

- At approximately 70 feet, a red plastic clay of unknown thickness is present. This unit probably represents the transition from the Quaternary alluvium to the Permian-age bedrock of the Artesia Group.

- As discussed in Section 2.5, the background water quality in the shallow alluvial aquifer is very poor in the vicinity of the site due to the presence of gypsum beds beneath the alluvium. TDS concentrations exceed 3000 mg/L in on-site monitor wells MW-3 and MW-5 (Table 3-5). These two wells do not appear to be impacted by site activities; rather, the elevated TDS concentrations in these wells simply reflect the poor background quality of ground water in the region.

- The ground-water flow direction in the alluvium underlying the former impoundments is east-northeast, and the dimensionless head gradient is approximately 0.009.

3.7.2 Soil Impacts

Based on field OVA measurements and analytical chemistry results, elevated VOC concentrations in soil appear to encompass an area of approximately 600 feet by 400 feet centered between the three former surface impoundments. Figure 3-8 shows the estimated areal extent of impacted soil, in excess of 100 mg/kg TPH.

Near the former surface impoundments, the vertical extent of impacted soils extends from approximately land surface to the uppermost aquifer at approximately 60 feet. The vertical extent of impacted soil decreases as one moves laterally away from the surface impoundments. Due to local soil heterogeneities, it appears that VOCs have spread out along preferential pathways on top of the clay lenses at the 30- to 40-foot depth, prior to continued downward migration to the uppermost aquifer.

A generalized cross-sectional profile of impacted soils is shown in Figure 3-9; Figure 3-6 shows the location of the cross section. The estimated distribution of impacted soils is based both on field organic vapor analyzer readings and soil TPH concentrations as determined in the laboratory.

The extent of 1,1,1,-TCA detected in soil samples is limited to the area immediately below the former surface impoundments. However, elevated 1,1,1-TCA soil vapor concentrations are present throughout the estimated area of actionable soils (Figure 3-8).

3.7.3 Ground-Water Impacts

The estimated extent of actionable VOCs in ground water is difficult to ascertain due to the limited number of existing monitor wells. However, the lateral extent of VOCs is bounded on-site by monitor wells MW-3, MW-5, and MW-6. The ground-water plume most likely extends downgradient beyond the estimated extent of actionable soil contamination. The direction of ground-water flow is to the east-northeast in this area.

PSH is present in on-site monitor wells MW-1, MW-2, and MW-1B completed in the uppermost aquifer at 55 to 70 feet bgs, and in recovery well RW-1, completed in the limited perched zone from 35 to 42 feet bgs. The extent of PSH off-site, if any, remains to be defined.

4. SOIL ASSESSMENT PLAN

A phased approach will be used to assess the nature and extent of soil impacts resulting from past usage of the former surface impoundments. Phase I will consist of precisely locating the former impoundments and characterizing residual wastes through laboratory analyses. Phase II will attempt to define the lateral and vertical extents of impacts to soils underlying and adjacent to the former surface impoundments. Sections 4.1 through 4.6 describe Phase I soil sampling strategy and procedures, while Section 4.7 provides a brief description of Phase II objectives.

4.1 Phase I Soil Sampling Strategy

The sampling strategy described herein is based on information collected from previous investigations at the facility (Section 3) and examination of historical aerial photographs (Section 2.2). The goal of the Phase I soil assessment is to characterize any wastes that may remain within the former impoundments with respect to RCRA Appendix IX constituents. In accordance with NMED's request, waste characterization will include collection of soil samples from two locations directly beneath each of the known and suspected surface impoundments. Six to eight soil samples from the four potential source areas (Pit 1, Pit 2, Pit 3, SG 86) will be analyzed in the laboratory for Appendix IX VOCs, SVOCs, PCBs, metals, cyanide, and sulfide.

As described in Section 2.2, hydrocarbon liquids, primarily pipeline condensate, were placed in the impoundments during their operational lifetimes. Later, the impoundments were backfilled with clean soil, and the surface was restored to approximately original grade. At each impoundment location, this history has resulted in clean backfill overlying subsoils that are potentially impacted by seepage of liquids from the former impoundments. The Phase I soil assessment is intended to permit collection of subsoil samples from the most highly impacted horizon immediately beneath the clean backfill. Based on prior experience, the clean soil backfill is generally visually quite distinct from the underlying impacted subsoil, due to staining of the latter by hydrocarbon liquids. The soil sampling rationale for each suspected source area is described in the following paragraphs, and detailed soil sampling procedures are provided in Section 4.2.

The soil sampling rationale for Pits 1 and 2 differs from that for Pit 3 and SG 86. Because the former locations of Pit 1 and Pit 2 (Figure 2-1) are known with relative certainty from examination of aerial photographs, two soil borings will be drilled at each of these two areas at the approximate locations shown on Figure 4-1. In order to chemically characterize the wastes, a single sample of the most highly impacted soil will be selected from each boring at Pits 1 and 2 for laboratory analysis of Appendix IX constituents. The most highly impacted sample from each boring will be selected based on visual examination and field headspace screening with the PID.

The location of Pit 3, if indeed it ever existed, is not known with any degree of certainty (Figure 2-1). Likewise, the location of a possible hydrocarbon source area in the vicinity of Metric Corporation boring SG 86 is poorly known (Figure 3-4). Therefore, in order to determine whether subsurface wastes exist at these two suspect areas, an exploratory soil sampling program will be undertaken at these locations. The approach will be to begin by collecting a continuous soil core at the center of each suspected location (Figure 4-1). If hydrocarbon-impacted soils are not found, up to four additional soil borings will then be drilled at 50-foot centers on a grid centered about the initial soil sampling location, as shown in Figure 4-1. One of the Pit 3 borings will be drilled to the top of the bedrock, at approximately 75 feet, in order to allow stratigraphic correlation between the monitor wells. Each boring will then be plugged as described in Section 4.3, to prevent downward migration of fluids.

The presence of any hydrocarbon wastes at these sites is expected to be obvious, based upon visual examination of soil cores and field headspace screening of soil samples using a PID. If wastes are found at the locations of Pit 3 and SG 86, a single soil sample from the two most highly impacted borings at each of the two locations (Pit 3 and SG 86) will be selected for laboratory analysis of Appendix IX constituents. If no evidence of hydrocarbon impacts are noted in any of the five borings at Pit 3 or SG-86, as determined by field screening with the PID, then a single soil sample from the center boring will be submitted for laboratory analysis, as discussed in Section 6.

The overall purpose of the Phase I soil assessment is to characterize residual subsurface wastes with respect to RCRA constituents such that a list of "target analytes" may be developed and the extent of subsurface impacts can be further defined during Phase II. Laboratory analysis of the soil samples collected during Phase I for selected Appendix IX analytes will permit identification of those constituents that represent contaminants of concern at this site. As agreed upon in a meeting on November 1, 1994, NMED Hazardous and Radioactive Materials Bureau will approve the list of target analytes for the Phase II investigation based on the laboratory results of the Phase I soil and ground-water analyses.

4.2 Soil Sampling Procedures

Phase I soil sampling will be performed by continuous drive sampling through the clean soil backfill and into the underlying impacted subsoil below. By retrieving successive continuous soil samples, the maximum stratigraphic information will be obtained from each boring, with a minimum of soil cuttings that require disposal being generated. Based on reasonable assumptions regarding the depths of the former impoundments, it is estimated that the contact between the clean soil backfill and the underlying impacted subsoils will be encountered between 10 and 20 feet below grade.

Drive samples will be obtained using a 24-inch-long split-barrel sampler in accordance with DBS&A SOP 13.3.2 (Appendix F). The split-barrel sampler will be driven into the soil using the rig-mounted drive hammer with uniform drive-pressure/drop-height. Blow counts will be recorded for all split-barrel drives. Following retrieval from the borehole, the split-barrel sampler will be placed on a table covered with a clean plastic sheet. The split-barrel sampler will then be opened and the soil material described according to DBS&A SOP 13.3.2. A subsample of the material will be placed in a ziplock plastic bag for field headspace screening for VOCs using a PID.

When the base of the clean backfill is encountered, a clean split-barrel sampler equipped with 6-inch-long brass liner rings will be used to collect a sample of the hydrocarbon-impacted subsoil below. The split-barrel sampler will be driven in the same manner as described above. Upon opening the split-barrel, however, the center two liner rings to be submitted for laboratory analysis will immediately be sealed with Teflon® membranes, plastic end caps, and solvent-free tape to minimize loss of VOCs from the soil samples due to volatilization.

All sample containers will be labeled using waterproof ink. Label information will include the sampling location, depth interval, sampling date and time, type of analysis requested, project number, and the initials of the sampler. The containers will be sealed and placed in clear plastic bags. The sealed containers will be put into coolers on bags of ice or frozen ice packs. Plastic bubble pack or other suitable packing material will be used to protect the samples during shipping. Chain-of-custody forms will be completed in triplicate for each sample shipment as described in Section 6.5.

Field personnel will ship the sample coolers to the laboratory using an overnight courier service. The fastest possible shipping method will be used, and all sample shipments will be carefully tracked to ensure that samples arrive intact and that all holding times are met.

4.3 Borehole Abandonment Procedures

The approximately 15 foot-deep, 3-inch-diameter boreholes created by continuous drive sampling of the soil will be abandoned by plugging them with a bentonite slurry poured slowly down the borehole using a funnel. The approximate volume of each borehole will be determined to estimate the volume of bentonite slurry required, and the quantity of slurry actually emplaced will be recorded. Borings drilled using a hollow-stem auger will be plugged in a similar manner, except that a cement-bentonite grout will be emplaced using a tremie pipe.

4.4 Laboratory Analysis of Soil Samples

Six to eight soil samples will be submitted to the laboratory for analysis of Appendix IX VOCs, SVOCs, PCBs, metals, cyanide, and sulfide. These samples will include one collected from the uppermost portion of the impacted soil horizon in each of two borings drilled at Pit 1 and Pit 2, plus one or two soil samples from Pit 3 and SG 86, as discussed in Section 4.1. Chemical analysis of the soil samples will be performed using standard RCRA protocols in Test *Methods for Evaluating Solid Waste* (U.S. EPA, 1986). The analytical methods and data quality objectives are discussed in greater detail in Section 6 of this closure plan.

4.5 Decontamination Procedures

All non-disposable field equipment that may potentially come in contact with any soil sample will be decontaminated in accordance with DBS&A SOP 13.5.2, Decontamination of Field Equipment (Appendix F), in order to minimize the potential for cross-contamination between sampling locations. Clean latex or plastic gloves will be worn during all decontamination operations. The following sequence of decontamination procedures will be followed prior to each sampling event:

1. Wash all down-hole equipment in a solution of non-phosphate detergent (Liquinox®) and distilled/deionized water. All surfaces that may come into direct contact with the soil sample will be washed. Use a clean Nalgene® tub to contain the wash solution and a scrub brush to mechanically remove loose particles.

2. Rinse the equipment twice with distilled/deionized water.

3. Allow the equipment to air dry prior to the next use.

The drill rig and all down-hole equipment will be steam-cleaned and allowed to air dry between borings. A decontamination area lined with plastic sheeting will be set up to contain all wash water associated with the steam-cleaning operation. Liquid wastes produced during equipment decontamination will be contained in 55-gallon drums at a designated on-site drum storage area. Pending the results of laboratory analyses, all liquids will be handled as potentially hazardous wastes, as described in Section 4.6.

4.6 Management of Investigation-Derived Wastes

All soil cuttings, decontamination fluids, and used personal protective equipment (PPE) will be stored in 55-gallon drums and labeled to identify contents, date of generation, and amount of material generated. All wastes, with the exception of PPE, will be handled as potentially hazardous wastes, pending results of laboratory analyses for associated samples.

Liquid wastes generated during decontamination of drilling and sampling equipment will be stored pending results of associated soil sample laboratory results. For example, the disposition of wash water associated with a particular boring will be determined from the analytical results of soil samples collected from that particular boring. If the water is determined to be hazardous, it will be filtered through an activated carbon filtration system as described in Section 5.7.

Soil cuttings generated during the soil assessment will be stored in 55-gallon drums pending analytical results for soil samples collected from associated soil borings. Hydrocarbon-contaminated soils, as determined by field headspace screening, will be segregated from clean soils. Clean soils will be disposed of on-site by spreading soil cuttings on the ground surface, and contaminated soils will be shipped for off-site disposal at a permitted RCRA disposal facility. PPE and dry waste associated with these materials will be disposed of in a sanitary landfill.

4.7 Phase II Soil Assessment

The detailed scope of work for the Phase II soil assessment cannot be determined until the Phase I investigation is completed. The Phase II soil assessment scope of work, along with that for the Phase II ground-water assessment, will therefore be submitted later as an amendment to this closure plan. Nevertheless, the overall objectives for the Phase II assessment may be defined at this time.

Following its completion, the results of the Phase I soil assessment will be summarized in a report submitted to NMED, along with copies of the laboratory results for the soil samples analyzed during Phase I. The report will include a proposed list of target analytes to direct subsequent Phase II investigations. For RCRA metals, the selection of target analytes will be based on comparison of the observed concentrations of each element with its expected background concentration in soils, as reported in existing literature. Statistical techniques for determining whether a particular constituent is present above background levels will follow EPA guidance (EPA, 1989a, 1989b). Following review of the Phase I report and proposed list of target analytes by NMED, a meeting will be scheduled between Transwestern and NMED to discuss any issues remaining to be resolved prior to approval of the target analyte list and preparation of a closure plan amendment detailing Phase II activities.

Briefly, the Phase II soil assessment will consist of delineating the lateral and vertical extent of impacted soils beneath and adjacent to the former impoundments. This delineation will necessitate an iterative approach to soil sampling. Following NMED's review and approval of the Phase II scope of work, additional soil borings will be drilled outward along a grid centered on the location of each source area identified during Phase I.

5. GROUND-WATER ASSESSMENT PLAN

In parallel with the soil assessment plan, a phased approach will be used to assess ground-water impacts resulting from the former impoundments. Phase I will consist of characterization of the target analytes present in ground water both on- and off-site, and Phase II will define the downgradient extent of a potential off-site ground-water contaminant plume. In addition, a deep monitor well will be installed to define the vertical extent of impacts. As described in the soil assessment plan, the detailed scope of work for Phase II activities will be submitted at a later date as an amendment to this closure plan.

The Phase I ground-water assessment will include the following tasks: (1) installation and development of three additional monitor wells downgradient of the former impoundments, (2) redevelopment of existing monitor wells MW-3, MW-5, and MW-6, (3) sampling of all new and existing monitor wells, and (4) additional water level measurements in the new and existing monitor wells to allow refinement of the ground-water flow direction and gradient. The procedures for the Phase I ground-water assessment are described in Sections 5.1 through 5.7.

5.1 Phase I Monitor Well Installation

Three monitor wells will be installed within the uppermost aquifer downgradient of the former impoundments using hollow-stem auger drilling techniques. The proposed locations for the downgradient monitor wells are shown in Figure 5-1. Prior to well installation, pilot soil borings will be drilled to the total depth at each location with minimum 6-inch-O.D. augers. Soil samples will be collected at 10-foot intervals during the drilling of the pilot hole using the procedures described in Section 4, and field headspace screening will be performed using a PID meter, as described in Section 4. Soil grab samples will also be collected periodically during drilling to better define the geologic conditions at the site. All soil samples will be collected in accordance with DBS&A SOP 13.3.2, Soils Logging, Sampling, Handling, and Shipping for Geotechnical and Chemical Analyses (Appendix F).

The shallow monitor wells will be installed within the hollow-stem augers following the completion of the pilot soil boring. Immediately prior to well construction, the total depth of the borehole will be determined using a clean, weighted steel tape or tag line. The monitor wells will be constructed of 2-inch-diameter schedule 40 PVC pipe and will include, in ascending order, a 6-inch flush-threaded silt trap (sump) at the bottom, 10 to 25 feet of flush-threaded 0.01-inch machine-slotted PVC screen, and blank casing from the top of the screen to approximately 2 feet above ground surface. No more than 15 feet of screen will be installed below the water table. If high VOC concentrations are detected, however, up to 10 feet of screen may extend above the water table in the vadose zone, to allow subsequent use of the well for soil vapor extraction.

Once the well casing has been lowered to the bottom of the borehole, a sandpack consisting of #20-40 mesh silica sand will be poured down the annulus of the auger in 3-foot lifts. After each 3-foot interval is filled, the augers will be pulled up approximately the same distance. This procedure will be repeated until the sand pack level is approximately 2 feet above the top of the screened section. The annular space above the sand pack will then be filled with a minimum 2-foot-thick pelletized bentonite seal, which will be hydrated with distilled water. The remaining annular space will be filled with a cement/bentonite slurry grout consisting of approximately 3 percent bentonite by weight. The top of the well casing will be protected by a PVC cap, and the exposed casing will be protected by a locking steel shroud. A 6-inch-thick concrete pad will then be constructed around the shroud. Generalized monitor well construction details are shown in Figure 5-2.

Immediately following their installation, the three new downgradient monitor wells will be checked for the presence of PSH. If any of the three wells are found to contain PSH, one additional monitor well will be installed approximately 100 feet downgradient from that well. This procedure will permit the subsequent conversion of the well with free product to a soil vapor extraction well, while still satisfying the RCRA recommendation for three downgradient monitor wells.

5.2 Monitor Well Development Procedures

The newly installed downgradient monitor wells and existing wells MW-3, MW-5, and MW-6 will be developed by a sequence of surging and pumping and/or bailing in accordance with DBS&A SOP 13.4.3, Well Development (Appendix F). Initially, the wells will be surged with a surge block to dislodge any smeared material on the borehole wall that would otherwise inhibit ground-water flow and to remove fine particles from the formation. The suspended sediments will be removed by bailing, pumping, or air lifting. During well development, pH, temperature, specific conductance, and turbidity will be monitored periodically to determine when the wells have been sufficiently developed. Development will be considered complete when the water becomes relatively clear and water quality parameters have stabilized to within ± 5 percent over three consecutive measurements.

5.3 Ground-Water Sampling Procedures

Ground-water samples will be collected on a quarterly basis for the first year and on an annual basis thereafter. This monitoring schedule will be maintained until closure certification has been achieved. Ground-water samples will be collected from existing monitor wells MW-3, MW-5, and MW-6 and from all of the new downgradient monitor wells (Figure 5-1), except those found to contain PSH. All ground-water samples will be collected in accordance with DBS&A SOP 13.5, Water Sampling (Appendix F). Dedicated bladder pumps will be installed in all new and existing monitor wells that do not contain PSH, to allow purging and collection of representative ground-water samples using low flow rates.

Prior to ground-water sample collection, the following preparations will be made:

1. The area around the wellhead will be inspected for integrity, cleanliness, and signs of possible contamination.

2. A clean plastic sheet will be spread over the ground around the wellhead.

3. The cap on the wellhead will be removed and a flame ionization detector (FID) or photoionization detector (PID) will be used to determine if VOC vapors are present. Any obvious odors will be noted in the field logbook.

4. The static water level will be measured to the nearest 0.01 foot using an electrical water level sounder. The presence of any obvious contamination on the water level sounder will be noted in the field logbook. The sounder will be decontaminated between wells, as described in Section 5.6, in order to prevent cross contamination.

5. Prior to purging the wells, a clear bailer or interface probe will be used to check for the presence of PSH. The presence or absence of PSH will be recorded in the field logbook, as well as the thickness of PSH, if any.

6. The well will then be purged to remove standing/stagnant water in order to ensure the collection of representative ground-water samples. Purging will be accomplished using the dedicated bladder pump at a rate equal to or greater than the anticipated sample collection flow rate. The field parameters pH, electric conductivity, dissolved oxygen, and temperature will be measured throughout the purging process at a frequency of at least once per casing volume. These parameters will be measured at the pump outlet within a clean container or a closed flow-through cell. Purging will continue for a minimum of three casing volumes and until the field parameters remain stable to within ±5 percent over at least one casing volume, except if the well is a very poor producer. In this case, the well will be purged dry once prior to sample collection. All fluids produced during purging will be contained for later disposal as described in Section 5.7.

Following purging, unfiltered ground-water samples will be collected as soon as possible using the dedicated bladder pump. Under no circumstances will the well be allowed to stand for more than three hours after well purging before collecting samples. The only exception is for very low-yield wells that are pumped dry under normal purging and sampling rates. In this case, the well will be pumped dry and allowed to recover until sufficient water is present in the well to allow a sample to be collected.

The samples will be collected in order of decreasing volatility, with samples for VOC analysis being collected first. The pumping rate during sample collection of VOC samples will be maintained at 100 milliliters (mL) per minute or less to minimize volatilization. All samples will be collected in precooled, acidified, certified-clean 40-mL glass vials with septum caps supplied by the laboratory. Following collection of the VOC samples, the SVOC, metals, and other samples will be collected in appropriate containers, as described in greater detail in Section 6.

Sample labeling, packaging, and chain-of custody procedures will be performed as described in Section 6.5. The sample coolers with the associated chain-of-custody forms will be shipped to the laboratory using an overnight commercial carrier. The fastest possible shipping method will be used, and all sample shipments will be carefully tracked to ensure that samples arrive intact and that all holding times are met.

5.4 Laboratory Analysis of Ground-Water Samples

During the first sampling event, ground-water samples from each well will be analyzed for RCRA Appendix IX VOCs, SVOCs, PCBs, metals, cyanide, and sulfide. In addition, the major cations and anions (Ca, Mg, Mn, Na, K, Cl, Fe, bicarbonate, nitrate, and sulfate) will be determined, along with total dissolved solids (TDS) and TPH by EPA Method 418.1. Chemical analyses will be performed in accordance with procedures set forth in *Test Methods for Evaluating Solid Waste* (U.S. EPA, 1986). Section 6 describes data quality objectives and quality assurance procedures applicable to the ground-water assessment.

5.5 Aquifer Testing

Aquifer slug tests will be performed on existing monitor wells MW-3, MW-5, and MW-6, and on each of the newly installed shallow wells (Figure 5-1). Data collected from the individual slug tests will be used to estimate the hydraulic conductivity of both the uppermost aquifer and deep bedrock aquifer. All slug tests will be performed in accordance with the procedures described in DBS&A SOP 13.6.2, Slug Testing (Appendix F).

Slug tests are performed by causing a sudden change in the water level in the well and then measuring the water level recovery rate. Slug tests will be accomplished by either rapidly removing water from the water column or immersing a solid cylinder (slug) into the water column and measuring the resulting water level recovery. If the slug removal method is used (rising head), water will be removed from the well using a bailer. If the slug immersion method is used (falling head), water will be displaced in the well using a clean, solid PVC cylinder. Whichever method is used, the slug will be of sufficient size to achieve an instantaneous water level change of at least 2 feet.

Water levels will be measured immediately prior to the aquifer test and throughout the recovery period until water levels have recovered to within approximately 95 percent of the static water level. Water levels will be recorded using a downhole pressure transducer and electronic data logger. The transducer will be calibrated prior to the test using standard procedures required by the manufacturer. In addition, periodic manual water level measurements will be made using an electric water level indicator for comparison with the data recorded by the data logger.

Standard aquifer testing equations will be used to estimate the hydraulic conductivity of both the uppermost aquifer and deep bedrock aquifer. Appropriate analytical procedures are presented in *Groundwater and Wells* (Driscoll, 1986) and *Analysis and Evaluation of Pumping Test Data* (Kruseman and de Ridder, 1992).

5.6 Decontamination Procedures

All non-disposable field equipment that may potentially come in contact with contaminated ground water or soils will be decontaminated in accordance with DBS&A SOP 13.5.2, Decontamination of Field Equipment (Appendix F), in order to minimize the potential for cross-contamination between sampling locations. Clean latex or plastic gloves will be worn during all decontamination operations. The following sequence of decontamination procedures will be followed prior to each sampling and/or testing event:

1. Wash the equipment in a solution of non-phosphate detergent (Liquinox®) and distilled/deionized water. Use a clean Nalgene® tub to contain the wash solution and a scrub brush to mechanically remove loose particles.

2. Rinse the equipment twice with distilled/deionized water.

3. Allow the equipment to air dry before the next use.

All wash water generated during equipment decontamination will be contained in 55-gallon drums for proper disposal. All liquids will be assumed to be contaminated and properly labeled as described in Section 5.7. Decontamination water will remain on-site pending the results of laboratory analysis of the associated ground-water samples. The laboratory results for the ground-water samples will be used to determine the method of disposal for the drummed wash water, as described in Section 5.7. All drilling equipment will be decontaminated as described in Section 4.5.

5.7 Management of Investigation-Derived Wastes

A variety of wastes will be generated during the implementation of the ground-water assessment plan. These wastes include soil cuttings, decontamination fluids, used PPE, and ground water produced during well development and purging. All wastes, with the exception of PPE, will be handled as potentially hazardous wastes.

All waste materials will be drummed and labeled to identify the contents, date of generation, and amount of material generated. Waste material will be stored in 55-gallon drums. All waste containers generated during the ground-water assessment will be stored in a designated drum storage area within the facility.

For those wastes that are associated with a particular sample collected during the ground-water assessment (e.g., soil cuttings collected during the drilling of a well with soil samples collected for chemical analyses at 10-foot intervals, or purged ground water from a well that was subsequently sampled and analyzed), the analytical results will be used to determine if the drummed materials constitute hazardous waste. All contaminated water and water that is potentially contaminated but cannot be associated with a particular sample or set of samples will be passed through an activated carbon filtration system to remove all organic constituents. A sample of the clean filtered water will then be collected for laboratory analysis of VOCs. Upon verification that the water is clean, it will be released to the ground surface on-site. The carbon filter will be disposed of at a licensed hazardous waste disposal facility such as the Rollins facility in Deer Park, Texas that is currently receiving PSH product from the recovery well system. PPE and dry refuse associated with these materials will be disposed of in a sanitary landfill.

5.8 Phase II Ground-Water Assessment

As with the soil assessment plan, the Phase II ground-water assessment cannot be fully scoped until the Phase I results are available. However, the objective of the Phase II ground-water investigation is to define the downgradient extent of impacted ground water. Thus an iterative approach will be required. In general, additional downgradient monitor wells will be installed in the alluvium to track the dissolved-phase plume that may exist to the northeast of the former impoundments. Drilling, well installation, and well development procedures will be similar to those described in Section 5.1. The number of monitor wells that will be required to define the downgradient plume remains unknown at this time.

In addition to the installation of additional monitor wells in the shallow alluvium, one downgradient deep monitor well will be installed into the San Andres bedrock aquifer. The purpose of the deep well is to determine whether the bedrock aquifer has been impacted by the former impoundments. The location of the deep bedrock monitor well will be determined based on the results of the Phase I ground-water assessment. Drilling and well installation procedures will be provided in the closure plan amendment that details the scope of work for Phase II activities.

6. QUALITY ASSURANCE PROJECT PLAN

This section describes the procedures that will be followed to ensure that the data obtained during this investigation will be adequate for the project objectives. The Quality Assurance Project Plan (QAPP) presented herein describes the laboratory analyses to be performed, data quality objectives, and quality assurance/quality control (QA/QC) procedures to be used to ensure that project objectives are met. Sections 6.1 through 6.12 have been prepared in accordance with the *Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans* (U.S. EPA, 1983), and are those elements required for consideration in any QAPP, according to EPA.

6.1 Analytical Parameters and Methods

Based on previous investigations, petroleum hydrocarbons and the chlorinated solvent 1,1,1-TCA are recognized as the principal threats to ground water in the study area. However, in order to ensure that other constituents are not present, Appendix IX analyses will be specified for soil and ground-water samples collected during Phase I. Accordingly, soil and ground-water samples collected as described in Sections 4.1 and 5.1 of this closure plan will be analyzed for the suite of target analytes listed in Table 6-1.

The suite of analytes specified in Table 6-1 includes all of the RCRA Appendix IX constituents except pesticides/herbicides and dioxins/furans, as there is no evidence that these compounds were ever present at this facility. In addition, ground-water samples will be analyzed for major cations and anions and total dissolved solids in order to characterize the overall water quality. Total petroleum hydrocarbons (TPH) will also be determined on both soil and ground-water samples. Analytical methods for all parameters will follow standard RCRA procedures specified in *Test Methods for Evaluating Solid Waste* (SW-846) (EPA, 1986).

6.2 Data Quality Objectives

Data quality objectives (DQOs) are the qualitative and quantitative objectives established to ensure that the data generated meet the needs of the project. Therefore DQOs are project-specific and depend largely on the ultimate use for which the data are intended. DQOs have been established for this project in accordance with EPA guidance documents, particularly *Data*

Quality Objectives for Remedial Response Activities (U.S. EPA, 1987a), and *RCRA Ground-Water Monitoring: Draft Technical Guidance* (U.S. EPA, 1992). The parameters used to quantify data quality include precision, accuracy, representativeness, completeness, and comparability (PARCC).

Objectives or goals for the so-called PARCC parameters (U.S. EPA, 1987a) constitute the project-specific DQOs for a particular investigation. Each PARCC parameter is described below, along with the proposed DQO for this closure plan, where applicable. The proposed DQOs for this investigation are summarized in Table 6-1.

- **Precision** is a quantitative measure of the reproducibility (or variability) of the analytical results. Precision will be calculated by determining the relative percent difference (RPD) between the concentrations reported for field duplicate samples collected from the same location. Methods for collecting duplicate field samples are discussed in Section 5.3. The proposed RPD precision objective is 20 or less.

- **Accuracy** is defined as the degree to which the reported analytical result approaches the "true" value. Accuracy will be estimated through the analysis of matrix spikes (MS). The percent recovery (%R) of the "true" spike concentration will be calculated for each MS. The accuracy objective is within the range of 80 to 120 percent recovery of the matrix spike.

- **Representativeness** refers to how well the analytical data reflect subsurface contaminant concentrations. Due to numerous site-specific factors, such as the degree of heterogeneity in the subsurface, representativeness is difficult to define and even more difficult to quantify. For this project, representative data will be attained through the use of consistent and approved sampling and analytical procedures and through a well defined sampling plan that specifies adequate investigation of all areas of concern.

- **Completeness** is the percentage of samples collected that meet or exceed the DQOs for precision, accuracy, and representativeness, as estimated from the analysis of QA/QC samples described above. The completeness objective for this project is 90%.

- **Comparability** is an assessment of the relative consistency of the data. No quantitative method exists for evaluating comparability; hence, professional judgment must be relied upon. Internal comparability of the soil and ground-water data set will be achieved by the use of consistent sampling and analysis procedures throughout the project. Likewise, by using identical analytical methods to those employed during previous investigations, the data generated during this investigation will be comparable with existing data.

6.3 Quality Assurance/Quality Control Samples

QA/QC samples include matrix spikes/matrix spike duplicates (MS/MSD), field duplicates, trip blanks, and equipment blanks. EPA guidance recommends that QA/QC samples be collected at a minimum 5-percent frequency (U.S. EPA, 1987). For this project, both soil and ground-water QA/QC samples will be analyzed at this frequency.

Equipment blank samples are collected in order to determine if any of the analytes detected in environmental samples may be attributable to improper and/or incomplete decontamination of field sampling equipment. Equipment blanks will be collected in the following manner. After the sampling device has been decontaminated in accordance with DBS&A SOP 13.5.2, Decontamination of Field Equipment (Appendix F), it will be rinsed with deionized water. The rinsate will be collected and sent to the laboratory as an equipment blank.

Field duplicate samples will be collected to provide a measure of precision for the analytical results. VOC soil duplicates will be collected by submitting two adjacent brass liner rings from the same split-barrel sample. The ground-water duplicate samples will be collected by filling sample containers in an alternating manner following the sampling protocol described in Section 5.3 of this closure plan.

One VOC trip blank will accompany each shipment to the laboratory. VOC trip blanks are prepared as a check on possible contamination originating from container preparation methods, shipment, handling, storage, or other site-specific conditions. VOC trip blanks will consist of deionized, organic-free water added to a clean 40-mL glass septum vial.

In addition to the above QA/QC samples, MS/MSD analyses will be performed in the laboratory by spiking the soil or water samples with a known quantity of the analyte of interest. MS/MSD analyses are performed to determine laboratory accuracy and precision and to determine if any matrix interferences exist. MS/MSD analysis will be specified on the chain-of custody form for at least 5 percent of the samples collected.

6.4 Sampling Procedures

The soil and ground-water sampling procedures described in Sections 4 and 5 will be performed in accordance with DBS&A SOPs 13.3.2 and 13.5, respectively (Appendix F). A summary of the analytical methods, required sample volumes, containers, and sample preservation is provided in Table 6-2. All sample containers will be acquired from the laboratory and will be certified clean.

Adhesive labels will be applied to the sample containers, and a waterproof marking pen will be used to complete the labels. Information will include the date and time of sample collection, type of analysis to be performed, preservative used (if any), depth of sample (for soils), and the initials of sampling personnel. The containers will be sealed and placed in clear plastic bags. The sealed containers will be put in coolers on bags of ice or frozen ice packs. Plastic bubble pack or other suitable packing material will be used to prevent breakage.

The field personnel will ship the sample coolers to the laboratory using an overnight courier service. The fastest possible shipping method will be used, and all sample shipments will be carefully tracked to ensure that samples arrive intact and that all holding times are met.

6.5 Chain of Custody Procedures

For analytical data to be valid, samples must be traceable from the time of collection through chemical analysis and final disposition. Chain-of-custody forms have been developed for this purpose. The necessary blank documents will be obtained from the laboratory, including chain-of-custody forms and seals.

Chain-of-custody forms will be completed in triplicate. The original form and one copy will be placed inside each cooler, and one copy will be retained by field personnel. The chain-of-custody forms accompanying each cooler will be sealed in a plastic bag and taped to the inside of the cooler lid. Each cooler will have a clearly visible return address. The cooler lids will be secured with shipping tape that encircles the cooler ends. A chain-of-custody seal will be placed at the front left and rear right sides of the cooler so that opening the lid will break the chain-of-custody seals.

Field activities and sample collection will be documented in a bound logbook dedicated to the project. For each sample, the location, time, monitor well/boring number, sample depth, sample volumes and preservation, and other pertinent field observations will be recorded. Each page of the logbook will be dated, numbered, and signed by those individuals making entries.

6.6 Equipment Calibration Procedures and Frequency

Numerous instruments will be used in the field and the laboratory during this investigation. In order for reliable data to be generated, it is important that these instruments be routinely calibrated. Calibration of analytical instruments within the laboratory will be the responsibility of the contracted laboratory. Although the details of the laboratory calibration procedures are beyond the scope of this QAPP, the frequency of initial and continuing calibrations will adhere to established EPA protocols, as described in the analytical method (U.S. EPA, 1986). In addition, the laboratory's QA manual will be available for review upon request.

During this investigation, DBS&A anticipates using the following field equipment:

- PID (Thermo Environmental 580B or equivalent)
- FID type OVA (Foxboro 108 or equivalent)
- Salinity-conductivity-temperature (SCT) meter (YSI Model 33 or equivalent)
- pH meter (Orion Model 250A or equivalent)
- Dissolved oxygen (DO) meter (YSI Model 57 or equivalent)
- Water level indicator (Solinst or equivalent)
- PSH interface meter (Solinst or equivalent)

Calibration and maintenance procedures for each of these instruments are described in the following paragraphs. Documentation of daily calibration for each of these instruments will be recorded in the field logbook, along with any required maintenance procedures performed.

A PID and/or FID will be used to screen soil samples for volatile organic compounds using the headspace method. The PID or FID will also serve for health and safety monitoring of the work area for organic vapors. Background VOC concentrations will be recorded daily in the logbook. The PID and/or FID will be calibrated daily with standard isobutylene (PID) or standard methane (FID). Recalibration of the PID and/or FID can occur during the work day at the discretion of the site health and safety officer in the event of suspect readings. Care will be taken to ensure that the PID and/or FID remains free of sand and dirt. The battery will be charged on a daily basis.

The SCT meter calibration will be checked initially with a standard potassium chloride solution and mercury thermometer, and a battery check will be performed daily prior to beginning field work. In the event of erratic measurements, the instrument calibration will be checked in the field. When not in use, the electrode will be kept immersed in deionized water to keep the platinum black surfaces fully hydrated, in accordance with manufacturers' instructions.

Prior to use each day, the pH meter will be calibrated using two pH buffers. The buffer solutions will be chosen to bracket the expected ground-water pH range. Calibration of the instrument will be periodically checked throughout the day using the pH buffers to ensure accurate readings. In the event of instrument drift, the pH meter will be recalibrated. The electrode will be rinsed with deionized water following each measurement and placed in the appropriate potassium chloride storage solution.

The DO meter will be calibrated in air by adjusting the calibration control until the oxygen concentration reads the correct value for the elevation and temperature at the site. The DO meter calibration will be checked periodically during the day and recalibrated if necessary.

The water level indicator will be initially calibrated against a steel tape, prior to commencement of field activities. The battery and electrical connections will be periodically checked to ensure proper functioning of the instrument. The indicator probe and tape will be rinsed clean following each measurement. The PSH interface meter will be calibrated in a similar manner following manufacturer's instructions.

6.7 Data Reduction and Reporting

Data reduction will be performed by the laboratory in accordance with EPA protocols for the respective analytical method. Data from the analytical laboratory will be reviewed following the laboratory's internal QA/QC plan. All EPA required elements will be provided with the data package. If the analytical data do not meet the minimum data quality objectives, the laboratory will implement the corrective actions described in Section 6.10. All data falling outside the quality control limits defined in this QAPP will be flagged by the laboratory, as required by EPA protocol. Any discrepancies noted in the laboratory QA review will be noted in the case summaries included with the data packages.

Following the field investigation phase of the project, the degree to which the data quality objectives have been met will be examined by comparing the actual results for the QA/QC samples with the objectives listed in Table 6-1. The results of this comparison will be tabulated in the final report, along with detailed descriptions of any deviations from the protocols proposed in this closure plan.

6.8 Internal Quality Control Checks

The specific quality control checks to be used are included with the individual analytical methods specified for each parameter. The quality control criteria for VOCs and TPH (gasoline) are described in *Test Methods for Evaluating Solid Wastes - SW-846*, (U.S. EPA, 1986).

6.9 Performance and System Audits

Performance and system audits are the practices followed by analytical laboratories to evaluate quality control procedures and laboratory performance (U.S. EPA, 1983). System audits are performed in order to assess whether a new analytical system is functioning properly. Performance audits rate the ongoing performance of the laboratory in terms of the accuracy and precision of the analytical data generated. Examples of performance audits include the analysis of performance evaluation samples, such as standard reference materials obtained from the National Institute of Standards and Technology or EPA, or participation in interlaboratory performance evaluation studies using "round-robin" samples. Each participating laboratory is graded and ranked based on the results. The performance and system audits of the laboratory contracted for this closure plan will be provided and available for review.

6.10 Corrective Actions

If QA activities reveal apparent problems or deficiencies with the analytical data, corrective actions must be applied. The type of corrective action depends on the specific problem that occurs, but a general sequence of corrective actions will be followed. If the data do not fall within the prescribed data quality objectives, the affected samples will be re-analyzed by the laboratory until the objectives are met. Any data falling outside QC limits will be flagged and qualified to explain the nature of the data quality problem.

6.11 Routine Data Assessment Procedures

Routine procedures to assess the precision, accuracy, and completeness of the analyses include RPD for field duplicates and MS/MSD samples, as well as percent recovery (%R) for MS samples. The specific statistical techniques to be used are described with the appropriate analytical method (U.S. EPA, 1986). Any problems or deficiencies will be reported to the NMED in the quarterly progress reports, or by telephone, if warranted by the nature and urgency of the problem.

6.12 Quality Assurance Reports to Management

Periodic assessment of data accuracy, precision, and completeness will be performed by the QA manager of the contracted laboratory. The results of these assessments, as well as the results of laboratory performance and system audits, will be available upon request. The laboratory QA manager will also review the case narratives and accompanying analytical data package to ensure that all data quality objectives are met. In the event that objectives are not met, the QA manager will consult with the laboratory manager to correct the problem.

7. PROJECT SCHEDULE AND CONDITIONS FOR CLOSURE CERTIFICATION

The proposed Phase I project schedule will require about 4 months to complete (Figure 7-1). Quarterly progress reports will be prepared for submittal to NMED from the time field work begins until closure certification is achieved. The progress reports will provide a means of tracking the schedule for investigative and corrective action activities and explain the need for any modifications to the proposed project schedule.

The soil assessment plan (Section 4) and ground-water assessment plan (Section 5) will be initiated approximately six weeks following approval of this closure plan. The drilling and monitor well installation program is expected to require approximately two weeks to complete. Monitor well development, ground-water sampling, and aquifer testing will require an additional week.

Preparation of a report summarizing Phase I activities will require 6 weeks following receipt of the laboratory data. A meeting between Transwestern and NMED is proposed to discuss the results of Phase I and to determine the scope of work for the upcoming Phase II activities to be submitted as a closure plan amendment. All remaining closure activities will be addressed in subsequent phases following completion of the Phase I report. These include establishing cleanup criteria, developing soil and ground-water corrective action plans, and establishing the schedule for corrective action activities and closure certification. Each of these tasks will be included in subsequent closure plan amendments submitted for NMED approval.

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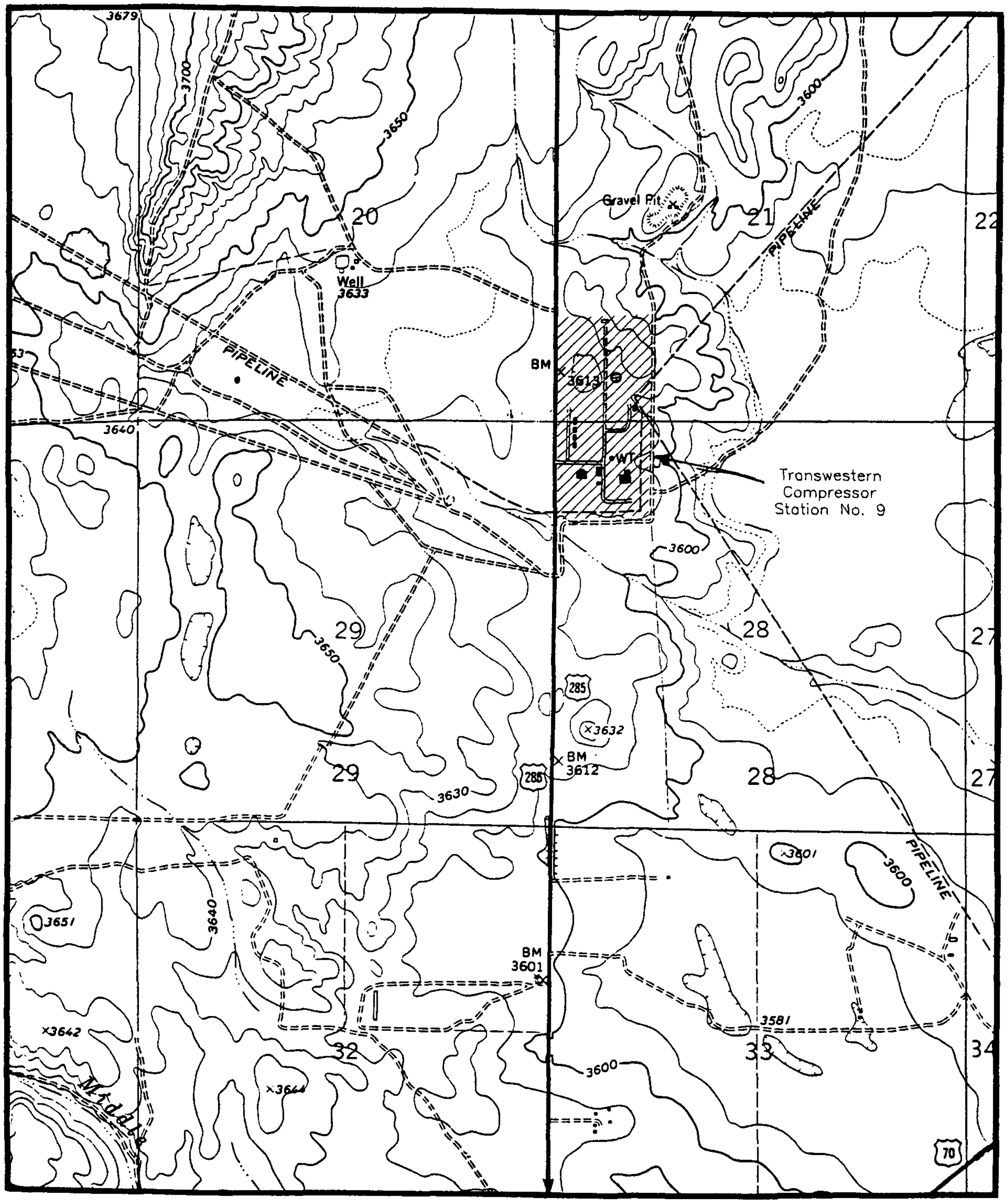
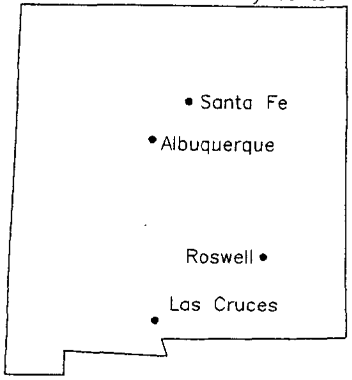
FIGURES



7 miles to Roswell city center



N

0 3000 Feet

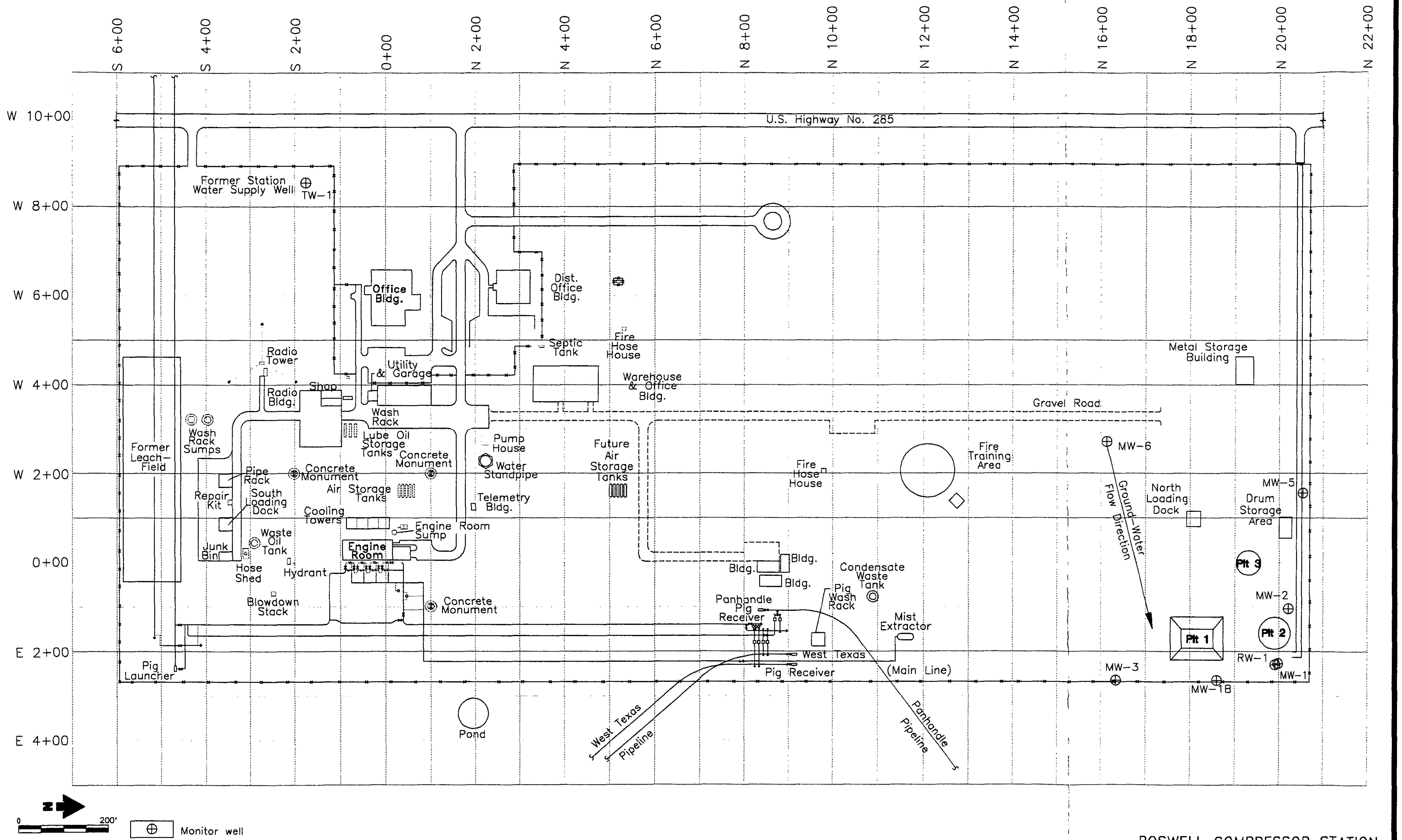
Source: U.S. Geological Survey. 1982
Panther Hill, Roswell North
7 1/2 Minute Topographic
Quadrangle Map.

ROSWELL COMPRESSOR STATION
Location Map

DANIEL B. STEPHENS & ASSOCIATES, INC.
5-94
JN 4115

Figure 1-1

D\4115\1-1LM



ROSWELL COMPRESSOR STATION
Site Plan

D:\4115\1-2SP.DWG

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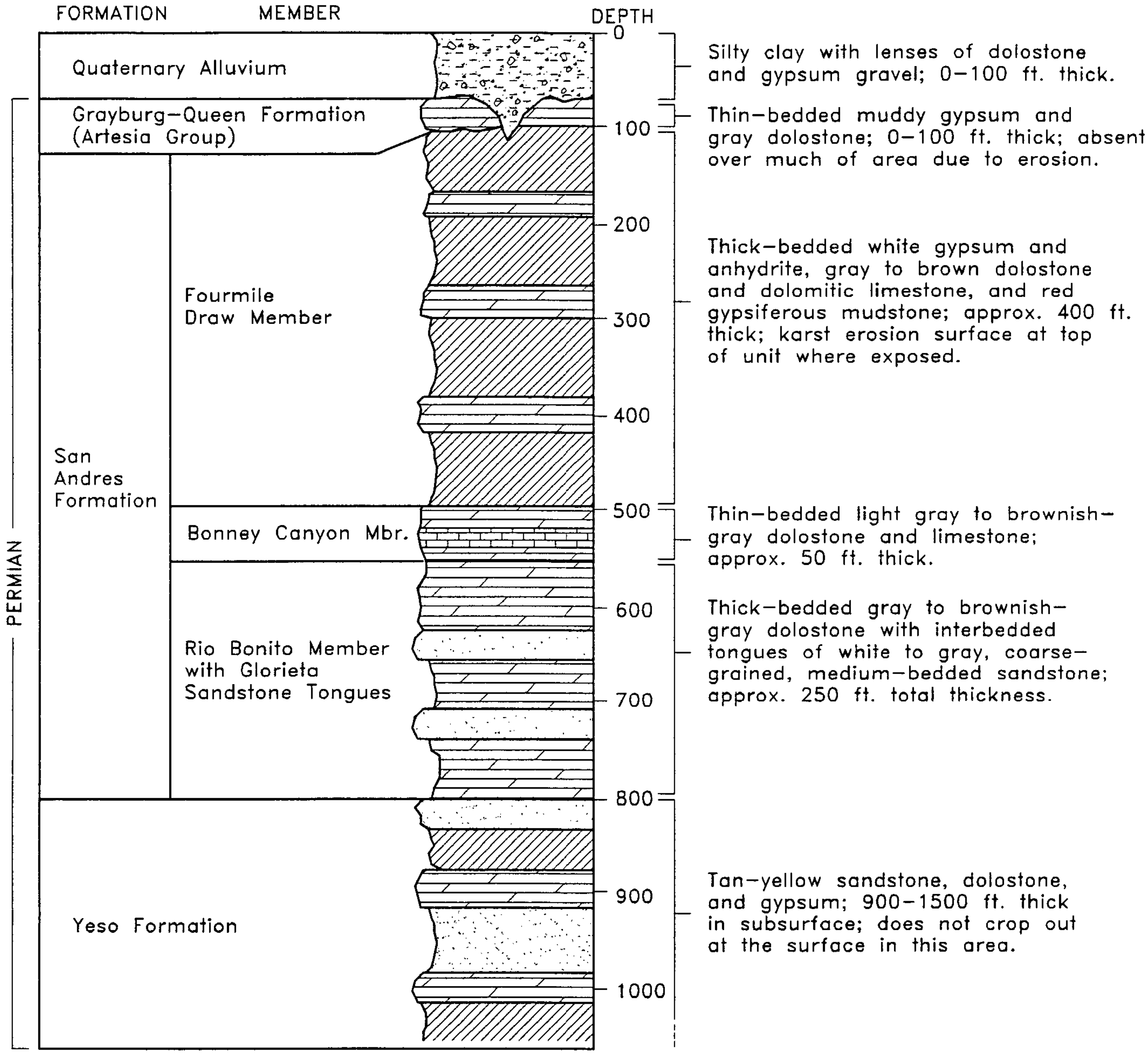
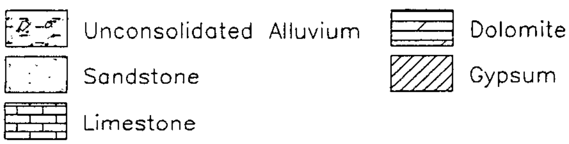
1-95
JN 4115

Figure 2-1



Information Source: Kelley, 1971

Explanation



ROSWELL COMPRESSOR STATION

Generalized Stratigraphic Section Near Roswell Compressor Station

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5-94 JN 4115

Figure 2-2

D/4115/2-2GSS.DWG

Information Sources: Kelley, 1971; Lyford, 1973

N

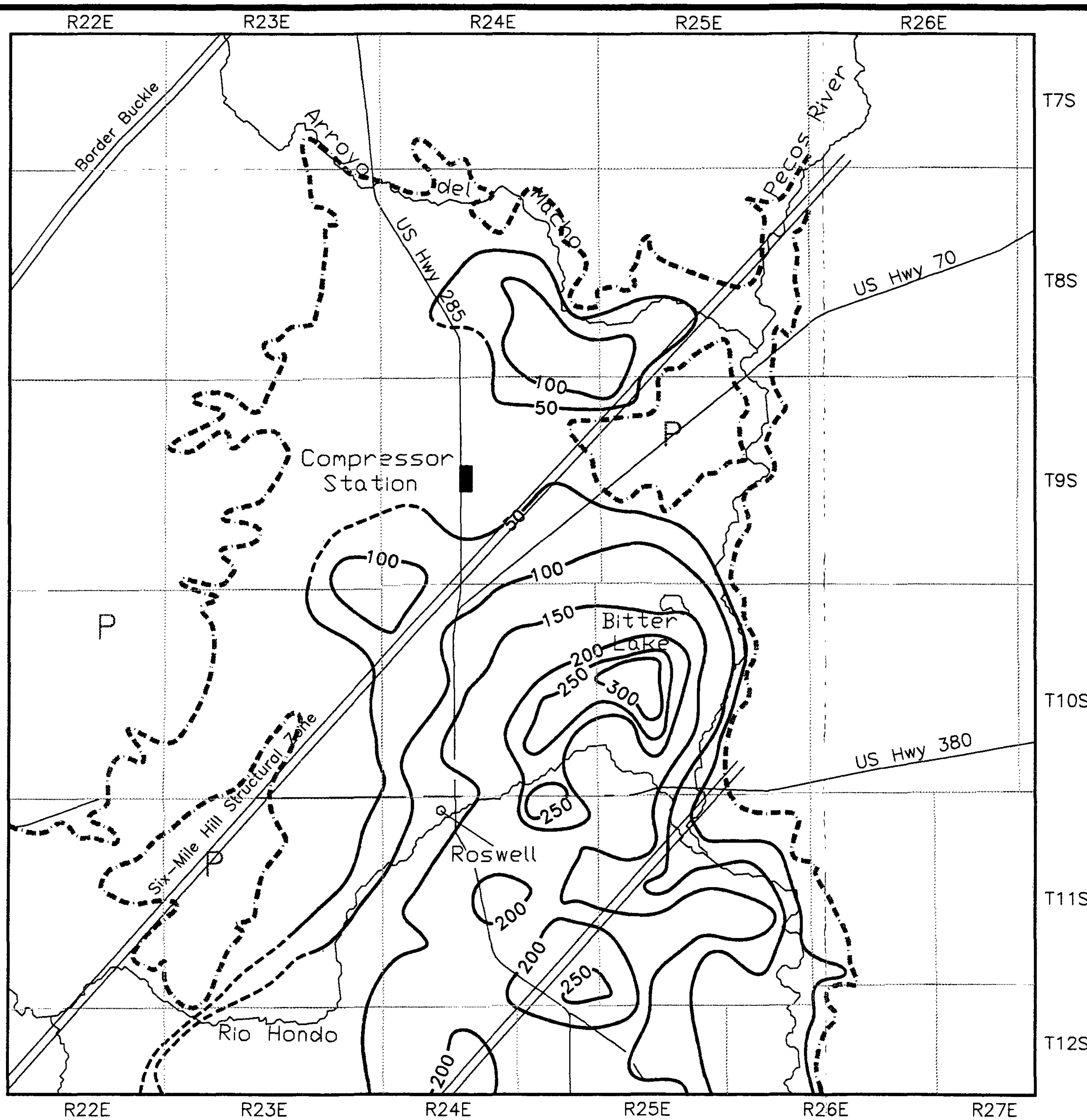
0 10 Miles

Explanation

- - - - - Thickness of valley fill alluvium (feet)

-·-·-·- Approx. surface contact between Permian rocks and valley fill alluvium

P Outcrop area of Permian rocks



ROSWELL COMPRESSOR STATION

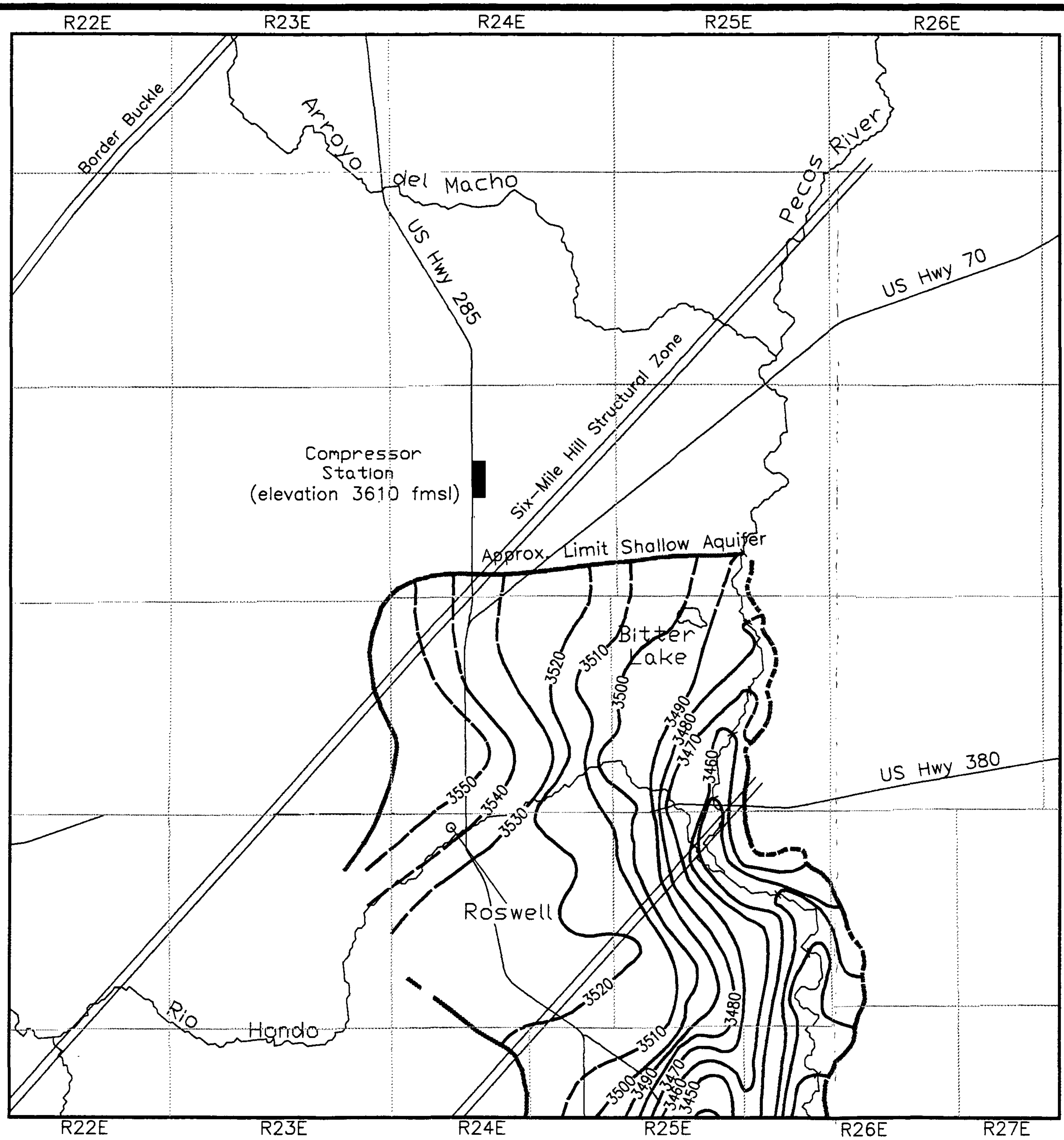
Approximate Thickness of Shallow Alluvial Aquifer

DANIEL B. STEPHENS & ASSOCIATES, INC.

5-94 JN4115

Figure 2-3

D\4115\2-1TSAA



Information Source: Welder, 1983

N

0 10 Miles

Explanation

3350 Water level contour (feet above mean sea level [fmsl])

Approximate extent of shallow alluvial aquifer

Structural zone (Maddox, 1968; Kelley, 1971)

ROSWELL COMPRESSOR STATION

Water Levels in Shallow Alluvial Aquifer, January 1984

DANIEL B. STEPHENS & ASSOCIATES, INC.

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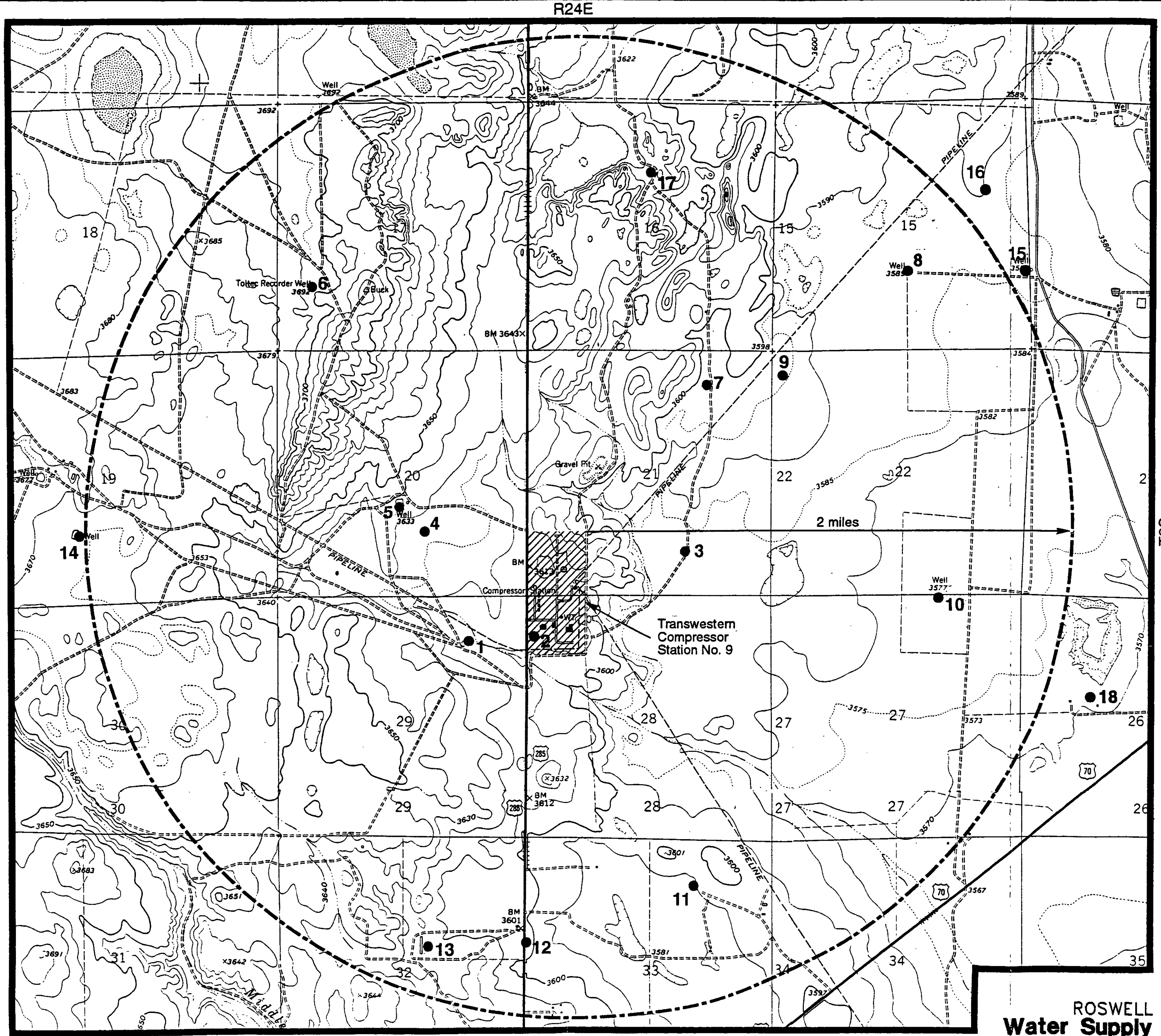
D\4115\2-2WL

Figure 2-4



Note: Well numbers refer to wells listed on Table 2-1.

N

0 2000'

DANIEL B. STEPHENS & ASSOCIATES, INC.

12-94 JN 4115

D\4115\2-3WSW.DWG

ROSWELL COMPRESSOR STATION

Water Supply Well Location Map

Figure 2-5

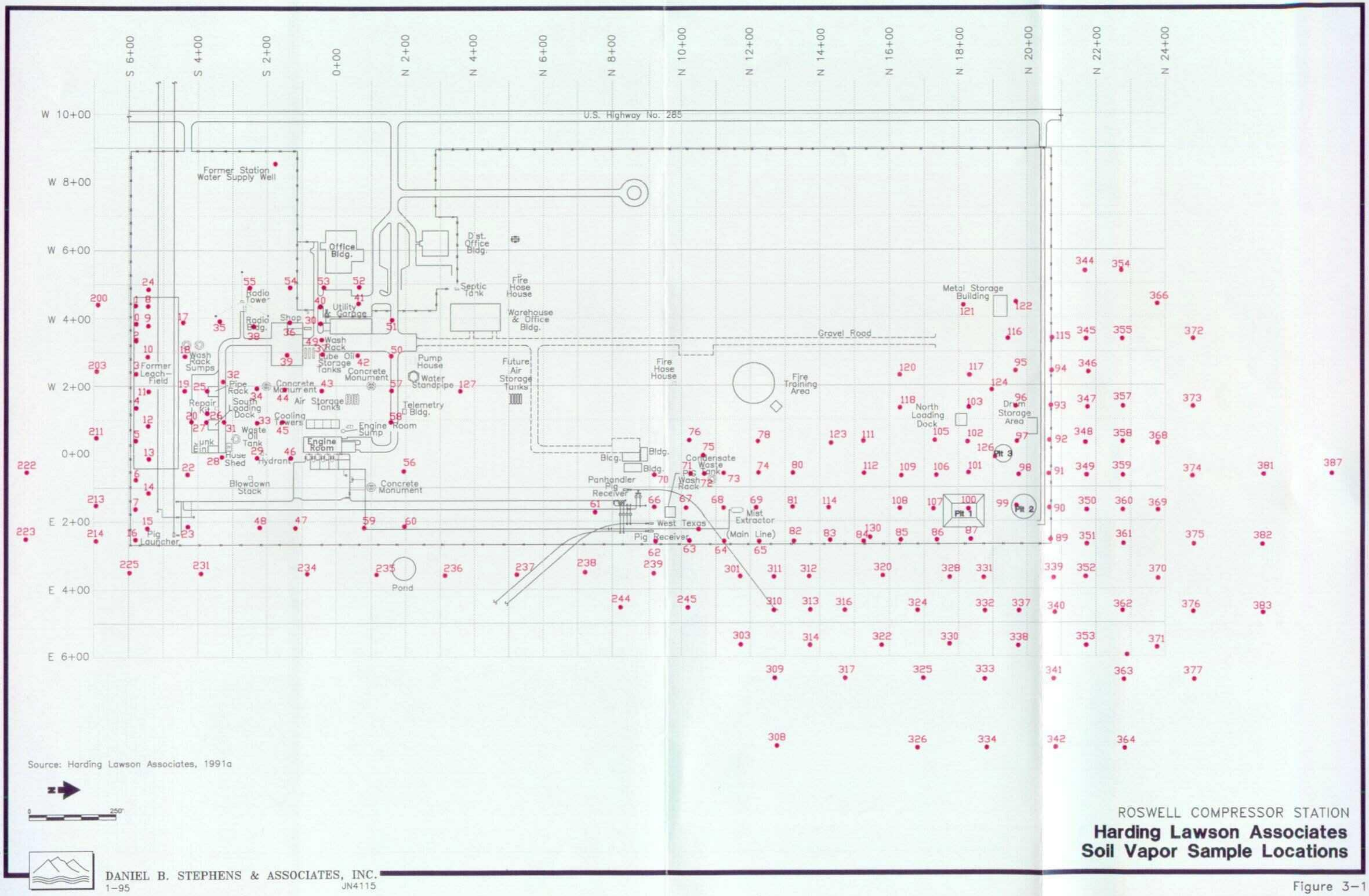
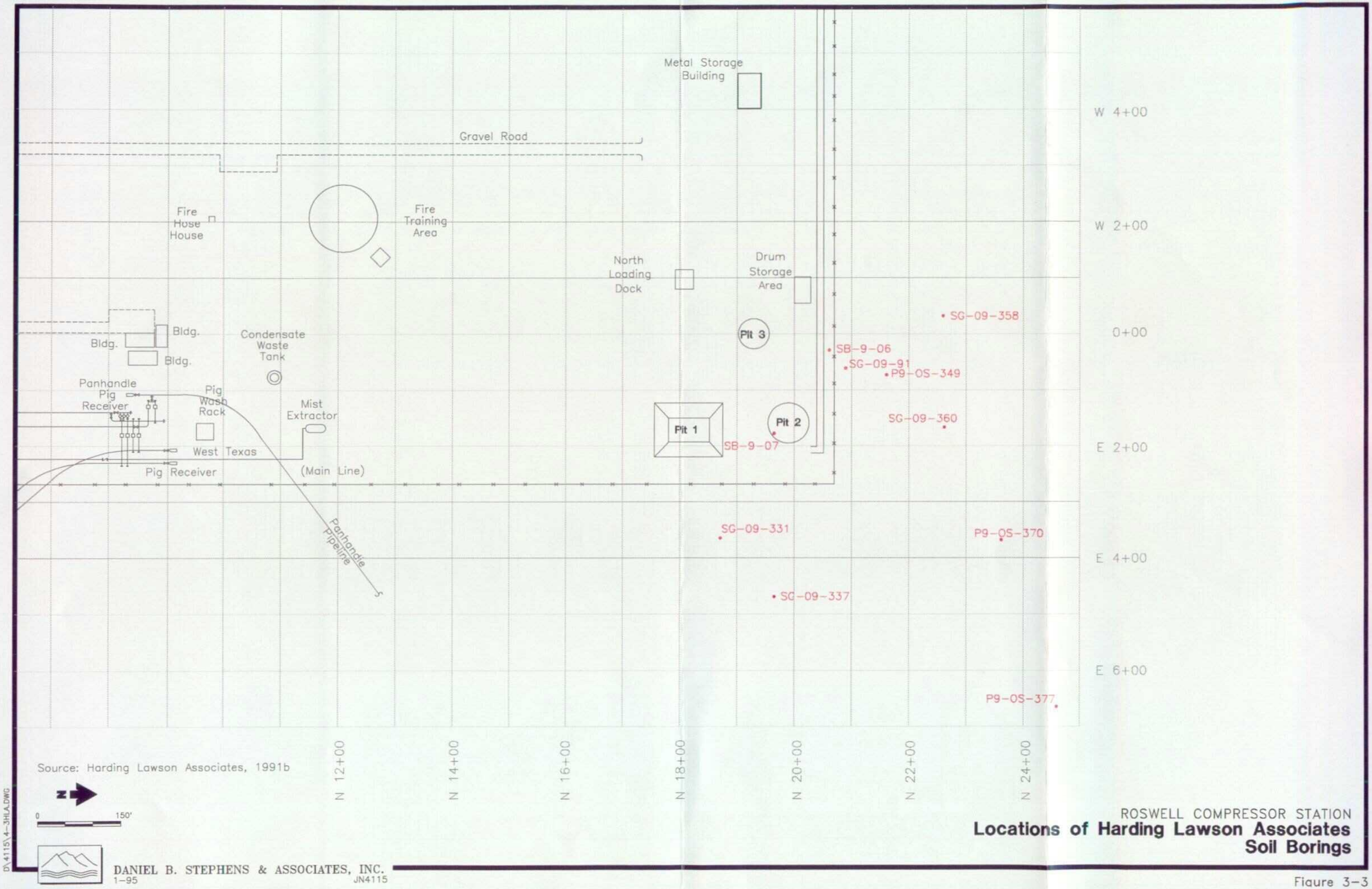

U.S. Highway No. 285
Former Station Water Supply Well
Office Bldg.
Dist. Office Bldg.
Septic Tank
Fire Hose House
Warehouse & Office Bldg.
Radio Tower
Radio Bldg.
Shop
Utility Garage
Wash Rack
Lube Oil Storage Tanks
Concrete Monument
Pump House
Water Standpipe
Future Air Storage Tanks
Former Leach Field
Wash Rack Sumps
Pipe Rack
South Loading Dock
Repair Rd
Air Storage Tanks
Cooling Towers
Waste Oil Tank
Engine Sump
Engine Room
Telemetry Bldg.
Hose Shed
Hydrant
Blowdown Stack
Pig Launcher
Pond
Gravel Road
Fire Hose House
Fire Training Area
Metal Storage Building
North Loading Dock
Drum Storage Area
Pit 1
Pit 2
Pit 3
Bldg.
Panhandler Pig Receiver
Condensate Waste Tank
Wash Rack
Mist Extractor
West Texas
(Main Line)
Pig Receiver
Source: Harding Lawson Associates, 1991a
250'
ROSWELL COMPRESSOR STATION
Harding Lawson Associates
Soil Vapor Sample Locations
DANIEL B. STEPHENS & ASSOCIATES, INC.
1-95
JN4115
D/4115/4-1SV.DWG

Figure 3-1

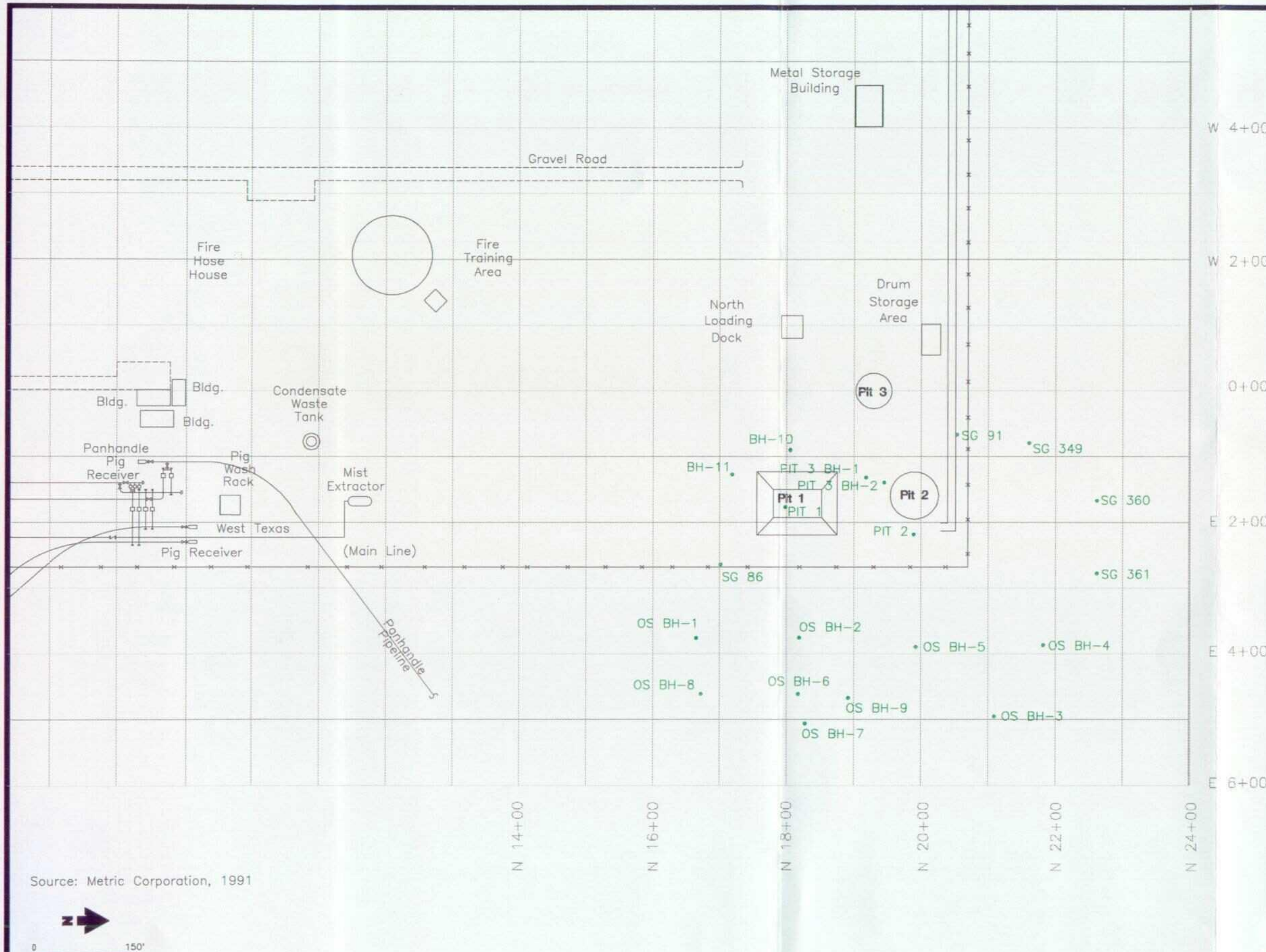

Metal Storage Building
Gravel Road
Fire Hose House
Fire Training Area
North Loading Dock
Drum Storage Area
Pit 1
Pit 2
Pit 3
Bldg.
Bldg.
Bldg.
Condensate Waste Tank
Panhandle Pig Receiver
Pig Wash Rack
Mist Extractor
West Texas
Pig Receiver
(Main Line)
W 4+00
W 2+00
0+00
E 2+00
E 4+00
E 6+00
N 14+00
N 16+00
N 18+00
N 20+00
N 22+00
N 24+00
Source: Harding Lawson Associates. 1991a
0
150'
Explanation
Soil gas concentration contour (ppm)
Concentration of TCA gas in parts per million (ppm) by volume
NS
Not sampled
DANIEL B. STEPHENS & ASSOCIATES, INC.
12-94
JN4115
ROSWELL COMPRESSOR STATION
Concentrations of 1,1,1-TCA in Soil Vapor at 10-Foot Depth

Figure 3-2



ROSWELL COMPRESSOR STATION
Locations of Harding Lawson Associates Soil Borings

Figure 3-3



Source: Metric Corporation, 1991

D:\4115\4-4MC.DWG

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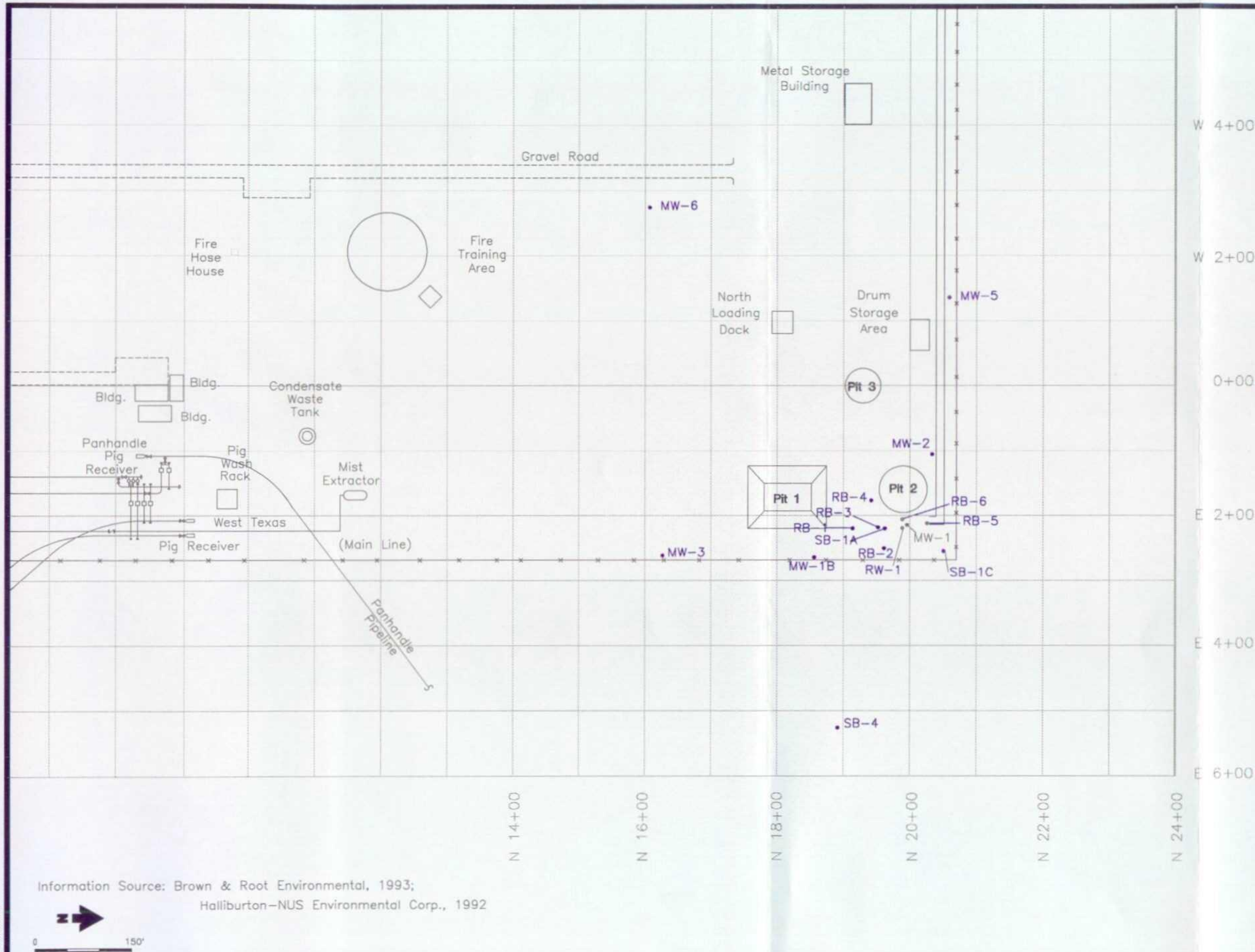
1-95 JN4115

ROSWELL COMPRESSOR STATION
Locations of Metric Corporation Soil Borings

Figure 3-4



Information Source: Brown & Root Environmental, 1993;
Halliburton-NUS Environmental Corp., 1992

D\4115\4-5HBR.DWG

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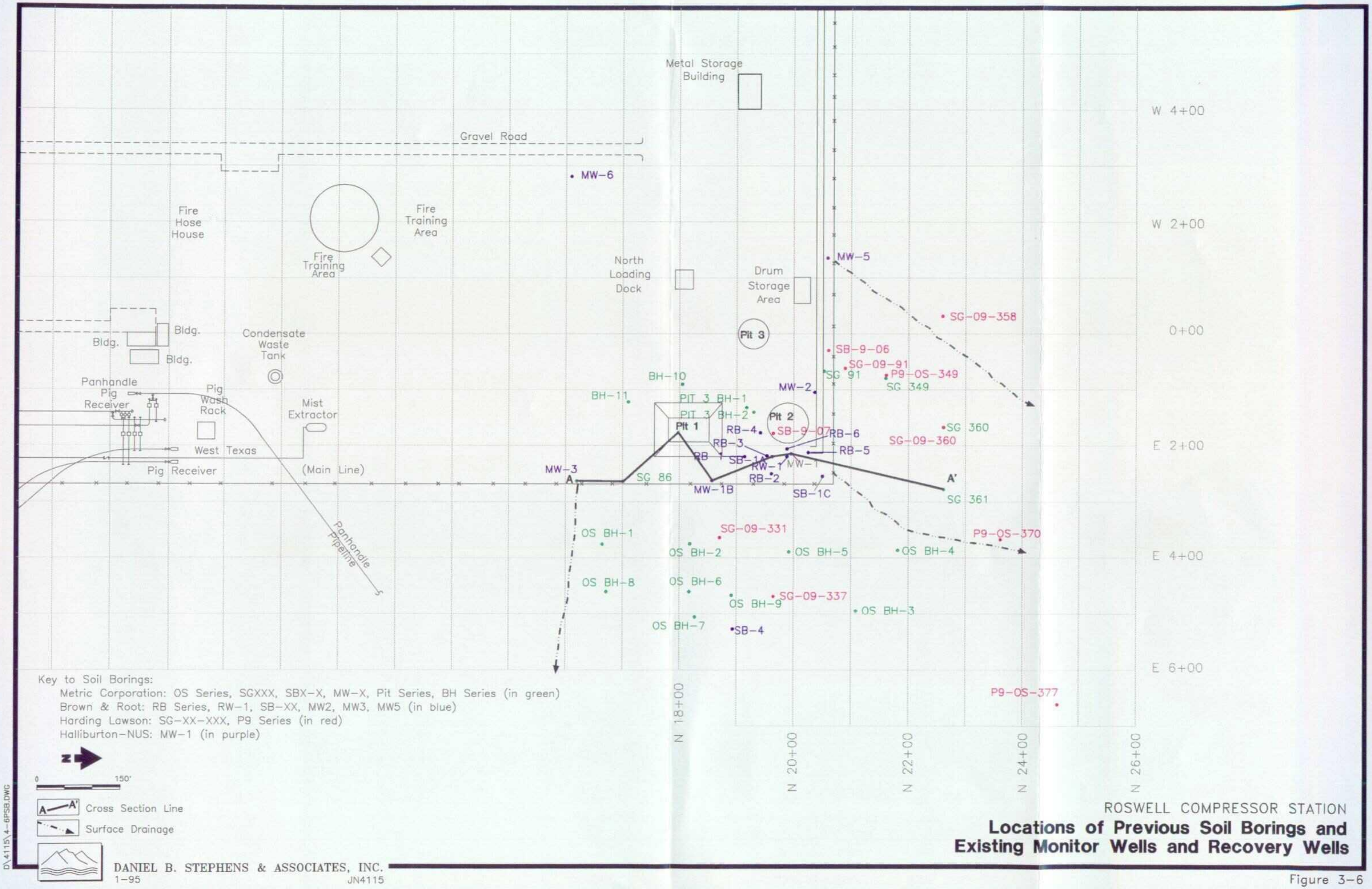
JN4115

ROSWELL COMPRESSOR STATION
Locations of Halliburton and Brown & Root Soil Borings

Figure 3-5

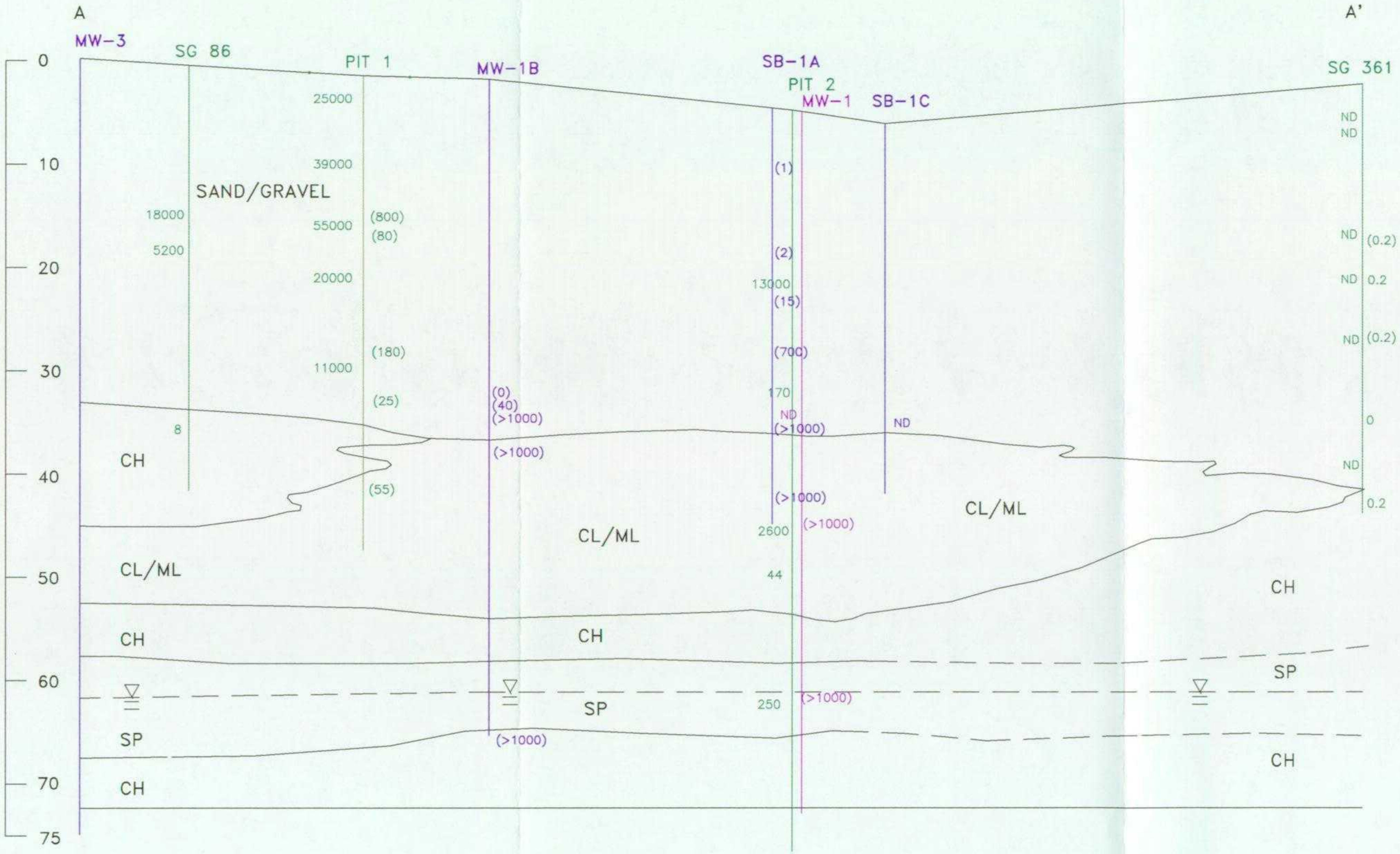


ROSWELL COMPRESSOR STATION

Locations of Previous Soil Borings and Existing Monitor Wells and Recovery Wells

Figure 3-6

D\4115\4-7HCS.DWG



SP	Sand	CH	Clay
SM	Silty Sand	20,000	Total Petroleum Hydrocarbon (ppm) as Determined by EPA Method 418.1
ML	Silt	(>1000)	Headspace VOC Concentration Determined Using an OVA Meter
CL	Silty Clay	▽	Estimated Water Table
		ND	Not Detected

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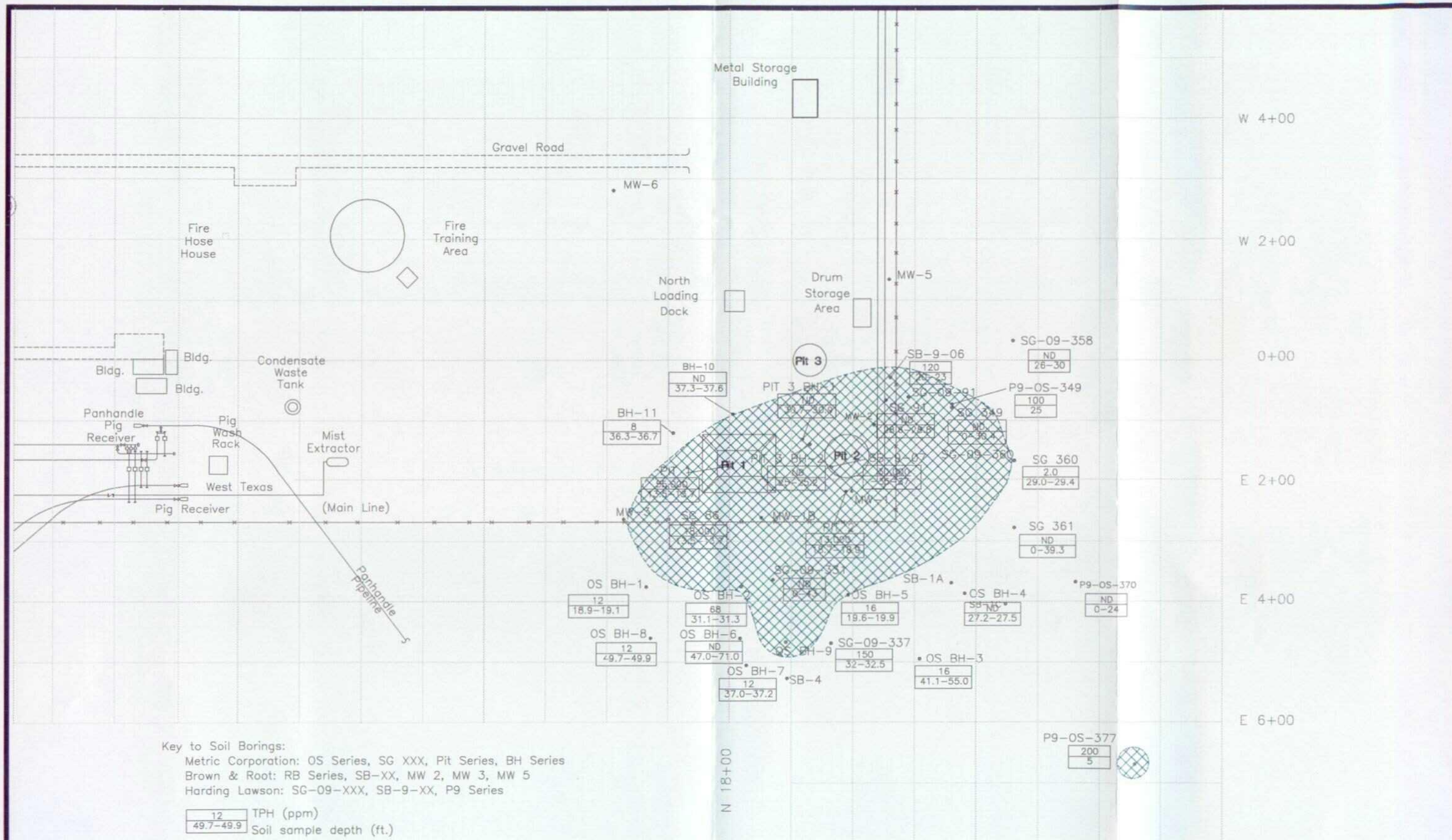
1-95 JN 4115

ROSWELL COMPRESSOR STATION
Hydrogeologic Cross Section

Figure 3-7



Key to Soil Borings:
Metric Corporation: OS Series, SG XXX, Pit Series, BH Series
Brown & Root: RB Series, SB-XX, MW 2, MW 3, MW 5
Harding Lawson: SG-09-XXX, SB-9-XX, P9 Series

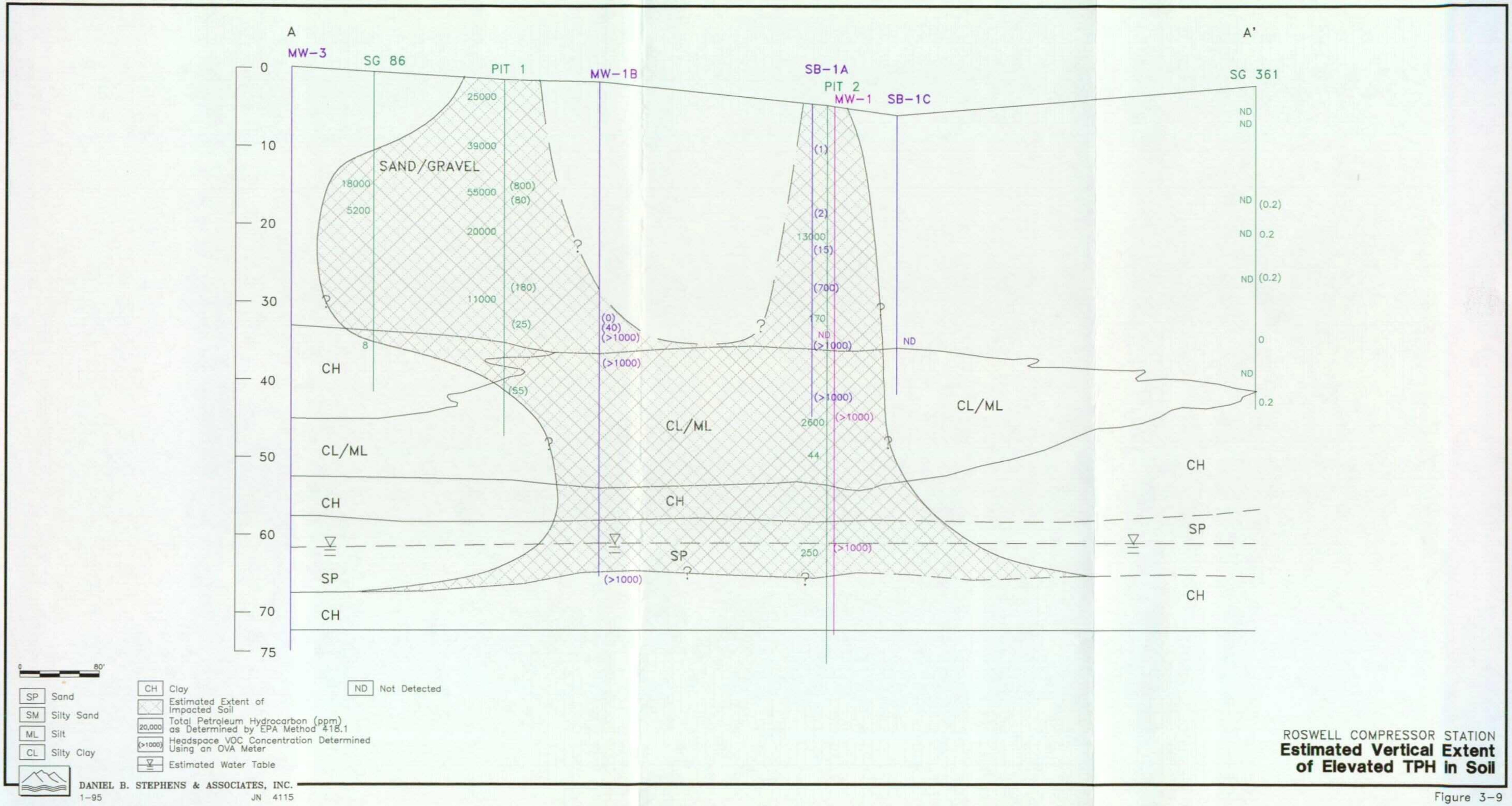
12	TPH (ppm)
49.7-49.9	Soil sample depth (ft.)

Note: Estimated extent of impacted soils based on TPH concentration greater than 100 mg/kg. (OCD Guidline)
TPH concentrations in ppm determined by EPA Method 418.1.
TPH data for P9 and SB-9 series boring determined by Harding Lawson Associates; all others by Metric Corporation.

ROSWELL COMPRESSOR STATION
Estimated Areal Extent of Elevated TPH in Soils

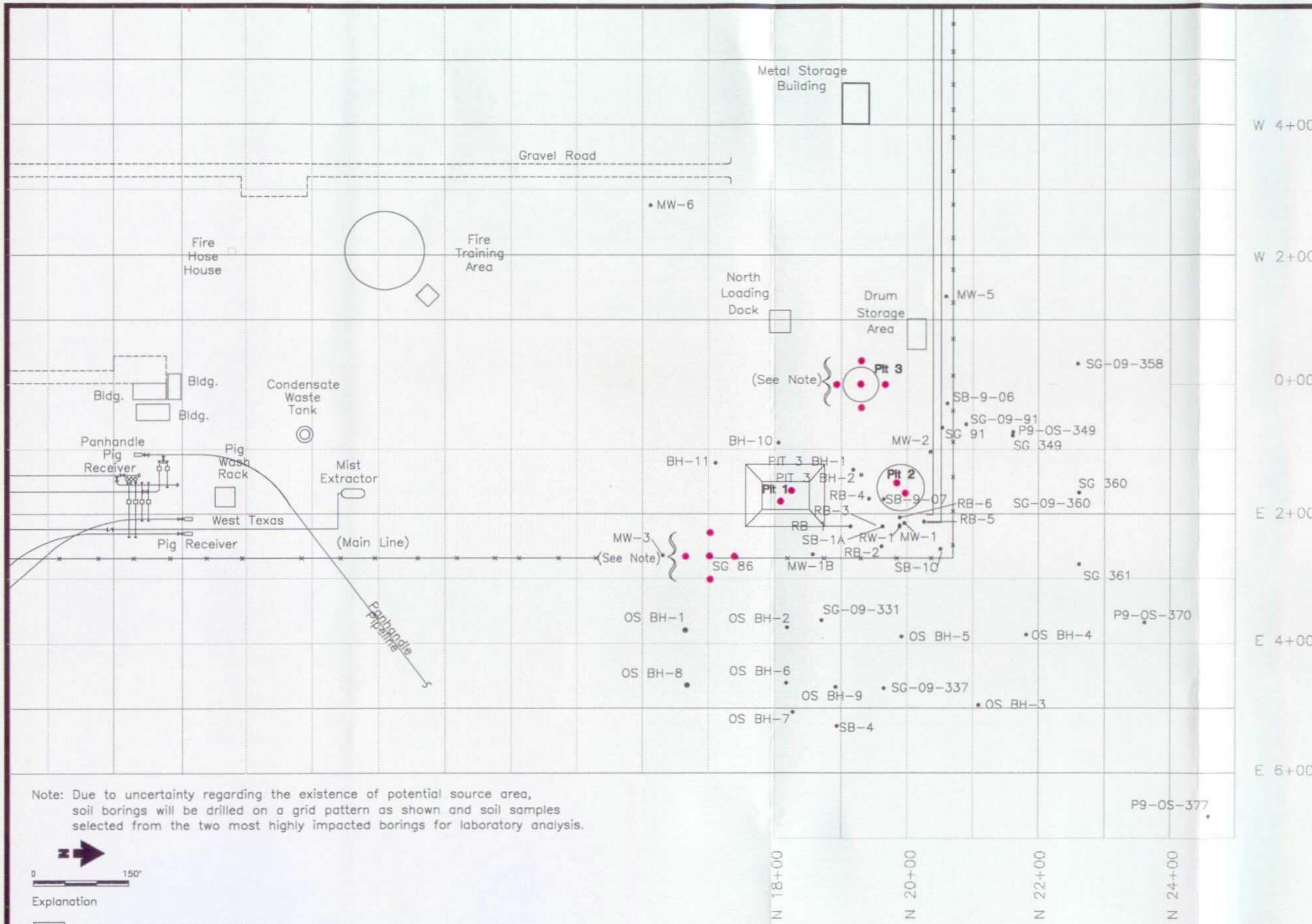
DANIEL B. STEPHENS & ASSOCIATES, INC.
12-94 JN4115

Figure 3-8



ROSWELL COMPRESSOR STATION
Estimated Vertical Extent of Elevated TPH in Soil

Figure 3-9



Note: Due to uncertainty regarding the existence of potential source area, soil borings will be drilled on a grid pattern as shown and soil samples selected from the two most highly impacted borings for laboratory analysis.

Explanation

- Proposed Soil Boring Locations
- Previous Soil Boring Locations

D:\4115\5-1SBL.DWG

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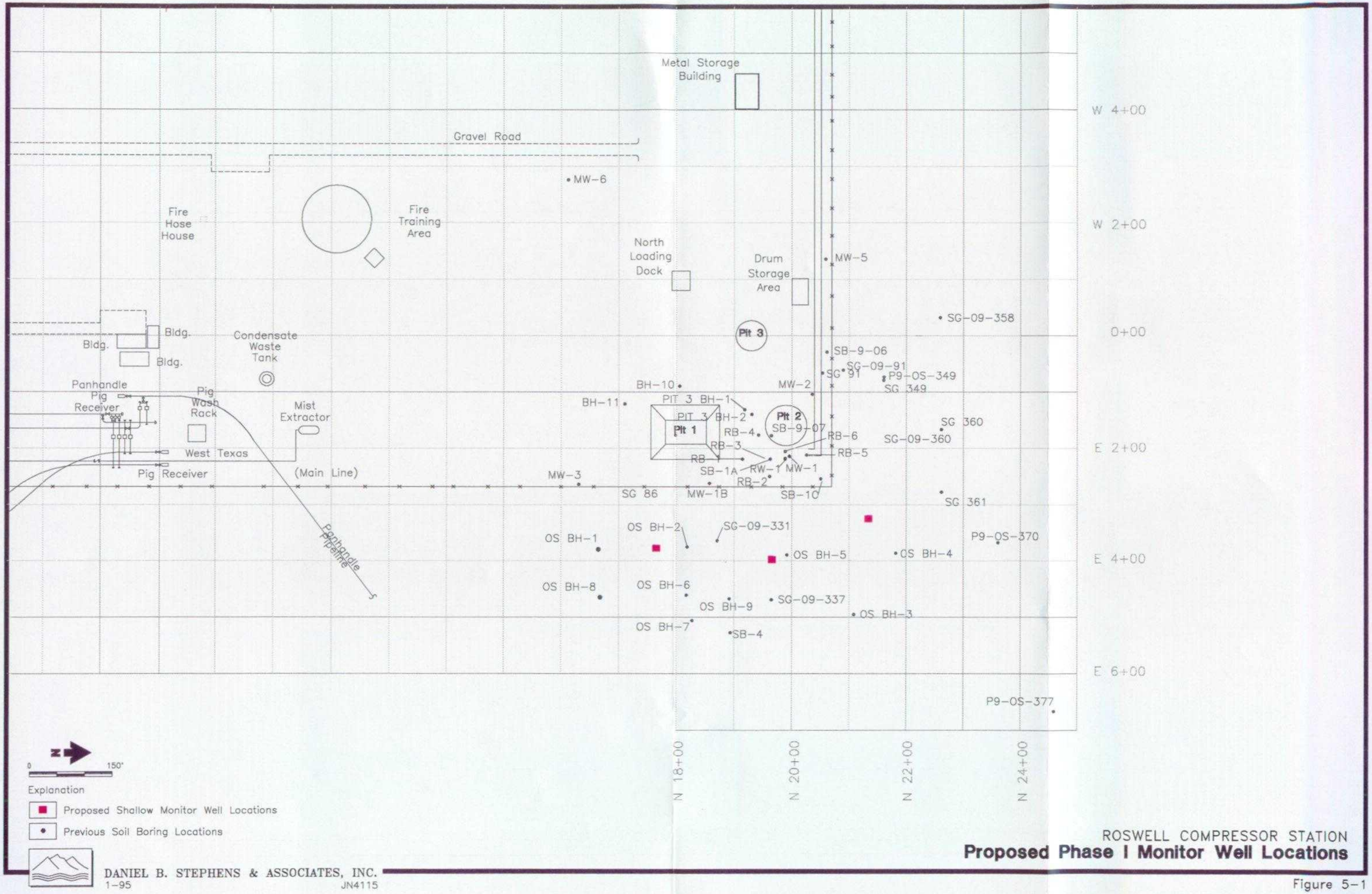
1-95 JN4115

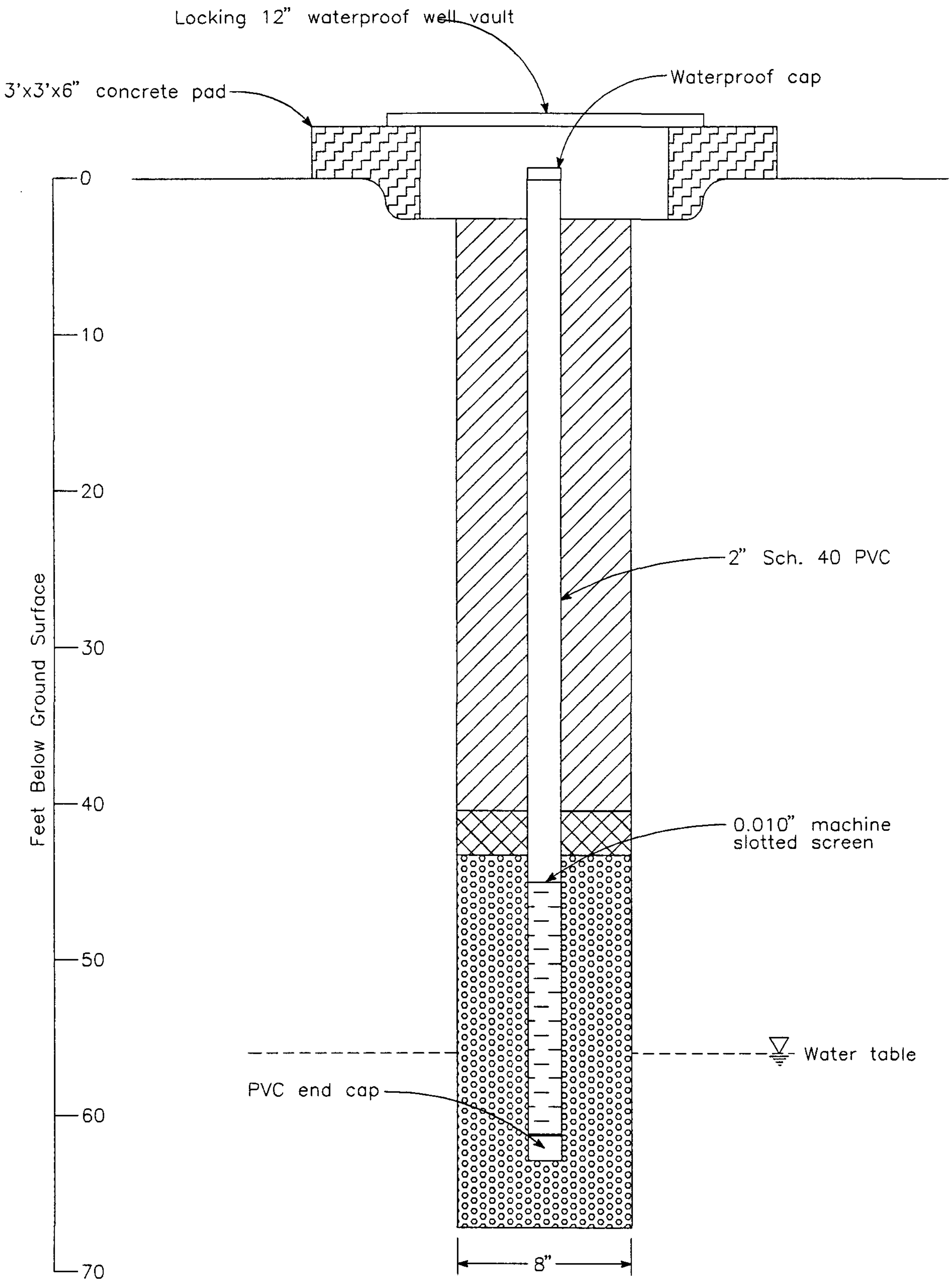
ROSWELL COMPRESSOR STATION
Proposed Phase I Soil Boring Locations

Figure 4-1



Metal Storage Building
Gravel Road
W 4+00
W 2+00
0+00
E 2+00
E 4+00
E 6+00
MW-6
Fire Hose House
Fire Training Area
North Loading Dock
Drum Storage Area
MW-5
SG-09-358
Pit 3
Bldg.
Bldg.
Bldg.
Condensate Waste Tank
SB-9-06
SG-09-91
SG 91
P9-OS-349
SG 349
Panhandle Pig Receiver
Pig Wash Rack
BH-10
MW-2
BH-11
PIT 3 BH-1
PIT 3 BH-2
Pit 1
Pit 2
SB-9-07
Mist Extractor
RB-4
RB-6
RB-3
RB-5
SG 360
SG-09-360
RB-1
RW-1
MW-1
SB-1A
RB-2
West Texas
Pig Receiver
(Main Line)
MW-3
SG 86
MW-1B
SB-10
SG 361
Panhandle Pipeline
OS BH-1
OS BH-2
SG-09-331
OS BH-5
OS BH-4
P9-OS-370
OS BH-8
OS BH-6
OS BH-9
SG-09-337
OS BH-3
OS BH-7
SB-4
P9-OS-377
N 18+00
N 20+00
N 22+00
N 24+00
N
0
150'
Explanation
Proposed Shallow Monitor Well Locations
Previous Soil Boring Locations
D\4115\411501F.DWG
DANIEL B. STEPHENS & ASSOCIATES, INC.
1-95
JN4115
ROSWELL COMPRESSOR STATION
Proposed Phase I Monitor Well Locations

Figure 5-1



Note: Actual depth and screened interval will be determined following initiation of ground-water assessment plan.

Cement/Bentonite Grout
Hydrated Bentonite Plug
20/40 Silica Sand Pack
Not to Scale

D\4115\6-2MWS.DWG

ROSWELL COMPRESSOR STATION
Monitor Well Schematic

DANIEL B. STEPHENS & ASSOCIATES, INC.
1-95 4115

Figure 5-2

ROSWELL COMPRESSOR STATION

Proposed Schedule for Phase I Closure Activities

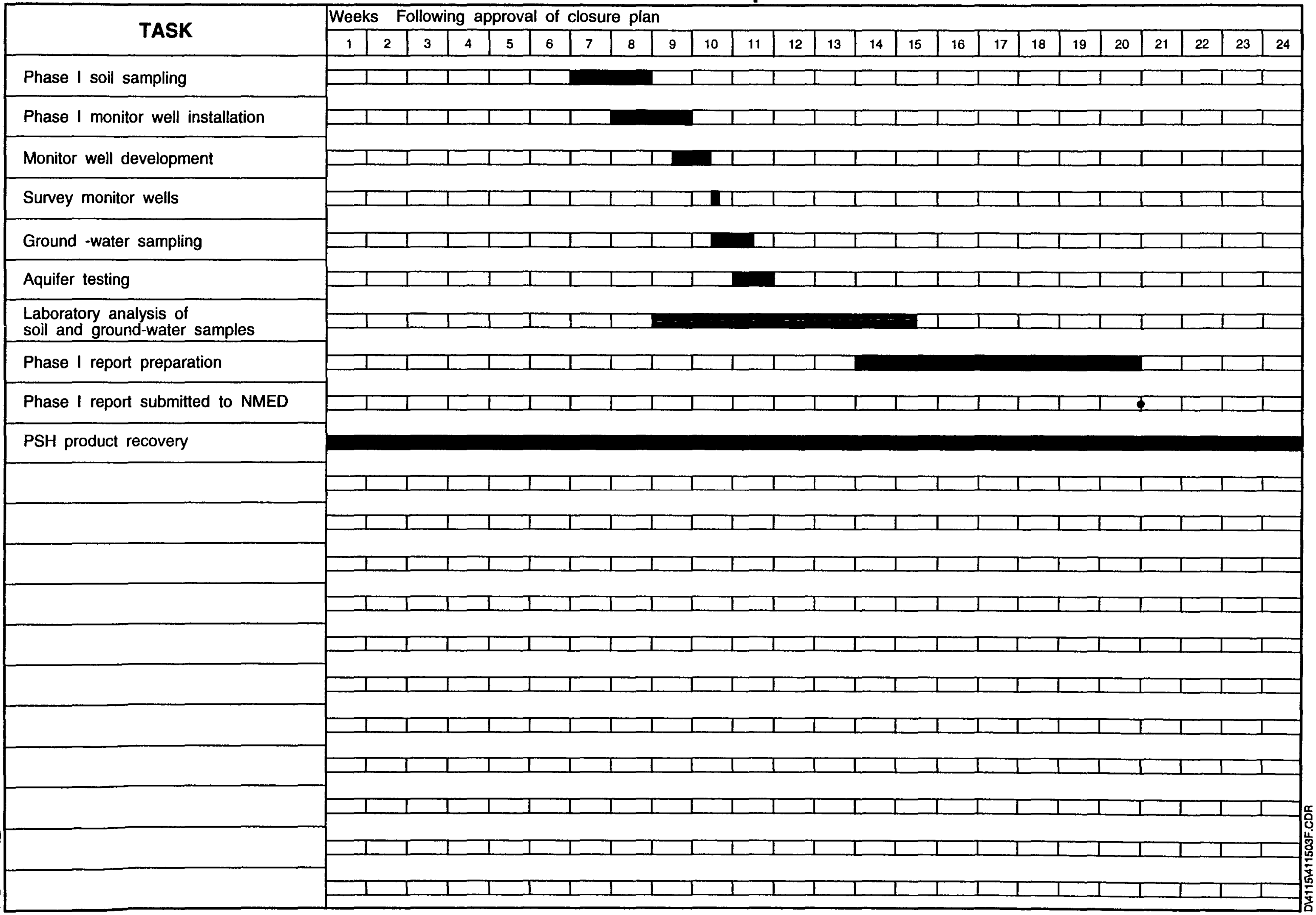


Figure 7-1

Notes: Project 4115

DANIEL B. STEPHENS & ASSOCIATES, INC.

TABLES

Table 2-1. Water Supply Wells Located Within 2 Miles of Roswell Compressor Station No. 9

Well Number[1]	Latitude	Longitude	Well ID	Well Depth (ft)	Depth to Water (ft) / Year	Aquifer	Distance From Site (miles)	Date Drilled	Use	Status
1	333028	1043119	09S.24E.29.223313	NA	63 / 1961	San Andres Fm	0.66	NA	Livestock	Abandoned; plugged
2	333031	1043103	09S.24E.28.113132	352	65 / 1994	San Andres Fm	0.49	09/17/69	Observation	Abandoned; open
3	333050	1043025	09S.24E.21.43213	58	15 / 1937	Alluvial Fill	0.45	NA	Livestock	Abandoned; plugged
4	333053	1043134	09S.24E.20.413	NA	NA	San Andres Fm	0.63	NA	NA	Abandoned; not found
5	333059	1043135	09S.24E.20.32422	370	63 / 1948	San Andres Fm	0.73	NA	Industrial	In use
6	333145	1043159	09S.24E.17.331222	208	119 / 1948	Artesia Group	1.54	NA	Observation	NA
7	333128	1043022	09S.24E.21.2124	NA	NA	NA	0.83	NA	Livestock	Abandoned; plugged
8	333149	1042931	09S.24E.15.41313	425	47 / 1961	San Andres Fm	1.72	03/18/59	Irrigation	In use
9	333128	1043004	09S.24E.22.1113	386	281 / 1968	San Andres Fm	1.06	NA	Livestock	Abandoned; open
10	333041	1042924	09S.24E.27.21212	NA	NA	NA	1.50	NA	Irrigation	Not in use
11	332934	1043021	09S.24E.33.21443	510	53 / 1965	San Andres Fm	1.60	NA	Irrigation	NA
12	332927	1043106	09S.24E.32.242443	NA	43 / 1961	Artesia Group	1.66	NA	Livestock	Abandoned
13	332921	1043134	09S.24E.32.233324	116	72 / 1960	San Andres Fm	1.86	NA	Livestock	NA
14	333055	1043236	09S.24E.19.41331	550	126 / 1962	San Andres Fm	2.01	NA	Irrigation	NA
15	333151	1042903	09S.24E.15.42442	375	55 / 1959	San Andres Fm	2.08	12/15/58	Domestic	Abandoned; open
16	333207	1042914	09S.24E.15.24321	365	66 / 1966	San Andres Fm	2.12	11/15/65	Irrigation	Abandoned; has pump
17	333211	1043037	09S.24E.16.1422	NA	NA	NA	1.53	NA	Irrig/Stock	In use
18	333021	1042845	09S.24E.26.1431	NA	NA	NA	2.15	NA	Domestic	In use

Sources: USGS Ground-Water Site Inventory; field verification by Transwestern using GPS.

[1] Well numbers correspond to well locations shown on Figure 2-5. NA = Not available

Table 3-1. Summary of Previous Soil Borings and Monitor Wells
Roswell Compressor Station No. 9
Page 1 of 3

Boring No.	Source[1]	Boring Type[2]	Date of Completion	Location		Ground Surface Elevation	Total Depth (feet bgs)	Casing Diameter (inches)	Screened Interval (feet bgs)	Top of Sand Pack (feet bgs)	Top of Upper Clay[3] (feet bgs)
				North	East						
SB-9-06	HLA	ASB	04/03/90	NA	NA	NA	29.0	N/A	N/A	N/A	28.0
SB-9-07	HLA	ASB	04/03/90	NA	NA	NA	38.5	N/A	N/A	N/A	38.0
P9-OS-349	HLA	ASB	05/02/90	NA	NA	NA	40.0	N/A	N/A	N/A	34.0
P9-OS-377	HLA	ASB	05/02/90	NA	NA	NA	30.0	N/A	N/A	N/A	12.0
SG-09-91	HLA	ASB	05/15/90	NA	NA	NA	33.0	N/A	N/A	N/A	31.0
SG-09-331	HLA	ASB	05/16/90	NA	NA	NA	43.0	N/A	N/A	N/A	38.0
SG-09-337	HLA	ASB	05/17/90	NA	NA	NA	33.0	N/A	N/A	N/A	28.0
SG-09-358	HLA	ASB	05/17/90	NA	NA	NA	30.0	N/A	N/A	N/A	21.0
SG-09-360	HLA	ASB	05/16/90	NA	NA	NA	34.5	N/A	N/A	N/A	30.0
SG-09-370	HLA	ASB	05/16/90	NA	NA	NA	24.0	N/A	N/A	N/A	12.0
Pit 1	Metric	ASB	07/16/91	1798	176.6	3615.72	47.8	N/A	N/A	N/A	30.6
Pit 2	Metric	ASB	07/17/91	1995	216.6	3615.72	71.6	N/A	N/A	N/A	10.1
Pit 3 (BH-1)	Metric	ASB	07/18/91	1918	131.5	3615.71	32.8	N/A	N/A	N/A	ND
Pit 3 (BH-2)	Metric	ASB	07/18/91	1948	138.5	3615.68	29.5	N/A	N/A	N/A	ND
SG 86	Metric	ASB	07/22/91	1710	268.2	3613.52	40.7	N/A	N/A	N/A	33.6

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[2] ASB = Abandoned soil boring
MW = Monitor well
RW = Product recovery well

[3] Depth below ground surface (feet) to uppermost clay reported on boring log

bgs = Below ground surface
NA = Not available
N/A = Not applicable
ND = Not detected

Table 3-1. Summary of Previous Soil Borings and Monitor Wells
Roswell Compressor Station No. 9
Page 2 of 3

Boring No.	Source[1]	Boring Type[2]	Date of Completion	Location North	Location East	Ground Surface Elevation	Total Depth (feet bgs)	Casing Diameter (inches)	Screened Interval (feet bgs)	Top of Sand Pack (feet bgs)	Top of Upper Clay[3] (feet bgs)
SG 91	Metric	ASB	07/22/91	2053.2	66.5	3612.28	33.0	N/A	N/A	N/A	28.2
SG 349	Metric	ASB	07/25/91	2160.2	79.0	3615.56	30.4	N/A	N/A	N/A	29.7
SG 360	Metric	ASB	07/25/91	2261.5	166.8	3610.83	29.4	N/A	N/A	N/A	28.9
SG 361	Metric	ASB	07/25/91	2261.5	277.8	3610.15	41.3	N/A	N/A	N/A	38.9
OS BH-1	Metric	ASB	07/22/91	1664.9	375.9	3622.30	35.7	N/A	N/A	N/A	34.5
OS BH-2	Metric	ASB	07/24/91	1826.0	379.0	3618.39	70.6	N/A	N/A	N/A	22.1
OS BH-3	Metric	ASB	07/26/91	2108.7	495.1	3607.04	55.0	N/A	N/A	N/A	10.2
OS BH-4	Metric	ASB	07/29/91	2181.6	386.6	3604.95	31.0	N/A	N/A	N/A	24.4
OS BH-5	Metric	ASB	07/30/91	1992.0	389.5	3611.12	24.8	N/A	N/A	N/A	19.9
OS BH-6	Metric	ASB	07/30/91	1817.5	460.9	3619.15	72.6	N/A	N/A	N/A	ND
OS BH-7	Metric	ASB	07/31/91	1827.6	505.7	3616.69	40.3	N/A	N/A	N/A	22.0
OS BH-8	Metric	ASB	07/31/91	1671.9	460.8	3620.04	49.9	N/A	N/A	N/A	33.9
OS BH-9	Metric	ASB	08/01/91	1891.6	467.2	3614.77	49.7	N/A	N/A	N/A	31.0
BH-10	Metric	ASB	11/15/91	NA	NA	3617.33	37.8	N/A	N/A	N/A	27.8
BH-11	Metric	ASB	11/15/91	NA	NA	3617.60	37.8	N/A	N/A	N/A	28.9

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[3] Depth below ground surface (feet) to uppermost clay reported on boring log

bgs = Below ground surface
NA = Not available
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Table 3-1. Summary of Previous Soil Borings and Monitor Wells
Roswell Compressor Station No. 9
Page 3 of 3

Boring No.	Source[1]	Boring Type[2]	Date of Completion	Location North	Location East	Ground Surface Elevation	Total Depth (feet bgs)	Casing Diameter (inches)	Screened Interval (feet bgs)	Top of Sand Pack (feet bgs)	Top of Upper Clay[3] (feet bgs)
MW-1	Hall-NUS	MW/RW	7/21/92	2001.4	217.6	NA	68	4	28-68	25.2	NA
MW-1B	B&R	MW/RW	04/21/93	1854.0	265.5	3609.96[4]	65.5	2	55-65	53	34.5
MW-2	B&R	MW/RW	04/21/93	2034.3	102.4	3611.76[4]	65.0	2	55-65	53	30
MW-3	B&R	MW	04/26/93	1629.8	265.3	3614.88[4]	72.5	2	60-70	58	32
MW-5	B&R	MW	04/28/93	2049.7	–151.0	3612.76[4]	70	2	60-70	58	19.5
SB-1A	B&R	ASB	04/20/93	NA	NA	3613.48[4]	41.5	N/A	N/A	N/A	ND
SB-1C	B&R	ASB	04/29/93	NA	NA	3606.08[4]	36.0	N/A	N/A	N/A	30
SB-4	B&R	ASB	04/25/93	NA	NA	3604.78[4]	75	N/A	N/A	N/A	18
RB-1	B&R	ASB	6/13/93	1914	222	3613.22[4]	36.3	N/A	N/A	N/A	36.0
RB-2	B&R	ASB	6/12/93	1962	254	3611.11[4]	34.5	N/A	N/A	N/A	34.30
RB-3	B&R	ASB	6/12/93	1953	220	3612.76[4]	42	N/A	N/A	N/A	41.25
RB-4	B&R	ASB	6/13/93	1943	175	3614.41[4]	39	N/A	N/A	N/A	37.75
RB-5	B&R	ASB	6/13/93	2027	213	3608.61[4]	32	N/A	N/A	N/A	31.50
RB-6	B&R	ASB	NA	1989	206	3613.36[4]	38.5	N/A	N/A	N/A	38.5
RW-1 (RB-7)	B&R	RW	6/13/93	1987	222	3612.32[4]	42.5	4	36.8-41.7	34.8	41.5
MW-6	DBS&A	MW	12/1/94	1607.4	–266.2	3618.62	79	2	59.9-74.9	57.1	35.5

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B&R = Brown & Root Environmental, 1993
DBS&A = Daniel B. Stephens & Associates, Inc., 1994

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MW = Monitor well
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[3] Depth below ground surface (feet) to uppermost clay reported on boring log

bgs = Below ground surface
NA = Not available
N/A = Not applicable
ND = Not detected

[4] Original survey to arbitrary datum corrected to elevations above sea level by referencing boring elevations to the surveyed elevation of MW-3 (3614.88 asl).

Table 3-2. Summary of Organic Compounds Detected in Soil Samples
Roswell Compressor Station No. 9
Page 1 of 6

Sample ID	Source[2]	Concentration[1]													
		1,1,1-TCA	1,1-DCA	Acetone	Chloro-benzene	Chloro-form	PCA	PCE	Freon-113	Methylene chloride	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TPH (mg/kg)
SB9-6 @ 8-11'	HLA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<20
SB9-6 @ 18-20'	HLA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<20
SB9-6 @ 20-23'	HLA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	120
SB9-6 @ 26-28'	HLA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<20
SB9-6 @ 26-28' Tube #5	HLA	<5	ND	<10	<5	ND	<5	ND	6	16	ND	ND	<5	<5	<20
SB9-6 @ 26-28' Tube #6	HLA	<7	ND	<14	<7	ND	<7	ND	23*	9*	ND	ND	<7	<7	<20
SB9-7 @ 9-12'	HLA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1100
SB9-7 @ 21.5-24'	HLA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2000
SB9-7 @ 25.5-28'	HLA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2500
SB9-7 @ 29-32'	HLA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	11000
SB9-7 @ 29-32' Tube #7	HLA	<1300	ND	<2600	<1300	ND	<1300	ND	5100	<1300	ND	ND	720	1800	5000
SB9-7 @ 35-37'	HLA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4600
SB9-7 @ 35-37' Tube #8	HLA	<640	ND	<1300	<640	ND	<640	ND	<640	<640	ND	ND	1800	4200	13000
SB9-7 @ 35-37' Tube #9	HLA	2000	ND	<1300	<670	ND	2100	ND	<670	<670	ND	ND	2800	6500	30000
P9-OS-349 @ 5'	HLA	<5	ND	<11	<5	ND	<5	ND	26*	6*	ND	ND	<5	<5	<20
P9-OS-349 @ 10'	HLA	<6	ND	<11	<6	ND	<6	ND	18	9	ND	ND	<6	<6	100
P9-OS-349 @ 20'	HLA	<5	ND	<11	<5	ND	<5	ND	45*	<5*	ND	ND	<5	<5	<20
P9-OS-349 @ 25'	HLA	<5	ND	<11	<5	ND	<5	ND	21	10	ND	ND	<5	<5	100

[1] Concentrations are in µg/kg unless otherwise noted

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Note: All HLA analyses performed in on-site mobile laboratory

1,1,1-TCA = 1,1,1-Trichloroethane
1,1-DCA = 1,1-Dichloroethane
PCA = Tetrachloroethane
PCE = Tetrachloroethene
Freon-113 = 1,1,2-Trichloro-1,2,2-trifluoroethane
TPH = Total petroleum hydrocarbons

NA = Not analyzed
ND = Not detected
* = Compound was also detected in the QC blanks

Table 3-2. Summary of Organic Compounds Detected in Soil Samples
Roswell Compressor Station No. 9
Page 2 of 6

Sample ID	Source[2]	Concentration[1]													
		1,1,1-TCA	1,1-DCA	Acetone	Chloro-benzene	Chloro-form	PCA	PCE	Freon-113	Methylene chloride	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TPH (mg/kg)
P9-OS-349 @ 30'	HLA	<7	ND	<14	<7	ND	<7	ND	45*	<7	ND	ND	<7	<7	<20
P9-OS-349 @ 35'	HLA	<7	ND	<14	<7	ND	<7	ND	39	15	ND	ND	<7	<7	<20
P9-OS-349 @ 40'	HLA	<5	ND	<10	<5	ND	<5	ND	40	8	ND	ND	<5	<5	<20
P9-OS-377 @ 5'	HLA	<6	ND	34*	<6	ND	<6	ND	<6	<6	ND	ND	<6	<6	200
P9-OS-377 @ 10'	HLA	<6	ND	27*	<6	ND	<6	ND	<6	<6	ND	ND	<6	<6	<20
P9-OS-377 @ 15'	HLA	<6	ND	27*	<6	ND	<6	ND	<6	11	ND	ND	<6	<6	<20
P9-OS-377 @ 20'	HLA	<7	ND	37*	<7	ND	<7	ND	<7	7	ND	ND	<7	<7	<20
P9-OS-377 @ 25'	HLA	<6	ND	<12	<6	ND	<6	ND	46	36	ND	ND	<6	<6	<20
P9-OS-377 @ 30'	HLA	<7	ND	<13	<7	ND	<7	ND	69	23	ND	ND	<7	<7	<20
Pit 1 @ 2.8-3.0'	Metric	3200	ND	NA	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	25000
Pit 1 @ 9.2-9.4'	Metric	19000	ND	NA	ND	ND	ND	260	NA	ND	NA	NA	NA	NA	39000
Pit 1 @ 13.5-13.7'	Metric	18000	590	NA	ND	200	ND	330	NA	ND	NA	NA	NA	NA	55000
Pit 1 @ 18.8-19.0'	Metric	330	ND	NA	ND	ND	ND	870	NA	ND	NA	NA	NA	NA	20000
Pit 1 @ 26.8-27.0'	Metric	ND	ND	NA	ND	ND	ND	160	NA	ND	NA	NA	NA	NA	11000
Pit 1 @ 30.6-30.8'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	16
Pit 1 @ 41.6-41.8'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND	16
Pit 1 @ 43.5-43.7'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND	56

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1,1,1-TCA = 1,1,1-Trichloroethane
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PCA = Tetrachloroethane
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Freon-113 = 1,1,2-Trichloro-1,2,2-trifluoroethane
TPH = Total petroleum hydrocarbons

NA = Not analyzed
ND = Not detected
* = Compound was also detected in the QC blanks

Table 3-2. Summary of Organic Compounds Detected in Soil Samples
Roswell Compressor Station No. 9

Sample ID	Source[2]	Concentration[1]													
		1,1,1-TCA	1,1-DCA	Acetone	Chloro-benzene	Chloro-form	PCA	PCE	Freon-113	Methylene chloride	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TPH (mg/kg)
Pit 2 #1 @ 18.7-18.9'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	ND
Pit 2 #2 @ 18.7-18.9'	Metric	370	ND	NA	ND	ND	ND	650	NA	ND	NA	NA	NA	NA	13000
Pit 2 @ 26.0-26.2'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	170
Pit 2 @ 29.1-29.3'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	ND
Pit 2 @ 39.8-39.9'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	2600
Pit 2 @ 44.1-44.3'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND	44
Pit 2 @ 57.5-57.8'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	250
Pit 2 @ 69.9-70.1'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND	ND
Pit 3 BH-1 @ 30.7-30.9'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND	ND
Pit 3 BH-2 @ 25.0-25.2'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND	ND
SG 86 @ 13.5-13.7'	Metric	240	ND	NA	ND	ND	ND	1900	NA	ND	NA	NA	NA	NA	18000
SG 86 @ 18.7-18.9'	Metric	ND	ND	NA	ND	ND	ND	230	NA	ND	NA	NA	NA	NA	5200
SG 86 @ 24.9-25.1'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	ND
SG 86 @ 35.0-35.2'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	8.0
SG 86 @ 40.5-40.7'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND	ND
SG 91 @ 28.6-28.8'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND	ND
SG 349 @ 0.0-1.8'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	ND
SG 349 @ 2.9-4.6'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	ND

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1,1,1-TCA = 1,1,1-Trichloroethane
1,1-DCA = 1,1-Dichloroethane
PCA = Tetrachloroethane
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Freon-113 = 1,1,2-Trichloro-1,2,2-trifluoroethane
TPH = Total petroleum hydrocarbons

NA = Not analyzed
ND = Not detected
* = Compound was also detected in the QC blanks

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Table 3-2. Summary of Organic Compounds Detected in Soil Samples
Roswell Compressor Station No. 9
Page 4 of 6

Sample ID	Source[2]	Concentration[1]													
		1,1,1-TCA	1,1-DCA	Acetone	Chloro-benzene	Chloro-form	PCA	PCE	Freon-113	Methylene chloride	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TPH (mg/kg)
SG 349 @ 9.0-10.0'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	ND
SG 349 @ 14.0-14.8'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	ND
SG 349 @ 20.3-21.3'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	ND
SG 349 @ 5.3-26.3'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	ND
SG 349 @ 29.7-30.4'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND	ND
SG 360 @ 0.0-2.5'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	ND
SG 360 @ 4.0-5.0'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	ND
SG 360 @ 9.0-9.9'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	ND
SG 360 @ 14.0-14.7'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	ND
SG 360 @ 19.0-20.0'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	ND
SG 360 @ 24.0-25.0'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	ND
SG 360 @ 29.0-29.4'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	2.0
SG 361 @ 0.0-2.5'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	ND
SG 361 @ 4.0-5.0'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	ND
SG 361 @ 9.0-10.0'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	ND
SG 361 @ 16.0-16.4'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	ND
SG 361 @ 19.5-19.8'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	ND
SG 361 @ 24.0-25.0'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	ND

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NA = Not analyzed
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* = Compound was also detected in the QC blanks

Table 3-2. Summary of Organic Compounds Detected in Soil Samples
Roswell Compressor Station No. 9

Sample ID	Source[2]	Concentration[1]													
		1,1,1-TCA	1,1-DCA	Acetone	Chloro-benzene	Chloro-form	PCA	PCE	Freon-113	Methylene chloride	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TPH (mg/kg)
SG 361 @ 38.0-39.3'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	ND
OS BH-1 @ 18.9-19.1'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	12
OS BH-1 @ 34.3-34.5'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	ND
OS BH-2 @ 9.9-10.1'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	ND
OS BH-2 @ 22.5-22.6'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	ND
OS BH-2 @ 31.1-31.3'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	68
OS BH-2 @ 41.8-42.0'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	24
OS BH-2 @ 55.2-55.4'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	16
OS BH-2 @ 69.0-69.2'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	16
OS BH-3 @ 21.0-21.2'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND	ND
OS BH-3 @ 44.1-44.3'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	16
OS BH-3 @ 54.7-55.0'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND	16
OS BH-4 @ 27.5-27.7'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND	ND
OS BH-5 @ 14.0-14.2'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	ND
OS BH-5 @ 19.6-19.9'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	16
OS BH-5 @ 23.4-23.6'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND	12
OS BH-6 @ 13.6-13.8'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	12
OS BH-6 @ 47.0-47.2'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	ND

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Metric = Metric Corporation (1991)
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Note: All HLA analyses performed in on-site mobile laboratory

1,1,1-TCA = 1,1,1-Trichloroethane
1,1-DCA = 1,1-Dichloroethane
PCA = Tetrachloroethane
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Freon-113 = 1,1,2-Trichloro-1,2,2-trifluoroethane
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NA = Not analyzed
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Table 3-2. Summary of Organic Compounds Detected in Soil Samples Roswell Compressor Station No. 9 Page 6 of 6

Sample ID	Source[2]	Concentration[1]													
		1,1,1-TCA	1,1-DCA	Acetone	Chloro-benzene	Chloro-form	PCA	PCE	Freon-113	Methylene chloride	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TPH (mg/kg)
OS BH-6 @ 52.6-52.8'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	ND
OS BH-6 @ 70.0-71.0'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND	ND
OS BH-7 @ 22.1-22.3'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND	ND
OS BH-7 @ 33.5-33.7'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	ND
OS BH-7 @ 37.0-37.2'	Metric	ND	ND	NA	ND	ND	ND	170	NA	ND	ND	ND	190	440	12
OS BH-8 @ 4.6-4.9'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	12
OS BH-8 @ 33.9-34.1'	Metric	ND	ND	NA	120	ND	ND	160	NA	ND	NA	NA	NA	NA	ND
OS BH-8 @ 49.7-49.9'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	ND	ND	140	300	12
OS BH-9 @ 4.5-4.9'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	8
OS BH-9 @ 32.0-32.5'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	NA	NA	NA	NA	150
OS BH-9 @ 49.5-49.7'	Metric	ND	ND	NA	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND	8
BH-10 @ 37.3-37.6'	Metric	NA	NA	NA	ND	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND
BH-11 @ 36.3-36.7'	Metric	NA	NA	NA	ND	NA	NA	NA	NA	NA	ND	ND	ND	ND	8
SB-1C @ 25-26'	B&R	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<20
SB-5 @ 19-21'	B&R	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<20
SB-5 @ 64-66'	B&R	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<20

[1] Concentrations are in µg/kg unless otherwise noted

[2] HLA = Harding Lawson Associates (1991a)
Metric = Metric Corporation (1991)
B&R = Brown and Root Environmental (1993)
Note: All HLA analyses performed in on-site mobile laboratory

1,1,1-TCA = 1,1,1-Trichloroethane
1,1-DCA = 1,1-Dichloroethane
PCA = Tetrachloroethane
PCE = Tetrachloroethene
Freon-113 = 1,1,2-Trichloro-1,2,2-trifluoroethane
TPH = Total petroleum hydrocarbons

NA = Not analyzed
ND = Not detected
* = Compound was also detected in the QC blanks

Table 3-3. Summary of TCLP Inorganic Constituents Detected in Soil Samples
Roswell Compressor Station No. 9
Page 1 of 2

Sample ID	Source[1]	Concentration (mg/L) Arsenic (TCLP Extract)	Barium (TCLP Extract)	Cadmium (TCLP Extract)	Chromium (TCLP Extract)	Lead (TCLP Extract)	Mercury (TCLP Extract)	Selenium (TCLP Extract)	Silver (TCLP Extract)
TCLP Limit	—	***5.0***	***100.0***	***1.0***	***5.0***	***5.0***	***0.2***	***1.0***	***5.0***
SB9-6 @ 8-11'	HLA	0.004	0.63	0.0010	<0.006	<0.002	<0.0002	<0.003	<0.0005
SB9-6 @ 18-20'	HLA	<0.003	1.21	<0.0005	<0.006	<0.002	<0.0002	<0.003	<0.0005
SB9-6 @ 20-23'	HLA	<0.003	0.7	<0.0005	0.011	<0.002	<0.0002	<0.003	0.0026
SB9-6 @ 26-28'	HLA	<0.003	1.22	0.0006	0.006	0.008	<0.0002	<0.003	<0.0005
SB9-6 @ 26-28' Tube #5	HLA	<0.003	1.3	0.0012	0.007	0.002	<0.0002	<0.003	<0.0005
SB9-6 @ 26-28' Tube #6	HLA	0.009	0.010	0.0008	0.011	<0.002	<0.0002	<0.003	<0.0005
SB9-7 @ 9-12'	HLA	<0.003	0.75	0.0005	0.007	0.003	<0.0002	<0.003	<0.0005
SB9-7 @ 21.5-24'	HLA	0.004	2.22	0.0010	<0.006	<0.002	<0.0002	<0.003	<0.0005
SB9-7 @ 25.5-28'	HLA	<0.003	1.81	<0.0005	0.009	<0.002	<0.0002	<0.003	<0.0005
SB9-7 @ 29-32'	HLA	0.008	3.59	0.0011	0.009	<0.002	<0.0002	<0.003	<0.0005
SB9-7 @ 29-32' Tube #7	HLA	0.008	1.81	0.0012	0.006	<0.002	<0.0002	<0.003	<0.0005
SB9-7 @ 35-37'	HLA	0.008	1.72	0.0007	0.007	<0.002	<0.0002	<0.003	<0.0005
SB9-7 @ 35-37' Tube #8	HLA	0.005	1.84	0.0006	<0.006	<0.002	<0.0002	<0.003	<0.0005
SB9-7 @ 35-37' Tube #9	HLA	0.004	3.12	0.0006	0.01	<0.002	<0.0002	<0.003	<0.0005
P9-OS-349 @ 5'	HLA	0.007	1.21	0.0009	0.012	0.012	<0.0002	<0.003	<0.0006
P9-OS-349 @ 10'	HLA	0.005	0.4	<0.0006	0.013	0.011	<0.0002	<0.01	<0.0006
P9-OS-349 @ 20'	HLA	<0.003	0.77	<0.0006	0.009	0.004	<0.0002	<0.003	<0.0006

[1] HLA = Harding Lawson Associates (1991a)

**Table 3-3. Summary of TCLP Inorganic Constituents Detected in Soil Samples
Roswell Compressor Station No. 9
Page 2 of 2**

Sample ID	Source[1]	Concentration (mg/L)							
		Arsenic (TCLP Extract)	Barium (TCLP Extract)	Cadmium (TCLP Extract)	Chromium (TCLP Extract)	Lead (TCLP Extract)	Mercury (TCLP Extract)	Selenium (TCLP Extract)	Silver (TCLP Extract)
TCLP Limit	---	***5.0***	***100.0***	***1.0***	***5.0***	***5.0***	***0.2***	***1.0***	***5.0***
P9-OS-349 @ 30'	HLA	<0.003	1.48	<0.0006	0.009	0.007	<0.0002	<0.003	<0.0006
P9-OS-349 @ 35'	HLA	<0.003	1.36	<0.0006	0.011	0.005	<0.0002	<0.003	<0.0006
P9-OS-349 @ 40'	HLA	0.005	0.23	0.0013	<0.007	<0.002	<0.0002	<0.003	<0.0006
P9-OS-377 @ 5'	HLA	0.004	1.05	<0.0006	0.009	0.003	<0.0002	<0.003	<0.0006
P9-OS-377 @ 10'	HLA	0.01	0.19	0.0018	0.007	0.004	<0.0002	<0.01	<0.0006
P9-OS-377 @ 15'	HLA	<0.003	0.15	0.003	0.011	0.009	<0.0002	<0.003	<0.0006
P9-OS-377 @ 20'	HLA	0.003	0.16	0.0010	0.011	0.003	<0.0002	<0.01	<0.0006
P9-OS-377 @ 25'	HLA	0.006	0.06	0.0009	<0.007	<0.002	<0.0002	<0.02	<0.0006
P9-OS-377 @ 30'	HLA	0.011	0.32	<0.0006	<0.007	<0.002	<0.0002	<0.003	<0.0006

[1] HLA = Harding Lawson Associates (1991a)

Table 3-4. Summary of Organic Compounds Detected in Ground-Water Samples Roswell Compressor Station No. 9

Sample ID	Source[2]	Date	Concentration[1]											
			Benzene	Toluene	Ethyl-benzene	o-Xylene	p-Xylene, m-Xylene	1,1,1-TCA	1,1-DCA	2-Butanone (MEK)	Naphthalene	2-Methyl-naphthalene	4-Methyl-phenol	Petroleum Hydrocarbons (mg/L)
NMWQCC Ground-Water Standard			10	750	750	620[3]		60	NS	NS	NS	30[4]	NS	NS
MW-1	HB	09/21/92	370	61	110	120	820	180	560	220	34	51	250	37
MW-2	B&R	10/09/93	6,500	15,000	2,100	13,000[3]		<300	<300	NA	NA	NA	NA	NA
MW-3	B&R	04/30/93	<5	<5	<5	NA	NA	<5	<5	NA	NA	NA	NA	<0.2
MW-5	B&R	04/30/93	<5	<5	<5	NA	NA	<5	<5	NA	NA	NA	NA	<0.2
MW-6	DBS&A	12/02/94	<0.5	<0.5	<0.5	<0.5[3]		<0.2	<0.2	NA	NA	NA	NA	<2.5
TW-1	DBS&A	12/22/94	<1	<5	<5	<5		<5	<5	<100	<10	<10	<10	NA
Well #5[5]	DBS&A	12/22/94	<1	<5	<5	<5		<5	<5	<100	NA	NA	NA	NA

[1] Concentrations are in µg/L unless otherwise noted
[2] HB = Halliburton NUS Environmental Corp. (1992)
B&R = Brown and Root Environmental (1993)
DBS&A = Daniel B. Stephens & Associates, Inc. (1994)
[3] Total xylenes
[4] Sum of naphthalene and methylnaphthalene
[5] Off-site water supply well; see Figure 2-5 for location

1,1,1-TCA = 1,1,1-Trichloroethane
1,1-DCA = 1,1-Dichloroethane
MEK = Methyl ethyl ketone

NA = Not analyzed
ND = Not detected
NS = No standard

Table 3-5. Summary of Inorganic Constituents Detected in Ground-Water Samples Roswell Compressor Station No. 9

			Concentration (mg/L)																
			Arsenic		Barium		Cadmium		Chromium		Lead		Mercury		Selenium		Silver		
Sample ID	Source[1]	Date	T	D	T	D	T	D	T	D	T	D	T	D	T	D	T	D	TDS
NMWQCC Ground-Water Standards			NS	0.1	NS	1.0	NS	0.01	NS	0.05	NS	0.05	0.002	NS	NS	0.05	NS	0.05	1000
MW-1	HB	09/21/92	0.19	NA	4.4	NA	<0.005	NA	0.01	NA	<0.05	NA	<0.0002	NA	<0.003	NA	<0.01	NA	NA
MW-3	B&R	04/30/93	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3,400
	CES	03/23/94	<0.03	<0.03	0.09	0.02	<0.01	<0.01	<0.01	<0.01	0.04	<0.03	<0.0002	<0.0002	<0.04	<0.04	<0.01	<0.01	NA
MW-5	B&R	04/30/93	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3,800
	CES	03/23/94	<0.03	<0.03	0.38	0.01	<0.01	<0.01	0.03	<0.01	0.04	<0.03	<0.0002	<0.0002	<0.04	<0.04	<0.01	<0.01	NA
TW-1	DBS&A	12/22/94	<0.05	NA	0.14	NA	<0.005	NA	<0.01	NA	0.06	NA	<0.0002	NA	<0.1	NA	<0.01	NA	1,290
Well #5[2]	DBS&A	12/22/94	<0.05	NA	0.02	NA	<0.005	NA	<0.01	NA	<0.05	NA	<0.0002	NA	<0.1	NA	<0.01	NA	2,420

[1] HB = Halliburton NUS Environmental Corp. (1992)
B&R = Brown and Root Environmental (1993)
CES = Cypress Engineering Services (1994)
DBS&A = Daniel B. Stephens & Associates, Inc. (1994)
[2] Off-site water supply well; see Figure 2-5 for location.

TDS = Total dissolved solids
T = Total metals concentrations determined on unfiltered samples
D = Dissolved metals concentrations determined on samples filtered in the laboratory prior to analysis
NA = Not analyzed
NS = Not standard

Note: New Mexico Water Quality Control Commission (NMWQCC) ground-water standards pertain to dissolved constituents, except mercury; the mercury standard applies to the total (unfiltered) mercury concentration.

Table 3-6. Well Coordinates and Depth to Water for Existing Monitor Wells

Monitor Well	Location[1]	RP Elevation[2] (feet asl)	DTW[3] (feet)	Ground-Water Elevation (feet asl)	Date/Time Measured
RW-1	N1999.1 E224.4	3612.03	NA	NA	NA
MW-1	N2001.4 E217.6	3612.95	NA	NA	NA
MW-1B	N1854.0 E265.5	3610.44	NA	NA	NA
MW-2	N2034.3 E102.4	3612.83	NA	NA	NA
MW-3	N1629.8 E265.3	3614.88	64.6 64.58	3550.28 3550.30	12/04/94 1145 12/22/94 1721
MW-5	N2049.7 W151.0	3612.78	62.55 62.64	3550.23 3550.14	12/04/94 1140 12/22/94 1728
MW-6	N1607.4 W266.2	3618.62	65.5 63.59	3553.12 3555.03	12/04/94 1155 12/22/94 1715

Note: Well coordinates surveyed December 1, 1994 by Atkins Engineering Associates, Inc. (Roswell)

[1] Horizontal coordinates relative to station datum (see Figure 2-1).
[2] Reference point elevation (feet above sea level) for each monitor well determined relative to station datum.
[3] Depth to water (DTW) below RP on top of casing.
[4] Ground-water elevation determined as RP elevation minus DTW

Boring logs, if available, are provided in Appendix G.

Table 6-1. Analytical Parameters, Methods, and Data Quality Objectives

Analyte Class	EPA Method[1]	Precision Objective (RPD)[2]	Accuracy Objective (%R)[3]	Completeness Objective (%)
Soils and Ground Water				
VOCs	8240	20	80 to 120	90
SVOCs	8270	30	60 to 140	90
PCBs	8080	30	60 to 140	90
Appendix IX total metals[4]	6010/7000	20	80 - 120	90
Total cyanide	9012	20	80 to 120	90
Total sulfide	9030	20	80 to 120	90
Total petroleum hydrocarbons	418.1	20	NA	90
Ground Water Only				
Major cations[5]	6010	20	NA	90
Total alkalinity	310.1	20	NA	90
Chloride	9250	20	NA	90
Sulfate	9038	20	NA	90
Nitrate and nitrite	9200	20	NA	90
TDS	160.1	20	NA	90

[1] U.S. EPA, 1986.
[2] Relative percent difference between duplicate.
[3] Percent recovery of matrix spike.
[4] Includes Ag, As, Ba, Be, Cd, Co, Cr, Cu, Hg, Ni, Pb, Sb, Se, Sn, Tl, V, Zn.
[5] Includes Ca, K, Mg, Na, Fe, Mn.

Table 6-2. Sample Collection Protocol

Analyte	EPA Method	Sample Volume/Container	Sample Preservation	Holding Time
Soil Matrix				
VOCs	8010/8020	2.5" x 6" brass ring	Chill to 4°C	14 days
SVOCs	8270	2.5" x 6" brass ring	Chill to 4°C	14/40 days
PCBs	8080	2.5" x 6" brass ring	Chill to 4°C	14/40 days
Appendix IX metals[1]	6010/7000	2.5" x 6" brass ring	Chill to 4°C	6 months
Total cyanide	9010	2.5" x 6" brass ring	Chill to 4°C	14 days
Total sulfide	9030	2.5" x 6" brass ring	Chill to 4°C	7 days
TPH (gasoline)	418.1	2.5" x 6" brass ring	Chill to 4°C	28 days
Ground-Water Matrix				
VOCs	8240	Two 40-mL septum vials	HCl to pH<2; chill to 4°C	14 days
SVOCs	8270	1 L glass	Chill to 4°C	7/40 days
Pests/PCBs	8080	1 L glass	Chill to 4°C	7/40 days
Phosphorus pesticides	8140	1 L glass	Chill to 4°C	7/40 days
Chlorinated herbicides	8150	1 L glass	Chill to 4°C	7/40 days
Appendix IX metals[1]	6010/7000	1 L glass	Chill to 4°C	6 months
Total cyanide	9010	1 L glass	NaOH to pH>12	14 days
Total sulfide	9030	1 L glass	ZnAc + NaOH to pH>12	7 days
TPH (gasoline)	418.1	Two 40-mL septum vials	HCl to pH<2; chill to 4°C	28 days
Major cations[2]	3010/6010	500-mL plastic	HNO_3 to pH<2	6 months
Bicarbonate (total)	310.1	500-mL plastic	Chill to 4°C	14 days
Chloride (total)	9250	500-mL plastic	Chill to 4°C	28 days
Nitrate (total)	9200	500-mL plastic	H_2SO_4 to pH<2; chill to 4°C	28 days
Sulfate (total)	9038	500-mL plastic	Chill to 4°C	28 days
TDS	160.1	500-mL plastic	Cihll to 4°C	7 days

Note: All laboratory analyses to be performed on unfiltered ground-water samples.

[1] Includes Ag, As, Ba, Be, Cd, Co, Cr, Cu, Hg, Ni, Pb, Sb, Se, Sn, Tl, V, Zn.
[2] Includes Ca, K, Mg, Na, Fe, Mn.

DANIEL B. STEPHENS & ASSOCIATES, INC.
ENVIRONMENTAL SCIENTISTS AND ENGINEERS

CLOSURE PLAN FOR ROSWELL COMPRESSOR STATION SURFACE IMPOUNDMENTS

Volume II: Appendices A Through E

Prepared for

ENRON Environmental Affairs

Houston, Texas

January 16, 1995

6020 ACADEMY NE • SUITE 100 • ALBUQUERQUE, NM 87109 • (505) 822-9400

DANIEL B. STEPHENS & ASSOCIATES, INC.

ENVIRONMENTAL SCIENTISTS AND ENGINEERS

CLOSURE PLAN FOR ROSWELL COMPRESSOR STATION SURFACE IMPOUNDMENTS

Volume II: Appendices A Through E

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Appendix

APPENDIX A

NMED NOTICE OF DEFICIENCY

March 7, 1994
Notice of Deficiency

ATTACHMENT

TRANSWESTERN PIPELINE COMPANY

NOTICE OF DEFICIENCY

Liquid Waste Impoundment Closure Plan

MARCH 7, 1994

Introduction:

The following is a list of the required information that Transwestern Pipeline Company (TW) must provide to the New Mexico Environment Department (NMED), Hazardous and Radioactive Materials Bureau (HRMB). Quotes in bold, below, are taken directly from the text submitted by TW, dated June 21, 1993:

I. Closure Plan [HWMR-7, Part VI, 40 CFR, §§265.111 and 112]

a) Provide a comprehensive Closure Plan identifying the steps necessary to perform closure of the Compression Station No. 9 Surface Impoundment (hereafter,facility). Include a description of how final closure of the facility will be conducted.

b) Present a closure schedule for the surface impoundment in question, including at a minimum, the total time required to close the hazardous waste management unit and the time required for intervening closure activities which will allow tracking of the progress of the partial and final closure.

c) (Page 5, Section 5.0,): **"Summary of Interim Corrective Measures"**

Submit a report to HRMB, on a monthly basis, describing the status of the interim corrective measures being implemented by TW. This will enable HRMB to keep track of the progress of the corrective action interim measures.

d) (Page 5, Section 6.0, second paragraph): **"The vertical and lateral extent of contamination in this zone has been clearly defined."**

Provide the documentation evidence necessary to support this statement. The copy of the Brown and Root letter report, enclosed in a September 7, 1993 letter to Mr.

Edward Horst, is insufficient documentation to support this statement.

e) Provide a map similar to Brown and Root's Attachment 1 of May 15, 1993, but with the limits of the recoverable petroleum hydrocarbons clearly established such that the lateral and vertical extent of the contamination plume limits of interest will no longer be termed "**suspect**" as indicated on the TW's Attachment 1 mentioned above. Include an indication of the locations of monitoring wells.

f) (Page 6, Section 7.0, paragraph 4): **"... an inside-out approach will be used to determine boring locations."**

Provide an adequate method to delineate the horizontal and vertical extent of contamination. This is required because the general application of an "inside-out" approach to investigating the contamination, both within the perched aquifer and the uppermost aquifer is acceptable, however, the approach specified in this section is inadequate for delineating the extent of the contamination both vertically and horizontally.

g) Submit a site-specific map indicating the location of the liquid waste impoundment under discussion in relation to the facility site. Include TW's Figure 2 that was mentioned, but not included in the June 21, 1993 report and closure plan.

h) Furnish an estimate of the maximum inventory of hazardous waste that needs to be removed from the contaminated site, including, the methods and steps TW plans to use for removing, transporting, treating, storing or disposing of all hazardous waste of interest.

i) Submit a detailed description of the measures that will be taken to remove or decontaminate all hazardous waste residues and contaminated equipment, containment system, structures, and soils during final closure.

II. <u>Amendment of Plan</u> [HWMR-7, Part VI, 40 CFR, §265.112(c)]

The Closure Plan must contain provisions for possible amendment of the Closure Plan and for notifying the Secretary, NMED at least 60 days prior to the any proposed change(s) in corrective action design or operation, preceded by a 180 day notification to the date on which TW expects to begin closure of the surface impoundment, in accordance with the approved closure plan.

III. Disposal or Decontamination of Equipment, Structures and Soils [HWMR-7, Part VI, 40 CFR, §265.114]

a) Demonstrate how disposal or decontamination of all equipment, soils, and structures will be conducted during partial and final closure periods. Include the anticipated amount of time within which TW plans to submit to the Secretary, NMED, by registered mail, a certification that the hazardous waste management facility has been closed in accordance with specifications in the approved closure plan.

b) (Page 5, Section 6.0, first paragraph): **"Remediation of the shallow perched zone..."**

Explain the "natural clay basin", and the "presumed basin", described in earlier portions of the Closure Plan [Section 4.0, paragraph 3, fourth sentence; and paragraph 4, first sentence]. This is confusing and may lead to misunderstanding in the future.

TW must assign a formal title to the liquid waste impoundment for all subsequent documentation. For purposes of the assessment portion of the Closure Plan, the saturated material within the liquid waste impoundment should henceforth be referred to as the "perched aquifer".

IV. **Ground Water monitoring [HWMR-7, Part VI, §265.90-93]**

a) Provide a ground-water monitoring program capable of determining the facility's impact on the quality of the ground water in the uppermost aquifer underlying the facility. The ground water monitoring system must be capable of yielding ground water samples for analysis. Also explain how any leachate collection, and run-on and run-off controls will be managed.

b) (Page 6, Section 7.0, paragraph 3): **"Additional investigations and evaluation are required prior to development of a final corrective measures plan for the lower unconfined aquifer."**

The requirements for additional investigations (a ground water quality assessment plan) are outlined and described in HWMR-7, Part VI, 40 CFR, §265.93(d)(4), 265.93(e) and 265.94(b). Additional requirements pertaining to the ground water quality assessment plan may be found in HWMR-7, Part VI, 40 CFR, §265.112(b)(4) and 265.112(b)(5).

For purposes of the assessment portion of the Closure

Plan the "lower unconfined aquifer" will be referred to as the "uppermost aquifer". See HWMR-7, Part I, 40 CFR, §260.10 for the definition of "uppermost aquifer".

c) Provide an acceptable ground water quality assessment plan which should include, at a minimum, the following:

1. A characterization of the uppermost aquifer including flow nets, cross-sections, hydraulic conductivities of the aquifer and any confining units based upon site-specific data (pump or slug test data), and all calculations of hydraulic conductivity based on the data.

2. The hydraulic conditions and potential contaminant pathways;

3. The proposed assessment monitoring system;

4. The investigative approach that will be used to fully characterize the rate, extent and concentrations of hazardous constituents and each investigatory phase involved;

5. The number, location, screen placement and depth of the wells that will initially be installed and the rationale for these decisions;

6. The strategy to be used in subsequent investigatory phases;

7. The chosen method of well drilling, construction and completion,

8. A comprehensive sampling and analysis plan (program) that will be used, including the number of samples to be collected and analyzed;

9. A data collection and data analysis quality assurance/quality control (QA/QC) program

10. The data analysis procedures that will be used to interpret the analytical data; and

11. The schedule of implementation of each phase of the assessment program.

September 28, 1994
Notice of Deficiency

State of New Mexico
ENVIRONMENT DEPARTMENT
Harold Runnels Building
1190 St. Francis Drive, P.O. Box 26110
Santa Fe, New Mexico 87502
(505) 827-2850

BRUCE KING
GOVERNOR

JUDITH M. ESPINOSA
SECRETARY

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DEPUTY SECRETARY

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September 28, 1994

Mr. Larry Campbell
Division Environmental Specialist
Transwestern Pipeline Company
Roswell, New Mexico 88202-1717

RE: **Notice of Technical Deficiency (NOD) of Closure Plan for Roswell Compressor Station Surface Impoundments.**

Dear Mr Campbell:

The New Mexico Environment Department (NMED) has reviewed for technical adequacy, the May 31, 1994 Transwestern Pipeline Company (TW) Closure Plan for Roswell Compressor Station Surface Impoundments as required under the Resource Conservation and Recovery Act (RCRA).

After reviewing the Closure Plan, NMED has found it to be technically deficient. The enclosed attachment lists the required information.

The information requested in the attachment must be submitted to NMED within thirty (30) days of receipt of this NOD. Failure to submit the required information in this designated time may result in our proposal to disapprove the closure plan or an appropriate enforcement act.

If you have any questions about how detailed your responses to any deficiency item should be, contact Ms. Teri Davis or Mr. Cornelius Amindyas at 827-4308 for further discussion.

Sincerely,

for Benito Garcia, Chief
Hazardous and Radioactive Materials Bureau

cc: Barbara Hoditschek, HRMB
Tracy Hughes, NMED
David Neleigh, EPA Region 6, w/Enclosures
Teri Davis, HRMB
File Red-94

ATTACHMENT

CLOSURE PLAN FOR ROSWELL COMPRESSOR STATION SURFACE IMPOUNDMENTS

NOTICE OF DEFICIENCY

September 28, 1994

NOTE: (1) The sections and pages quoted in parentheses correspond to the sections and pages of the May 31, 1994 cover letter and Closure Plan that Transwestern Pipeline Company (TW) submitted to the New Mexico Environment Department/Hazardous and Radioactive Materials Bureau (HRMB).

(2) The New Mexico Hazardous Waste Management Regulations formerly written as **HWMR-7**, shall from now henceforth be written as **20 NMAC 4.1.**

1. **Performance Standards: 20 NMAC 4.1, Subpart VI, 40 CFR, §265.112**

(Cover Letter): As stated in May 31, 1994 TW cover letter, "the compounds which have triggered RCRA involvement at this site are present in concentrations below USEPA proposed action levels for RCRA closure(proposed Subpart S, 7/27/90)". It should be clarified that acceptable ground water protection standards for RCRA units are derived using the guidance of Subpart S (Appendices A[Examples of Concentrations Meeting Criteria for Action Levels], B[Maximum Contaminant Levels], and C[Range of Concentrations for Establishing Media Protection Standards for Carcinogens]), plus New Mexico and U.S. EPA Drinking Water Standards, as well as risk assessment-derived concentrations that consider the effects of multiple constituents [52 FR No. 53 p. 8706, March 19, 1987].

Semi-volatile organic compounds (SVOC), volatile organic compounds (VOC), and metals have been detected above acceptable levels in the ground water of the uppermost aquifer underlying the subject regulated units (see Tables 3-4 and 3-5 of Closure Plan). The determination of a release from the unit(s) has already been shown by previous analysis indicating concentrations of SVOC, VOC, and metals above appropriate regulatory levels.

The Toxicity Characteristic Leaching Procedure (TCLP) is designed to determine the mobility of both organic and inorganic analytes present within wastes. This test is not appropriate for comparison with concentration limits to be established in the closure plan to ensure hazardous constituents do not exceed ground water protection standards. Ground water monitoring for 20 NMAC 4.1, Subpart V, 40 CFR, §264 Appendix IX constituents should be proposed in the closure plan in lieu of TCLP for ground water evaluations.

2. **Corrective Action Plan: 20 NMAC 4.1, Subpart V, 40 CFR, §264.97 and 264.112**

(Section 1.2, Page 2): Bullet #7 indicates that TW intends to apply for clean closure certification. However, data indicates that the uppermost aquifer has already been impacted. TW must therefore provide HRMB with detailed ground water assessment and ground water remediation plans, as well as the time frames associated with ground water remediation at similar sites.

3. **Location of Surface Impoundments**

(2.1, Page 5): The latitude and longitude of all three surface impoundments should be included in this section.

4. **Hazardous Waste Inventory**

(Section 2.2, Page 6): This section must contain information describing knowledge of process for the spent halogenated solvents (F001 wastes). How were these wastes utilized at this facility, what was the disposal practice (burning pits?), and how much of the waste was handled at the facility during what periods of time, etc? What prompted TW to believe that a contamination problem may exist at the compressor station? What led to the initial soil gas survey? TW must explain and clarify these comments.

5. **Releases from Surface Impoundments: 20 NMAC 4.1, Subpart V, 40 CFR, §264 Subpart F**

(Section 3.6.3, Page 26): The sentence "the lateral extent is bounded on-site by two clean monitoring wells along the northern (MW-5) and eastern (MW-3) fencelines" must be verified by Appendix IX sampling. Additionally, TW must determine the background water quality and specify the statistical method(s) that will be used in evaluating ground-water monitoring data for all hazardous constituents listed in Appendix IX. The background water quality evaluation must follow the requirements of 20 NMAC 4.1 Subpart V, Section 264 Subpart F.

6. **Ground Water Elevations**

(Section 3.6.3,Page 26): Ground water elevations are not included in this closure plan, preventing the evaluation of the direction of ground-water flow using MW 1B, 2,3,and 5. The closure plan must include estimates on the direction of ground water flow, based on data from monitoring wells completed within the uppermost aquifer and screened within the same elevation intervals.

7. (Section 3.6.3, Page 27): Include a descriptive summary of the ground water impacts in this section.

8. <u>Waste Characterization</u>: 20 NMAC 4.1, Subpart V, §264 Appendix IX
(Section 4.0, Page 28):

All surface impoundments should be characterized with respect to 20 NMAC 4.1, Subpart V, 40 CFR, §264 Appendix VIII hazardous constituents.

9. <u>Soil Assessment Plan</u>: (Section 4.1, Page 28):

A plan should be included in the Closure Plan to satisfy the sampling requirements of characterization at each impoundment. Based on the results from the surface impoundment characterization, a complete hazardous constituent list for the soil-assessment plan should be compiled for HRMB's approval.

10. (Section 4.1, Page 28, Fig.4-1):

The proposed soil boring locations in Figure 4-1 are inadequate to assess the extent of contamination. As mentioned in the March 7, 1994 NOD, the investigatory approach that will be used to fully characterize the rate, extent and concentrations of hazardous constituents and each investigatory phase involved must specify the number, location and depth of sampling; the rationale of sampling locations must be clearly stated. A phased approach to the soil assessment should be included in this section.

For example, if contamination is detected in the Phase I soil borings, a Phase II sampling plan will be submitted to HRMB for approval to further define the extent of soil contamination. A contingency sampling plan should be included in this section which will include such information as a predetermined distance (horizonal and vertical) and direction proposed to extend the sampling locations when contamination is detected in any of the soil borings. This approach will assure that the extent of contamination in a lateral manner and vertical manner has been assessed.

11. (Section 4.1, Page 28):

Include in this section a reference to the Standard Operating Procedures for assuring that cross-contamination between zones of saturation (perched zone and the uppermost aquifer) will not occur.

12. Laboratory Analysis: 20 NMAC 4.1, Subpart V, 40 CFR, §264 Appendix IX (Section 4.4, Page 30):

Laboratory analysis of soil samples should include Appendix IX hazardous constituents for the soil samples characterizing the surface impoundments. Appropriate analytical methods and parameters should be in accordance with 20 NMAC 4.1, Subpart II, 40 CFR 261 Appendix VIII suggestions. Based on the results from the surface impoundments, the Director, Water and Waste Management Division (hereafter Director) will determine what hazardous constituents will constitute the list for sampling during the phased investigation for soil assessment. Table 5-1 should be revised as appropriate.

13. Ground Water Assessment Plan: (Section 5.1, Page 34).

All monitoring wells should be constructed in accordance with the U.S. EPA RCRA Ground-Water Monitoring Technical Enforcement Guidance Document (TEGD)(September 1986) and updates as appropriate from the EPA RCRA Ground-Water monitoring: Draft Technical Guidance (November 1992). The screened intervals proposed in the closure plan should not exceed fifteen feet within the aquifer.

14. (Section 5.1, Page 34):

The latitude and longitude of all monitoring wells to be utilized in the compliance monitoring program and corrective action program should be summarized in table form. The coordinate system utilized in correspondence with HRMB should be consistent. It is suggested that the location system shown in Table 3-1 be replaced with the latitude-longitude system for consistency with State Engineer Office records and surface impoundments descriptions.

15. (Section 5.1.1, Page 34).

HRMB understands that the proposed locations of the monitoring wells are tentative. TW should address the possibility that information gained from drilling monitoring wells closest to the impoundments may change the proposed location of monitoring wells shown in Figure 5-1.

16. (Section 5.1.1, Page 34).

The proposed monitoring well locations in Figure 5-1 are inadequate to assess the extent of contamination. As mentioned in the previous NOD, the investigatory approach that will be used to fully characterize the rate, extent and concentrations of hazardous constituents and each investigatory phase involved must specify the number, location and depth of sampling. Also, the rationale of sampling locations must be clearly stated.

A phased approach to the ground water assessment needs to be included in this section. If contamination is detected in the initial downgradient monitoring wells, a Phase II sampling plan will be submitted to HRMB for approval to further define the extent of ground water contamination. A contingency sampling plan should be included in this section which will include such information as a predetermined distance and direction proposed to extend the sampling locations in a lateral and vertical manner to determine extent.

17. (Section 5.1.2, Page 35).

The deep aquifer investigation should be a continuation of the ground water phased investigation. If ground water contamination is detected in any of the monitoring wells to be installed immediately from the regulated units, screened and completed as specified in the TEGD in the uppermost aquifer, the phased approach must be employed to investigate any contamination in the deep aquifer. In this case therefore, a deep monitoring well or deep monitoring wells must be installed to determine the vertical extent of contamination from the regulated units. TW must provide a proposal to install wells to determine the background conditions required in 20 NMAC 4.1, Subpart V, 40 CFR, Section 264. Mud rotary is not an acceptable drilling method for monitoring well installation or for determining hydrogeologic information while drilling. Air rotary is a more acceptable drilling method under these investigatory conditions.

18. (5.3, Page 37):

This section should be revised to be consistent with the requirements of ground water sampling under 20 NMAC 4.1, Subpart V, 40 CFR, Sections 264.97 and 264.99.

19. (Section 5.4, Page 39):

Laboratory analysis of ground water samples will consist of the 20 NMAC 4.1, Subpart V, 40 CFR Section 264, Appendix IX ground water monitoring list for all monitoring wells as outlined by the requirements of 20 NMAC 4.1, Subpart V, 40 CFR, Sections 264.99 and 264.97. Appropriate analytical methods and parameters should be in accordance with 20 NMAC 4.1, Subpart II, 40 CFR, Section 261, Appendix VIII suggestions. Based on the analytical results from the initial monitoring wells, the Director will determine what parameters can be excluded from the Appendix IX list during the phase I ground water assessment plan. Table 5-1 should be revised as appropriate.

20. (Section 5.3, Page 38):

The interface between the Phase Separated Hydrocarbons (PSH) and water level should be determined by use of appropriate equipment or probes. The procedures for detecting and measuring immiscible layers should be outlined in the Quality Assurance Project Plan. Guidance on this procedure should follow EPA RCRA Ground Water Monitoring: Draft Technical Guidance (November 1992).

21. (Section 6.1, Page 43):

This section should be changed in accordance with comment #19 and 20 NMAC 4.1, Subpart V, Section §264 requirements.

22. (Section 6.2, Page 45):

Detection limits for EPA methods in Table 5-2 should be consistent with comment # 19.

23. Interim Measures: (Section 7.1, Page 51):

The interim measures involving the PSH recovery system should continue. However, MW-1 should be plugged and abandoned to prevent any further cross-contamination between the 30 foot and 70 foot zones of saturation beneath the unit. A proposal for generic plug and abandonment procedures must be included in the closure plan which should be sent under separate cover to HRMB for approval.

24. Remedial Options: (Section 7.3, Page 52):

HRMB is reserving comment on the soil and ground-water remedial options until the soil and ground-water assessments are complete and a baseline risk-assessment has been conducted. Guidance on the process of corrective action can be found in Closure process.

25. (7.5, Page 56):

Clean-up criteria should be established through a risk assessment in order to determine the risk associated with multiple contaminants. The Subpart S Standards are action levels and not necessarily cleanup standards. If a hazardous constituent is found to be above Subpart S action level then further investigation is triggered. Guidance for risk assessment can be found in EPA's Risk Assessment Guidance for Superfund (RAGS) manuals. A baseline Risk Assessment (RA) should be proposed after the results of the phase I soil and ground water sampling results have identified the hazardous constituents that will be specified in the Closure Plan and the extent of contamination has been determined. The baseline RA will aid in determining the media cleanup standards for contamination in soil and ground water underlying the regulated units at TW.

26. (Section Table 3.1):

The elevations of monitoring wells need to be determined by a certified professional surveyor.

27. (All Tables):

Tables showing analytical results should include a column showing appropriate regulatory levels for comparison to the data.

28. (Figure 3-5):

Pit 3 is labeled twice, and pit 2 is missing. This should be corrected.

29. (All Figures):

The locations of MW-2 and MW-5 are not consistent with past documents submitted to HRMB. This discrepancy needs to be clarified.

30. (Appendix E):

The data for MW-2 is missing. The data for MW-2 should be included in this section.

31. HRMB requests a copy of your worker health and safety documentation for the closure plan. However, it is the facility's responsibility to maintain working conditions that insure worker health and safety, pursuant to 24 CFR, Section 1910.120. Therefore liability for operations relating to worker health and safety remain with Transwestern Pipeline Company.

APPENDIX B

CLOSURE PLAN CHECKLIST

CLOSURE PLAN CHECKLIST:

SURFACE IMPOUNDMENTS AT WHICH ALL WASTES ARE REMOVED

EPA I.D. 986676955

CLOSURE PLAN CHECKLIST
SURFACE IMPOUNDMENTS: ALL HAZARDOUS WASTES REMOVED*

SUBJECT REQUIREMENT	PART 264/265	PROVIDED	NOT APPLICABLE	CLOSURE PLAN SECTION
1. FACILITY DESCRIPTION	264.111/265.111			
1.1 General description (e.g., size, location)		X		2.1
1.2 Topographic map		X		Figures 1-1, 2-5
1.3 List of other HWM units and wastes handled in each			X	
1.4 Hydrogeologic information:				
• Ground-water and soil conditions		X		2.5, 3.7
• Ground-water monitoring systems		X		2.5, 3.3, 3.4, 3.6, 5.0
• Corrective actions		X		3.5
1.5 Surface impoundments description:				
• Wastes managed (EPA hazardous waste numbers and quantities)		X		1.1, 2.2
• Number and size (aerial dimensions and depth) of impoundments (including engineering drawings)		X		2.2, Figure 2-1
• Liner systems and leachate collection systems design		X		3.5
• Run-on and run-off control systems			X	
1.6 References to other environmental permits (NPDES, UIC, TSCA)		X		2.2
1.7 Anticipated waivers or exemptions			X	
2. CLOSURE PROCEDURES				
2.1 Estimates of maximum quantity of inventory (by waste type) to be removed:	264.112(b)(3)/265.112(b)(3); 264.228(a)/265.228(a)			
• Pumpable wastes in the impoundments		X		2.2
• Bottom sludges/residues in the impoundments		X		4.1
2.2 Procedures for handling removed inventory (address quantities, waste types, methods):	264.112(b)(3)/265.112(b)(3); 264.228(a)/265.228			

* See also Contingent Closure Plan Checklist for permitted impoundments without liner systems as specified in Section 264.221(a) (i.e., double liners)

EPA I.D. 986676955

CLOSURE PLAN CHECKLIST
SURFACE IMPOUNDMENTS: ALL HAZARDOUS WASTES REMOVED*

SUBJECT REQUIREMENT	PART 264/265	PROVIDED	NOT APPLICABLE	CLOSURE PLAN SECTION
• On-site treatment			X	
• On-site disposal			X	
• Transportation distance off-site		X		4.6, 5.7
• Off-site treatment		X		4.6, 5.7
• Off-site disposal			X	
2.3 Procedures for decontamination and/or disposal:	264.112(b)(4)/265.112(b)(4); 264.114/265.114; 264.228(a)/ 265.228(a)			
• Equipment/structures (piping, pumps) decontamination (address sampling protocol)			X	
• Cleaning agent/rinsewater treatment or disposal (address quantities, waste types, and methods):				
— On-site treatment/disposal		X		4.6, 5.7
— Off-site treatment/disposal		X		4.6, 5.7
• Containment systems (liners, dikes) and other equipment/structures demolition and removal (address quantities and methods):				
— On-site treatment/disposal			X	
— Off-site treatment/disposal			X	
• Other contaminated soil removal:	264.228(a)/265.228(a)			
— List or sketch of potentially contaminated areas		X		Figures 3-8, 3-9
— Estimated amount of contaminated soil to be removed (address sampling protocol)		X		2.2
— Soil removal methods			X	
— On-site disposal			X	
— Off-site disposal			X	
• Protocol for determining "clean" closure			X	

* See also Contingent Closure Plan Checklist for permitted impoundments without liner systems as specified in Section 264.221(a) (i.e., double liners)

EPA I.D. 986676955

CLOSURE PLAN CHECKLIST
SURFACE IMPOUNDMENTS: ALL HAZARDOUS WASTES REMOVED*

SUBJECT REQUIREMENT	PART 264/265	PROVIDED	NOT APPLICABLE	CLOSURE PLAN SECTION
2.4 Ground-water monitoring:	264.112(b)(5)/265.112(b)(5); 264.90/265.90			
• Number, location and frequency of samples		X		5.3, Figure 5-1
• Procedures for analysis		X		5.4
2.5 Description of security systems:	264.14(b) and (c)/ 265.14(b) and (c)			
• Posted signs and 24-hour surveillance system		X		2.1
• Fence or natural barrier		X		2.1
2.6 Closure certification:	264.115/265.115			
• Activities to be conducted		X		7.0
• Testing and analyses to be performed		X		7.0
• Criteria for evaluating adequacy		X		7.0
• Schedule of inspections		X		7.0
• Types of documentation		X		7.0
3. CLOSURE SCHEDULE	264.112(b)(6)/265.112(b)(6)			
3.1 Expected year of closure	264.112(b)(7)/265.112(b)(7)		X	
3.2 Frequency of partial closures			X	
3.3 Milestone chart showing time for:				
• Removal, treatment or disposal of inventory	264.113(a)/265.113(a)		X	See Section 7.0
• Decontamination of equipment/ structures			X	See Section 7.0
• Containment systems, equipment, and structures demolition and soil removal/disposal			X	See Section 7.0
• Total time to close	264.113(b)/265.113(b)		X	See Section 7.0
3.4 Request for extension to deadlines for handling inventory or completing closure	264.113(c)/265.113(c)		X	See Section 7.0

* See also Contingent Closure Plan Checklist for permitted impoundments without liner systems as specified in Section 264.221(a) (i.e., double liners)

APPENDIX C

ENRON FINANCIAL ASSURANCE DOCUMENTS

ENRON
Transwestern Pipeline Company

P. O. Box 1188 Houston, Texas 77251-1188 (713) 853-6161

June 28, 1993

Ms. Barbara Hoditschek
RCRA Permit Program Manager
Hazardous and Radioactive Materials Bureau
State of New Mexico Environment Department
Harold Runnels Bldg.
1190 St. Francis Drive, P.O. Box 26110
Santa Fe, N.M. 87502

Dear Ms. Hoditschek:

I am the chief financial officer of Transwestern Pipeline Company, 1400 Smith Street, Houston, Texas 77002. This letter is in support of this firm's use of the financial test to demonstrate financial assurance, as specified in subpart H of 40 CFR parts 264 and 265.

The firm identified above is the owner or operator of the following facilities for which liability coverage for both sudden and nonsudden accidental occurrences is being demonstrated through the financial test specified in subpart H of 40 CFR parts 264 and 265: Roswell Compressor Station.

The firm identified above guarantees, through the guarantee specified in subpart H of 40 CFR parts 264 and 265, liability coverage for both sudden and nonsudden accidental occurrences at the following facilities owned or operated by the following: Roswell Compressor Station.

1. The firm identified above owns or operates the following facilities for which financial assurance for closure or post-closure care or liability coverage is demonstrated through the financial test specified in subpart H of 40 CFR parts 264 and 265. The current closure and/or post-closure cost estimate covered by the test are shown for each facility: Roswell Compressor Station - @ $3,000,000.00.

2. The firm identified above guarantees, through the guarantee specified in subpart H of 40 CFR parts 264 and 265, the closure and post-closure care or liability coverage of the following facilities owned or operated by the guaranteed party. The current cost estimates for the closure or post-closure care so guaranteed are shown for each facility: NONE.

3. In States where EPA is not administering the financial requirements of subpart H of 40 CFR parts 264 and 265, this firm is demonstrating financial assurance for the closure or post-closure care of the following facilities through the use of a test equivalent or substantially equivalent to the financial test specified in subpart H of 40 CFR parts 264 and 265. The current closure or post-closure cost estimates covered by such a test are shown for each facility: NONE.

4. The firm identified above owns or operates the following hazardous waste management facilities for which financial assurance for closure or, if a disposal facility, post-closure care, is not demonstrated either to EPA or a State through the financial test or any other financial assurance mechanisms specified in subpart H of 40 CFR parts 264 and 265 or equivalent or substantially equivalent State mechanisms. The current closure and/or post-closure cost estimates not covered by such financial assurance are shown for each facility: NONE.

5. This firm is the owner or operator of the following UIC facilities for which financial assurance for plugging and abandonment is required under 40 CFR part 144. The current closure cost estimates as required by 40 CFR 144.62 are shown for each facility: NONE.

This firm is not required to file a Form 10K with the Securities and Exchange Commission (SEC) for the latest fiscal year.

The fiscal year of this firm ends on December 31st. The figures for the following items marked with an asterisk are derived from this firm's independently audited, year-end financial statements for the latest completed fiscal year ended December 31, 1992.

ALTERNATIVE II

	1. Sum of current closure and post-closure cost estimates (total of all cost estimates shown in the four paragraphs above)	$3,000,000.00
	2. Amount of annual aggregate liability coverage to be demonstrated	$2,000,000.00
	3. Sum of lines 1 and 2	$5,000,000.00
	4. Current bond rating of most recent issuance of this firm and name of rating service	N/A
	5. Date and issuance of bond	N/A
	6. Date of maturity of bond	N/A
*	7. Tangible net worth (if any portion of the closure and post-closure cost estimates is included in "total liabilities" on your firm's financial statements, you may add the amount of that portion to this line)	$561,866,000.00
*	8. Total assets in U.S. (required only if less than 90% of firm's assets are located in the U.S.)	$944,307,000.00

		Yes	No
	9. Is line 7 at least $10 million?	X	
	10. Is line 7 at least 6 times line 3?	X	
*	11. Are at least 90% of firm's assets located in the U.S.? If not, complete line 12	X	
	12. Is line 8 at least 6 times line 3?	N/A	

I hereby certify that the wording of this letter is identical to the wording specified in 40 CFR 264.151(g) as such regulations were constituted on the date shown immediately below.

E. G. Parks
Vice President & Controller
Transwestern Pipeline Company

93/66

ARTHUR ANDERSEN & CO.

REPORT OF INDEPENDENT PUBLIC ACCOUNTANTS

To Transwestern Pipeline Company:

We have audited, in accordance with generally accepted auditing standards, the balance sheet of Transwestern Pipeline Company, a wholly-owned subsidiary of Enron Corp., as of December 31, 1992, and the related statements of income, retained earnings and additional paid-in capital and cash flows for the year then ended and have issued our report thereon dated February 19, 1993. We have not audited any financial statements or performed any auditing procedures for any period subsequent to December 31, 1992.

At your request, we have read the letter dated June 28, 1993, from your Chief Financial Officer to the RCRA Permit Program Manager of the Hazardous and Radioactive Materials Bureau for the State of New Mexico Environment Department to demonstrate financial assurance for both closure and/or post-closure and liability care as specified in the Code of Federal Regulations Subpart H of 40 CFR Parts 264 and 265 for the United States Environmental Protection Agency. As further required by Sections 264.143 (f)(3)(iii) and 264.145 (f)(3)(iii), we have compared the amounts comprising the data, except for the tangible net worth which is discussed in the paragraph below, which the letter from the Chief Financial Officer specifies have been derived from the independently audited financial statements as of and for the year ended December 31, 1992, referred to above, with the corresponding amounts appearing in such financial statements and found them to be in agreement.

We compared the dollar amount representing tangible net worth appearing in the letter from the Chief Financial Officer to the corresponding amount appearing on an analysis schedule prepared by Transwestern Pipeline Company, and found such amount to be in agreement. Such analysis schedule shows the components of tangible net worth. We compared the amount appearing on such analysis schedule representing total stockholder's equity to the financial statements referred to above, and found such amount to be in agreement. We compared the amount appearing on such analysis schedule representing intangible assets to Transwestern Pipeline Company's accounting records and found such amount to be in agreement. We recomputed tangible net worth and found such amount to be arithmetically correct.

In connection with the procedures described in the preceding paragraphs, no matters came to our attention that caused us to believe that the specified data should be adjusted.

This report relates only to the data specified above and does not extend to the financial statements of Transwestern Pipeline Company taken as a whole, for the year ended December 31, 1992. It is furnished solely for the use of Transwestern Pipeline Company for its distribution to the State of New Mexico Environment Department, and should not be used for any other purpose.

Arthur Andersen & Co.

Houston, Texas
June 25, 1993

ARTHUR ANDERSEN & CO.

REPORT OF INDEPENDENT PUBLIC ACCOUNTANTS

To Transwestern Pipeline Company:

We have audited the accompanying balance sheets of Transwestern Pipeline Company (a Delaware Corporation and a wholly-owned subsidiary of Enron Corp.) as of December 31, 1992 and 1991, and the related statements of income, retained earnings and additional paid-in capital and cash flows for the years then ended. These financial statements are the responsibility of Transwestern Pipeline Company's management. Our responsibility is to express an opinion on these financial statements based on our audits.

We conducted our audits in accordance with generally accepted auditing standards. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of Transwestern Pipeline Company as of December 31, 1992 and 1991, and the results of its operations and its cash flows for the years then ended, in conformity with generally accepted accounting principles.

Arthur Andersen & Co.

ARTHUR ANDERSEN & CO.

Houston, Texas
February 19, 1993

TRANSWESTERN PIPELINE COMPANY
BALANCE SHEET

(In Thousands)

	December 31, 1992	December 31, 1991
ASSETS		
Current Assets:		
Cash and cash equivalents	$ 5	$ 3
Accounts receivable–		
Customers (net of allowance for doubtful accounts of $269 at December 31, 1992 and 1991)	615	52
Associated companies	251	157
Notes receivable from associated company	–	21,118
Materials and supplies, at average cost	6,707	6,626
Exchange gas receivable	8,306	2,104
Other	640	674
Total current assets	16,524	30,734
Property, Plant and Equipment, at cost:	1,098,711	1,044,343
Less – Accumulated depreciation and amortization	218,273	194,592
Net property, plant and equipment	880,438	849,751
Deferred Charges and Other Assets:		
Deferred contract reformation costs, net	5,975	8,075
Environmental cleanup cost, net	26,585	26,708
Other	14,785	10,626
Total deferred charges and other assets	47,345	45,409
Total assets	$ 944,307	$ 925,894

The accompanying notes are an integral part of these financial statements.

TRANSWESTERN PIPELINE COMPANY
BALANCE SHEET

(In Thousands)

	December 31, 1992	December 31, 1991
LIABILITIES AND STOCKHOLDER'S EQUITY		
Current Liabilities:		
Current portion of long-term debt	$ –	$ 40,000
Accounts payable –		
Trade	4,933	24,327
Other	1,779	39,426
Associated companies	3,958	4,453
Notes payable to associated companies	19,743	–
Accrued interest	1,056	3,515
Regulatory reserves	–	8,891
Other	4,208	1,164
Total current liabilities	35,677	121,776
Long-Term Debt, Net of Current Maturities	150,000	50,000
Deferred Credits and Other Liabilities:		
Deferred income taxes	187,920	174,815
Other	7,829	12,789
Total deferred credits and other liabilities	195,749	187,604
Commitments and Contingencies (Notes 8 and 9)		
Stockholder's Equity		
Common stock	1	1
Additional paid-in capital	409,191	409,191
Retained earnings	153,689	157,322
Total stockholder's equity	562,881	566,514
Total liabilities and stockholder's equity	$ 944,307	$ 925,894

The accompanying notes are an integral part of these financial statements.

TRANSWESTERN PIPELINE COMPANY
STATEMENT OF INCOME

(In Thousands)

	Year Ended December 31,	
	1992	1991
Revenues:		
Gas Sales	$ 15,679	$ 37,288
Transport	193,295	210,292
Other	1,838	1,315
Total revenues	210,812	248,895
Operating Expenses:		
Natural gas purchased	8,432	41,015
Operations and maintenance	69,743	88,895
Amortization of deferred contract reformation costs	15,478	45,626
Depreciation and amortization	32,083	26,525
Taxes other than income taxes	6,384	6,511
Total operating expenses	132,120	208,572
Operating Income	78,692	40,323
Other Income (Expense):		
Interest income	102	6,233
Interest expense and related charges	(7,225)	(11,287)
Allowance for funds used during construction	10,857	11,907
Other, net	(77)	133
Total other income (expense)	3,657	6,986
Income Before Income Taxes	82,349	47,309
Income Tax Expense	31,607	18,027
Net Income	$ 50,742	$ 29,282

The accompanying notes are an integral part of these financial statements.

TRANSWESTERN PIPELINE COMPANY
STATEMENT OF RETAINED EARNINGS AND ADDITIONAL PAID–IN CAPITAL

(In Thousands)

	Additional Paid–In Capital	Retained Earnings
Balance, December 31, 1990	$ 409,191	$ 128,040
Net Income	–	29,282
Balance, December 31, 1991	409,191	157,322
Dividend	–	(54,375)
Net Income	–	50,742
Balance, December 31, 1992	$ 409,191	$ 153,689

The accompanying notes are an integral part of these financial statements.

TRANSWESTERN PIPELINE COMPANY
STATEMENT OF CASH FLOWS

(In Thousands)

	Year Ended December 31, 1992	1991
sh Flows From Operating Activities:		
t Income	$ 50,742	$ 29,282
conciliation of net income to net sh provided by operating activities:		
epreciation and amortization	32,083	26,525
mortization of deferred contract reformation costs	15,478	45,626
eferred income taxes	13,105	(12,668)
lowance for funds used during construction	(10,857)	(11,907)
hanges in components of working capital:		
ccounts receivable	(657)	8,206
aterials and supplies	(81)	(2,367)
Other current assets	(6,168)	4,975
ccounts payable	(57,536)	48,636
Notes payable – Enron Corp.	32,738	122,473
ccrued interest	(2,459)	(88)
Other current liabilities	(5,847)	(1,683)
eferred contract reformation costs:		
Cash payments	(5,422)	(13,071)
Recoupments via direct bill	1,635	4,699
Other, net	(10,194)	24,288
et Cash Provided by Operating Activities	46,560	272,926
ash Flows Used in Investing Activities:		
Additions to property, plant and equipment	(41,802)	(243,952)
Other capital expenditures	(10,381)	(19,232)
et Cash Used in Investing Activities	(52,183)	(263,184)
ash Flows Provided by Financing Activities:		
Issuance of long–term debt	100,000	–
Decrease in long–term debt	(40,000)	(10,000)
Dividend Paid	(54,375)	–
et Cash Provided by (Used in) Financing Activities	5,625	(10,000)
ncrease (Decrease) in Cash	2	(258)
ash and Cash Equivalents, Beginning of Period	3	261
ash and Cash Equivalents, End of Period	$ 5	$ 3

dditional cash flow information:

terest payments and income tax payments were as follows:

	1992	1991
Interest (net of amounts capitalized)	$ 470	$ 1,975
Income taxes	18,502	30,695

The accompanying notes are an integral part of these financial statements.

TRANSWESTERN PIPELINE COMPANY

NOTES TO FINANCIAL STATEMENTS

(1) Summary of Significant Accounting Policies

Control and Financial Statement Presentation

Transwestern Pipeline Company (the Company) is a wholly-owned subsidiary of Enron Pipeline Company (EPC), which is a wholly-owned subsidiary of Enron Corp. (Enron). EPC and its subsidiaries are members of an operating group which engages in transactions characteristic of group administration and operations with other members of the group.

The Company's financial statements reflect the effect of the allocation of the purchase prices for prior acquisitions. As required under purchase accounting, the purchase price was allocated to the assets and liabilities acquired based upon their estimated value as of the acquisition dates.

Cash Equivalents

The Company records as cash equivalents all highly liquid short-term investments with original maturities of three months or less.

Property, Plant and Equipment

Property, plant and equipment is depreciated on the straight-line basis at rates ranging from 1.3% to 10%. Depreciation rates are based on the estimated useful lives of the individual properties and are subject to approval by the Federal Energy Regulatory Commission (FERC), except as discussed below.

Included in gross property, plant and equipment is an aggregate plant acquisition adjustment of $438.8 million which represents the additional cost allocated to the Company's transmission plant, as a result of prior acquisitions. Currently, such amount is not considered by the FERC in determining the tariff the Company may charge to its regulated customers. The plant acquisition adjustment is being amortized over 40 years. At December 31, 1992, $85.7 million is included in accumulated depreciation and amortization.

The Company charges to operations and maintenance expense the costs of repairs. Costs of replacements and renewals of units of property are capitalized. The original cost of property retired is charged to accumulated depreciation and amortization, net of salvage and removal costs.

Allowance for Funds Used During Construction (AFUDC)

The accrual of AFUDC is a utility accounting practice calculated under guidelines prescribed by the FERC and capitalized as part of the cost of utility plant representing the cost of servicing the capital invested in construction work in progress. Such AFUDC has been segregated into two component parts - borrowed and equity funds. The allowance for borrowed funds used during construction was $1.4 million and $1.8 million for 1992 and 1991, respectively. The allowance for equity funds was $9.4 million and $10.1 million for 1992 and 1991, respectively.

Income Taxes

The Company is included in the consolidated federal and state income tax returns filed by Enron. Under their tax sharing arrangement, each subsidiary in a taxable income position pays to Enron its income tax provision on a separate return basis. It is Enron's practice to reimburse each subsidiary in a tax loss position to the extent its deductions are utilized in the consolidated return.

The Company accounts for income taxes under the provisions of Statement of Financial Accounting Standards (SFAS) No. 96 - "Accounting for Income Taxes". Deferred income taxes have been provided for all differences in the bases of assets and liabilities for tax and financial reporting purposes.

During February 1992, the Financial Accounting Standards Board issued SFAS No. 109 - "Accounting for Income Taxes". SFAS No. 109 requires an asset and liability approach for financial accounting and reporting for income taxes and supercedes SFAS No. 96. SFAS No. 109 is effective for fiscal years beginning after December 15, 1992. The Company intends to retroactively adopt SFAS No. 109 during the first quarter of 1993 and believes the adoption will not have a material impact on the Company's results of operations or financial position.

Reclassifications

Certain reclassifications have been made in the 1991 amounts to conform with 1992 financial statement classifications.

(2) Income Taxes

The provisions for income taxes for 1992 and 1991 are as follows (in thousands):

	1992	1991
Payable currently		
Federal	$ 15,590	$ 26,579
State	2,912	4,116
Total	18,502	30,695
Payment deferred		
Federal	10,577	(11,466)
State	2,528	(1,202)
Total	13,105	(12,668)
Total income tax expense	$ 31,607	$ 18,027

Deferred tax expense results from changes in the bases of assets and liabilities for tax and financial reporting purposes as follows (in thousands):

	1992	1991
Gas Contract Settlement Charges	$ 2,869	$(7,746)
Depreciation and Amortization	3,289	(977)
Purchase and Exchange Gas	2,446	418
Reserve for Deferred Regulatory Costs and Contingencies	3,427	(6,860)
Other	1,074	2,497
Total	$ 13,105	$(12,668)

The differences between taxes computed at the U.S. federal statutory rate and the Company's income taxes for financial reporting purposes are as follows (in thousands):

	1992	1991
Statutory federal income tax provision	$ 27,999	$ 16,085
Provision for state income taxes, net of federal benefit	3,590	1,923
Other	18	19
Income tax provision	$ 31,607	$ 18,027

(3) Long-Term Debt

Long-term debt net of current maturities is summarized as follows (in thousands):

	December 31,	
	1992	1991
9.10% Notes due 2000	$ 23,000	$ 23,000
7.55% Notes due 2000	100,000	-
9.20% Notes due 1998 to 2004	27,000	27,000
	$150,000	$ 50,000

Long-term debt outstanding will begin maturing with approximately $3.9 million due in 1998 with the balance maturing through 2004.

A provision of the note agreements restricts the availability of retained earnings for the payment of dividends on common stock. Under such provision, at December 31, 1992, the Company's retained earnings was unrestricted.

At December 31, 1992, the estimated fair value of the Company's long-term debt was $154.6 million. The fair value of long-term debt is based upon market quotations of similar debt at interest rates currently available.

(4) Accounts Receivable Sales

The Company, through Enron, has entered into agreements which provide for the sale of trade accounts receivable with limited recourse provisions. At December 31, 1992 and 1991, the Company had sold receivables approximating $18.6 million and $31.7 million, respectively.

The fees incurred on the sales of these receivables and on the sales of rights to certain recoverable take-or-pay buy-out and contract reformation costs are included in "Interest expense and related charges" in the Statement of Income and totaled approximately $.9 million and $1.2 million for 1992 and 1991, respectively.

The Company has a concentration of customers in the electric and gas utility industries. These concentrations of customers may impact the Company's overall exposure to credit risk, either positively or negatively, in that the customers may be similarly affected by changes in economic or other conditions. Credit losses incurred on receivables in these industries compare favorably to losses experienced in the Company's receivable portfolio as a whole. The Company also has a concentration of customers located in the western United States, primarily within the state of California. Receivables are generally not collateralized. However, the Company's management believes that the portfolio of receivables, which includes local distribution companies and municipalities, is well diversified and that such diversification minimizes any potential credit risk.

(5) Revenue Transactions with Major Customer

The Company's revenues include billings for transportation to a major customer of approximately $126 million and $136 million for the years 1992 and 1991, respectively. The Company currently has a contract extending until October 1996 for approximately 750 mcf/day, and until October 2005 for approximately 300 mcf/day with this major customer to transport gas to California.

(6) Retirement Benefits

The Company participates in the Enron Retirement Plan (the Enron Plan), a noncontributory defined benefit plan which covers substantially all employees. Participants in the Enron Plan with five or more years of service are entitled to retirement benefits based on a formula that uses a percentage of final average pay and years of service.

As of September 30, 1992, the most recent valuation date, the actuarial present value of projected plan benefit obligations under the Enron Plan were less than plan net assets by approximately $15.1 million. The assumed discount rate used in determining the actuarial present value of projected plan benefits in both 1992 and 1991 was 9.0%. The expected long-term rate of return on assets was 10.5% and the assumed rate of increase in wages was 5.0% for both 1992 and 1991. The costs of pension expense for the Company were included in operating expense and were not significant.

Assets of the Enron Plan are comprised primarily of equity securities, fixed income securities and temporary cash investments. It is Enron's policy to fund all pension costs accrued to the minimum amount required by federal tax regulations.

In addition to providing pension benefits, the Company also provides certain health care benefits to substantially all of its retired employees and life insurance benefits to certain retirees. The costs of these postretirement benefits are recognized as expense when paid, and were not significant in 1992 and 1991.

During December 1990, the Financial Accounting Standards Board issued SFAS No. 106 "Employers' Accounting for Postretirement Benefits Other Than Pensions." SFAS No. 106 is effective for fiscal years beginning after December 15, 1992 and requires that employers providing health, life insurance or other postretirement benefits (other than pension benefits) accrue the cost of those benefits over the service lives of the employees expected to be eligible to receive such benefits. Such costs are currently accounted for on an accrual basis and are not significant. The liability for such benefits existing as of the date of adoption of SFAS No. 106 (the transition obligation) may be immediately charged to earnings or may be amortized over a period not to exceed 20 years.

The Company will adopt the provisions of SFAS No. 106 during 1993 and will amortize the transition obligation (estimated to be $2.0 million) over a period of approximately 19 years. In accordance with the FERC policy statement issued December 17, 1992, the Company intends to seek recovery of the transition obligation from its customers in future general rate case filings.

(7) Related Party Transactions

The Company purchased natural gas from subsidiaries of Enron at market prices totaling approximately $1.1 million and $.5 million during 1992 and 1991, respectively. The Company recorded no sales revenue in 1992 and $3.7 million in 1991 and transportation revenue totaling approximately $6.7 million and $25.8 million during 1992 and 1991, respectively, from subsidiaries of Enron.

The Company receives interest income and pays interest expense on its note with associated companies at rates equal to certain prevailing market rates. Interest income amounted to approximately $1.4 million and $16.9 million for 1992 and 1991, respectively. Interest expense was approximately $4.1 million and $10.8 million for 1992 and 1991, respectively.

The Company incurred corporate administrative expenses including employee benefit costs from Enron, primarily based upon usage and other factors, of approximately $12.3 million and $10.3 million for the years 1992 and 1991, respectively. The residual amounts are distributed based on components of gross property, plant and equipment, gross margin and annualized payroll.

(8) Litigation and Other Contingencies

The Company is party to various claims and litigation, the significant items of which are discussed below. Although no assurances can be given, the Company believes, based on its experience to date and additional recoveries from customers, that the ultimate resolution of such items, individually or in the aggregate, will not have a material adverse impact on its financial position or results of operations.

Take-or-Pay Provisions in Gas Purchase Contracts

The Company has substantially completed its Gas Purchase Contract Reformation/Termination efforts, though three cases are currently pending before arbitration panels. As of December 31, 1992, the Company had pending against it take-or-pay claims and litigation aggregating approximately $13.0 million. However, based upon settlements reached to date, the Company believes that it is probable that those claims will be resolved at significantly less cost than the amounts claimed. Furthermore, up to seventy-five percent of prudently paid settlement costs are eligible for recovery from transportation customers under FERC Orders 500/528.

Mewbourne Oil Company (Mewbourne) has asserted claims against the Company for approximately $250 million pursuant to pricing provisions of various gas purchase contracts between Mewbourne and the Company and as a result of alleged acts of the Company with respect to such contracts. Included are allegations of breach of contract, contract repudiation, fraud and violations of the federal Racketeering Influenced and Corrupt Organizations Act. This dispute has been submitted to arbitration. No discovery has been undertaken in this proceeding, and no date has been set for the arbitration hearing; accordingly, it is not possible to predict the outcome of this matter. However, although no assurances can be given, the Company believes that a significant portion of the claims for damages are either duplicative or without merit, and that the ultimate resolution of this matter will not have a materially adverse effect on its financial position or results of operations.

The Company continually evaluates its position relative to gas purchase contract matters, including the likelihood of loss from asserted or unasserted take-or-pay claims or above market prices. Based upon this evaluation and its experience to date, management believes that it has not incurred losses for which reserves should be provided at December 31, 1992.

Environmental Protection Agency

The Company has completed the cleanup of polychlorinated biphenyl (PCB) contaminated soils in Arizona pursuant to an agreement with the Environmental Protection Agency, Region 9, and has received final approval from Region 6, relative to the cleanup and disposal of PCB-contaminated liquids and soils in New Mexico that were found in or adjacent to its facilities. Approximately $52.8 million has been incurred for cleanup as of December 31, 1992. The total cost amortized or written off as of December 31, 1992 was $42.0 million with the remaining amount to be amortized through 1994.

As of year end, the Company has also paid $11.9 million for litigation and damages incurred through December 31, 1990 related to PCBs that migrated into one of its customer's facilities through a PCB-based lubricant. The Company paid an additional $1.8 million in January, 1993 for damages incurred through September 30, 1992. The Company is pursuing litigation against third parties for the amount paid to its customer for past damages, and for future reasonable damages.

The Company is subject to extensive federal, state and local environmental laws and regulations which require expenditures for remediation at various operating facilities and waste disposal sites, as well as expenditures in connection with the construction of new facilities. However, management does not believe that any such potential costs, including environmental cleanup mentioned above, will have a material impact on the Company's financial position or results of operations.

(9) Rate Matters and Regulatory Issues

The Company is involved in several rate matters and regulatory issues, the significant items of which are discussed below. The Company believes, based on appropriate reserves that have been established, that the ultimate outcome of such matters, individually or in the aggregate, will not have a material adverse impact in its financial position or results of operations.

The Company has filed approximately $243.1 million in transition costs with the FERC under Order No. 500 providing for recovery from customers through direct billing of approximately $58.5 million and surcharges of approximately $123.8 million. In addition, the FERC has allowed the Company to collect certain post-GIC (Gas Inventory Charge) transition costs through the Order No. 500 recovery mechanism. This matter is currently pending before the D.C. Court of Appeals.

In 1992, the Company resolved its general section 4 rate case (Docket No. RP89-48-000) with its customers with the exception of one minor issue, which should be resolved in the very near term. On March 13, 1992, the Company filed an abbreviated section 4 rate case to establish rates for the newly constructed San Juan pipeline. On November 30, 1992, the Company filed a section 4 rate case with the FERC (Docket No. RP93-34-000). The filed rates, effective January 1, 1993, reflect a slight rate decrease from the rates previously on file. On December 31, the FERC issued an order placing the rates into effect, subject to refund upon hearing.

On April 8, 1992, the FERC issued Order No. 636, restructuring the pipeline industry to require the unbundling of transportation and sales services provided by pipelines. Order No. 636 requires pipelines to implement Straight Fixed Variable rate design and authorizes capacity release programs so that firm shippers can release unwanted capacity on a temporary or permanent basis to those desiring capacity. In addition, Order No. 636 allows pipelines to recover transition costs incurred as a result of implementing the Order. On February 1, 1993, the FERC issued a final order in the Company's Order No. 636 Compliance Filing, to be effective on February 1, 1993 implementing, among other things, the above mentioned requirements and a straight fixed variable rate design. Estimated future transition costs included in the filing under the provisions of the Order are not considered to be significant in relation to total costs.

APPENDIX D

EVENTS AND CORRESPONDENCE CHRONOLOGY

EVENTS AND CORRESPONDENCE CHRONOLOGY

8/60	Compressor station begins operations.
6/73-4/81	Period during which Pits 2 and 3 are backfilled.
Mid-1984	Last use of surface impoundments.
6/86	Pit 1 backfilled.
4/90	Transwestern requests permission from the State of New Mexico Office of the Commissioner of Public Lands to drill exploratory borings on State Trust land in order to collect soil samples to assess soil contamination.
4/2/90	State of New Mexico Office of the Commissioner of Public Lands (Surface Water Resources Division) authorizes Transwestern to drill exploratory borings on State Trust land for the purpose of obtaining soil samples to be tested for contamination.
6/20/91	Harding Lawson Associates completes shallow soil vapor investigation at Compressor Station No. 9.
7/17/91	Transwestern requests authorization to drill additional soil borings on State Trust land northeast of the compressor station.
7/22/91	State of New Mexico Office of the Commissioner of Public Lands (Surface Water Resources Division) authorizes Transwestern to drill approximately 15 soil borings to allow collection of soil samples.
12/91	Metric Corporation completes report on a shallow subsurface investigation at the compressor station.
2/14/92	Larry Campbell (Transwestern) meets with Coby Muckelroy and Bruce Swanton (New Mexico Environment Department [NMED]) to discuss closure of surface impoundment at Compressor Station No. 9.
2/14/92	Larry Campbell (Transwestern) meets with Roger Anderson (Oil Conservation Division [OCD]) to discuss closure of surface impoundment at Compressor Station No. 9.
4/29/92	Bruce Swanton (NMED) calls Larry Campbell (Transwestern) to request additional information regarding the former surface impoundments.
5/6/92	Joint meeting attended by Transwestern, NMED and OCD. Transwestern states intention to hire Halliburton-NUS Corporation to install a monitor well in the center of the former pit to remove and test liquids to determine their status as hazardous or non-hazardous waste. Field work scheduled to begin July 20, 1992.
7/92	Monitor well MW-1 installed by Halliburton-NUS Environmental Corporation.

10/15/92	Joint meeting attended by Transwestern, NMED and OCD. Transwestern presents the results of sampling and analysis of the new monitor well. Options for closure of the site are discussed.
11/30/92	Transwestern submits duplicate copies of a RCRA Part A permit application to NMED and OCD.
12/10/92	Joint meeting attended by Transwestern, NMED and OCD to discuss remediation and closure activities at former surface impoundments. NMED requests that the RCRA Part A permit application submitted previously be resubmitted using the proper EPA forms. The schedule for submittal of other documents and information is also discussed.
1/5/93	Transwestern resubmits RCRA Part A permit application using the EPA forms.
1/25/93	Transwestern notifies NMED that monitor wells will be installed to determine ground-water quality beneath the former surface impoundments.
2/7/93	Transwestern provides NMED with historical information on the use of the former surface impoundments.
2/17/93	Transwestern meets with NMED to discuss remediation and closure of the surface impoundment.
2/17/93	Transwestern requests permission from the State of New Mexico Office of the Commissioner of Public Lands to install two monitor wells on State Trust land in order to collect ground-water samples.
2/17/93	NMED requests that Transwestern submit a closure plan in accordance with the New Mexico Hazardous Waste Management Regulations, Part VI, Section 40 CFR 265.112(a). NMED also provides Transwestern with a list of Deficiency Comments related to NMED review of the RCRA Part A permit application previously submitted and requests that a new or amended Part A application be submitted within 30 days.
3/10/93	Transwestern requests NMED to grant a 60-day extension (until July 1, 1993) for filing the closure plan.
3/16/93	George Robinson (Cypress Engineering Services) meets with Larry Campbell (Transwestern) to discuss conclusions of Metric Report.
4/6/93	NMED grants extension for filing of closure plan.
4/7/93	Transwestern submits amended RCRA Part A permit application to NMED, along with a list of responses to NMED review comments on the previous permit application.
5/19/93	Larry Campbell and Lou Soldano (Transwestern) meet with NMED to discuss NMED request for closure plan for the surface impoundments. NMED requests information regarding the proposed installation of a product recovery pump.

5/21/93	Product recovery pump installed in MW-1. Interim corrective action begins by pumping product from MW-1 into aboveground storage tank.
6/11/93	Transwestern notifies the State of New Mexico Office of the Commissioner of Public Lands that remediation operations are in progress at the compressor station.
6/22/93	Brown & Root Environmental completes a report for Transwestern describing a ground-water assessment at the compressor station.
7/1/93	Larry Campbell (Transwestern) delivers closure plan to NMED. Transwestern begins free product recovery from recovery wells MW-1B, MW-2, and RW-1.
9/7/93	Transwestern notifies OCD of the installation of product recovery pumps in three monitor wells as part of ground-water cleanup and requests associated modifications to Discharge Plan GW-52.
9/22/93	OCD requests additional information regarding the design of the product recovery system prior to approving modifications to Discharge Plan GW-52.
10/25/93	Transwestern responds to comments from OCD regarding the product recovery system.
11/18/93	OCD approves Transwestern's proposed modifications to Discharge Plan GW-52 in accordance with ongoing remedial activities.
3/7/94	Transwestern receives a letter from NMED rejecting closure plan previously submitted on July 1, 1993, on the grounds that it is incomplete. NMED includes Notice of Deficiency listing items to be included in the closure plan.
3/23/94	Cypress Engineering Services removes inoperative product recovery pump from MW-1 and collects ground-water samples from MW-3 and MW-5.
4/5/94	George Robinson (Cypress Engineering Services) prepares letter report to Bill Kendrick (Enron Operations Corporation) discussing soil and ground-water quality at the Roswell compressor station.
4/8/94	Larry Campbell (Transwestern), Bill Kendrick (Enron Operations Corporation), and George Robinson (Cypress Engineering Services) meet with NMED to discuss Notice of Deficiency. NMED requests that another closure plan be submitted by June 1, 1994.
4/15/94	Brown & Caldwell installs new product recovery pump in MW-1 and measures depth to PSH and depth to ground water in MW-1, MW-1B, MW-2, and RW-1.
5/18/94	George Robinson (Cypress Engineering Services) and Jeffrey Forbes (DBS&A) meet with Marc Sides (NMED) to discuss closure plan format.
5/31/94	Closure Plan for Roswell Compressor Station Surface Impoundments submitted to NMED Hazardous and Radioactive Materials Bureau (HRMB).

9/28/94	NMED HRMB issues Notice of Deficiency (NOD) to Transwestern for closure plan dated May 31, 1994, including a list of NMED comments and requests for additional information. NMED gives Transwestern 30 days to revise the closure plan in response to their comments.
11/1/94	Bill Kendrick (Enron Operations Corporation) and George Robinson (Cypress Engineering Services) meet with NMED to discuss Notice of Deficiency dated September 28, 1994. NMED requests that Transwestern (1) submit request for extension of the closure plan due date, (2) evaluate the potential to collect and analyze ground-water samples from off-site wells and the deep on-site well (TW-1), and (3) revise the closure plan in accordance with NMED comments.
11/9/94	Transwestern requests a 75-day extension of the due date for the revised closure plan. Included with the letter is an attachment describing the procedure and method for installation of an upgradient monitor well.
12/1/94	Transwestern installs upgradient monitor well MW-6 approximately 500 feet southwest of the former surface impoundments. A ground-water sample collected by DBS&A from this well is submitted for laboratory analysis in accordance with procedures outlined in Transwestern's letter dated November 9, 1994. All existing on-site monitor wells are resurveyed.
12/2-3/94	Clayton Barnhill and George Robinson accurately locate off-site wells using Magellen GPS Satellite Navigator.
12/16/94	Transwestern receives letter from NMED dated December 8, 1994, granting a 75-day extension of closure plan due date until January 16, 1995. Also included are NMED's comments on Transwestern's procedures and methods for installation of the upgradient monitor well.
12/19/94	Transwestern sends letter to NMED HRMB describing proposed ground-water sampling and analysis for off-site wells.
12/22/94	Ground-water samples are collected by DBS&A from on-site deep well TW-1 and off-site well #5 for laboratory analysis of Appendix IX constituents.
1/16/95	Transwestern submits revised closure plan to NMED HRMB.

APPENDIX E

LABORATORY REPORTS FROM PREVIOUS SUBSURFACE INVESTIGATIONS

Harding Lawson Associates
1990 Soil Analytical Results

FOOTNOTES FOR:

SUMMARY OF CORE SAMPLE ANALYTICAL RESULTS

ROSWELL, NEW MEXICO

~ = Reported value is less than the detection limit.

< = Compound analyzed for but not detected. The reported value is the minimum attainable detection limit for the sample.

* = Compound was also detected in the QC blanks.

B = Reported value was less than the Contract Required Detection Limit (CRDL) but greater than or equal to the Instrument Detection Limit (IDL).

N = Spiked sample recovery not within control limits.

S = Reported value determined by Method of Standard Addition (MSA).

U = Reported value was analyzed for but not detected.

W = Post-digestion spike for Furnace AA analysis is out of control limits (85-100%), while sample absorbance is less than 50% of spike absorbance.

NA = Not analyzed by conventional, EPA-approved methods

mg/kg = parts per million

μg/kg = parts per billion

mg/l = parts per million

μg/l = parts per billion

TABLE 1

PHASE A

SUMMARY OF ON-SITE CORE SAMPLE ANALYTICAL RESULTS

Roswell, New Mexico

Core Hole No. Sample Depth Sample ID		SB9-1 5'-6.5' S9-01.1-8	SB9-1 14'-17' S9-02.1-8		Blank # 1 Equipment	Blank # 2 Trip		SB9-2 3.5'-7.5' S9-03.1-8	SB9-2 9'-12' S9-04.1-8	SB9-2 14'-16' S9-05.1-8	SB9-2 17'-18.5' S9-06.1-8		Blank #3 Equipment	Blank #4 Trip		
TPH	mg/kg	<20	<20	mg/l	<1	6	mg/kg	40	80	80	<20	mg/l	<1	<1		
Methanol	mg/l	NA	NA	mg/l	NA	NA	mg/l	NA	NA	NA	NA	mg/l	NA	NA		
Methylene Chloride	ug/kg	NA	NA	ug/l	NA	NA	ug/kg	NA	NA	NA	NA	ug/l	NA	NA		
Acetone	ug/kg	NA	NA	ug/l	NA	NA	ug/kg	NA	NA	NA	NA	ug/l	NA	NA		
Carbon Disulfide	ug/kg	NA	NA	ug/l	NA	NA	ug/kg	NA	NA	NA	NA	ug/l	NA	NA		
Trichlorofluoromethane	ug/kg	NA	NA	ug/l	NA	NA	ug/kg	NA	NA	NA	NA	ug/l	NA	NA		
Ethyl Ether	ug/kg	NA	NA	ug/l	NA	NA	ug/kg	NA	NA	NA	NA	ug/l	NA	NA		
Freon (TF)	ug/kg	NA	NA	ug/l	NA	NA	ug/kg	NA	NA	NA	NA	ug/l	NA	NA		
2-Butanone	ug/kg	NA	NA	ug/l	NA	NA	ug/kg	NA	NA	NA	NA	ug/l	NA	NA		
1,1,1-Trichloroethane	ug/kg	NA	NA	ug/l	NA	NA	ug/kg	NA	NA	NA	NA	ug/l	NA	NA		
Carbon Tetrachloride	ug/kg	NA	NA	ug/l	NA	NA	ug/kg	NA	NA	NA	NA	ug/l	NA	NA		
Cyclohexanone	ug/kg	NA	NA	ug/l	NA	NA	ug/kg	NA	NA	NA	NA	ug/l	NA	NA		
Ethyl Acetate	ug/kg	NA	NA	ug/l	NA	NA	ug/kg	NA	NA	NA	NA	ug/l	NA	NA		
Isobutyl Alcohol	ug/kg	NA	NA	ug/l	NA	NA	ug/kg	NA	NA	NA	NA	ug/l	NA	NA		
2-Ethoxyethanol	ug/kg	NA	NA	ug/l	NA	NA	ug/kg	NA	NA	NA	NA	ug/l	NA	NA		
n-Butyl Alcohol	ug/kg	NA	NA	ug/l	NA	NA	ug/kg	NA	NA	NA	NA	ug/l	NA	NA		
Trichloroethene	ug/kg	NA	NA	ug/l	NA	NA	ug/kg	NA	NA	NA	NA	ug/l	NA	NA		
1,1,2-Trichloroethane	ug/kg	NA	NA	ug/l	NA	NA	ug/kg	NA	NA	NA	NA	ug/l	NA	NA		
Benzene	ug/kg	NA	NA	ug/l	NA	NA	ug/kg	NA	NA	NA	NA	ug/l	NA	NA		
4 Methyl 2 Pentanone	ug/kg	NA	NA	ug/l	NA	NA	ug/kg	NA	NA	NA	NA	ug/l	NA	NA		
Tetrachloroethane	ug/kg	NA	NA	ug/l	NA	NA	ug/kg	NA	NA	NA	NA	ug/l	NA	NA		
Toluene	ug/kg	NA	NA	ug/l	NA	NA	ug/kg	NA	NA	NA	NA	ug/l	NA	NA		
Chlorobenzene	ug/kg	NA	NA	ug/l	NA	NA	ug/kg	NA	NA	NA	NA	ug/l	NA	NA		
Ethylbenzene	ug/kg	NA	NA	ug/l	NA	NA	ug/kg	NA	NA	NA	NA	ug/l	NA	NA		
Xylene (total)	ug/kg	NA	NA	ug/l	NA	NA	ug/kg	NA	NA	NA	NA	ug/l	NA	NA		
Pyridine	ug/kg	NA	NA	ug/l	NA	NA	ug/kg	NA	NA	NA	NA	ug/l	NA	NA		
1,3-Dichlorobenzene	ug/kg	NA	NA	ug/l	NA	NA	ug/kg	NA	NA	NA	NA	ug/l	NA	NA		
1,4-Dichlorobenzene	ug/kg	NA	NA	ug/l	NA	NA	ug/kg	NA	NA	NA	NA	ug/l	NA	NA		
1,2-Dichlorobenzene	ug/kg	NA	NA	ug/l	NA	NA	ug/kg	NA	NA	NA	NA	ug/l	NA	NA		
2-Methylphenol	ug/kg	NA	NA	ug/l	NA	NA	ug/kg	NA	NA	NA	NA	ug/l	NA	NA		
3-Methylphenol	ug/kg	NA	NA	ug/l	NA	NA	ug/kg	NA	NA	NA	NA	ug/l	NA	NA		
4-Methylphenol	ug/kg	NA	NA	ug/l	NA	NA	ug/kg	NA	NA	NA	NA	ug/l	NA	NA		
Nitrobenzene	ug/kg	NA	NA	ug/l	NA	NA	ug/kg	NA	NA	NA	NA	ug/l	NA	NA		
Silver, total	mg/l	0.0005UW	0.0005UW	mg/l	0.0005U	0.0005U	mg/l	<.0005	<.0005	<.0005	<.0005	mg/l	<.0005	<.0005		
Arsenic, total	mg/l	0.004B	0.004BW	mg/l	0.003U	0.003U	mg/l	.005BW	.004B	<.003	.003B	mg/l	<.003	<.003		
Barium, total	mg/l	0.38	0.12B	mg/l	0.05U	0.05U	mg/l	0.38	1.28	1.01	1.3	mg/l	<.05	<.05		
Cadmium, total	mg/l	.0005UW	.0005U	mg/l	0.0005U	0.0006U	mg/l	.0006BW	.0007BW	.0005BW	.0008BW	mg/l	<.0005W	<.0005W		
Chromium, total	mg/l	.006B	.006U	mg/l	0.009B	0.006B	mg/l	<.006	0.008	<.006	.007B	mg/l	<.006	<.006		
Mercury, total	mg/l	.0002U	.0002U	mg/l	0.0002U	0.0002U	mg/l	<.0002	<.0002	<.0002	<.0002	mg/l	<.0002	<.0002		
Lead, total	mg/l	.002B	.002UW	mg/l	0.007	0.003	mg/l	.002B	0.004	.002B	0.003	mg/l	<.002W	<.002		
Selenium,total	mg/l	.003UW	.003UW	mg/l	0.003U	0.003U	mg/l	<.003W	<.003W	<.003W	<.003W	mg/l	<.003W	<.003W		

TABLE 1 (CONT)

SUMMARY OF ON-SITE CORE SAMPLE ANALYTICAL RESULTS

Roswell, New Mexico

Core Hole No. Sample Depth Sample ID		SB9-3 2'-6' S9-07.3-8	SB9-3 16'-18'.5 S9-08.1-8	SB9-3 20'-23' S9-09.1-4,7-8		Blank #5 Equipment			SB9-4 8'-13' S9-10.3-8	SB9-4 14'-16' S9-11.1-8	SB9-4 18'-21' S9-12.1-8	SB9-4 25'-27' S9-13.1-8	SB9-5 4'-6' S9-14.1-8	SB9-5 10'-13' S9-15.1-8	SB9-5 15'-17.5' S9-16.1,3-5,7-8	SB9-5 18'-20' S9-17.1-5,7,8
TPH	mg/kg	<20	<20	110	mg/l	<1		mg/kg	120	70	70	280	<20	100	<20	<20
Methanol	mg/l	NA	NA	NA	mg/l	NA		mg/l	NA	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	ug/kg	NA	NA	NA	ug/l	NA		ug/kg	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	ug/kg	NA	NA	NA	ug/l	NA		ug/kg	NA	NA	NA	NA	NA	NA	NA	NA
Carbon Disulfide	ug/kg	NA	NA	NA	ug/l	NA		ug/kg	NA	NA	NA	NA	NA	NA	NA	NA
Trichlorofluoromethane	ug/kg	NA	NA	NA	ug/l	NA		ug/kg	NA	NA	NA	NA	NA	NA	NA	NA
Ethyl Ether	ug/kg	NA	NA	NA	ug/l	NA		ug/kg	NA	NA	NA	NA	NA	NA	NA	NA
Freon (TF)	ug/kg	NA	NA	NA	ug/l	NA		ug/kg	NA	NA	NA	NA	NA	NA	NA	NA
2-Butanone	ug/kg	NA	NA	NA	ug/l	NA		ug/kg	NA	NA	NA	NA	NA	NA	NA	NA
1,1,1-Trichloroethane	ug/kg	NA	NA	NA	ug/l	NA		ug/kg	NA	NA	NA	NA	NA	NA	NA	NA
Carbon Tetrachloride	ug/kg	NA	NA	NA	ug/l	NA		ug/kg	NA	NA	NA	NA	NA	NA	NA	NA
Cyclohexanone	ug/kg	NA	NA	NA	ug/l	NA		ug/kg	NA	NA	NA	NA	NA	NA	NA	NA
Ethyl Acetate	ug/kg	NA	NA	NA	ug/l	NA		ug/kg	NA	NA	NA	NA	NA	NA	NA	NA
Isobutyl Alcohol	ug/kg	NA	NA	NA	ug/l	NA		ug/kg	NA	NA	NA	NA	NA	NA	NA	NA
2-Ethoxyethanol	ug/kg	NA	NA	NA	ug/l	NA		ug/kg	NA	NA	NA	NA	NA	NA	NA	NA
n-Butyl Alcohol	ug/kg	NA	NA	NA	ug/l	NA		ug/kg	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethene	ug/kg	NA	NA	NA	ug/l	NA		ug/kg	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	ug/kg	NA	NA	NA	ug/l	NA		ug/kg	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	ug/kg	NA	NA	NA	ug/l	NA		ug/kg	NA	NA	NA	NA	NA	NA	NA	NA
4 Methyl 2 Pentanone	ug/kg	NA	NA	NA	ug/l	NA		ug/kg	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	ug/kg	NA	NA	NA	ug/l	NA		ug/kg	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	ug/kg	NA	NA	NA	ug/l	NA		ug/kg	NA	NA	NA	NA	NA	NA	NA	NA
Chlorobenzene	ug/kg	NA	NA	NA	ug/l	NA		ug/kg	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	ug/kg	NA	NA	NA	ug/l	NA		ug/kg	NA	NA	NA	NA	NA	NA	NA	NA
Xylene (total)	ug/kg	NA	NA	NA	ug/l	NA		ug/kg	NA	NA	NA	NA	NA	NA	NA	NA
Pyridine	ug/kg	NA	NA	NA	ug/l	NA		ug/kg	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	ug/kg	NA	NA	NA	ug/l	NA		ug/kg	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	ug/kg	NA	NA	NA	ug/l	NA		ug/kg	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	ug/kg	NA	NA	NA	ug/l	NA		ug/kg	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylphenol	ug/kg	NA	NA	NA	ug/l	NA		ug/kg	NA	NA	NA	NA	NA	NA	NA	NA
3-Methylphenol	ug/kg	NA	NA	NA	ug/l	NA		ug/kg	NA	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol	ug/kg	NA	NA	NA	ug/l	NA		ug/kg	NA	NA	NA	NA	NA	NA	NA	NA
Nitrobenzene	ug/kg	NA	NA	NA	ug/l	NA		ug/kg	NA	NA	NA	NA	NA	NA	NA	NA
Silver, total	mg/l	<.0005	<.0005	<.0005	mg/l	<.0006		mg/l	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005W	<.0005W
Arsenic, total	mg/l	0.01	<.003	<.003	mg/l	<.003		mg/l	.009B	<.003	<.003	<.003	.006B	<.003W	<.003W	<.003
Barium, total	mg/l	0.24	0.39	1.3	mg/l	<.05		mg/l	0.93	0.83	0.9	1.7B	0.53	0.72	1.03	1.05
Cadmium, total	mg/l	.0006BW	.0009BW	<.0005W	mg/l	<.0005		mg/l	<.0005W	<.0005W	.0013BW	.0006BW	<.0005W	<.0005W	<.0005W	<.0005
Chromium, total	mg/l	<.006	.008B	.008B	mg/l	<.006		mg/l	<.006	<.006	<.006	<.006	<.006	<.006	<.006	<.006
Mercury, total	mg/l	<.0002	<.0002	<.0002	mg/l	<.0002		mg/l	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002
Lead, total	mg/l	0.003	.002B	.002B	mg/l	0.003		mg/l	0.003	.002B	0.003	.002B	.002B	0.003	0.007	<.002N
Selenium,total	mg/l	<.003W	<.003W	<.003W	mg/l	<.003W		mg/l	<.003	<.003	<.003	<.003W	<.003W	<.003W	<.0003W	<.003WN

TABLE 1 (CONT)

SUMMARY OF ON-SITE CORE SAMPLE ANALYTICAL RESULTS

Roswell, New Mexico

Core Hole No. Sample Depth Sample ID		SB9-5 20-22.5' 89-18.1,4,7	SB9-5 20-22.5' Tube #3	SB9-5 20-22.5' Tube #4		Blank #8 Equipment	Blank #7 Trip			SB9-6 8-11' S9-20.1-8	SB9-6 16-20' S9-21.3,5,8	SB9-6 20-23' S9-22.1-8	SB9-6 26-28' S9-23.1,3,4,7		SB9-6 26-28' Tube #5	SB9-6 26-28' Tube #6
TPH	mg/kg	<20	<20	<20	mg/l	<1	<1		mg/kg	<20	<20	120	<20	mg/kg	<20	<20
Methanol	mg/l	NA	<1	<1	mg/l	<1	<1		mg/l	NA	NA	NA	NA	mg/kg	<50	<50
Methylene Chloride	ug/kg	NA	7*	10*	ug/l	<5	<5		ug/kg	NA	NA	NA	NA	ug/kg	16	9*
Acetone	ug/kg	NA	26	13	ug/l	<10*	<10		ug/kg	NA	NA	NA	NA	ug/kg	<10	<14
Carbon Disulfide	ug/kg	NA	<6	<6	ug/l	<5	<5		ug/kg	NA	NA	NA	NA	ug/kg	<5	<7
Trichlorofluoromethane	ug/kg	NA	<6	<6	ug/l	<5	<5		ug/kg	NA	NA	NA	NA	ug/kg	<5	<7
Ethyl Ether	ug/kg	NA	<6	<6	ug/l	<5	<5		ug/kg	NA	NA	NA	NA	ug/kg	<5	<7
Freon (TF)	ug/kg	NA	15*	16*	ug/l	<5	<5		ug/kg	NA	NA	NA	NA	ug/kg	6	23*
2-Butanone	ug/kg	NA	<11	<12	ug/l	<10	<10		ug/kg	NA	NA	NA	NA	ug/kg	<10	<14
1,1,1-Trichloroethane	ug/kg	NA	<6	<6	ug/l	<5	<5		ug/kg	NA	NA	NA	NA	ug/kg	<5	<7
Carbon Tetrachloride	ug/kg	NA	<6	<6	ug/l	<5	<5		ug/kg	NA	NA	NA	NA	ug/kg	<5	<7
Cyclohexanone	ug/kg	NA	<6	<6	ug/l	<5	<5		ug/kg	NA	NA	NA	NA	ug/kg	<5	<7
Ethyl Acetate	ug/kg	NA	<6	<6	ug/l	<5	<5		ug/kg	NA	NA	NA	NA	ug/kg	<5	<7
Isobutyl Alcohol	ug/kg	NA	<230	<230	ug/l	<200	<200		ug/kg	NA	NA	NA	NA	ug/kg	<200	<280
2-Ethoxyethanol	ug/kg	NA	<11	12	ug/l	<10	<10		ug/kg	NA	NA	NA	NA	ug/kg	<10	<14
n-Butyl Alcohol	ug/kg	NA	<110	<120	ug/l	<100	<100		ug/kg	NA	NA	NA	NA	ug/kg	<100	<140
Trichloroethene	ug/kg	NA	<6	<6	ug/l	<5	<5		ug/kg	NA	NA	NA	NA	ug/kg	<5	<7
1,1,2-Trichloroethane	ug/kg	NA	<6	<6	ug/l	<5	<5		ug/kg	NA	NA	NA	NA	ug/kg	<5	<7
Benzene	ug/kg	NA	<6	<6	ug/l	<5	<5		ug/kg	NA	NA	NA	NA	ug/kg	<5	<7
4 Methyl 2 Pentanone	ug/kg	NA	<11	<12	ug/l	<10	<10		ug/kg	NA	NA	NA	NA	ug/kg	<10	<14
Tetrachloroethane	ug/kg	NA	<6	<6	ug/l	<5	<5		ug/kg	NA	NA	NA	NA	ug/kg	<5	<7
Toluene	ug/kg	NA	<6	<6	ug/l	<5	<5		ug/kg	NA	NA	NA	NA	ug/kg	<5	<7
Chlorobenzene	ug/kg	NA	<6	<6	ug/l	<5	<5		ug/kg	NA	NA	NA	NA	ug/kg	<5	<7
Ethylbenzene	ug/kg	NA	<6	<6	ug/l	<5	<5		ug/kg	NA	NA	NA	NA	ug/kg	<5	<7
Xylene (total)	ug/kg	NA	<6	<6	ug/l	<5	<5		ug/kg	NA	NA	NA	NA	ug/kg	<5	<7
Pyridine	ug/kg	NA	<370	<380	ug/l	<40	<40		ug/kg	NA	NA	NA	NA	ug/kg	<340	<430
1,3-Dichlorobenzene	ug/kg	NA	<370	<380	ug/l	<40	<40		ug/kg	NA	NA	NA	NA	ug/kg	<340	<430
1,4-Dichlorobenzene	ug/kg	NA	<370	<380	ug/l	<40	<40		ug/kg	NA	NA	NA	NA	ug/kg	<340	<430
1,2-Dichlorobenzene	ug/kg	NA	<370	<380	ug/l	<40	<40		ug/kg	NA	NA	NA	NA	ug/kg	<340	<430
2-Methylphenol	ug/kg	NA	<370	<380	ug/l	<40	<40		ug/kg	NA	NA	NA	NA	ug/kg	<340	<430
3-Methylphenol	ug/kg	NA	<370	<380	ug/l	<40	<40		ug/kg	NA	NA	NA	NA	ug/kg	<340	<430
4-Methylphenol	ug/kg	NA	<370	<380	ug/l	<40	<40		ug/kg	NA	NA	NA	NA	ug/kg	<340	<430
Nitrobenzene	ug/kg	NA	<370	<380	ug/l	<40	<40		ug/kg	NA	NA	NA	NA	ug/kg	<340	<430
Silver, total	mg/l	.0022BW	<.0005W	<.0005	mg/l	<.0005	<.0005		mg/l	<.0005W	<.0005	.0026B	<.0005W	mg/l	<.0005W	<.0005
Arsenic, total	mg/l	.003B	.006B	.004B	mg/l	<.003	<.003		mg/l	.004B	<.003W	<.003	<.003W	mg/l	<.003	.009B
Barium, total	mg/l	1.12	0.27	0.62	mg/l	<.05	<.05		mg/l	0.63	1.21	0.7	1.22	mg/l	1.3	.010B
Cadmium, total	mg/l	.0005BW	.0005BW	.0010BW	mg/l	<.0005W	<.0005W		mg/l	.0010BW	<.0005	<.0005	.0006B	mg/l	.0012B	.0008B
Chromium, total	mg/l	<.006	<.006	<.006	mg/l	<.006	<.006		mg/l	<.006	<.006	0.011	.006B	mg/l	0.007B	0.011
Mercury, total	mg/l	<.0002	<.0002	<.0002	mg/l	<.0002	<.0002		mg/l	<.0002	<.0002	<.0002	<.0002	mg/l	<.0002	<.0002
Lead, total	mg/l	<.002N	<.002WN	<.002WN	mg/l	0.004	0.003		mg/l	<.002WN	<.002WN	<.002W	.008W	mg/l	.002W	<.002
Selenium,total	mg/l	.005BN	<.003N	<.003W	mg/l	<.003	<.003		mg/l	<.003WN	<.003N	<.003	<.003	mg/l	<.003	<.003

TABLE 1 (CONT)

SUMMARY OF ON-SITE CORE SAMPLE ANALYTICAL RESULTS

Roswell, New Mexico

Core Hole No. Sample Depth Sample ID		Blank #10 Equipment	Blank #11 Trip			SB9-7 9'-12' S9-24.1-8	SB9-7 21.5'-24' S9-25.1-8	SB9-7 25.5'-28' S9-26.1-8	SB9-7 29'-32' S9-27.3-8	SB9-7 29'-32' Tube #7	SB9-7 35'-37' S9-28.3-8	SB9-7 35'-37' Tube #8	SB9-7 35'-37' Tube #9		Blank #12 Field	Blank #13 Equipment
TPH	mg/l	<4	<4		mg/kg	3100	2000	2500	11000	5000	4600	13000	30000	mg/l	<4	<4
Methanol	mg/l	<50	<50		mg/l	NA	NA	NA	NA	<1	NA	<1	<1	mg/l	<10	<10
Methylene Chloride	ug/l	<5	<5		ug/kg	NA	NA	NA	NA	<1300	NA	<640	<670	ug/l	<5	<5
Acetone	ug/l	10	10		ug/kg	NA	NA	NA	NA	<2600	NA	<1300	<1300	ug/l	<10	<10
Carbon Disulfide	ug/l	<5	<5		ug/kg	NA	NA	NA	NA	<1300	NA	<640	<670	ug/l	<5	<5
Trichlorofluoromethane	ug/l	<5	<5		ug/kg	NA	NA	NA	NA	<1300	NA	<640	<670	ug/l	<5	<5
Ethyl Ether	ug/l	<5	<5		ug/kg	NA	NA	NA	NA	<1300	NA	<640	<670	ug/l	<5	<5
Freon (TF)	ug/l	7	6		ug/kg	NA	NA	NA	NA	5100	NA	<640	<670	ug/l	8	7
2-Butanone	ug/l	46	<10		ug/kg	NA	NA	NA	NA	<2600	NA	<1300	<1300	ug/l	<10	<10
1,1,1-Trichloroethane	ug/l	<5	<5		ug/kg	NA	NA	NA	NA	<1300	NA	<640	2000	ug/l	<5	<5
Carbon Tetrachloride	ug/l	<5	<5		ug/kg	NA	NA	NA	NA	<1300	NA	<640	<670	ug/l	<5	<5
Cyclohexanone	ug/l	<5	<5		ug/kg	NA	NA	NA	NA	<1300	NA	<640	<670	ug/l	<5	<5
Ethyl Acetate	ug/l	<5	<5		ug/kg	NA	NA	NA	NA	<1300	NA	<640	<670	ug/l	<5	<5
Isobutyl Alcohol	ug/l	<200	<200		ug/kg	NA	NA	NA	NA	<53000	NA	<26000	<27000	ug/l	<200	<200
2-Ethoxyethanol	ug/l	<10	<10		ug/kg	NA	NA	NA	NA	<2600	NA	<1300	<1300	ug/l	<10	<10
n-Butyl Alcohol	ug/l	<100	<100		ug/kg	NA	NA	NA	NA	<26000	NA	<13000	<13000	ug/l	<100	<100
Trichloroethene	ug/l	<5	<5		ug/kg	NA	NA	NA	NA	<1300	NA	<640	<670	ug/l	<5	<5
1,1,2-Trichloroethane	ug/l	<5	<5		ug/kg	NA	NA	NA	NA	<1300	NA	<640	<670	ug/l	<5	<5
Benzene	ug/l	<5	<5		ug/kg	NA	NA	NA	NA	<1300	NA	<640	<670	ug/l	<5	<5
4 Methyl 2 Pentanone	ug/l	<10	<10		ug/kg	NA	NA	NA	NA	<2600	NA	<1300	<1300	ug/l	<10	<10
Tetrachloroethane	ug/l	<5	<5		ug/kg	NA	NA	NA	NA	<1300	NA	<640	2100	ug/l	<5	<5
Toluene	ug/l	<5	<5		ug/kg	NA	NA	NA	NA	<1300	NA	<640	<670	ug/l	<5	<5
Chlorobenzene	ug/l	<5	<5		ug/kg	NA	NA*	NA	NA	<1300	NA	<640	<670	ug/l	<5	<5
Ethylbenzene	ug/l	<5	<5		ug/kg	NA	NA	NA	NA	720	NA	1600	2600	ug/l	<5	<5
Xylene (total)	ug/l	<5	<5		ug/kg	NA	NA	NA	NA	1800	NA	4200	6600	ug/l	<5	<5
Pyridine	ug/l	<40	<87		ug/kg	NA	NA	NA	NA	<350	NA	<340	<21000	ug/l	<40	<40
1,3-Dichlorobenzene	ug/l	<40	<87		ug/kg	NA	NA	NA	NA	<350	NA	<340	<21000	ug/l	<40	<40
1,4-Dichlorobenzene	ug/l	<40	<87		ug/kg	NA	NA	NA	NA	<350	NA	<340	<21000	ug/l	<40	<40
1,2-Dichlorobenzene	ug/l	<40	<87		ug/kg	NA	NA	NA	NA	<350	NA	<340	<21000	ug/l	<40	<40
2-Methylphenol	ug/l	<40	<87		ug/kg	NA	NA	NA	NA	<350	NA	<340	<21000	ug/l	<40	<40
3-Methylphenol	ug/l	<40	<87		ug/kg	NA	NA	NA	NA	<350	NA	<340	<21000	ug/l	<40	<40
4-Methylphenol	ug/l	<40	<87		ug/kg	NA	NA	NA	NA	<350	NA	<340	<21000	ug/l	<40	<40
Nitrobenzene	ug/l	<40	<87		ug/kg	NA	NA	NA	NA	<350	NA	<340	<21000	ug/l	<40	<40
Silver, total	mg/l	<.0005	<.0005		mg/l	<.0005	<.0005WN	<.0005WN	<.0005WN	<.0005WN	<.0005WN	<.0005WN	<.0005WN	mg/l	.0005W	<.0005
Arsenic, total	mg/l	<.003	<.003		mg/l	<.003	0.004B	<.003W	.008B	.008B	.008B	.005B	.004BW	mg/l	<.003	<.003
Barium, total	mg/l	<.05	<.05		mg/l	0.75	2.22	1.83	3.69	1.81	1.72	1.84	3.12	mg/l	<.05	<.05
Cadmium, total	mg/l	.0010B	.0011BW		mg/l	.0005B	.0010B	<.0005	.0011BW	.0012BW	.0007BW	.0006BW	.0006BW	mg/l	<.0005	.0006B
Chromium, total	mg/l	<.008	<.006		mg/l	.007B	<.008	.009B	.009B	.006B	.007B	<.006	0.01	mg/l	.007B	<.006
Mercury, total	mg/l	<.0002	<.0002		mg/l	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	mg/l	<.0002	<.0002
Lead, total	mg/l	<.002B	<.002W		mg/l	.003BWN	<.002WN	<.002WN	<.002WN	<.002N	<.002NW	<.002WN	<.002WN	mg/l	<.002S	.002BS
Selenium, total	mg/l	<.003W	<.003		mg/l	<.003	<.003W	<.003WN	<.003	<.003W	<.003N	<.003N	<.003WN	mg/l	<.003	<.003W

TABLE 1 (CONT)

Core Hole No. Sample Depth Sample ID		Blank #14 Trip	Blank #15 Trip	Blank #16 Dist. Water
TPH	mg/l	<4	<1	<1
Methanol	mg/l	<1	<1	<1
Methylene Chloride	ug/l	<5	<5	<5
Acetone	ug/l	<10	<10	23
Carbon Disulfide	ug/l	<5	<5	<5
Trichlorofluoromethane	ug/l	<5	<5	<5
Ethyl Ether	ug/l	<5	<5	<5
Freon (TF)	ug/l	9*	7*	6*
2-Butanone	ug/l	<10	<10	150
1,1,1-Trichloroethane	ug/l	<5	<5	<5
Carbon Tetrachloride	ug/l	<5	<5	<5
Cyclohexanone	ug/l	<5	<5	<5
Ethyl Acetate	ug/l	<5	<5	<5
Isobutyl Alcohol	ug/l	<200	<200	<200
2-Ethoxyethanol	ug/l	<10	<10	<10
n-Butyl Alcohol	ug/l	<100	<100	<100
Trichloroethene	ug/l	<5	<5	<5
1,1,2-Trichloroethane	ug/l	<5	<5	<5
Benzene	ug/l	<5	<5	<5
4 Methyl 2 Pentanone	ug/l	<10	<10	<10
Tetrachloroethane	ug/l	<5	<5	<5
Toluene	ug/l	<5	<5	<5
Chlorobenzene	ug/l	<5	<5	<5
Ethylbenzene	ug/l	<5	<5	<5
Xylene (total)	ug/l	<5	<5	<5
Pyridine	ug/l	<40	<40	<40
1,3-Dichlorobenzene	ug/l	<40	<40	<40
1,4-Dichlorobenzene	ug/l	<40	<40	<40
1,2-Dichlorobenzene	ug/l	<40	<40	<40
2-Methylphenol	ug/l	<40	<40	<40
3-Methylphenol	ug/l	<40	<40	<40
4-Methylphenol	ug/l	<40	<40	<40
Nitrobenzene	ug/l	<40	<40	<40
Silver, total	mg/l	<.0005N	<.0005	<.0005
Arsenic, total	mg/l	<.003	<.003W	<.003
Barium, total	mg/l	<.05	<.05	<.05
Cadmium, total	mg/l	<.0005W	<.0005	<.0005
Chromium, total	mg/l	<.006	<.006	<.006
Mercury, total	mg/l	<.0002	<.0002	<.0002
Lead, total	mg/l	.004SN	<.002WN	<.002N
Selenium,total	mg/l	<.003	<.003N	<.003N

[redacted]

TABLE 2 PHASE B

							Roswell, New Mexico											
Core Hole No. Sample Depth		P9-OS-213 (5') Soil	P9-OS-213 (10') Soil	P9-OS-213 (15') Soil	P9-OS-213 (20') Soil	P9-OS-213 (25') Soil	P9-OS-213 (29'-30') Rock	P9-OS-213 (31.5'-32') Soil	P9-OS-238 (5') Soil	P9-OS-238 (10') Soil	P9-OS-238 (15') Soil	P9-OS-238 (20') Soil	P9-OS-349 (5') Soil	P9-OS-349 (10') Soil	P9-OS-349 (20') Soil	P9-OS-349 (25') Soil		P9-OS-349 (25') Duplicate Soil/Water
TPH	mg/kg	<20	<20	<20	<20	<20	<20	<20	70	120	<20	50	<20	100	<20	100		
Methanol	mg/l	<5	<5	<5	<5	<5	<1	<5	<20	<5	<10	<20	<1	<5	<1	<10	ug/l	
Methylene Chloride	ug/kg	9	<6	<7	7	<5	<5	<6	<5	<5	<5	<5	6*	9	<5*	10	ug/l	NA
Acetone	ug/kg	32*	35*	59*	33*	29*	22*	39*	29*	23*	17*	19*	<11	<11	<11	<11	ug/l	NA
Carbon Disulfide	ug/kg	<6	<6	<5	<6	<5	<5	<6	<5	<5	<5	<5	<5	<6	<5	<5	ug/l	NA
Trichlorofluoromethane	ug/kg	<6	<6	<5	<6	<5	<5	<6	<5	<5	<5	<5	<5	<6	<5	<5	ug/l	NA
Ethyl Ether	ug/kg	<6	<6	<5	<6	<5	<5	<6	<5	<5	<5	<5	<5	<6	<5	<5	ug/l	NA
Freon (TF)	ug/kg	<6	<6	<5	<6	<5	<5	<6	<5	<5	<5	<5	26*	18	45*	21	ug/l	NA
2-Butanone	ug/kg	<12	<12	<10	<13	<10	<10	<12	<10	<10	<10	<10	<11	<11	<11	<11	ug/l	NA
1,1,1-Trichloroethane	ug/kg	<6	<6	<5	<6	<5	<5	<6	<5	<5	<5	<5	<5	<6	<5	<5	ug/l	NA
Carbon Tetrachloride	ug/kg	<6	<6	<5	<6	<5	<5	<6	<5	<5	<5	<5	<5	<6	<5	<5	ug/l	NA
Cyclohexanone	ug/kg	<6	<6	<5	<6	<5	<5	<6	<5	<5	<5	<5	<5	<6	<5	<5	ug/l	NA
Ethyl Acetate	ug/kg	<6	<6	<5	<6	<5	<5	<6	<5	<5	<5	<5	<5	<6	<5	<5	ug/l	NA
Isobutyl Alcohol	ug/kg	<230	<230	<210	<260	<200	<200	<250	<200	<210	<210	<210	<220	<220	<210	<220	ug/l	NA
2-Ethoxyethanol	ug/kg	<12	<12	<10	<13	<10	<10	<12	<10	<10	<10	<10	<11	<11	<11	<11	ug/l	NA
n-Butyl Alcohol	ug/kg	<120	<120	<100	<130	<100	<100	<120	<100	<100	<100	<100	<110	<110	<110	<110	ug/l	NA
Trichloroethene	ug/kg	<6	<6	<5	<6	<5	<5	<6	<5	<5	<5	<5	<5	<6	<5	<5	ug/l	NA
1,1,2-Trichloroethane	ug/kg	<6	<6	<5	<6	<5	<5	<6	<5	<5	<5	<5	<5	<6	<5	<5	ug/l	NA
Benzene	ug/kg	<6	<6	<5	<6	<5	<5	<6	<5	<5	<5	<5	<5	<6	<5	<5	ug/l	NA
2 Methyl 4 Pentanone	ug/kg	<12	<12	<10	<13	<10	<10	<12	<10	<10	<10	<10	<11	<11	<11	<11	ug/l	NA
Tetrachloroethane	ug/kg	<6	<6	<5	<6	<5	<5	<6	<5	<5	<5	<5	<5	<6	<5	<5	ug/l	NA
Toluene	ug/kg	<6	<6	<5	<6	<5	<5	<6	<5	<5	<5	<5	<5	<6	<5	<5	ug/l	NA
Chlorobenzene	ug/kg	<6	<6	<5	<6	<5	<5	<6	<5	<5	<5	<5	<5	<6	<5	<5	ug/l	NA
Ethylbenzene	ug/kg	<6	<6	<5	<6	<5	<5	<6	<5	<5	<5	<5	<5	<6	<5	<5	ug/l	NA
Xylene (total)	ug/kg	<6	<6	<5	<6	<5	<5	<6	<5	<5	<5	<5	<5	<6	<5	<5	ug/l	NA
Pyridine	ug/kg	<380	<380	<340	<420	<340	<330	<410	<340	<340	<340	<340	<350	<370	<350	Not Tested	ug/l	NA
1,3-Dichlorobenzene	ug/kg	<380	<380	<340	<420	<340	<330	<410	<340	<340	<340	<340	<350	<370	<350	Not Tested	ug/l	NA
1,4-Dichlorobenzene	ug/kg	<380	<380	<340	<420	<340	<330	<410	<340	<340	<340	<340	<350	<370	<350	Not Tested	ug/l	NA
1,2-Dichlorobenzene	ug/kg	<380	<380	<340	<420	<340	<330	<410	<340	<340	<340	<340	<350	<370	<350	Not Tested	ug/l	NA
2-Methylphenol	ug/kg	<380	<380	<340	<420	<340	<330	<410	<340	<340	<340	<340	<350	<370	<350	Not Tested	ug/l	NA
3-Methylphenol	ug/kg	<380	<380	<340	<420	<340	<330	<410	<340	<340	<340	<340	<350	<370	<350	Not Tested	ug/l	NA
4-Methylphenol	ug/kg	<380	<380	<340	<420	<340	<330	<410	<340	<340	<340	<340	<350	<370	<350	Not Tested	ug/l	NA
Nitrobenzene	ug/kg	<380	<380	<340	<420	<340	<330	<410	<340	<340	<340	<340	<350	<370	<350	Not Tested	ug/l	NA
Silver, total	mg/l	<0.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	Not Tested	mg/l	<.0006
Arsenic, total	mg/l	0.008	.007B	.004B	<.003W	<.003	<.003W	.004B	.004BW	<.003	.003B	.003B	.007B	.005B	<.003	Not Tested	mg/l	<.003
Barium, total	mg/l	1.34	15B	0.22	1.05	1.54	2.09	0.68	1.01	0.39	0.33	<.06	1.21	0.4	0.77	Not Tested	mg/l	0.96
Cadmium, total	mg/l	<.0008BW	<.0006	<.0006	<.0006W	<.0006W	<.0006BW	.0011BW	.0009BW	<.0006	.0009B	<.0006	.0009BW	<.0006	<.0006	Not Tested	mg/l	.0009BW
Chromium, total	mg/l	<.007	<.007	<.007	<.007	<.007	<.007	<.007	0.011	.007B	0.01	0.01	0.012	0.013	.009B	Not Tested	mg/l	.007B
Mercury, total	mg/l	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	Not Tested	mg/l	<.0002
Lead, total	mg/l	<.002W	<.002	<.002W	<.002W	<.002W	0.004	.003B	.003N	.007N	.005N	.005WN	0.012	.011S	0.004	Not Tested	mg/l	0.009
Selenium,total	mg/l	<.003W	<.01W	<.003	<.003W	<.003W	<.01	<.003W	<.003W	<.003W	<.003W	<.02	<.003	<.01W	<.003W	Not Tested	mg/l	<.003W

SUMMARY OF OFF-SITE CORE SAMPLE ANALYTICAL RESULTS

Roswell, New Mexico

Core Hole No. / Sample Depth		P9-OS-349 (30') Soil	P9-OS-349 (35') Soil	P9-OS-349 (40') Soil	P9-OS-377 (5') Soil	P9-OS-377 (10') Soil	P9-OS-377 (15') Soil	P9-OS-377 (20') Soil	P9-OS-377 (25') Soil	P9-OS-377 (30') Soil		P9-OS-377 (30')Duplicat Soil/Water	Field Blank	Field Blank	Trip Blank
TPH	mg/kg	<20	<20	<20	200	<20	<20	<20	<20	<20	mg/l	NA	<1	<1	<1
Methanol	mg/l	<5	<1	<5	<5	<1	<1	<5	<1	<5	mg/l	NA	<1	<1	<1
Methylene Chloride	ug/kg	<7	15	8	<6	<6	11	7	36	23	ug/l	NA	22*	<5	23*
Acetone	ug/kg	<14	<14	<10	34*	27*	27*	37*	<12	<13	ug/l	NA	<10	<10	<10
Carbon Disulfide	ug/kg	<7	<7	<5	<6	<6	<6	<7	<6	<7	ug/l	NA	<5	<5	<5
Trichlorofluoromethane	ug/kg	<7	<7	<5	<6	<6	<6	<7	<6	<7	ug/l	NA	<5	5	<5
Ethyl Ether	ug/kg	<7	<7	<5	<6	<6	<6	<7	<6	<7	ug/l	NA	<5	<5	<5
Freon (TF)	ug/kg	45*	39	40	<6	<6	<6	<7	46	69	ug/l	NA	<5	<5	<5
2-Butanone	ug/kg	<14	<14	<10	<11	<12	<12	<13	<12	<13	ug/l	NA	<10	<10	<10
1,1,1-Trichloroethane	ug/kg	<7	<7	<5	<6	<6	<6	<7	<6	<7	ug/l	NA	<5	<5	<5
Carbon Tetrachloride	ug/kg	<7	<7	<5	<6	<6	<6	<7	<6	<7	ug/l	NA	<5	<5	<5
Cyclohexanone	ug/kg	<7	<7	<5	<6	<6	<6	<7	<6	<7	ug/l	NA	<5	<5	<5
Ethyl Acetate	ug/kg	<7	<7	<5	<6	<6	<6	<7	<6	<7	ug/l	NA	<5	<5	<5
Isobutyl Alcohol	ug/kg	<290	<270	<200	<220	<240	<240	<270	<250	<260	ug/l	NA	<200	<200	<200
2-Ethoxyethanol	ug/kg	<14	<14	<10	<11	<12	<12	<13	<12	<13	ug/l	NA	<10	<10	<10
n-Butyl Alcohol	ug/kg	<140	<140	<100	<110	<120	<120	<130	<120	<130	ug/l	NA	<100	<100	<100
Trichloroethene	ug/kg	<7	<7	<5	<6	<6	<6	<7	<6	<7	ug/l	NA	<5	<5	<5
1,1,2-Trichloroethane	ug/kg	<7	<7	<5	<6	<6	<6	<7	<6	<7	ug/l	NA	<5	<5	<5
Benzene	ug/kg	<7	<7	<5	<6	<6	<6	<7	<6	<7	ug/l	NA	<5	<5	<5
2 Methyl 4 Pentanone	ug/kg	<14	<14	<10	<11	<12	<12	<13	<12	<13	ug/l	NA	<10	<10	<10
Tetrachloroethane	ug/kg	<7	<7	<5	<6	<6	<6	<7	<6	<7	ug/l	NA	<5	<5	<5
Toluene	ug/kg	<7	<7	<5	<6	<6	<6	<7	<6	<7	ug/l	NA	<5	<5	<5
Chlorobenzene	ug/kg	<7	<7	<5	<6	<6	<6	<7	<6	<7	ug/l	NA	<5	<5	<5
Ethylbenzene	ug/kg	<7	<7	<5	<6	<6	<6	<7	<6	<7	ug/l	NA	<5	<5	<5
Xylene (total)	ug/kg	<7	<7	<5	<6	<6	<6	<7	<6	<7	ug/l	NA	<5	<5	<5
Pyridine	ug/kg	<480	<450	<390	<370	<400	<400	<440	<410	Not Tested	ug/l	NA	<10	<10	<10
1,3-Dichlorobenzene	ug/kg	<480	<450	<390	<370	<400	<400	<440	<410	Not Tested	ug/l	NA	<10	<10	<10
1,4-Dichlorobenzene	ug/kg	<480	<450	<390	<370	<400	<400	<440	<410	Not Tested	ug/l	NA	<10	<10	<10
1,2-Dichlorobenzene	ug/kg	<480	<450	<390	<370	<400	<400	<440	<410	Not Tested	ug/l	NA	<10	<10	<10
2-Methylphenol	ug/kg	<480	<450	<390	<370	<400	<400	<440	<410	Not Tested	ug/l	NA	<10	<10	<10
3-Methylphenol	ug/kg	<480	<450	<390	<370	<400	<400	<440	<410	Not Tested	ug/l	NA	<10	<10	<10
4-Methylphenol	ug/kg	<480	<450	<390	<370	<400	<400	<440	<410	Not Tested	ug/l	NA	<10	<10	<10
Nitrobenzene	ug/kg	<480	<450	<390	<370	<400	<400	<440	<410	Not Tested	ug/l	NA	<10	<10	<10
Silver, total	mg/l	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006W	<.0006	<.0006	mg/l	<.0006	<.0006	<.0006	<.0006
Arsenic, total	mg/l	<.003	<.003	0.005B	.004B	0.01	<.003	.003B	.006B	0.011	mg/l	0.011	<.003	<.003	<.003
Barium, total	mg/l	1.48	1.36	0.23	1.05	.19B	.15B	.16B	.06B	0.32	mg/l	0.32	<.06	<.06	<.06
Cadmium, total	mg/l	<.0006	<.0006W	0.0013BW	<.0006W	.0018BW	.003B	.0010B	.0009B	<.0006	mg/l	<0.0006	<.0006W	<.0006W	<.0006W
Chromium, total	mg/l	.009B	0.011	<.007	.009B	.007B	0.011	0.011	<.007	<.007	mg/l	<0.007	<0.007	<0.007	<0.007
Mercury, total	mg/l	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	mg/l	<.0002	<.0002	<.0002	<.0002
Lead, total	mg/l	0.007	0.005	<.002W	0.003	0.004	0.009	.003BW	<.002W	<.002	mg/l	<.002W	.003B	.003B	.002BW
Selenium,total	mg/l	<.003W	<.003W	<.003W	<.003W	<.01W	<.003W	<.01W	<.02	<.003	mg/l	<.003	<.003W	<.003	<.003W

TABLE 2 (CONT)

Harding Lawson Associates
1990 Soil Gas Analytical Results

TABLE 2

Analysis Results for Soil Gas Samples, ppm v/v

Roswell, New Mexico
2/6/90 - 3/17/90

SAMPLE ID	DEPTH (FT.)	1,1,1-TCA PPM (V/V)	TCE PPM (V/V)	PCE PPM (V/V)	$CHCl_3$ PPM (V/V)	CCl_4 PPM (V/V)
N-00	2.0	0.02	-	1.46	-	-
N-00	4.0	-	-	0.09	-	-
N-00	9.0	-	-	0.01	-	-
N-00	14.0	0.02	-	0.45	-	-
N-01	2.0	-	-	-	-	-
N-01	4.5	-	-	-	-	-
N-01	9.0	-	-	-	-	-
N-02	2.0	-	-	<0.01	-	-
N-02	4.0	-	-	0.01	-	-
N-02	9.0	-	-	0.01	-	-
N-02	14.0	-	-	<0.01	-	-
N-03	2.0	-	-	-	-	-
N-03	4.5	-	-	-	-	-
N-03	9.0	-	-	-	-	-
N-04	2.0	-	-	-	-	-
N-04	5.0	-	-	-	-	-
N-05	4.0	-	-	-	-	-
N-06	2.0	-	-	-	-	-
N-07	1.0	0.02	-	-	-	-
N-07	3.5	0.35	-	<0.01	-	-
N-08	1.0	-	-	<0.01	-	-
N-09	1.0	0.06	-	0.03	-	-
N-09	4.5	0.31	-	0.13	-	-
N-09	6.8	0.40	-	0.20	-	-
N-09	14.0	0.62	-	0.34	-	-
N-10	8.0	-	-	-	-	-
N-11	2.0	-	-	-	-	-
N-11	4.5	<0.01	-	-	-	-
N-11	9.0	<0.01	-	-	-	-
N-12	1.0	<0.01	-	-	-	-
N-12	4.0	0.02	-	<0.01	-	-
N-12	9.5	0.05	-	<0.01	-	-
N-12	14.0	0.07	-	<0.01	-	-
N-13	3.0	0.02	-	-	-	-
N-13	4.5	0.03	-	-	-	-

SAMPLE ID	DEPTH (FT.)	1,1,1-TCA PPM (V/V)	TCE PPM (V/V)	PCE PPM (V/V)	$CHCl_3$ PPM (V/V)	CCl_4 PPM (V/V)
N-13	28.0	0.15	-	0.17	-	-
N-14	2.0	0.11	-	-	-	-
N-14	4.5	0.14	-	-	-	-
N-14	11.0	0.38	-	0.02	-	-
N-14	34.0	0.14	-	0.14	-	-
N-15	2.0	<0.01	-	-	-	-
N-15	4.0	0.01	-	-	-	-
N-15	36.0	0.06	-	0.01	-	-
N-16	2.0	-	-	-	-	-
N-16	4.5	-	-	-	-	-
N-16A	2.0	0.01	-	-	-	-
N-16A	9.0	0.02	-	-	-	-
N-16A	14.0	0.06	-	-	-	-
N-17	1.5	-	-	-	-	-
N-17	4.0	<0.01	-	<0.01	0.01	0.01
N-17	18.0	-	-	<0.01	0.05	0.02
N-18	2.0	-	-	-	-	-
N-18	4.0	-	-	-	-	-
N-18	21.0	-	-	-	-	-
N-19	2.0	0.04	-	-	-	-
N-19	4.5	0.08	-	<0.01	<0.01	-
N-19	9.0	0.21	-	0.01	0.02	-
N-19	13.0	0.52	-	0.04	0.07	-
N-20	2.0	0.04	-	0.03	-	-
N-20	4.0	0.23	-	0.19	<0.01	-
N-22	2.0	0.06	-	0.01	0.22	0.07
N-22	5.0	0.08	-	0.02	0.34	0.10
N-22	28.0	0.16	-	0.22	0.20	0.13
N-23	2.0	-	-	-	-	-
N-23A	4.0	-	-	-	-	-
N-23A	9.0	-	-	-	-	-
N-24	2.0	-	-	-	-	-
N-24	4.0	-	-	-	-	-
N-25	1.0	0.04	-	-	<0.01	-
N-25	4.0	0.07	-	<0.01	0.02	-
N-25	9.0	0.09	-	0.01	0.03	-
N-25	14.0	0.18	-	0.02	0.08	-
N-25	28.0	0.23	-	0.01	0.03	-
N-26	2.0	3.87	0.07	3.65	-	<0.01
N-26	4.0	2.93	0.05	3.65	-	<0.01

SAMPLE ID	DEPTH (FT.)	1,1,1-TCA PPM (V/V)	TCE PPM (V/V)	PCE PPM (V/V)	$CHCl_3$ PPM (V/V)	CCl_4 PPM (V/V)
N-26	28.0	-	-	0.05	-	-
N-27	2.0	0.48	-	0.48	0.01	-
N-27	4.0	1.25	0.02	1.73	0.06	-
N-27	9.0	1.38	0.02	1.98	0.08	-
N-27	28.0	-	-	<0.01	-	-
N-28	2.0	0.17	-	0.02	-	-
N-28	5.0	0.20	-	0.03	-	-
N-28	29.0	-	-	-	-	-
N-29	2.0	<0.01	-	-	-	-
N-29	4.0	0.02	-	-	-	-
N-29	28.0	-	-	-	-	-
N-30	2.0	0.41	-	0.76	-	-
N-30	4.0	0.41	0.01	0.89	-	-
N-30	23.0	0.44	0.03	1.22	-	-
N-31	2.0	0.19	-	0.27	-	-
N-31	4.0	0.23	-	0.23	-	-
N-32	2.0	-	-	-	-	-
N-32	4.0	-	-	-	-	-
N-32	9.0	<0.01	-	-	-	-
N-33	1.0	<0.01	-	-	-	-
N-33	4.5	0.18	0.38	-	-	-
N-33	9.0	0.07	0.08	-	-	-
N-33	13.0	0.03	0.02	-	-	-
N-33	19.0	0.05	-	-	-	-
N-34	2.0	-	-	<0.01	-	-
N-34	4.0	-	-	-	-	-
N-34	9.0	-	-	-	-	-
N-34	14.0	<0.01	-	-	-	-
N-34	19.0	<0.01	-	-	-	-
N-35	2.0	-	-	-	-	-
N-35	4.0	-	-	-	-	-
N-35	9.0	-	-	-	-	-
N-36	2.0	0.43	-	0.02	-	-
N-36	4.0	0.35	-	0.02	-	-
N-36	9.0	0.53	-	0.04	-	-
N-36	10.5	0.53	-	0.04	-	-
N-37	2.0	<0.01	-	<0.01	-	-
N-37	4.0	<0.01	-	<0.01	-	-
N-37	15.0	0.03	-	0.06	-	-
N-38	2.0	-	-	0.04	-	-

SAMPLE ID	DEPTH (FT.)	1,1,1-TCA PPM (V/V)	TCE PPM (V/V)	PCE PPM (V/V)	$CHCl_3$ PPM (V/V)	CCl_4 PPM (V/V)
N-38	5.0	-	-	0.06	-	-
N-38	10.0	-	-	0.06	-	-
N-38	14.0	-	-	0.07	-	-
N-38	23.5	<0.01	-	0.07	-	-
N-39	2.0	<0.01	-	0.01	-	-
N-39	4.5	<0.01	-	0.02	-	-
N-39	9.0	0.01	-	0.02	-	-
N-39	14.0	0.01	-	0.02	-	-
N-39	19.0	0.02	-	0.02	-	-
N-40	2.0	0.01	-	<0.01	-	-
N-40	5.0	0.03	-	0.02	-	-
N-40	9.0	0.04	-	0.03	-	-
N-40	14.0	0.07	-	0.04	-	-
N-41	2.0	0.01	-	-	-	-
N-41	9.0	0.11	-	0.01	-	-
N-42	1.5	0.14	-	0.01	-	-
N-42	4.5	0.23	-	0.02	-	-
N-42	9.5	0.28	-	0.02	-	-
N-43	2.0	0.02	-	<0.01	0.01	<0.01
N-43	4.0	0.02	-	<0.01	0.02	<0.01
N-43	9.0	0.03	-	<0.01	0.04	<0.01
N-43	14.0	0.05	-	0.02	0.04	<0.01
N-44	2.0	0.01	-	-	-	-
N-44	4.0	0.02	-	<0.01	-	-
N-44	9.0	0.02	-	<0.01	-	-
N-45	2.0	0.05	-	<0.01	0.01	0.06
N-45	4.0	0.11	-	0.01	0.03	0.08
N-45	9.0	0.12	-	0.02	0.05	0.16
N-45	14.0	0.20	-	0.03	0.05	0.17
N-46	2.0	0.13	-	-	-	-
N-46	4.0	0.21	-	-	-	-
N-46	9.0	0.30	-	-	-	-
N-47	2.0	-	-	-	<0.01	<0.01
N-47	4.0	-	-	-	<0.01	<0.01
N-47	9.0	-	-	-	0.03	0.01
N-47	29.0	-	-	-	0.02	<0.01
N-48	1.0	-	-	-	-	-
N-48	4.0	-	-	-	-	<0.01
N-48	9.0	-	-	-	<0.01	<0.01
N-48	28.5	-	-	-	<0.01	<0.01

SAMPLE ID	DEPTH (FT.)	1,1,1-TCA PPM (V/V)	TCE PPM (V/V)	PCE PPM (V/V)	$CHCl_3$ PPM (V/V)	CCl_4 PPM (V/V)
N-49	2.0	0.05	-	0.18	-	-
N-49	4.0	0.05	-	0.21	-	-
N-49	9.0	0.06	-	0.24	-	-
N-49	14.0	0.08	-	0.29	-	-
N-50	2.0	0.03	-	<0.01	-	-
N-50	4.0	0.04	-	<0.01	-	-
N-50	9.0	0.05	-	<0.01	-	-
N-50	14.0	0.10	-	0.02	-	-
N-51	1.5	-	-	-	-	-
N-51	4.0	<0.01	-	<0.01	-	-
N-51	8.0	<0.01	-	<0.01	-	-
N-52	2.0	-	-	-	-	-
N-52	5.0	-	-	-	-	-
N-52	9.0	-	-	-	-	-
N-53	2.0	-	-	<0.01	-	-
N-53	5.0	<0.01	-	<0.01	-	-
N-53	9.0	<0.01	-	<0.01	-	-
N-53	26.0	-	-	-	-	-
N-54	1.0	-	-	-	-	-
N-54	4.0	<0.01	-	-	-	-
N-54	9.0	0.01	-	-	-	-
N-55	2.0	-	-	-	-	-
N-55	4.0	-	-	-	-	-
N-55	9.0	-	-	-	-	-
N-55	18.5	-	-	-	-	-
N-56	1.0	-	-	-	-	-
N-56	5.0	-	-	-	-	-
N-56	9.0	-	-	-	-	-
N-56	18.5	-	-	-	-	-
N-56	24.5	0.03	-	0.02	-	-
N-57	2.0	0.02	-	0.01	-	-
N-57	4.5	0.02	-	0.01	-	-
N-57	9.5	0.04	-	0.02	-	-
N-57	26.0	0.41	-	0.04	-	-
N-58	1.0	0.03	-	-	-	-
N-58	4.0	0.08	-	-	-	-
N-58	9.0	PC	PC	PC	PC	PC
N-58	14.0	PC	PC	PC	PC	PC
N-58	26.5	0.12	-	-	<0.01	<0.01
N-59	2.0	-	-	-	-	-

PC = Probe Clogged

SAMPLE ID	DEPTH (FT.)	1,1,1-TCA PPM (V/V)	TCE PPM (V/V)	PCE PPM (V/V)	$CHCl_3$ PPM (V/V)	CCl_4 PPM (V/V)
N-59	4.0	-	-	-	0.02	<0.01
N-59	9.0	-	-	-	0.02	<0.01
N-60	2.0	-	-	-	<0.01	<0.01
N-60	4.0	-	-	-	0.02	<0.01
N-60	9.0	-	-	-	0.04	<0.01
N-60	31.0	0.06	-	-	<0.01	<0.01
N-61	2.0	0.04	-	0.02	-	-
N-61	4.0	0.02	-	0.02	-	-
N-61	9.0	0.06	-	0.05	-	-
N-61	14.0	0.08	-	0.09	-	-
N-61	26.0	0.68	-	0.18	-	-
N-62	2.0	-	-	<0.01	-	-
N-62	4.0	-	-	<0.01	-	-
N-62	9.0	<0.01	-	0.02	-	-
N-62	14.0	<0.01	-	0.03	-	-
N-63	2.,0	<0.01	-	<0.01	-	-
N-63	4.0	<0.01	-	<0.01	-	-
N-63	9.0	0.02	-	0.01	-	-
N-63	27.0	0.09	-	0.03	-	-
N-64	1.0	<0.01	-	-	-	-
N-64	4.0	0.02	-	<0.01	-	-
N-64	9.0	0.03	-	0.01	-	-
N-64	14.0	0.04	-	0.02	-	-
N-65	1.0	<0.01	-	<0.01	-	-
N-65	4.0	0.04	-	0.03	-	-
N-65	8.0	0.05	-	0.04	-	-
N-65	19.0	0.12	-	0.10	-	-
N-65	35.0	0.10	-	0.13	-	-
N-66*	2.0	-	-	0.06	-	-
N-66*	5.0	<0.01	-	0.13	-	-
N-66*	10.0	0.02	-	0.23	-	-
N-66*	15.0	0.03	-	0.21	0.03	-
N-66*	20.0	0.17	-	0.85	0.03	-
N-67*	1.0	-	-	-	-	-
N-67*	5.0	SD	SD	SD	SD	SD
N-67	10.0	-	-	0.01	-	-
N-67	25.0	0.03	-	0.05	-	-
N-68	2.0	0.05	-	0.01	-	-
N-68	5.0	0.06	-	0.01	-	-
N-68	9.0	0.07	-	0.02	-	-

SD = Sample Destroyed
* Analyzed on 3400 GC

SAMPLE ID	DEPTH (FT.)	1,1,1-TCA PPM (V/V)	TCE PPM (V/V)	PCE PPM (V/V)	$CHCl_3$ PPM (V/V)	CCl_4 PPM (V/V)
N-68	25.5	-	-	-	-	-
N-69	2.0	-	-	-	-	-
N-69	4.0	-	-	0.01	-	-
N-69	9.0	-	-	0.02	-	-
N-69	14.0	-	-	0.03	-	-
N-69	30.0	0.01	-	0.07	-	-
N-70	2.0	0.02	-	0.05	-	-
N-70	5.0	0.02	-	0.06	-	-
N-70	21.0	-	-	-	-	-
N-71	2.0	<0.01	-	-	-	-
N-71	4.0	0.02	-	<0.01	-	-
N-71	9.0	0.04	-	0.01	-	-
N-71	21.0	0.07	-	0.02	-	-
N-72	2.0	<0.01	-	-	-	-
N-72	4.0	<0.01	-	-	-	-
N-72	9.0	0.05	-	0.01	-	-
N-72	14.0	0.05	0.03	0.02	-	-
N-72	25.0	0.05	0.04	0.02	-	-
N-73	2.0	-	-	<0.01	-	-
N-73	5.0	0.01	-	0.02	-	-
N-73	9.0	0.02	-	0.02	-	-
N-73	25.0	0.06	-	0.04	-	-
N-74	2.0	-	-	0.01	-	-
N-74	4.0	-	-	0.03	-	-
N-74	9.0	<0.01	-	0.06	-	-
N-74	14.0	0.01	-	0.08	-	-
N-74	29.0	0.03	-	0.07	-	-
N-75	2.0	-	-	-	-	-
N-75	4.0	-	-	-	-	-
N-75	9.0	-	-	-	-	-
N-75	24.0	-	-	-	-	-
N-76	1.5	-	-	-	-	-
N-76	5.0	-	-	-	-	-
N-76	9.0	-	-	-	-	-
N-76	24.5	-	-	-	-	-
N-78	2.0	-	-	-	-	-
N-78	4.0	-	-	-	-	-
N-78	9.0	-	-	-	-	-
N-78	14.0	-	-	-	-	-
N-80	2.0	-	-	-	-	-

* Analyzed on 3400 GC

SAMPLE ID	DEPTH (FT.)	1,1,1-TCA PPM (V/V)	TCE PPM (V/V)	PCE PPM (V/V)	$CHCl_3$ PPM (V/V)	CCl_4 PPM (V/V)
N-80	5.0	-	-	-	-	-
N-80	10.0	-	-	-	-	-
N-80	15.0	-	-	-	-	-
N-80	28.0	-	-	-	-	-
N-81	2.0	-	-	-	-	-
N-81	5.0	-	-	-	-	-
N-81	10.0	-	-	-	-	-
N-81	15.0	-	-	<0.01	-	-
N-81	20.0	-	-	0.01	-	-
N-81	32.0	-	-	<0.01	-	-
N-82	1.0	0.02	-	0.02	-	-
N-82	4.5	0.09	-	0.09	-	-
N-82	9.0	0.18	-	0.15	-	-
N-83	2.0	0.10	-	0.07	-	-
N-83	5.0	0.21	-	0.14	-	-
N-83	9.0	0.51	-	0.33	-	-
N-83	14.0	0.33	-	0.20	-	-
N-83	37.0	1.02	-	0.89	-	-
N-84*	2.0	0.11	-	0.04	-	-
N-84*	5.0	0.76	-	0.26	-	-
N-84*	10.0	0.53	-	0.12	-	-
N-84*	15.0	4.19	-	1.76	-	-
N-84*	31.0	NS	NS	NS	NS	NS
N-85	1.0	0.21	-	0.07	-	-
N-85	4.0	1.61	-	0.39	-	-
N-85	9.0	1.75	-	0.59	-	-
N-85	14.0	1.99	-	0.83	-	-
N-85	30.0	3.71	0.06	2.14	-	-
N-86	1.0	0.08	-	0.06	-	-
N-86	4.0	1.50	-	0.90	-	-
N-86	8.0	4.09	-	2.32	-	-
N-86	20.0	15.61	0.58	12.19	-	-
N-86	39.5	-	-	0.01	-	-
N-87*	2.0	0.22	-	0.02	-	-
N-87*	5.0	1.95	-	0.13	-	-
N-87*	10.0	4.27	0.02	0.37	-	-
N-87*	15.0	7.29	0.05	0.92	-	-
N-87*	28.0	11.51	0.06	1.78	-	-
N-89*	2.0	0.12	-	<0.01	-	-
N-89*	5.0	0.56	-	0.04	-	-

NS = No Sample
* Analyzed on 3400 GC

SAMPLE ID	DEPTH (FT.)	1,1,1-TCA PPM (V/V)	TCE PPM (V/V)	PCE PPM (V/V)	$CHCl_3$ PPM (V/V)	CCl_4 PPM (V/V)
N-89*	10.0	1.06	-	0.09	-	-
N-89*	15.0	NS	NS	NS	NS	NS
N-89*	20.0	1.31	-	0.18	-	-
N-90*	2.0	6.18	-	-	-	-
N-90*	5.0	6.87	-	-	-	-
N-90*	10.0	13.73	-	0.02	-	-
N-90*	15.0	33.89	-	-	-	-
N-90*	27.0	30.77	-	-	-	-
N-91*	2.0	58.85	-	<0.01	-	-
N-91*	5.0	124.61	-	-	-	-
N-91*	10.0	175.18	-	-	-	-
N-91*	19.0	224.46	-	0.05	-	-
N-91*	28.0	371.86	-	0.29	-	-
N-92*	2.0	NS	NS	NS	NS	NS
N-92*	5.0	32.27	-	<0.01	-	-
N-92*	10.0	182.28	-	-	-	-
N-92*	15.0	177.95	-	-	-	-
N-92*	27.0	NS	NS	NS	NS	NS
N-93*	2.0	12.57	-	-	-	-
N-93*	5.0	99.53	-	-	-	-
N-93*	10.0	101.71	-	-	-	-
N-93*	15.0	160.50	-	-	-	-
N-93*	18.0	NS	NS	NS	NS	NS
N-94*	2.0	1.52	-	-	-	-
N-94*	5.0	5.34	-	-	-	-
N-94*	20.0	-	-	-	-	-
N-95*	2.0	0.72	-	-	-	-
N-95*	5.0	1.04	-	-	-	-
N-95*	10.0	2.63	-	-	-	-
N-95*	15.0	3.29	-	-	-	-
N-95*	18.0	10.34	-	<0.01	-	-
N-96*	2.0	5.70	-	-	-	-
N-96*	5.0	14.71	-	-	-	-
N-96*	10.0	20.08	-	-	-	-
N-96*	15.0	21.82	-	-	-	-
N-96*	18.0	-	-	-	-	-
N-97*	2.0	7.49	-	-	-	-
N-97*	5.0	11.62	-	-	-	-
N-97*	10.0	98.10	-	-	-	-
N-97*	15.0	150.50	-	-	-	-

NS = No Sample
* Analyzed on 3400 GC

SAMPLE ID	DEPTH (FT.)	1,1,1-TCA PPM (V/V)	TCE PPM (V/V)	PCE PPM (V/V)	$CHCl_3$ PPM (V/V)	CCl_4 PPM (V/V)
N-97*	20.0	158.23	-	-	-	-
N-98	2.0	32.49	-	-	-	-
N-98	4.0	18.67	-	-	-	-
N-98	9.0	31.06	-	-	-	-
N-98	14.0	1.52	-	-	-	-
N-98*	26.5	150.79	-	-	-	-
N-99	1.0	2.99	-	-	-	-
N-99*	5.0	12.94	-	-	-	-
N-99	10.0	0.60	-	0.03	-	-
N-99	14.0	0.47	-	0.03	-	-
N-99*	25.0	11.38	-	0.03	-	-
N-99*	35.0	19.00	-	0.07	-	-
N-100	2.0	12.93	-	0.02	-	-
N-100	5.0	18.34	-	0.03	-	-
N-100	9.0	SD	SD	SD	SD	SD
N-100	14.0	21.51	-	0.13	-	-
N-100	35.0	0.17	-	-	-	-
N-101	1.0	0.24	-	0.03	-	-
N-101	4.0	0.23	-	0.04	-	-
N-101	9.0	1.00	-	0.09	-	-
N-101	14.0	1.17	-	0.14	-	-
N-101	25.0	5.09	-	0.45	<0.01	-
N-102*	2.0	0.05	-	-	-	-
N-102*	5.0	0.50	-	-	-	-
N-102*	10.0	0.06	-	-	-	-
N-102*	15.0	0.49	-	-	-	-
N-102*	20.0	3.30	-	0.03	-	-
N-103*	2.0	0.13	-	-	-	-
N-103*	5.0	0.81	-	-	-	-
N-103*	10.0	1.26	-	-	-	-
N-103*	15.0	4.17	-	-	-	-
N-103*	20.0	5.07	-	-	-	-
N-105*	1.0	<0.01	-	-	-	-
N-105*	5.0	0.19	-	0.01	-	-
N-105*	10.0	0.11	-	<0.01	-	-
N-105*	15.0	0.79	-	0.03	-	-
N-105*	20.0	0.93	-	0.02	-	-
N-105*	35.0	1.13	-	0.10	-	-
N-106	2.0	0.23	-	0.08	-	-
N-106	4.5	0.60	-	0.15	-	-

SD = Sample Destroyed
* Analyzed on 3400 GC

SAMPLE ID	DEPTH (FT.)	1,1,1-TCA PPM (V/V)	TCE PPM (V/V)	PCE PPM (V/V)	$CHCl_3$ PPM (V/V)	CCl_4 PPM (V/V)
N-106	9.0	.91	-	0.21	-	-
N-106	14.0	1.51	-	0.37	-	-
N-107	1.0	1.81	-	0.25	-	-
N-107	4.0	2.15	-	0.29	-	-
N-107	9.0	5.55	-	0.61	-	-
N-107	27.0	21.32	-	-	-	-
N-108	1.0	0.06	-	0.09	-	-
N-108	4.0	0.36	-	-	-	-
N-108	9.0	0.65	-	0.63	-	-
N-108	14.0	1.27	-	0.86	-	-
N-108	30.0	3.80	-	2.08	-	-
N-109	1.0	0.11	-	0.05	-	-
N-109	4.0	0.05	-	0.02	-	-
N-109	9.0	1.21	-	0.35	-	-
N-109	14.0	2.71	0.47	1.10	-	-
N-111	2.0	-	-	-	-	-
N-111	4.5	0.11	-	0.04	-	-
N-111	9.0	0.08	-	0.03	-	-
N-111	14.0	0.21	-	0.08	-	-
N-111	31.5	0.28	-	0.13	-	-
N-112	2.0	0.06	-	0.02	-	-
N-112	4.0	0.20	-	0.10	-	-
N-112	9.0	0.40	-	0.19	-	-
N-112	14.0	0.52	-	0.24	-	-
N-114	1.5	0.03	-	0.02	-	-
N-114	4.5	0.13	-	0.09	-	-
N-114	9.0	0.28	-	0.17	-	-
N-114	14.0	0.49	-	0.31	-	-
N-114	34.0	0.25	-	0.19	-	-
N-115*	2.0	-	-	-	-	-
N-115*	5.0	0.04	-	0.02	-	-
N-115*	15.0	0.02	-	0.04	-	-
N-115*	33.0	0.05	-	0.10	-	-
N-116*	2.0	-	-	0.02	-	-
N-116*	5.0	-	-	0.03	-	-
N-116*	10.0	0.06	-	-	-	-
N-116*	15.0	0.01	-	0.05	-	-
N-116*	35.0	NS	NS	NS	NS	NS
N-117	1.0	0.23	-	-	-	-
N-117	4.5	0.01	-	-	-	-

NS = No Sample
* Analyzed on 3400 GC

SAMPLE ID	DEPTH (FT.)	1,1,1-TCA PPM (V/V)	TCE PPM (V/V)	PCE PPM (V/V)	$CHCl_3$ PPM (V/V)	CCl_4 PPM (V/V)
N-117	9.0	1.66	-	-	-	-
N-117	31.0	3.64	-	0.03	-	-
N-118	2.0	-	-	-	-	-
N-118	4.0	-	-	-	-	-
N-118	9.0	-	-	-	-	-
N-118	14.0	0.06	-	-	-	-
N-120	1.0	-	-	-	-	-
N-120	4.0	-	-	-	-	-
N-120	9.0	-	-	-	-	-
N-120	14.0	-	-	-	-	-
N-121*	2.0	-	-	-	-	-
N-121*	5.0	-	-	-	-	-
N-121*	10.0	-	-	-	-	-
N-121*	15.0	-	-	-	-	-
N-122*	1.0	-	-	-	-	-
N-122*	5.0	-	-	-	-	-
N-122*	10.0	-	-	-	-	-
N-123	2.0	-	-	-	-	-
N-123	4.5	-	-	-	-	-
N-123	9.0	-	-	-	-	-
N-123	14.0	-	-	-	-	-
N-124*	1.0	1.32	-	-	-	-
N-124*	5.0	5.23	-	-	-	-
N-124*	10.0	8.91	-	-	-	-
N-124*	15.0	17.52	-	-	-	-
N-124*	30.0	19.64	-	-	-	-
N-126	2.0	0.05	-	-	-	-
N-126	5.0	0.25	-	-	-	-
N-126	9.0	1.70	-	-	-	-
N-126	14.0	2.50	-	-	-	-
N-126	20.0	3.08	-	-	-	-
N-126	29.0	1.07	-	-	-	-
N-127	2.0	-	-	-	-	-
N-127	5.0	-	-	-	-	-
N-127	9.0	-	-	-	-	-
N-127	14.0	-	-	-	-	-
N-127	28.0	-	-	-	-	-
N-129*	1.0	0.61	-	-	-	-
N-129*	5.0	0.08	-	-	-	-
N-129*	10.0	0.48	-	-	-	-

* Analyzed on 3400 GC

SAMPLE ID	DEPTH (FT.)	1,1,1-TCA PPM (V/V)	TCE PPM (V/V)	PCE PPM (V/V)	$CHCl_3$ PPM (V/V)	CCl_4 PPM (V/V)
N-129*	15.0	0.77	-	0.99	-	-
N-130*	1.0	0.07	-	0.03	-	-
N-130*	5.0	0.63	-	0.23	-	-
N-130*	10.0	0.97	-	0.34	-	-
N-130*	15.0	2.56	-	0.77	-	-
N-131	2.0	0.10	-	0.05	-	-
N-131	4.0	0.34	-	0.17	-	-
N-131	9.0	0.06	-	0.04	-	-
N-131	14.0	0.73	-	0.45	0.08	-

* Analyzed on 3400 GC

Off-Site

Roswell, New Mexico
4-4-90 to 5-1-90

SAMPLE ID	DEPTH (FT.)	TCA PPM	TCE PPM	PCE PPM
SG9-200	2	0	0	0
	5	<.01	0	0
	10	0	0	0
SG9-203	2	0	0	0
	5	<.01	0	0
	10	0	0	0
	15	0	0	0
SG9-211	2	<.01	0	0
	5	<.01	0	0
	10	0.02	0	<.01
	14.5	<.01	0	<.01
	25.5	0	0	0
SG9-213	2	0	0	0
	5	0.11	0	<.01
	9.5	0.10	0	<.01
	25.5	0	0	0
SG9-214	2	<.01	0	0
	5	<.01	0	0
	9.5	0.02	0	<.01
	14	0.04	0	<.01
	19	0.06	0	<.01
	29	0	0	0
SG9-222	2	0	0	0
	5	<.01	0	0
	10	0.01	0	<.01
	14.5	0.02	0	<.01
	19.5	0.05	0	<.01
	30	0.11	0	<.01
	35	0	0	0

SAMPLE ID	DEPTH (FT.)	TCA PPM	TCE PPM	PCE PPM
SG9-223	2	<.01	0	<.01
	5	0	0	0
	10	<.01	0	<.01
	15	0.02	0	<.01
	26	0.02	0	<.01
SG9-225	2	0	0	0
	5	<.01	0	<.01
	10	0	0	<.01
	14.5	0	0	<.01
	24	<.01	0	<.01
SG9-231	2	<.01	0	<.01
	4.5	<.01	0	<.01
	9.5	<.01	0	0
	14.5	<.01	0	<.01
	19.5	<.01	<.01	<.01
SG9-234	2	0	0	0
	5	0	0	0
	10	0	0	0
	15	0	0	0
	20	0	0	0
SG9-235	1	0	0	0
	4	0	0	0
	9	0	0	0
	14	0	0	0
	26	0	0	0
SG9-236	2	0	0	0
	10	0	0	0
	15	0	0	0
	20	0	0	0
	25	NS	NS	NS
SG9-237	1	0	0	0
	4.5	0	0	0
	9	0	0	0
	14	0	0	0
SG9-238	1	0	0	0
	4.5	0	0	<.01
	9	0	0	0
	14	0	0	0
	19.5	0	0	<.01

Table 2, Page 15

SAMPLE ID	DEPTH (FT.)	TCA PPM	TCE PPM	PCE PPM
SG9-239	2	<.01	0	<.01
	5	<.01	0	0
	9.5	0	0	0
	14	0	0	0
SG9-244	2	0	0	0
	4.5	0	0	0
	9	<.01	0	<.01
SG9-245	2	0	0	0
	5	0	0	0
	10	0	0	0
	25	0	0	0
SG9-301	1	<.01	0.01	<.01
	5	0.12	0	0.05
	10	0.14	0	0.05
	15	0.17	0	0.06
	20	0.17	0	0.06
	25	0.27	0	0.09
	30	<.01	<.01	<.01
SG9-303	2	0	0	0
	5	0	0	0
	15	0	0	0
	20	0	0	0
	30	0	0	0
	35	0	0	0
	40	0	0	0.01
SG9-308	2	0	0	0
	5	0	0	0
	10	0	0	0
	15	0	0	0
	20	NS	NS	NS
SG9-309	2	0	0	0
	5	0	0	0
	10	0	0	0
SG9-310	2	<.01	0	<.01
	5	0.19	0	0.10
	10	0.18	0.08	0
SG9-312	1	0.12	0	0.03
	5	0.43	0	0.17
	10	0.85	0	0.19

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SAMPLE ID	DEPTH (FT.)	TCA PPM	TCE PPM	PCE PPM
SG9-314	2	0	0	<.01
	5	<.01	0	<.01
	10	<.01	0	<.01
	20	0.16	0	0.06
	25	NS	NS	NS
SG9-316	2	0.08	0	0.03
	4	0.30	0	0.09
	9	0.43	0	0.10
SG9-317	2	0	0	0
	4	0	0	0
	10	<.01	0	<.01
	15	0	0	<.01
	20	<.01	0	<.01
SG9-320	2	0.33	0	0.07
	5	1.37	0	0.33
	10	2.2	0	0.47
	15	NS	NS	NS
SG9-322	2	0.01	0	0.010.01
	5	0.01	0	0.01
	9	0.02	0	<.01
	14.5	0.02	0	<.01
	26	0	0	0
SG9-324	1	0	0	0.31
	5	1.3	0	0.92
	19	3.1	<.01	1.0
	30	3.0	<.01	0
SG9-325	2	0	0	0
	5	0	0	0
	10	0	0	0
	20	0	0	0
SG9-326	2	0	0	0
	5	0	0	0
	10	0	0	0
	15	0	0	0
	20	0	0	0
SG9-328	1	0.14	0	0.02
	4	1.14	0	0.18
	9	2.5	0.01	0.4
	14	2.0	0.01	0.35

Table 2, Page 17

SAMPLE ID	DEPTH (FT.)	TCA PPM	TCE PPM	PCE PPM
SG9-330	1	0.13	0	0.05
	4	0.74	0	0.24
	15	2.0	0	0.65
	20	2.8	<.01	0.97
	40	1.6	0	0.47
SG9-331	1	0.11	0	0.02
	5	3.7	<.01	0.48
	9	4.82	<.01	0.90
	14	5.93	<.01	1.08
	25	NS	NS	NS
SG9-332	2	0.27	0	0.04
	4	0.50	0	0.09
	9.5	0.82	0	0.09
	14	1.51	0	0.19
	20	5.2	0	1.02
	40	NS	NS	NS
SG9-333	1.5	0.01	<.01	<.01
	5	0.09	<.01	<.01
	9	0.19	0	0.01
	14	0.22	0	0.01
	24	NS	NS	NS
SG9-334	2	<.01	0	0
	5	0	0	0
	9	0	0	0
	14.5	NS	NS	NS
SG9-337	2	0.10	0	<.01
	5	1.24	0	0.06
	15	3.25	0	0.15
	25	6.92	0	0.39
	30	7.65	0	0.43
SG9-338	2	0	0	0
	5	0.13	0	<.01
	10	0.50	0	<.01
	15	NS	NS	NS
SG9-339	2	0.26	0	0.02
	5	0.98	0	0.07
	10	3.02	0	0.14
	20	9.95	0	0.38

SAMPLE ID	DEPTH (FT.)	TCA PPM	TCE PPM	PCE PPM
SG9-340	2	0.13	0	<.01
	5	0.44	0	0.02
	10	0.71	0	0.03
	20	3.93	0	0.12
	30	NS	NS	NS
SG9-341	2	0	0	0
	5	0	0	0
	9	0	0	0
	15	NS	NS	NS
SG9-342	2	0	0	<.01
	5	0	0	<.01
	9	<.01	0	<.01
	14	<.01	0	<.01
SG9-344	2	0	0	0
	4	0	0	0
	24.5	0	0	0.02
SG9-345	1	0	0	0
	5	0.10	0	<.01
	9	0.15	0	0.01
	19	1.3	0	0.02
	35	0	0	0.03
SG9-346	2	0.11	0	<.01
	5	0.73	0	0
	10	1.31	0	<.01
	25	1.74	0	<.01
SG9-347	2	5.8	<.01	0
	5.5	65.2	0	0.01
	9.5	29.1	0	0
SG9-348	2	4.13	0	0
	5	18.4	0.03	0.01
	10	102.4	0.21	0.09
	25	99.4	0.30	0.12
SG9-349	2	34.12	0	0
	5	142.0	0	0
	10	226.8	0	0
	15	2212.0	0.77	0.26
	20	2053.0	0.54	0.45
SG9-351	5	9.08	0	0.02
	10	8.23	0	0.02
	20	6.63	0	0.02
	30	NS	NS	NS

SAMPLE ID	DEPTH (FT.)	TCA PPM	TCE PPM	PCE PPM
SG9-352	2	<.01	0	<.01
	5	0.02	0	<.01
	10	0.02	0	<.01
SG9-353	2	<.01	<.01	<.01
	5	<.01	0	<.01
	10	0.02	<.01	0.02
	15	0.01	0	0.01
SG9-354	2	0	0	0
	5	0	0	0
	15	0	0	0
	20	0	0	0
SG9-355	2	0.08	0	0
	5	0.03	0	0
	10	0.04	0	<.01
	35	0.01	0	0.02
SG9-357	2	0.06	0	0
	5	0.45	0	0
	10	0.71	0	0
	15	1.43	0	0
SG9-359	2	5.5	<.01	<.01
	4	7.6	<.01	<.01
	9	11.3	<.01	<.01
	15	10.26	<.01	<.01
	19.5	80.45	<.01	<.01
	24	81.31	<.01	<.01
	35	86.56	<.01	<.01
SG9-360	2	2.99	0	<.01
	5	53.24	0.03	0.04
	15	73.22	0.08	0.10
	20	83.46	0.11	0.18
	25	85.12	0.12	0.19
	30	NS	NS	NS
	35	86.41	0.12	0.27
SG9-361	5	33.21	0	0.01
	15	46.99	0	0.08
SG9-362	2	<.01	0	<.01
	5	<.01	0	<.01
	10	0	0	0

SAMPLE ID	DEPTH (FT.)	TCA PPM	TCE PPM	PCE PPM
SG9-363	2	<.01	0	<.01
	5	<.01	0	<.01
	10	0	0	<.01
	15	0	0	<.01
SG9-364	2	0	0	0
	5	0	0	0
	10	NS	NS	NS
SG9-366	2	0	0	0
	5	0	0	0
	15	0	0	0
	20	0	0	0
SG9-368	2	0.48	0.01	<.01
	4	4.10	<.01	<.01
	9	7.5	0.03	<.01
	14	36.4	0.27	0.03
	19	0.74	0.20	0.03
SG9-369	2	0.41	0	0
	5	4.56	0	0.10
	10	31.90	0	0.20
	20	<.01	0	0
SG9-370	2	0.20	0	0
	5	0.15	0	<.01
	10	2.16	0	<.01
	15	2.16	0	<.01
	20	0.48	0	0
SG9-371	2	<.01	<.01	<.01
	5	0	<.01	<.01
	10	<.01	<.01	<.01
	15	<.01	<.01	<.01
SG9-372	2	<.01	0	<.01
	5	<.01	0	<.01
	10	<.01	0	<.01
SG9-373	2	0	0	0
	5	0	0	0
	10	0	0	0
	30	0	0	0

Table 2, Page 21

SAMPLE ID	DEPTH (FT.)	TCA PPM	TCE PPM	PCE PPM
SG9-374	2	0.32	0	0
	4	1.0	0	0
	9	2.4	0	<.01
	20	2.0	0	<.01
SG9-375	2	0.11	0	<.01
	5	0.34	0	<.01
	10	0.43	0.04	0
	30	0.98	0	<.01
SG9-376	2	<.01	<.01	<.01
	5	<.01	<.01	<.01
	10	0	0	0
	15	0	0	0
SG9-377	2	<.01	0	<.01
	5	0	0	<.01
	9	<.01	0	<.01
SG9-381	2	0.09	0	0
	5	0	0	0
	10	<.01	0	0
SG9-382	2	0	0	0.01
	5	0	0	0
	10	0	0	0
SG9-383	2	0	0	0
	5	0	0	0
	10	0	0	0
	14	0	0	0
	19.5	0.01	0	<.01
SG9-387	2	0	0	0
	5	<.01	0	0
	10	0	0	0

Harding Lawson Associates
1991 Soil Analytical Results

TABLE 2

PHASE 2

						SUMMARY OF ON-SITE CORE SAMPLE ANALYTICAL RESULTS										
								Roswell, New Mexico								
Core Hole No.		SB9-1	SB9-1					SB9-2	SB9-2	SB9-2	SB9-2					
Sample Depth		3-6.5'	14-17'		Blank # 1	Blank # 2		3.5-7.5'	9-12'	14-16'	17-18.6'		Blank #3	Blank #4		
Sample ID		S9-01.1-8	S9-02.1-8		Equipment	Trip		S9-03.1-8	S9-04.1-8	S9-05.1-8	S9-06.1-8		Equipment	Trip		
TPH	mg/kg	<20	<20	mg/l	<1	6	mg/kg	40	80	80	<20	mg/l	<1	<1		
Methanol	mg/l	<1	<1	mg/l	<1	<1	mg/l	<1	<1	<1	<1	mg/l	<1	<1		
Methylene Chloride	ug/kg	12	20	ug/l	<5	<5	ug/kg	12	10	16	11	ug/l	<5	<5		
Acetone	ug/kg	<9	<12	ug/l	45	<10	ug/kg	<11	<11	<14	<10	ug/l	<10*	14		
Carbon Disulfide	ug/kg	<5	<6	ug/l	<5	<5	ug/kg	<6	<6	<7	<5	ug/l	<5	<5		
Trichlorofluoromethane	ug/kg	<5	Not Tested	ug/l	<5	<5	ug/kg	<6	<6	<7	<5	ug/l	<5	<5		
Ethyl Ether	ug/kg	<5	Not Tested	ug/l	<5	<5	ug/kg	<6	<6	<7	<5	ug/l	<5	<5		
Freon (TF)	ug/kg	120	Not Tested	ug/l	<5	<5	ug/kg	57	96	70	37	ug/l	<5	<5		
2-Butanone	ug/kg	<9	<12	ug/l	<10	<10	ug/kg	<11	<11	<14	<10	ug/l	<10	<10		
1,1,1-Trichloroethane	ug/kg	<5	<6	ug/l	<5	<5	ug/kg	<6	<6	<7	<5	ug/l	<5	<5		
Carbon Tetrachloride	ug/kg	<5	<6	ug/l	<5	<5	ug/kg	<6	<6	<7	<5	ug/l	<5	<5		
Cyclohexanone	ug/kg	<5	Not Tested	ug/l	<5	<5	ug/kg	<6	<6	<7	<5	ug/l	<5	<5		
Ethyl Acetate	ug/kg	<5	Not Tested	ug/l	<5	<5	ug/kg	<6	<6	<7	<5	ug/l	<5	<5		
Isobutyl Alcohol	ug/kg	<180	Not Tested	ug/l	<200	<200	ug/kg	<230	<220	<270	<190	ug/l	<200	<200		
2-Ethoxyethanol	ug/kg	<9	Not Tested	ug/l	<10	<10	ug/kg	<11	<11	<14	<10	ug/l	<10	<10		
n-Butyl Alcohol	ug/kg	<90	Not Tested	ug/l	<100	<100	ug/kg	<110	<110	<140	<97	ug/l	<100	<100		
Trichloroethene	ug/kg	<5	<6	ug/l	<5	<5	ug/kg	<6	<6	<7	<5	ug/l	<5	<5		
1,1,2-Trichloroethane	ug/kg	<5	<6	ug/l	<5	<5	ug/kg	<6	<6	<7	<5	ug/l	<5	<5		
Benzene	ug/kg	<5	<6	ug/l	<5	<5	ug/kg	<6	<6	<7	<5	ug/l	<5	<5		
4 Methyl 2 Pentanone	ug/kg	<9	<12	ug/l	<10	<10	ug/kg	<11	<11	<14	<10	ug/l	<10	<10		
Tetrachloroethane	ug/kg	<5	<6	ug/l	<5	<5	ug/kg	<6	<6	<7	<5	ug/l	<5	<5		
Toluene	ug/kg	<5	<6	ug/l	<5	<5	ug/kg	<6	<6	<7	<5	ug/l	<5	<5		
Chlorobenzene	ug/kg	<5	<6	ug/l	<5	<5	ug/kg	<6	<6	<7	<5	ug/l	<5	<5		
Ethylbenzene	ug/kg	<5	<6	ug/l	<5	<5	ug/kg	<6	<6	<7	<5	ug/l	<5	<5		
Xylene (total)	ug/kg	<5	<6	ug/l	<5	<5	ug/kg	<6	<6	<7	<5	ug/l	<5	<5		
Pyridine	ug/kg	<340	<420	ug/l	<40	<40	ug/kg	<340	<340	<340	<340	ug/l	<40	<40		
1,3-Dichlorobenzene	ug/kg	<340	<420	ug/l	<40	<40	ug/kg	<340	<340	<340	<340	ug/l	<40	<40		
1,4-Dichlorobenzene	ug/kg	<340	<420	ug/l	<40	<40	ug/kg	<340	<340	<340	<340	ug/l	<40	<40		
1,2-Dichlorobenzene	ug/kg	<340	<420	ug/l	<40	<40	ug/kg	<340	<340	<340	<340	ug/l	<40	<40		
2-Methylphenol	ug/kg	<340	<420	ug/l	<40	<40	ug/kg	<340	<340	<340	<340	ug/l	<40	<40		
3-Methylphenol	ug/kg	<340	<420	ug/l	<40	<40	ug/kg	<340	<340	<340	<340	ug/l	<40	<40		
4-Methylphenol	ug/kg	<340	<420	ug/l	<40	<40	ug/kg	<340	<340	<340	<340	ug/l	<40	<40		
Nitrobenzene	ug/kg	<340	<420	ug/l	<40	<40	ug/kg	<340	<340	<340	<340	ug/l	<40	<40		
Silver, total	mg/l	0.0005UW	0.0005UW	mg/l	0.0005U	0.0005U	mg/l	<.0005	<.0005	<.0005	<.0005	mg/l	<.0005	<.0005		
Arsenic, total	mg/l	0.004B	0.004BW	mg/l	0.003U	0.003U	mg/l	.005BW	.004B	<.003	.003B	mg/l	<.003	<.003		
Barium, total	mg/l	0.38	0.12B	mg/l	0.05U	0.05U	mg/l	0.38	1.28	1.01	1.11	mg/l	<.05	<.05		
Cadmium, total	mg/l	.0005UW	.0005U	mg/l	0.0005U	0.0005U	mg/l	.0006BW	.0007BW	.0008BW	.0006BW	mg/l	<.0005W	<.0005W		
Chromium, total	mg/l	.006B	.006U	mg/l	0.009B	0.006B	mg/l	<.006	0.008	<.006	.007B	mg/l	<.006	<.006		
Mercury, total	mg/l	.0002U	.0002U	mg/l	0.0002U	0.0002U	mg/l	<.0002	<.0002	<.0002	<.0002	mg/l	<.0002	<.0002		
Lead, total	mg/l	.002B	.002UW	mg/l	0.007	0.003	mg/l	.002B	0.004	.002B	0.003	mg/l	<.002W	<.002		
Selenium, total	mg/l	.003UW	.003UW	mg/l	0.003U	0.003U	mg/l	<.003W	<.003W	<.003W	<.003W	mg/l	<.003W	<.003W		

ROS-83-XLS, 8/22/90, 1 of 5

TABLE 2 (CONT)

						SUMMARY OF ON-SITE CORE SAMPLE ANALYTICAL RESULTS										
								Roswell, New Mexico								
Core Hole No.		SB9-3	SB9-3	SB9-3					SB9-4	SB9-4	SB9-4	SB9-4	SB9-5	SB9-5	SB9-5	SB9-5
Sample Depth		13-6'	16-18.6'	20-23'		Blank #5			8-13'	14-16'	16-21'	20-27'	4-9'	10-13'	15-17.5'	18-20'
Sample ID		S9-07.3-8	S9-08.1-8*	S9-09.1-4,7-8*		(Equipment)			S9-10.3-8*	S9-11.1-8*	S9-12.1-8*	S9-13.1-8*	S9-14.1-8*	S9-16.1-8	S9-16.1,3-6,7-8	S9-17.1-5,7,8
TPH	mg/kg	<20	<20	110	mg/l	<1		mg/kg	120	70	70	280	<20	100	<20	<20
Methanol	mg/l	<5	<1	<1	mg/l	<1		mg/l	<5 mg/kg	<1	<1	<1	<1	<1	<1	<1
Methylene Chloride	ug/kg	16*	7*	9*	ug/l	<5		ug/kg	8*	12*	<6*	<18*	<6*	<8*	8*	[illegible]
Acetone	ug/kg	25	<11	<14	ug/l	57*		ug/kg	<11	<20	<12	<36	<12	<15	<10	<11
Carbon Disulfide	ug/kg	<5	<6	<7	ug/l	<5		ug/kg	<6	<10	<6	<18	<6	<8	<5	<6
Trichlorofluoromethane	ug/kg	<5	<6	<7	ug/l	<5		ug/kg	<6	<10	<6	<18	<6	<8	<5	<6
Ethyl Ether	ug/kg	<5	<6	<7	ug/l	<5		ug/kg	<6	<10	<6	<18	<6	<8	<5	<6
Freon (TF)	ug/kg	64*	8	14	ug/l	<5		ug/kg	6	11	<6	<18	<6	12	9	16
2-Butanone	ug/kg	<10	<11	<14	ug/l	120		ug/kg	<11	<20	<12	<36	<12	<15	<10	<11
1,1,1-Trichloroethane	ug/kg	<5	<6	<7	ug/l	<5		ug/kg	<6	<10	<6	<18	<6	<8	<5	<6
Carbon Tetrachloride	ug/kg	<5	<6	<7	ug/l	<5		ug/kg	<6	<10	<6	<18	<6	<8	<5	<6
Cyclohexanone	ug/kg	<5	<6	<7	ug/l	<5		ug/kg	<6	<10	<6	<18	<6	<8	<5	<6
Ethyl Acetate	ug/kg	<5	<6	<7	ug/l	<5		ug/kg	<6	<10	<6	<18	<6	<8	<5	<6
Isobutyl Alcohol	ug/kg	<190	<230	<280	ug/l	<200		ug/kg	<220	<400	<240	<720	<240	<310	<200	<220
2-Ethoxyethanol	ug/kg	<10	<11	<14	ug/l	<10		ug/kg	<11	<20	<20	<36	<12	<15	<10	<11
n-Butyl Alcohol	ug/kg	<97	<110	<140	ug/l	<100		ug/kg	<110	<200	<120	<360	<120	<150	<100	<110
Trichloroethene	ug/kg	<5	<6	<7	ug/l	<5		ug/kg	<6	<10	<6	<18	<6	<8	<5	<6
1,1,2-Trichloroethane	ug/kg	<5	<6	<7	ug/l	<5		ug/kg	<6	<10	<6	<18	<6	<8	<5	<6
Benzene	ug/kg	<5	<6	<7	ug/l	<5		ug/kg	<6	<10	<6	<18	<6	<8	<5	<6
4 Methyl 2 Pentanone	ug/kg	<10	<11	<14	ug/l	<10		ug/kg	<11	<20	<12	<36	<12	<15	<10	<11
Tetrachloroethane	ug/kg	<5	<6	<7	ug/l	<5		ug/kg	<6	<10	<6	<18	<6	<8	<5	<6
Toluene	ug/kg	<5	<6	<7	ug/l	<5		ug/kg	<6	<10	<6	<18	<6	<8	<5	<6
Chlorobenzene	ug/kg	<5	<6	<7	ug/l	<5		ug/kg	<6	<10	<6	<18	<6	<8	<5	<6
Ethylbenzene	ug/kg	<5	<6	<7	ug/l	<5		ug/kg	<6	<10	<6	<18	<6	<8	<5	<6
Xylene (total)	ug/kg	<5	<6	<7	ug/l	<5		ug/kg	<6	<6	<6	<18	<6	<8	<5	<6
Pyridine	ug/kg	<350	<340	<340	ug/l	<40		ug/kg	<330	<370	<350	<340	<340	<340	<340	<370
1,3-Dichlorobenzene	ug/kg	<350	<340	<340	ug/l	<40		ug/kg	<330	<370	<350	<340	<340	<340	<340	<370
1,4-Dichlorobenzene	ug/kg	<350	<340	<340	ug/l	<40		ug/kg	<330	<370	<350	<340	<340	<340	<340	<370
1,2-Dichlorobenzene	ug/kg	<350	<340	<340	ug/l	<40		ug/kg	<330	<370	<350	<340	<340	<340	<340	<370
2-Methylphenol	ug/kg	<350	<340	<340	ug/l	<40		ug/kg	<330	<370	<350	<340	<340	<340	<340	<370
3-Methylphenol	ug/kg	<350	<340	<340	ug/l	<40		ug/kg	<330	<370	<350	<340	<340	<340	<340	<370
4-Methylphenol	ug/kg	<350	<340	<340	ug/l	<40		ug/kg	<330	<370	<350	<340	<340	<340	<340	<370
Nitrobenzene	ug/kg	<350	<340	<340	ug/l	<40		ug/kg	<330	<370	<350	<340	<340	<340	<340	<370
Silver, total	mg/l	<.0005	<.0005	<.0005	mg/l	<.0006		mg/l	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005	<.0005W	<.0005W
Arsenic, total	mg/l	0.01	<.003	<.003	mg/l	<.003		mg/l	.009B	<.003	<.003	<.003	.005B	<.003W	<.003W	<.003
Barium, total	mg/l	0.24	0.39	1.3	mg/l	<.05		mg/l	0.91	0.83	0.9	1.78	0.53	0.77	1.03	1.05
Cadmium, total	mg/l	.0006BW	.0009BW	<.0005W	mg/l	<.0005		mg/l	<.0005W	<.0005W	.0013BW	.0006BW	<.0005W	<.0005W	<.0005W	<.0005
Chromium, total	mg/l	<.006	.008B	.006B	mg/l	<.006		mg/l	<.006	<.006	<.006	<.006	<.006	<.006	<.006	<.006
Mercury, total	mg/l	<.0002	<.0002	<.0002	mg/l	<.0002		mg/l	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002
Lead, total	mg/l	0.003	.002B	.002B	mg/l	0.003		mg/l	0.003	.002B	0.003	.002B	.002B	0.003	0.007	<.002N
Selenium, total	mg/l	<.003W	<.003W	<.003W	mg/l	<.003W		mg/l	<.003	<.003	<.003	<.003W	<.003W	<.003W	<.0003W	<.003WN

TABLE 2 (CONT)

						SUMMARY OF ON-SITE CORE SAMPLE ANALYTICAL RESULTS										
								Roswell, New Mexico								
Core Hole No.		SB9-5	SB9-5	SB9-5						SB9-6	SB9-6	SB9-6	SB9-6		SB9-6	SB9-6
Sample Depth		20-22.5'	20-22.5'	20-22.5'		Blank #6	Blank #7			16-18'	18-20'	20-23'	26-28'		26-26'	26-28'
Sample ID		169-16.1-4.7	Tube #3	Tube #4		Equipment	Trip			160-20.1-8	169-21.3-5.8	169-22.1-5	9-23.1,3,4,7		Tube #5	Tube #6
TPH	mg/kg	<20	<20	<20	mg/l	<1	<1		mg/kg	<20	<20	120	<20	mg/kg	<20	<20
Methanol	mg/l	<1	<1	<1	mg/l	<1	<1		mg/l	<1	<1	<10	<10	mg/kg	<50	<50
Methylene Chloride	ug/kg	9*	7*	10*	ug/l	<5	<5		ug/kg	15	12	8*	<5	ug/kg	16	29*
Acetone	ug/kg	47	26	13	ug/l	<10*	<10		ug/kg	<12	<11	20	<10	ug/kg	<10	<14
Carbon Disulfide	ug/kg	<6	<6	<6	ug/l	<5	<5		ug/kg	<6	<5	<5	<5	ug/kg	<5	<7
Trichlorofluoromethane	ug/kg	<6	<6	<6	ug/l	<5	<5		ug/kg	<6	<5	<5	<5	ug/kg	<5	<7
Ethyl Ether	ug/kg	<6	<6	<6	ug/l	<5	<5		ug/kg	<6	<5	<5	<5	ug/kg	<5	<7
Freon (TF)	ug/kg	16*	15*	16	ug/l	<5	<5		ug/kg	8	7	269	11	ug/kg	164	23
2-Butanone	ug/kg	<13	<11	<12	ug/l	<10	<10		ug/kg	<12	<11	<10	<10	ug/kg	<10	<14
1,1,1-Trichloroethane	ug/kg	<6	<6	<6	ug/l	<5	<5		ug/kg	<6	<5	12	<5	ug/kg	<5	<7
Carbon Tetrachloride	ug/kg	<6	<6	<6	ug/l	<5	<5		ug/kg	<6	<5	<5	<5	ug/kg	<5	<7
Cyclohexanone	ug/kg	<6	<6	<6	ug/l	<5	<5		ug/kg	<6	<5	<5	<5	ug/kg	<5	<7
Ethyl Acetate	ug/kg	<6	<6	<6	ug/l	<5	<5		ug/kg	<6	<5	<5	<5	ug/kg	<5	<7
Isobutyl Alcohol	ug/kg	<250	<230	<230	ug/l	<200	<200		ug/kg	<250	<210	<210	<200	ug/kg	<200	<280
2-Ethoxyethanol	ug/kg	<13	<11	12	ug/l	<10	<10		ug/kg	12	<11	<10	<10	ug/kg	<10	<14
n-Butyl Alcohol	ug/kg	<130	<110	<120	ug/l	<100	<100		ug/kg	<120	<110	<100	<100	ug/kg	<100	<140
Trichloroethene	ug/kg	<6	<6	<6	ug/l	<5	<5		ug/kg	<6	<5	<5	<5	ug/kg	<5	<7
1,1,2-Trichloroethane	ug/kg	<6	<6	<6	ug/l	<5	<5		ug/kg	<6	<5	<5	<5	ug/kg	<5	<7
Benzene	ug/kg	<6	<6	<6	ug/l	<5	<5		ug/kg	<6	<5	<5	<5	ug/kg	<5	<7
4 Methyl 2 Pentanone	ug/kg	<13	<11	<12	ug/l	<10	<10		ug/kg	<12	<11	<10	<10	ug/kg	<10	<14
Tetrachloroethene	ug/kg	<6	<6	<6	ug/l	<5	<5		ug/kg	<6	<5	<5	<5	ug/kg	<5	<7
Toluene	ug/kg	<6	<6	<6	ug/l	<5	<5		ug/kg	<6	<5	<5	<5	ug/kg	<5	<7
Chlorobenzene	ug/kg	<6	<6	<6	ug/l	<5	<5		ug/kg	<6	<5	<5	<5	ug/kg	<5	<7
Ethylbenzene	ug/kg	<6	<6	<6	ug/l	<5	<5		ug/kg	<6	<5	<5	<5	ug/kg	<5	<7
Xylene (total)	ug/kg	<6	<6	<6	ug/l	<5	<5		ug/kg	<6	<5	<5	<5	ug/kg	<5	<7
Pyridine	ug/kg	<420	<370	<380	ug/l	<40	<40		ug/kg	<330	<350	<390	<340	ug/kg	<340	<430
1,3-Dichlorobenzene	ug/kg	<420	<370	<380	ug/l	<40	<40		ug/kg	<330	<350	<390	<340	ug/kg	<340	<430
1,4-Dichlorobenzene	ug/kg	<420	<370	<380	ug/l	<40	<40		ug/kg	<330	<350	<390	<340	ug/kg	<340	<430
1,2-Dichlorobenzene	ug/kg	<420	<370	<380	ug/l	<40	<40		ug/kg	<330	<350	<390	<340	ug/kg	<340	<430
2-Methylphenol	ug/kg	<420	<370	<380	ug/l	<40	<40		ug/kg	<330	<350	<390	<340	ug/kg	<340	<430
3-Methylphenol	ug/kg	<420	<370	<380	ug/l	<40	<40		ug/kg	<330	<350	<390	<340	ug/kg	<340	<430
4-Methylphenol	ug/kg	<420	<370	<380	ug/l	<40	<40		ug/kg	<330	<350	<390	<340	ug/kg	<340	<430
Nitrobenzene	ug/kg	<420	<370	<380	ug/l	<40	<40		ug/kg	<330	<350	<390	<340	ug/kg	<340	<430
Silver, total	mg/l	.0022BW	<.0005W	<.0005	mg/l	<.0005	<.0005		mg/l	<.0005W	<.0005	.0026B	<.0005W	mg/l	<.0005W	<.0005
Arsenic, total	mg/l	.003B	.006B	.004B	mg/l	<.003	<.003		mg/l	.004B	<.003W	<.003	<.003W	mg/l	<.003	.009B
Barium, total	mg/l	1.12	0.27	0.62	mg/l	<.05	<.05		mg/l	0.63	1.21	0.7	1.22	mg/l	113	.010B
Cadmium, total	mg/l	.0005BW	.0005BW	.0010BW	mg/l	<.0005W	<.0005W		mg/l	.0010BW	<.0005	<.0005	.0006B	mg/l	.0012B	.0008B
Chromium, total	mg/l	<.006	<.006	<.006	mg/l	<.006	<.006		mg/l	<.006	<.006	0.011	.006B	mg/l	0.007B	0.011
Mercury, total	mg/l	<.0002	<.0002	<.0002	mg/l	<.0002	<.0002		mg/l	<.0002	<.0002	<.0002	<.0002	mg/l	<.0002	<.0002
Lead, total	mg/l	<.002N	<.002WN	<.002WN	mg/l	0.004	0.003		mg/l	<.002WN	<.002WN	<.002W	.008W	mg/l	.002W	<.002
Selenium, total	mg/l	.005BN	<.003N	<.003W	mg/l	<.003	<.003		mg/l	<.003WN	<.003N	<.003	<.003	mg/l	<.003	<.003

TABLE 2 (CONT)

						SUMMARY OF ON-SITE CORE SAMPLE ANALYTICAL RESULTS										
								Roswell, New Mexico								
Core Hole No.						SB9-7	SB9-7	SB9-7	SB9-7	SB9-7	SB9-7	SB9-7	SB9-7			
Sample Depth		Blank #10	Blank #11			10-12.5	21.5-24	25.5-28	29-32	29-32	35-37	35-37	35-37		Blank #12	Blank #13
Sample ID		Equipment	Trip			S9-24.1-8	S9-25.1-8	S9-26.1-8	S9-27.3-8	Tube #7	S9-28.3-8	Tube #8	Tube #9		Field	Equipment
TPH	mg/l	<4	<4		mg/kg	1100	2000	2500	11000	6000	4600	19000	30000	mg/l	<4	<4
Methanol	mg/l	<50	<50		mg/l	<1	<1	<1	<1	<1	<1	<1	<1	mg/l	<10	<10
Methylene Chloride	ug/l	<5	<5		ug/kg	17*	12*	71*	<1300	<1300	740	<640	<670	ug/l	<5	<5
Acetone	ug/l	10	10		ug/kg	28	81	270	<2600	<2600	<1300	<1300	<1300	ug/l	<10	<10
Carbon Disulfide	ug/l	<5	<5		ug/kg	<6	<6	<29	<1300	<1300	<640	<640	<670	ug/l	<5	<5
Trichlorofluoromethane	ug/l	<5	<5		ug/kg	<6	<5	<29	<1300	<1300	<640	<640	<670	ug/l	<5	<5
Ethyl Ether	ug/l	<5	<5		ug/kg	<6	<5	<29	<1300	<1300	<640	<640	<670	ug/l	<5	<5
Freon (TF)	ug/l	7*	6*		ug/kg	18	46	89	3700	5100	<640	<640	<670	ug/l	8*	107*
2-Butanone	ug/l	46	<10		ug/kg	<11	13	68	<2600	<2600	<1300	<1300	<1300	ug/l	<10	<10
1,1,1-Trichloroethane	ug/l	<5	<5		ug/kg	<6	<5	<29	<1300	<1300	<640	<640	2000	ug/l	<5	<5
Carbon Tetrachloride	ug/l	<5	<5		ug/kg	<6	<5	<29	<1300	<1300	<640	<640	<670	ug/l	<5	<5
Cyclohexanone	ug/l	<5	<5		ug/kg	<6	<5	<29	<1300	<1300	<640	<640	<670	ug/l	<5	<5
Ethyl Acetate	ug/l	<5	<5		ug/kg	<6	<5	<29	<1300	<1300	<640	<640	<670	ug/l	<5	<5
Isobutyl Alcohol	ug/l	<200	<200		ug/kg	<230	<210	<1200	<51000	<53000	<26000	<26000	<27000	ug/l	<200	<200
2-Ethoxyethanol	ug/l	<10	<10		ug/kg	<11	<10	<59	<2600	<2600	<1300	<1300	<1300	ug/l	<10	<10
n-Butyl Alcohol	ug/l	<100	<100		ug/kg	<110	<100	<590	<26000	<26000	<13000	<13000	<13000	ug/l	<100	<100
Trichloroethene	ug/l	<5	<5		ug/kg	<6	<5	<29	<1300	<1300	<640	<640	<670	ug/l	<5	<5
1,1,2-Trichloroethane	ug/l	<5	<5		ug/kg	<6	<5	<29	<1300	<1300	<640	<640	<670	ug/l	<5	<5
Benzene	ug/l	<5	<5		ug/kg	<6	<5	<29	<1300	<1300	<640	<640	<670	ug/l	<5	<5
4 Methyl 2 Pentanone	ug/l	<10	<10		ug/kg	<11	<10	<59	<2600	<2600	<1300	<1300	<1300	ug/l	<10	<10
Tetrachloroethane	ug/l	<5	<5		ug/kg	<6	<5	<29	<1300	<1300	740	<640	2100	ug/l	<5	<5
Toluene	ug/l	<5	<5		ug/kg	<6	<5	<29	<1300	<1300	<640	<640	<670	ug/l	<5	<5
Chlorobenzene	ug/l	<5	<5		ug/kg	<6	<5	<29	<1300	<1300	<640	<640	<670	ug/l	<5	<5
Ethylbenzene	ug/l	<5	<5		ug/kg	41	6	110	980	720	2300	1600	2800	ug/l	<5	<5
Xylene (total)	ug/l	<5	<5		ug/kg	78	17	270	2800	1800	4800	4200	6600	ug/l	<5	<5
Pyridine	ug/l	<40	<87		ug/kg	<370	<340	<390	<340	<350	<340	<340	<21000	ug/l	<40	<40
1,3-Dichlorobenzene	ug/l	<40	<87		ug/kg	<370	<340	<390	<340	<350	<340	<340	<21000	ug/l	<40	<40
1,4-Dichlorobenzene	ug/l	<40	<87		ug/kg	<370	<340	<390	<340	<350	<340	<340	<21000	ug/l	<40	<40
1,2-Dichlorobenzene	ug/l	<40	<87		ug/kg	<370	<340	<390	<340	<350	<340	<340	<21000	ug/l	<40	<40
2-Methylphenol	ug/l	<40	<87		ug/kg	<370	<340	<390	<340	<350	<340	<340	<21000	ug/l	<40	<40
3-Methylphenol	ug/l	<40	<87		ug/kg	<370	<340	<390	<340	<350	<340	<340	<21000	ug/l	<40	<40
4-Methylphenol	ug/l	<40	<87		ug/kg	<370	<340	<390	<340	<350	<340	<340	<21000	ug/l	<40	<40
Nitrobenzene	ug/l	<40	<87		ug/kg	<370	<340	<390	<340	<350	<340	<340	<21000	ug/l	<40	<40
Silver, total	mg/l	<.0005	<.0005		mg/l	<.0005	<.0005WN	<.0005WN	<.0005WN	<.0005WN	<.0005WN	<.0005WN	<.0005WN	mg/l	.0005W	<.0005
Arsenic, total	mg/l	<.003	<.003		mg/l	<.003	0.004B	<.003W	.006B	.008B	.008B	.005B	.004BW	mg/l	<.003	<.003
Barium, total	mg/l	<.05	<.05		mg/l	0.79	2.22	1.81	3.59	1.81	1.72	1.84	3.12	mg/l	<.05	<.05
Cadmium, total	mg/l	.0010B	.0011BW		mg/l	.0005B	.0010B	<.0005	.0011BW	.0012BW	.0007BW	.0006BW	.0006BW	mg/l	<.0005	.0006B
Chromium, total	mg/l	<.006	<.006		mg/l	.007B	<.006	.009B	.009B	.006B	.007B	<.006	0.01	mg/l	.007B	<.006
Mercury, total	mg/l	<.0002	<.0002		mg/l	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	mg/l	<.0002	<.0002
Lead, total	mg/l	<.002B	<.002W		mg/l	.003BWN	<.002WN	<.002WN	<.002WN	<.002N	<.002NW	<.002WN	<.002WN	mg/l	<.002S	.002BS
Selenium, total	mg/l	<.003W	<.003		mg/l	<.003	<.003W	<.003WN	<.003	<.003W	<.003N	<.003N	<.003WN	mg/l	<.003	<.003W

TABLE 2 (CONT)

SUMMARY OF ON-SITE CORE SAMPLE ANALYTICAL RESULTS

Roswell, New Mexico

Core Hole No.		[illegible]	[illegible]	[illegible]
Sample Depth		Blank #14	Blank #15	Blank #16
Sample ID		Trip	Trip	Dist. Water
TPH	mg/l	<4	<1	<1
Methanol	mg/l	<1	<1	<1
Methylene Chloride	ug/l	<5	<5	<5
Acetone	ug/l	<10	<10	23
Carbon Disulfide	ug/l	<5	<5	<5
Trichlorofluoromethane	ug/l	<5	<5	<5
Ethyl Ether	ug/l	<5	<5	<5
Freon (TF)	ug/l	9	7	6
2-Butanone	ug/l	<10	<10	150
1,1,1-Trichloroethane	ug/l	<5	<5	<5
Carbon Tetrachloride	ug/l	<5	<5	<5
Cyclohexanone	ug/l	<5	<5	<5
Ethyl Acetate	ug/l	<5	<5	<5
Isobutyl Alcohol	ug/l	<200	<200	<200
2-Ethoxyethanol	ug/l	<10	<10	<10
n-Butyl Alcohol	ug/l	<100	<100	<100
Trichloroethene	ug/l	<5	<5	<5
1,1,2-Trichloroethane	ug/l	<5	<5	<5
Benzene	ug/l	<5	<5	<5
4 Methyl 2 Pentanone	ug/l	<10	<10	<10
Tetrachloroethane	ug/l	<5	<5	<5
Toluene	ug/l	<5	<5	<5
Chlorobenzene	ug/l	<5	<5	<5
Ethylbenzene	ug/l	<5	<5	<5
Xylene (total)	ug/l	<5	<5	<5
Pyridine	ug/l	<40	<40	<40
1,3-Dichlorobenzene	ug/l	<40	<40	<40
1,4-Dichlorobenzene	ug/l	<40	<40	<40
1,2-Dichlorobenzene	ug/l	<40	<40	<40
2-Methylphenol	ug/l	<40	<40	<40
3-Methylphenol	ug/l	<40	<40	<40
4-Methylphenol	ug/l	<40	<40	<40
Nitrobenzene	ug/l	<40	<40	<40
Silver, total	mg/l	<.0005N	<.0005	<.0005
Arsenic, total	mg/l	<.003	<.003W	<.003
Barium, total	mg/l	<.05	<.05	<.05
Cadmium, total	mg/l	<.0005W	<.0005	<.0005
Chromium, total	mg/l	<.006	<.006	<.006
Mercury, total	mg/l	<.0002	<.0002	<.0002
Lead, total	mg/l	.004SN	<.002WN	<.002N
Selenium,total	mg/l	<.003	<.003N	<.003N

TABLE 3

PHASE 3

SUMMARY OF OFF-SITE CORE SAMPLE ANALYTICAL RESULTS

Roswell, New Mexico

Core Hole No.		P9-OS-213	P9-OS-213	P9-OS-213	P9-OS-213	P9-OS-213	P9-OS-213	P9-OS-213	P9-OS-238	P9-OS-238	P9-OS-238	P9-OS-238	P9-OS-349	P9-OS-349	P9-OS-349	P9-OS-349		P9-OS-349
Sample Depth		(5)	(10)	(15)	(20)	(23)	(29-30)	(31.5-32)	(5)	(10)	(15)	(20)	(5)	(10)	(20)	(25)		(25) Duplicate
		Soil	Soil	Soil	Soil	Soil	Rock	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		Soil/Water
TPH	mg/kg	<20	<20	<20	<20	<20	<20	<20	70	120	<20	60	<20	100	<20	100		
Methanol	mg/l	<5	<5	<5	<5	<5	<1	<5	<20	<5	<10	<20	<1	<5	<1	<10	ug/l	
Methylene Chloride	ug/kg	9	<6	<7	7	<5	<5	<6	<5	<5	<5	<5	6*	9*	<5*	10	ug/l	<5
Acetone	ug/kg	32*	35*	59*	33*	29*	22*	39*	29*	22*	17*	19*	<11	<11	<11	<11	ug/l	<10
Carbon Disulfide	ug/kg	<6	<6	<5	<6	<5	<5	<6	<5	<5	<5	<5	<5	<6	<5	<5	ug/l	<5
Trichlorofluoromethane	ug/kg	<6	<6	<5	<6	<5	<5	<6	<5	<5	<5	<5	<5	<6	<5	<5	ug/l	<5
Ethyl Ether	ug/kg	<6	<6	<5	<6	<5	<5	<6	<5	<5	<5	<5	<5	<6	<5	<5	ug/l	<5
Freon (TF)	ug/kg	<6	<6	<5	<6	<5	<5	<6	<5	<5	<5	<5	26*	18*	45*	21	ug/l	35*
2-Butanone	ug/kg	<12	<12	<10	<13	<10	<10	<12	<10	<10	<10	<10	<11	<11	<11	<11	ug/l	<10
1,1,1-Trichloroethane	ug/kg	<6	<6	<5	<6	<5	<5	<6	<5	<5	<5	<5	<5	<6	<5	<5	ug/l	36
Carbon Tetrachloride	ug/kg	<6	<6	<5	<6	<5	<5	<6	<5	<5	<5	<5	<5	<6	<5	<5	ug/l	<5
Cyclohexanone	ug/kg	<6	<6	<5	<6	<5	<5	<6	<5	<5	<5	<5	<5	<6	<5	<5	ug/l	<5
Ethyl Acetate	ug/kg	<6	<6	<5	<6	<5	<5	<6	<5	<5	<5	<5	<5	<6	<5	<5	ug/l	<5
Isobutyl Alcohol	ug/kg	<230	<230	<210	<260	<200	<200	<250	<200	<210	<210	<210	<220	<220	<210	<220	ug/l	<200
2-Ethoxyethanol	ug/kg	<12	<12	<10	<13	<10	<10	<12	<10	<10	<10	<10	<11	<11	<11	<11	ug/l	<10
n-Butyl Alcohol	ug/kg	<120	<120	<100	<130	<100	<100	<120	<100	<100	<100	<100	<110	<110	<110	<110	ug/l	<100
Trichloroethene	ug/kg	<6	<6	<5	<6	<5	<5	<6	<5	<5	<5	<5	<5	<6	<5	<5	ug/l	<5
1,1,2-Trichloroethane	ug/kg	<6	<6	<5	<6	<5	<5	<6	<5	<5	<5	<5	<5	<6	<5	<5	ug/l	<5
Benzene	ug/kg	<6	<6	<5	<6	<5	<5	<6	<5	<5	<5	<5	<5	<6	<5	<5	ug/l	<5
2 Methyl 4 Pentanone	ug/kg	<12	<12	<10	<13	<10	<10	<12	<10	<10	<10	<10	<11	<11	<11	<11	ug/l	<10
Tetrachloroethane	ug/kg	<6	<6	<5	<6	<5	<5	<6	<5	<5	<5	<5	<5	<6	<5	<5	ug/l	<5
Toluene	ug/kg	<6	<6	<5	<6	<5	<5	<6	<5	<5	<5	<5	<5	<6	<5	<5	ug/l	6
Chlorobenzene	ug/kg	<6	<6	<5	<6	<5	<5	<6	<5	<5	<5	<5	<5	<6	<5	<5	ug/l	<5
Ethylbenzene	ug/kg	<6	<6	<5	<6	<5	<5	<6	<5	<5	<5	<5	<5	<6	<5	<5	ug/l	<5
Xylene (total)	ug/kg	<6	<6	<5	<6	<5	<5	<6	<5	<5	<5	<5	<5	<6	<5	<5	ug/l	<5
Pyridine	ug/kg	<380	<380	<340	<420	<340	<330	<410	<340	<340	<340	<340	<350	<370	<350	Not Tested	ug/l	<350
1,3-Dichlorobenzene	ug/kg	<380	<380	<340	<420	<340	<330	<410	<340	<340	<340	<340	<350	<370	<350	Not Tested	ug/l	<350
1,4-Dichlorobenzene	ug/kg	<380	<380	<340	<420	<340	<330	<410	<340	<340	<340	<340	<350	<370	<350	Not Tested	ug/l	<350
1,2-Dichlorobenzene	ug/kg	<380	<380	<340	<420	<340	<330	<410	<340	<340	<340	<340	<350	<370	<350	Not Tested	ug/l	<350
2-Methylphenol	ug/kg	<380	<380	<340	<420	<340	<330	<410	<340	<340	<340	<340	<350	<370	<350	Not Tested	ug/l	<350
3-Methylphenol	ug/kg	<380	<380	<340	<420	<340	<330	<410	<340	<340	<340	<340	<350	<370	<350	Not Tested	ug/l	<350
4-Methylphenol	ug/kg	<380	<380	<340	<420	<340	<330	<410	<340	<340	<340	<340	<350	<370	<350	Not Tested	ug/l	<350
Nitrobenzene	ug/kg	<380	<380	<340	<420	<340	<330	<410	<340	<340	<340	<340	<350	<370	<350	Not Tested	ug/l	<350
Silver, total	mg/l	<0.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	Not Tested	mg/l	<.0006
Arsenic, total	mg/l	0.006	.007B	.004B	<.003W	<.003	<.003W	.004B	.004BW	<.003	.003B	.003B	.007B	.005B	<.003	Not Tested	mg/l	<.003
Barium, total	mg/l	1.34	.16B*	0.22	1.05	1.64	2.03	0.68	1.01	0.39	0.33	<.06	1.21	0.41	0.77	Not Tested	mg/l	0.96
Cadmium, total	mg/l	<.0006BW	<.0006	<.0006	<.0006W	<.0006W	<.0006BW	.0011BW	.0009BW	<.0006	.0009B	<.0006	.0009BW	<.0006	<.0006	Not Tested	mg/l	.0009BW
Chromium, total	mg/l	<.007	<.007	<.007	<.007	<.007	<.007	<.007	0.011	.007B	0.016	0.01	0.012	0.013	.009B	Not Tested	mg/l	.007B
Mercury, total	mg/l	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	Not Tested	mg/l	<.0002
Lead, total	mg/l	<.002W	<.002	<.002W	<.002W	<.002W	0.004	.003B	.003N	.007N	.005N	.005WN	0.012	.0116	0.004	Not Tested	mg/l	0.009
Selenium,total	mg/l	<.003W	<.01W	<.003	<.003W	<.003W	<.01	<.003W	<.003W	<.003W	<.003W	<.02	<.003	<.01W	<.003W	Not Tested	mg/l	<.003W

TABLE 3 (CONT)

						SUMMARY OF OFF-SITE CORE SAMPLE ANALYTICAL RESULTS								
							Roswell, New Mexico							
Core Hole No.		P9-OS-349	P9-OS-349	P9-OS-349	P9-OS-377	P9-OS-377	P9-OS-377	P9-OS-377	P9-OS-377	P9-OS-377		P9-OS-377	Field	Field	Trip
Sample Depth		(30)	(35)	(40)	(5)	(10)	(15)	(20)	(25)	(30)		(30) Duplicate	Blank	Blank	Blank
		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		Soil/Water			
TPH	mg/kg	<20	<20	<20	200	<20	<20	<20	<20	<20	mg/l	Not Tested	<1	<1	<1
Methanol	mg/l	<5	<1	<5	<5	<1	<1	<5	<1	<5	mg/l	Not Tested	<1	<1	<1
Methylene Chloride	ug/kg	<7	15	8	<6	<6	11	27	36	23	ug/l	20	22	<5	23
Acetone	ug/kg	<14	<14	<10	34	27	27	37	<12	<13	ug/l	43	<10	<10	<10
Carbon Disulfide	ug/kg	<7	<7	<5	<6	<6	<6	<7	<6	<7	ug/l	<5	<5	<5	<5
Trichlorofluoromethane	ug/kg	<7	<7	<5	<6	<6	<6	<7	<6	<7	ug/l	<5	<5	6	<5
Ethyl Ether	ug/kg	<7	<7	<5	<6	<6	<6	<7	<6	<7	ug/l	<5	<5	<5	<5
Freon (TF)	ug/kg	45	39	40	<6	<6	<6	<7	46	89	ug/l	<5	<5	<5	<5
2-Butanone	ug/kg	<14	<14	<10	<11	<12	<12	<13	<12	<13	ug/l	160	<10	<10	<10
1,1,1-Trichloroethane	ug/kg	<7	<7	<5	<6	<6	<6	<7	<6	<7	ug/l	<5	<5	<5	<5
Carbon Tetrachloride	ug/kg	<7	<7	<5	<6	<6	<6	<7	<6	<7	ug/l	<5	<5	<5	<5
Cyclohexanone	ug/kg	<7	<7	<5	<6	<6	<6	<7	<6	<7	ug/l	<5	<5	<5	<5
Ethyl Acetate	ug/kg	<7	<7	<5	<6	<6	<6	<7	<6	<7	ug/l	<5	<5	<5	<5
Isobutyl Alcohol	ug/kg	<290	<270	<200	<220	<240	<240	<270	<250	<260	ug/l	<200	<200	<200	<200
2-Ethoxyethanol	ug/kg	<14	<14	<10	<11	<12	<12	<13	<12	<13	ug/l	<10	<10	<10	<10
n-Butyl Alcohol	ug/kg	<140	<140	<100	<110	<120	<120	<130	<120	<130	ug/l	<100	<100	<100	<100
Trichloroethene	ug/kg	<7	<7	<5	<6	<6	<6	<7	<6	<7	ug/l	<5	<5	<5	<5
1,1,2-Trichloroethane	ug/kg	<7	<7	<5	<6	<6	<6	<7	<6	<7	ug/l	<5	<5	<5	<5
Benzene	ug/kg	<7	<7	<5	<6	<6	<6	<7	<6	<7	ug/l	<5	<5	<5	<5
2 Methyl 4 Pentanone	ug/kg	<14	<14	<10	<11	<12	<12	<13	<12	<13	ug/l	<10	<10	<10	<10
Tetrachloroethane	ug/kg	<7	<7	<5	<6	<6	<6	<7	<6	<7	ug/l	<5	<5	<5	<5
Toluene	ug/kg	<7	<7	<5	<6	<6	<6	<7	<6	<7	ug/l	<5	<5	<5	<5
Chlorobenzene	ug/kg	<7	<7	<5	<6	<6	<6	<7	<6	<7	ug/l	<5	<5	<5	<5
Ethylbenzene	ug/kg	<7	<7	<5	<6	<6	<6	<7	<6	<7	ug/l	<5	<5	<5	<5
Xylene (total)	ug/kg	<7	<7	<5	<6	<6	<6	<7	<6	<7	ug/l	<5	<5	<5	<5
Pyridine	ug/kg	<480	<450	<390	<370	<400	<400	<440	<410	Not Tested	ug/l	<430	<10	<10	<10
1,3-Dichlorobenzene	ug/kg	<480	<450	<390	<370	<400	<400	<440	<410	Not Tested	ug/l	<430	<10	<10	<10
1,4-Dichlorobenzene	ug/kg	<480	<450	<390	<370	<400	<400	<440	<410	Not Tested	ug/l	<430	<10	<10	<10
1,2-Dichlorobenzene	ug/kg	<480	<450	<390	<370	<400	<400	<440	<410	Not Tested	ug/l	<430	<10	<10	<10
2-Methylphenol	ug/kg	<480	<450	<390	<370	<400	<400	<440	<410	Not Tested	ug/l	<430	<10	<10	<10
3-Methylphenol	ug/kg	<480	<450	<390	<370	<400	<400	<440	<410	Not Tested	ug/l	<430	<10	<10	<10
4-Methylphenol	ug/kg	<480	<450	<390	<370	<400	<400	<440	<410	Not Tested	ug/l	<430	<10	<10	<10
Nitrobenzene	ug/kg	<480	<450	<390	<370	<400	<400	<440	<410	Not Tested	ug/l	<430	<10	<10	<10
Silver, total	mg/l	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006	<.0006W	<.0006	<.0006	mg/l	<.0006	<.0006	<.0006	<.0006
Arsenic, total	mg/l	<.003	<.003	0.005B	.004B	0.01	<.003	.003B	.006B	0.011	mg/l	0.011	<.003	<.003	<.003
Barium, total	mg/l	1.48	1.36	0.23	1.06	.19B	.16B	.16B	.06B	0.32	mg/l	0.32	<.06	<.06	<.06
Cadmium, total	mg/l	<.0006	<.0006W	0.0013BW	<.0006W	.0018BW	.003B	.0010B	.0009B	<.0006	mg/l	<0.0006	<.0006W	<.0006W	<.0006W
Chromium, total	mg/l	.009B	0.011	<.007	.009B	.007B	0.011	0.011	<.007	<.007	mg/l	<0.007	<0.007	<0.007	<0.007
Mercury, total	mg/l	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	<.0002	mg/l	<.0002	<.0002	<.0002	<.0002
Lead, total	mg/l	0.007	0.005	<.002W	0.003	0.004	0.009	.003BW	<.002W	<.002	mg/l	<.002W	.003B	.003B	.002BW
Selenium, total	mg/l	<.003W	<.003W	<.003W	<.003W	<.01W	<.003W	<.01W	<.02	<.003	mg/l	<.003	<.003W	<.003	<.003W

TABLE 4

PHASE 4

SUMMARY OF OFF-SITE CORE SAMPLE ANALYTICAL RESULTS - TWINNED SOIL-GAS/CORE HOLE LOCATIONS

Roswell, New Mexico

Core Hole No.		SG-09-91	SG-09-91	SG-09-91	SG-09-91	SG-09-91	SG-09-91	SG-09-91	SG-09-91	SG-09-91	SG-09-91
Sample Depth		(2-3')	(4'-9')	(9'-14')	(14'-19')	(20'-22')	(22'-26')	(26'-27')	(27'-29')	(29'-31')	(31'-33')
		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
F-list Alcohols											
Isobutanol	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
n-Butanol	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Methanol	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
F-list Semi-Vol											
M-Cresol	mg/kg	<.133	<.133	<.133	<.133	<.133	<.133	<.133	<.133	<.133	<.133
O-Cresol	mg/kg	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
P-Cresol	mg/kg	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2
1,2-Dichlorobenzene	mg/kg	<.033	<.033	<.033	<.033	<.033	<.033	<.033	<.033	<.033	<.033
Nitrobenzene	mg/kg	<.033	<.033	<.033	<.033	<.033	<.033	<.033	<.033	<.033	<.033
Pyridine	mg/kg	<.633	<.633	<.633	<.633	<.633	<.633	<.633	<.633	<.633	<.633
Cyclohexanone	mg/kg	<.167	<.167	<.167	<.167	<.167	<.167	<.167	<.167	<.167	<.167
F-List Volatiles											
Acetone	mg/kg	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Carbon Disulfide	mg/kg	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4
Carbon Tetrachloride	mg/kg	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2
Chlorobenzene	mg/kg	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2
Ethyl acetate	mg/kg	<.6	<.6	<.6	<.6	<.6	<.6	<.6	<.6	<.6	<.6
Ethylbenzene	mg/kg	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4
Ethylether	mg/kg	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4
Methylene Chloride	mg/kg	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4
Methyl ethyl ketone	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Methyl isobutyl ketone	mg/kg	<.6	<.6	<.6	<.6	<.6	<.6	<.6	<.6	<.6	<.6
Tetrachloroethylene	mg/kg	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2
Toluene	mg/kg	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2
1,1,1-Trichloroethane	mg/kg	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2
Trichloroethylene	mg/kg	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4
Trichlorofluoromethane	mg/kg	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2
1,1,2-Trichlorotrifluoroethan	mg/kg	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4
Xylenes (total)	mg/kg	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4
Total Recoverable HC	mg/kg	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Arsenic	mg/l	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
Barium	mg/l	1.18	0.36	1.34	1.17	1.75	1.66	1.88	2.4	1.67	1.51
Cadmium	mg/l	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01
Chromium	mg/l	0	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02
Lead	mg/l	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05
Mercury	mg/l	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02
Silver	mg/l	0.33	0.06	<.01	<.01	<.01	<.01	<.01	0.07	<.01	<.01
Selenium	mg/l	<.10	<.10	<.10	<.10	<.10	<.10	<.10	<.10	<.10	<.10

TABLE 4 (CONT)

SUMMARY OF OFF-SITE CORE SAMPLE ANALYTICAL RESULTS - TWINNED SOIL-GAS/CORE HOLE LOCATIONS

Roswell, New Mexico

Core Hole No.		SG-09-331	SG-09-331	SG-09-331	SG-09-331	SG-09-331	SG-09-331	SG-09-331	SG-09-331	SG-09-331	SG-09-331	SG-09-331	SG-09-331	SG-09-331
Sample Depth		(0-3 feet)	(4-8 feet)	(8-13 feet)	(14-18 feet)	(19-21 feet)	(22-24 feet)	(25-27 feet)	(28-30 feet)	(30-32 feet)	(32-34 feet)	(34-36 feet)	(36-38 feet)	(38-40 feet)
		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
F-List Alcohols in Water														
n-Butanol	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Isobutanol	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Methanol	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
F-List Semivolatiles in Water														
m-Cresol (3-Methylphenol)	mg/kg	<.133	<.133	<.133	<.133	<.133	<.133	<.133	<.133	<.133	<.133	<.133	<.133	<.133
o-Cresol (2-Methylphenol)	mg/kg	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
p-Cresol (4-Methylphenol)	mg/kg	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2
1,2-Dichlorobenzene	mg/kg	<.033	<.033	<.033	<.033	<.033	<.033	<.033	<.033	<.033	<.033	<.033	<.033	<.033
Nitrobenzene	mg/kg	<.033	<.033	<.033	<.033	<.033	<.033	<.033	<.033	<.033	<.033	<.033	<.033	<.033
Pyridine	mg/kg	<.633	<.633	<.633	<.633	<.633	<.633	<.633	<.633	<.633	<.633	<.633	<.633	<.633
Cyclohexanone	mg/kg	<.167	<.167	<.167	<.167	<.167	<.167	<.167	<.167	<.167	<.167	<.167	<.167	<.167
Toxicity Characteristic Leaching		done	done	done	done	done	done	done	done	done	done	done	done	done
F-List Volatiles														
Acetone	mg/kg	<2	<.9	<.9	<.9	<.9	<.9	<2	<2	<2	<2	<2	<2	<.9
Carbon disulfide	mg/kg	<.4	<.2	<.2	<.2	<.2	<.2	<.4	<.4	<.4	<.4	<.4	<.4	<.2
Carbon tetrachloride	mg/kg	<.2	<.1	<.1	<.1	<.1	<.1	<.2	<.2	<.2	<.2	<.2	<.2	<.1
Chlorobenzene	mg/kg	<.2	<.1	<.1	<.1	<.1	<.1	<.2	<.2	<.2	<.2	<.2	<.2	<.1
Ethyl acetate	mg/kg	<.6	<.3	<.3	<.3	<.3	<.3	<.6	<.6	<.6	<.6	<.6	<.6	<.3
Ethylbenzene	mg/kg	<.4	<.2	<.2	<.2	<.2	<.2	<.4	<.4	<.4	<.4	<.4	<.4	<.2
Ethyl ether	mg/kg	<.4	<.2	<.2	<.2	<.2	<.2	<.4	<.4	<.4	<.4	<.4	<.4	<.2
Methylene chloride	mg/kg	<.4	<.2	<.2	<.2	<.2	<.2	<.4	<.4	<.4	<.4	<.4	<.4	<.2
Methyl ethyl ketone (2-Butanone)	mg/kg	<1	<.6	<.6	<.6	<.6	<.6	<1	<1	<1	<1	<1	<1	<.6
Methyl isobutyl ketone (4Me2C5one	mg/kg	<.6	<.3	<.3	<.3	<.3	<.3	<.6	<.6	<.6	<.6	<.6	<.6	<.3
Tetrachloroethylene	mg/kg	<.2	<.1	<.1	<.1	<.1	<.1	<.2	<.2	<.2	<.2	<.2	<.2	<.1
Toluene	mg/kg	<.6	<.3	<.3	<.3	<.3	<.3	<.6	<.6	<.6	<.6	<.6	<.6	<.3
1,1,1-Trichloroethane	mg/kg	<.6	<.3	<.3	<.3	<.3	<.3	<.6	<.6	<.6	<.6	<.6	<.6	<.3
Trichloroethylene	mg/kg	<.4	<.2	<.2	<.2	<.2	<.2	<.4	<.4	<.4	<.4	<.4	<.4	<.2
Trichlorofluoromethane	mg/kg	<.2	<.1	<.1	<.1	<.1	<.1	<.2	<.2	<.2	<.2	<.2	<.2	<.1
1,1,2-Trichlorotrifluoroethane	mg/kg	<.4	<.2	<.2	<.2	<.2	<.2	<.4	<.4	<.4	<.4	<.4	<.4	<.2
Xylenes (total)	mg/kg	<.4	<.2	<.2	<.2	<.2	<.2	<.4	<.4	<.4	<.4	<.4	<.4	<.2
Total Recoverable Hydrocarbons	mg/kg	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Arsenic (As), TCLP Extraction	mg/l	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
Barium (Bas), TCLP Extraction	mg/l	2.65	1.03	1.56	0.61	2.19	0.6	1.11	0.64	1.78	0.93	2.31	1.94	1.26
Cadmium (Cd), TCLP Extraction	mg/l	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01
Chromium (Cr), TCLP Extraction	mg/l	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02
Lead (Pb), TCLP Extraction	mg/l	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05
Mercury (Hg), TCLP Extraction	mg/l	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001
Silver (Ag), TCLP Extraction	mg/l	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01
Selenium (Se), TCLP Extraction	mg/l	<.10	<.10	<.10	<.10	<.10	<.10	<.10	<.10	<.10	<.10	<.10	<.10	<.10

TABLE 4 (CONT)

			SUMMARY OF OFF-SITE CORE SAMPLE ANALYTICAL RESULTS - TWINNED SOIL-GAS/CORE HOLE LOCATIONS											
			Roswell, New Mexico											
Core Hole No.		SG-09-331	SG-09-331	SG-09-337	SG-09-337	SG-09-337	SG-09-337	SG-09-337	SG-09-337	SG-09-337	SG-09-337	SG-09-358	SG-09-358	SG-09-358
Sample Depth		(40-42 feet)	(42-43 feet)	(0-3 feet)	(3-8 feet)	(8-13 feet)	(13-18 feet)	(18-23 feet)	(18-23 feet)	(23-28 feet)	(28-33 feet)	(0-5 feet)	(5-9 feet)	(10-15 feet)
		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
F-List Alcohols In Water														
n-Butanol	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Isobutanol	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Methanol	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
F-List Semivolatiles In Water														
m-Cresol (3-Methylphenol)	mg/kg	<.133	<.133	<.133	<.133	<.133	<.133	<.133	<.133	<.133	<.133	<.133	<.133	<.133
o-Cresol (2-Methylphenol)	mg/kg	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
p-Cresol (4-Methylphenol)	mg/kg	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2
1,2-Dichlorobenzene	mg/kg	<.033	<.033	<.033	<.033	<.033	<.033	<.033	<.033	<.033	<.033	<.033	<.033	<.033
Nitrobenzene	mg/kg	<.033	<.033	<.033	<.033	<.033	<.033	<.033	<.033	<.033	<.033	<.033	<.033	<.033
Pyridine	mg/kg	<.633	<.633	<.633	<.633	<.633	<.633	<.633	<.633	<.633	<.633	<.633	<.633	<.633
Cyclohexanone	mg/kg	<.167	<.167	<.167	<.167	<.167	<.167	<.167	<.167	<.167	<.167	<.167	<.167	<.167
Toxicity Characteristic Leaching		done	done	done	done	done	done	done	done	done	done	done	done	done
F-List Volatiles														
Acetone	mg/kg	<.9	<.9	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Carbon disulfide	mg/kg	<.2	<.2	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4
Carbon tetrachloride	mg/kg	<.1	<.1	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2
Chlorobenzene	mg/kg	<.1	<.1	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2
Ethyl acetate	mg/kg	<.3	<.3	<.6	<.6	<.6	<.6	<.6	<.6	<.6	<.6	<.6	<.6	<.6
Ethylbenzene	mg/kg	<.2	<.2	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4
Ethyl ether	mg/kg	<.2	<.2	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4
Methylene chloride	mg/kg	<.2	<.2	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4
Methyl ethyl ketone (2-Butanone)	mg/kg	<.6	<.6	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Methyl isobutyl ketone (4Me2C5one	mg/kg	<.3	<.3	<.6	<.6	<.6	<.6	<.6	<.6	<.6	<.6	<.6	<.6	<.6
Tetrachloroethylene	mg/kg	<.1	<.1	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2
Toluene	mg/kg	<.3	<.3	<.6	<.6	<.6	<.6	<.6	<.6	<.6	<.6	<.6	<.6	<.6
1,1,1-Trichloroethane	mg/kg	<.3	<.3	<.6	<.6	<.6	<.6	<.6	<.6	<.6	<.6	<.6	<.6	<.6
Trichloroethylene	mg/kg	<.2	<.2	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4
Trichlorofluoromethane	mg/kg	<.1	<.1	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2
1,1,2-Trichlorotrifluoroethane	mg/kg	<.2	<.2	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4
Xylenes (total)	mg/kg	<.2	<.2	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4	<.4
Total Recoverable Hydrocarbons	mg/kg	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50			
Arsenic (As), TCLP Extraction	mg/l	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
Barium (Bas), TCLP Extraction	mg/l	1.63	1.1	1.33	0.91	0.56	2.01	<.01	2.18	0.45	0.4	1.05	0.89	0.52
Cadmium (Cd), TCLP Extraction	mg/l	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01
Chromium (Cr), TCLP Extraction	mg/l	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02
Lead (Pb), TCLP Extraction	mg/l	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05
Mercury (Hg), TCLP Extraction	mg/l	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001
Silver (Ag), TCLP Extraction	mg/l	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	0.03	<.01
Selenium (Se), TCLP Extraction	mg/l	<.10	<.10	<.10	<.10	<.10	<.10	<.10	<.10	<.10	<.10	<.10	<.10	<.10

TABLE 4 (CONT)

			SUMMARY OF OFF-SITE CORE SAMPLE ANALYTICAL RESULTS - TWINNED SOIL-GAS/CORE HOLE LOCATIONS											
							Roswell, New Mexico							
Core Hole No.		SG-09-358	SG-09-358	SG-09-358	SG-09-358	SG-09-358	SG-09-360	SG-09-360	SG-09-360	SG-09-360	SG-09-360	SG-09-360	SG-09-360	SG-09-360
Sample Depth		(16-20 feet)	(21-25 feet)	(26-30 feet)	(26-30 feet)	(26-30 feet)	(0-3 feet)	(3-8 feet)	(8-14 feet)	(14-18 feet)	(18-25 feet)	(18-25 feet)	(25-29 feet)	(29-30 feet)
		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
F-List Alcohols in Water														
n-Butanol	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Isobutanol	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Methanol	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
F-List Semivolatiles in Water														
m-Cresol (3-Methylphenol)	mg/kg	<.133	<.133	<.133	<.133	<.133	<.133	<.133	<.133	<.133	<.133	<.133	<.133	<.133
o-Cresol (2-Methylphenol)	mg/kg	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
p-Cresol (4-Methylphenol)	mg/kg	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2	<.2
1,2-Dichlorobenzene	mg/kg	<.033	<.033	<.033	<.033	<.033	<.033	<.033	<.033	<.033	<.033	<.033	<.033	<.033
Nitrobenzene	mg/kg	<.033	<.033	<.033	<.033	<.033	<.033	<.033	<.033	<.033	<.033	<.033	<.033	<.033
Pyridine	mg/kg	<.633	<.633	<.633	<.633	<.633	<.633	<.633	<.633	<.633	<.633	<.633	<.633	<.633
Cyclohexanone	mg/kg	<.167	<.167	<.167	<.167	<.167	<.167	<.167	<.167	<.167	<.167	<.167	<.167	<.167
Toxicity Characteristic Leaching		done	done	done	done	done	done	done	done	done	done	done	done	done
F-List Volatiles														
Acetone	mg/kg	<2	<2	<2	<2	<2	<.9	<2	<2	<2	<2	<2	<2	<2
Carbon disulfide	mg/kg	<.4	<.4	<.4	<.4	<.4	<.2	<.4	<.4	<.4	<.4	<.4	<.4	<.4
Carbon tetrachloride	mg/kg	<.2	<.2	<.2	<.2	<.2	<.1	<.2	<.2	<.2	<.2	<.2	<.2	<.2
Chlorobenzene	mg/kg	<.2	<.2	<.2	<.2	<.2	<.1	<.2	<.2	<.2	<.2	<.2	<.2	<.2
Ethyl acetate	mg/kg	<.6	<.6	<.6	<.6	<.6	<.3	<.6	<.6	<.6	<.6	<.6	<.6	<.6
Ethylbenzene	mg/kg	<.4	<.4	<.4	<.4	<.4	<.2	<.4	<.4	<.4	<.4	<.4	<.4	<.4
Ethyl ether	mg/kg	<.4	<.4	<.4	<.4	<.4	<.2	<.4	<.4	<.4	<.4	<.4	<.4	<.4
Methylene chloride	mg/kg	<.4	<.4	<.4	<.4	<.4	<.2	<.4	<.4	<.4	<.4	<.4	<.4	<.4
Methyl ethyl ketone (2-Butanone)	mg/kg	<1	<1	<1	<1	<1	<.6	<1	<1	<1	<1	<1	<1	<1
Methyl isobutyl ketone (4Me2C5one	mg/kg	<.6	<.6	<.6	<.6	<.6	<.3	<.6	<.6	<.6	<.6	<.6	<.6	<.6
Tetrachloroethylene	mg/kg	<.2	<.2	<.2	<.2	<.2	<.1	<.2	<.2	<.2	<.2	<.2	<.2	<.2
Toluene	mg/kg	<.6	<.6	<.6	<.6	<.6	<.3	<.6	<.6	<.6	<.6	<.6	<.6	<.6
1,1,1-Trichloroethane	mg/kg	<.6	<.6	<.6	<.6	<.6	<.3	<.6	<.6	<.6	<.6	<.6	<.6	<.6
Trichloroethylene	mg/kg	<.4	<.4	<.4	<.4	<.4	<.2	<.4	<.4	<.4	<.4	<.4	<.4	<.4
Trichlorofluoromethane	mg/kg	<.2	<.2	<.2	<.2	<.2	<.1	<.2	<.2	<.2	<.2	<.2	<.2	<.2
1,1,2-Trichlorotrifluoroethane	mg/kg	<.4	<.4	<.4	<.4	<.4	<.2	<.4	<.4	<.4	<.4	<.4	<.4	<.4
Xylenes (total)	mg/kg	<.4	<.4	<.4	<.4	<.4	<.2	<.4	<.4	<.4	<.4	<.4	<.4	<.4
Total Recoverable Hydrocarbons	mg/kg	Not Tested	Not Tested	<50	Not Tested	<50	<50	<50	<50	<50	<50	<50	<50	<50
Arsenic (As), TCLP Extraction	mg/l	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
Barium (Bas), TCLP Extraction	mg/l	0.61	1.55	0.67	0.91	0.67	1.61	1.21	0.2	0.69	0.41	2.47	1.38	2.03
Cadmium (Cd), TCLP Extraction	mg/l	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01
Chromium (Cr), TCLP Extraction	mg/l	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02
Lead (Pb), TCLP Extraction	mg/l	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05
Mercury (Hg), TCLP Extraction	mg/l	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001
Silver (Ag), TCLP Extraction	mg/l	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	0.18	<.01	<.01	<.01	<.01
Selenium (Se), TCLP Extraction	mg/l	<.10	<.10	<.10	<.10	<.10	<.10	<.10	<.10	<.10	<.10	<.10	<.10	<.10

TABLE 4 (CONT)

		SUMMARY OF OFF-SITE CORE SAMPLE ANALYTICAL RESULTS - TWINNED SOIL-GAS/CORE HOLE LOCATIONS					
		Roswell, New Mexico					
Core Hole No.		SG-09-360	SG-09-370	SG-09-370	SG-09-370	SG-09-370	SG-09-370
Sample Depth		(30-34.5 feet)	(0-4 feet)	(5-9 feet)	(10-14 feet)	(15-19 feet)	(20-24 feet)
		Soil	Soil	Soil	Soil	Soil	Soil
F-List Alcohols In Water							
n-Butanol	mg/kg	<1	<1	<1	<1	<1	<1
Isobutanol	mg/kg	ND	<1	<1	<1	<1	<1
Methanol	mg/kg	<1	<1	<1	<1	<1	<1
F-List Semivolatiles In Water							
m-Cresol (3-Methylphenol)	mg/kg	<.133	<.133	<.133	<.133	<.133	<.133
o-Cresol (2-Methylphenol)	mg/kg	<.1	<.1	<.1	<.1	<.1	<.1
p-Cresol (4-Methylphenol)	mg/kg	<.2	<.2	<.2	<.2	<.2	<.2
1,2-Dichlorobenzene	mg/kg	<.033	<.033	<.033	<.033	<.033	<.033
Nitrobenzene	mg/kg	<.033	<.033	<.033	<.033	<.033	<.033
Pyridine	mg/kg	<.633	<.633	<.633	<.633	<.633	<.633
Cyclohexanone	mg/kg	<.167	<.167	<.167	<.167	<.167	<.167
Toxicity Characteristic Leaching		done	done	done	done	done	done
F-List Volatiles							
Acetone	mg/kg	<2	<2	<2	<2	<2	<2
Carbon disulfide	mg/kg	<.4	<.4	<.4	<.4	<.4	<.4
Carbon tetrachloride	mg/kg	<.2	<.2	<.2	<.2	<.2	<.2
Chlorobenzene	mg/kg	<.2	<.2	<.2	<.2	<.2	<.2
Ethyl acetate	mg/kg	<.6	<.6	<.6	<.6	<.6	<.6
Ethylbenzene	mg/kg	<.4	<.4	<.4	<.4	<.4	<.4
Ethyl ether	mg/kg	<.4	<.4	<.4	<.4	<.4	<.4
Methylene chloride	mg/kg	<.4	<.4	<.4	<.4	<.4	<.4
Methyl ethyl ketone (2-Butanone)	mg/kg	<1	<1	<1	<1	<1	<1
Methyl isobutyl ketone (4Me2C5one	mg/kg	<.6	<.6	<.6	<.6	<.6	<.6
Tetrachloroethylene	mg/kg	<.2	<.2	<.2	<.2	<.2	<.2
Toluene	mg/kg	<.6	<.6	<.6	<.6	<.6	<.6
1,1,1-Trichloroethane	mg/kg	<.6	<.6	<.6	<.6	<.6	<.6
Trichloroethylene	mg/kg	<.4	<.4	<.4	<.4	<.4	<.4
Trichlorofluoromethane	mg/kg	<.2	<.2	<.2	<.2	<.2	<.2
1,1,2-Trichlorotrifluoroethane	mg/kg	<.4	<.4	<.4	<.4	<.4	<.4
Xylenes (total)	mg/kg	<.4	<.4	<.4	<.4	<.4	<.4
Total Recoverable Hydrocarbons	mg/kg	<50	<50	<50	<50	<50	<50
Arsenic (As), TCLP Extraction	mg/l	<.1	<.1	<.1	<.1	<.1	<.1
Barium (Bas), TCLP Extraction	mg/l	1.5	1.69	0.54	0.31	1.94	1.98
Cadmium (Cd), TCLP Extraction	mg/l	<.01	<.01	<.01	<.01	<.01	<.01
Chromium (Cr), TCLP Extraction	mg/l	<.02	<.02	<.02	<.02	<.02	<.02
Lead (Pb), TCLP Extraction	mg/l	<.05	<.05	<.05	<.05	<.05	<.05
Mercury (Hg), TCLP Extraction	mg/l	<.001	<.001	<.001	<.001	<.001	<.001
Silver (Ag), TCLP Extraction	mg/l	<.01	<.01	<.01	<.01	0.03	0.06
Selenium (Se), TCLP Extraction	mg/l	<.10	<.10	<.10	<.10	<.10	<.10

TABLE 4 (CONT)

		SUMMARY OF OFF-SITE CORE SAMPLE ANALYTICAL RESULTS - TWINNED SOIL-GAS/CORE HOLE LOCATIONS																
						Roswell, New Mexico												
Sample ID		Blank #331	Blank #331	Blank #331	Blank #331	Blank #337	Blank #337	Blank #337	Blank #337	Blank #358	Blank #358	Blank #358	Blank #360	Blank #360	Blank #360	Blank #360	Blank #370	Blank #370
		EQ	TR	FD	TR	EQ	FD	TR	TR	FD	TR	EQ	EQ	TR	FD	TR	TR	EQ
		Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water
F-List Alcohols in Water																		
n-Butanol	mg/l	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Isobutanol	mg/l	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Methanol	mg/l	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
F-List Semivolatiles in Water																		
m-Cresol (3-Methylphenol)	ug/l	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<.0133	<4	<4	<4	<4
o-Cresol (2-Methylphenol)	ug/l	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<.01	<3	<3	<3	<3
p-Cresol (4-Methylphenol)	ug/l	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<.02	<6	<6	<6	<6
1,2-Dichlorobenzene	ug/l	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<.033	<1	<1	<1	<1
Nitrobenzene	ug/l	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<.033	<1	<1	<1	<1
Pyridine	ug/l	<19	<19	<19	<19	<19	<19	<19	<19	<19	<19	<19	<19	<.633	<19	<19	<19	<19
Cyclohexanone	ug/l	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<.167	<5	<5	<5	<5
Toxicity Characteristic Leaching		done	done	done	done	done	done	done	done	done	done	done	done	done	done	done	done	done
F-List Volatiles																		
Acetone	ug/l	<17	<17	<17	<17	<17	<17	<17	<17	<17	<17	<17	<17	<17	<17	<17	<17	<17
Carbon disulfide	ug/l	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
Carbon tetrachloride	ug/l	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Chlorobenzene	ug/l	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Ethyl acetate	ug/l	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6
Ethylbenzene	ug/l	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
Ethyl ether	ug/l	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Methylene chloride	ug/l	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Methyl ethyl ketone (2-Butanone)	ug/l	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12
Methyl isobutyl ketone (4Me2C5one	ug/l	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6
Tetrachloroethylene	ug/l	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Toluene	ug/l	<2	<2	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
1,1,1-Trichloroethane	ug/l	<2	<2	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Trichloroethylene	ug/l	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Trichlorofluoromethane	ug/l	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
1,1,2-Trichlorotrifluoroethane	ug/l	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Xylenes (total)	ug/l	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
Total Recoverable Hydrocarbons	mg/l	<1	<1	<1	1.6	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Arsenic (As), TCLP Extraction	mg/l	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Barium (Ba), TCLP Extraction	mg/l	0.03	0.4	1.78	0.83	0.43	0.39	0.36	0.39	0.49	0.47	0.36	0.21	0.44	0.37	0.43	0.49	0.4
Cadmium (Cd), TCLP Extraction	mg/l	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01
Chromium (Cr), TCLP Extraction	mg/l	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02	<.02
Lead (Pb), TCLP Extraction	mg/l	<.05	<.05	<.05	<.05	0.05	0.06	0.05	0.05	0.06	0.05	0.05	<.05	<.05	<.05	0.43	0.05	0.05
Mercury (Hg), TCLP Extraction	mg/l	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001	<.001
Silver (Ag), TCLP Extraction	mg/l	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	0.34	<.01	<.01	<.01	<.01	<.01	<.01
Selenium (Se), TCLP Extraction	mg/l	<.10	<.10	<.10	<.10	<.10	<.10	<.10	<.10	<.10	<.10	<.10	<.10	<.10	<.10	<.10	<.10	<.10

TABLE 4 (CONT)

SUMMARY OF OFF-SITE SAMPLE ANALYTICAL RESULTS - TWINNED SOIL-GAS/CORE HOLE LOCATIONS							
			Roswell, New Mexico				
Sample ID			Blank #091	Blank #091	Blank #091	Blank #091	Blank #091
			TR	FD	EQ	TR	FD
			Water	Water	Water	Water	Water
F-list Alcohols							
Isobutanol	mg/l		<1	<1	<1	<1	<1
n-Butanol	mg/l		<1	<1	<1	<1	<1
Methanol	mg/l		<1	<1	<1	<1	4
F-list Semi-Vol							
M-Cresol	ug/l		Not Tested	Not Tested	<4	Not Tested	Not Tested
O-Cresol	ug/l		Not Tested	Not Tested	<3	Not Tested	Not Tested
P-Cresol	ug/l		Not Tested	Not Tested	<6	Not Tested	Not Tested
1,2-Dichlorobenzene	ug/l		Not Tested	Not Tested	<1	Not Tested	Not Tested
Nitrobenzene	ug/l		Not Tested	Not Tested	<1	Not Tested	Not Tested
Pyridine	ug/l		Not Tested	Not Tested	<19	Not Tested	Not Tested
Cyclohexanone	ug/l		Not Tested	Not Tested	<5	Not Tested	Not Tested
F-List Volatiles							
Acetone	ug/l		<17	<17	<17	<17	<17
Carbon Disulfide	ug/l		<3	<3	<3	<3	<3
Carbon Tetrachloride	ug/l		<2	<2	<2	<2	<2
Chlorobenzene	ug/l		<2	<2	<2	<2	<2
Ethyl acetate	ug/l		<6	<6	<6	<6	<6
Ethylbenzene	ug/l		<3	<3	<3	<3	<3
Ethylether	ug/l		<4	<4	<4	<4	<4
Methylene Chloride	ug/l		<4	<4	<4	<4	<4
Methyl ethyl ketone	ug/l		<25	<25	<12	<25	<25
Methyl isobutyl ketone	ug/l		<6	<6	<6	<6	<6
Tetrachloroethylene	ug/l		<2	<2	<2	<2	<2
Toluene	ug/l		<4	<4	<2	<4	<4
1,1,1-Trichloroethane	ug/l		<4	<4	<2	<4	<4
Trichloroethylene	ug/l		<4	<4	<4	<4	<4
Trichlorofluoromethane	ug/l		<2	<2	<2	<2	<2
1,1,2-Trichlorotrifluoroethan	ug/l		<4	<4	<4	<4	<4
Xylenes (total)	ug/l		<3	<3	<3	<3	<3
Total Recoverable HC	mg/l		Not Tested	Not Tested	<1	Not Tested	Not Tested
Arsenic	mg/l		Not Tested	Not Tested	<.1	Not Tested	Not Tested
Barium	mg/l		Not Tested	Not Tested	0.1	Not Tested	Not Tested
Cadmium	mg/l		Not Tested	Not Tested	<.01	Not Tested	Not Tested
Chromium	mg/l		Not Tested	Not Tested	<.02	Not Tested	Not Tested
Lead	mg/l		Not Tested	Not Tested	<.05	Not Tested	Not Tested
Mercury	mg/l		Not Tested	Not Tested	<.02	Not Tested	Not Tested
Silver	mg/l		Not Tested	Not Tested	0.07	Not Tested	Not Tested
[illegible]	[illegible]		Not Tested	Not Tested	<.10	Not Tested	Not Tested

Metric Corporation
1991 Soil VOC Analytical Results

TABLE 2

SUMMARY OF ANALYTICAL RESULTS FOR PURGEABLE HALOCARBON OCCURRENCE AT ROSWELL COMPRESSOR STATION

PARAMETER	SAMPLE NUMBER										
	Pit 1 1.8'-3.0'	Pit 1 9.2'-9.4'	Pit 1 13.5'-13.7'	Pit 1 18.8'-19.0'	Pit 1 26.8'-27.0'	Pit 1 30.6'-30.8'	Pit 1 41.6'-41.8'	Pit 1 43.5'-43.7'	Pit 2 001 (18.7'-18.9')	Pit 2 002	Pit 2 26.0'-26.2'
<u>Purgeable Halocarbon Compounds (mg/kg) Method 8010</u>											
1,1,1-Trichloroethane	3.2	19	18	0.33	BDL	BDL	BDL	BDL	BDL	0.37	BDL
Tetrachloroethene	BDL	0.26	0.33	0.87	0.16	BDL	BDL	BDL	BDL	0.65	BDL
Chloroform	BDL	BDL	0.20	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,1-Dichloroethane	BDL	BDL	0.59	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

PARAMETER	SAMPLE NUMBER								
	Pit 2 29.1'-29.3'	Pit 2 39.8'-39.9'	Pit 2 44.1'-44.3'	Pit 2 57.5'-57.8'	Pit 2 69.0'-70.1'	Pit 3, BH-1 30.7'-30.9'	Pit 3, BH-2 25.0'-25.2	SG 86 13.5'-13.7'	SG 86 18.7'-18.9'
<u>Purgeable Halocarbon Compounds (mg/kg) Method 8010</u>									
1,1,1-Trichloroethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.24	BDL
Tetrachloroethene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	1.9	0.23

TABLE 2 (Continued)

SUMMARY OF ANALYTICAL RESULTS FOR PURGEABLE HALOCARBON OCCURRENCE
AT ROSWELL COMPRESSOR STATION

PARAMETER	SAMPLE NUMBER									
	SG 86 24.9'-25.1'	SG 86 35.0'-35.2'	SG 86 40.5'-40.7'	SG 91 28.6'-28.8'	SG 349 0.0'-1.8'	SG 349 2.9'-4.6'	SG 349 9.0'-10.0'	SG 349 14.0'-14.8'	SG 349 20.3'-21.3'	SG 349 5.3'-26.3'
Purgeable Halocarbon Compounds (mg/kg) Method 8010	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

PARAMETER	SAMPLE NUMBER								
	SG 349 29.7'-30.4'	SG 360 0.0'-2.5'	SG 360 4.0'-5.0'	SG 360 9.0'-9.9'	SG 360 14.0'-14.7'	SG 360 19.0'-20.0'	SG 360 24.0'-25.0'	SG 360 29.0'-29.4'	SG 361 0.0'-2.5'
Purgeable Halocarbon Compounds (mg/kg) Method 8010	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

PARAMETER	SAMPLE NUMBER									
	SG 361 4.0'-5.0'	SG 361 9.0'-10.0'	SG 361 16.0'-16.4'	SG 361 19.5'-19.8'	SG 361 24.0'-25.0'	SG 361 38.0'-39.3'	OS BH-1 18.9'-19.1'	OS BH-1 34.3'-34.5'	OS BH-2 9.9'-10.1'	OS BH-2 22.5'-22.6'
Purgeable Halocarbon Compounds (mg/kg) Method 8010	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

TABLE 2 (Continued)

SUMMARY OF ANALYTICAL RESULTS FOR PURGEABLE HALOCARBON OCCURRENCE
AT ROSWELL COMPRESSOR STATION

PARAMETER	SAMPLE NUMBER							
	OS BH-2 31.1'-31.3'	OS BH-2 41.8'-42.0'	OS BH-2 55.2'-55.4'	OS BH-2 69.0'-69.2'	OS BH-3 21.0'-21.2'	OS BH-3 44.1'-44.3'	OS BH-3 54.7'-55.0'	OS BH-4 27.5'-27.7'
Purgeable Halocarbon Compounds (mg/kg) Method 8010								
	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

PARAMETER	SAMPLE NUMBER								
	OS BH-5 14.0'-14.2'	OS BH-5 19.6'-19.9'	OS BH-5 23.4'-23.6'	OS BH-6 13.6'-13.8'	OS BH-6 47.0'-47.2'	OS BH-6 52.6'-52.8'	OS BH-6 70.0'-71.0'	OS BH-7 22.1'-22.3'	OS BH-7 33.5'-33.7'
Purgeable Halocarbon Compounds (mg/kg) Method 8010									
	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

PARAMETER	SAMPLE NUMBER						
	OS BH-7 37.0'-37.2'	OS BH-8 4.6'-4.9'	OS BH-8 33.9'-34.1'	OS BH-8 49.7'-49.9'	OS BH-9 4.5'-4.9'	OS BH-9 32.0'-32.5'	OS BH-9 49.5'-49.7'
Purgeable Halocarbon Compounds (mg/kg) Method 8010							
Tetrachloroethene	0.17	BDL	0.16	BDL	BDL	BDL	BDL
Clorobenzene	BDL	BDL	0.12	BDL	BDL	BDL	BDL

DBL = below detection limit of 0.1 mg/kg.

REPORT

Work Order # 91-07-257

Received: 07/23/91

07/31/91 10:36:55

REPORT TO	ENRON/TRANSWESTERN PIPELINE 6381 N. MAIN STREET P.O. BOX 1717 ROSWELL, NM 88202-1717	PREPARED BY	Assaigai Analytical Labs 7300 Jefferson NE Albuquerque, NM 87109
ATTEN	LARRY CAMPBELL	ATTEN	SYED RIZVI
		PHONE	(505)345-8964

Syed Rizvi

CERTIFIED BY

CONTACT LAB MANAGER

CLIENT	ENR03 SAMPLES 12
COMPANY	ENRON/TRANSWESTERN PIPELINE
FACILITY	ROSWELL, NEW MEXICO ENR03

QUESTIONS ABOUT THIS REPORT SHOULD BE ADDRESSED TO:
LABORATORY OPERATIONS MANAGER/ASSAIGAI ANALYTICAL
7300 JEFFERSON N.E., ALBUQUERQUE, N.M. 87109

WORK ID	STATION #9 7784
TAKEN	7/22/91
TRANS	FEDERAL EXPRESS
TYPE	SOIL
P.O. #	
INVOICE	under separate cover

SAMPLE IDENTIFICATION

01	PIT 2 SAMPLE 001
02	PIT 2 SAMPLE 002
03	PIT 2 26.0-26.2
04	PIT 2 29.1-29.3
05	PIT 2 39.8-39.9
06	PIT 2 44.1-44.3
07	PIT 2 57.5-57.8
08	PIT 2 69.9-70.1
09	
10	
11	PIT 3 BH-2 25.0-25.2
12	PIT 3 BH-1 30.7-30.9

TEST CODES and NAMES used on this workorder

8010_S	PURGEABLE HALOCARBONS-SOIL
8020	AROMATIC VOLATILE ORGANICS
TRPH	TOTAL REC PET HYDROCARBONS

Received: 07/23/91

REPORT
Results by Sample

Work Order # 91-07-257

SAMPLE ID PIT 2 SAMPLE 001 FRACTION 01A TEST CODE 8010_S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected 07/22/91 Category

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	<0.1	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	<0.1	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

SAMPLE ID PIT 2 SAMPLE 001 FRACTION 01A TEST CODE 8010_S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected 07/22/91 Category ______

Notes and Definitions for this Report:

EXTRACTED 07/29/91
DATE RUN 07/29/91
ANALYST D/R
UNITS MG/KG

Received: 07/23/91

REPORT
Results by Sample

Work Order # 91-07-257

SAMPLE ID PIT 2 SAMPLE 002 FRACTION 02A TEST CODE 8010_S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected 07/22/91 Category

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	0.37	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	0.65	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

SAMPLE ID PIT 2 SAMPLE 002 FRACTION 02A TEST CODE 8010_S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected 07/22/91 Category ________

Notes and Definitions for this Report:

EXTRACTED 07/29/91
DATE RUN 07/29/91
ANALYST D/R
UNITS MG/KG

Received: 07/23/91

REPORT
Results by Sample

Work Order # 91-07-257

SAMPLE ID PIT 2 26.0-26.2

FRACTION 03A TEST CODE 8010_S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected 07/22/91 Category

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	<0.1	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	<0.1	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

SAMPLE ID PIT 2 26.0-26.2 FRACTION 03A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected 07/22/91 Category ___________

Notes and Definitions for this Report:

EXTRACTED 07/29/91
DATE RUN 07/29/91
ANALYST D/R
UNITS MG/KG

Received: 07/23/91

REPORT
Results by Sample

Work Order # 91-07-257

SAMPLE ID PIT 2 29.1-29.3 FRACTION 04A TEST CODE 8010_S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected 07/22/91 Category

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	<0.1	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	<0.1	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

REPORT
Results by Sample

Work Order # 91-07-257
Continued From Above

SAMPLE ID PIT 2 29.1-29.3 FRACTION 04A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected 07/22/91 Category

Notes and Definitions for this Report:

EXTRACTED 07/29/91
DATE RUN 07/29/91
ANALYST D/R
UNITS MG/KG

Received: 07/23/91

REPORT
Results by Sample

Work Order # 91-07-257

SAMPLE ID PIT 2 39.8-39.9 FRACTION 05A TEST CODE 8010_S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected 07/22/91 Category

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	<0.1	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	<0.1	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

SAMPLE ID **PIT 2 39.8-39.9** FRACTION **05A** TEST CODE **8010_S** NAME **PURGEABLE HALOCARBONS-SOIL**
Date & Time Collected **07/22/91** Category ____________

Notes and Definitions for this Report:

EXTRACTED 07/29/91
DATE RUN 07/29/91
ANALYST D/R
UNITS MG/KG

Received: 07/23/91

REPORT
Results by Sample

Work Order # 91-07-257

SAMPLE ID PIT 2 44.1-44.3 FRACTION 06A TEST CODE 8010_S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected 07/22/91 Category

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	<0.1	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	<0.1	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

SAMPLE ID **PIT 2 44.1-44.3**

FRACTION **06A** TEST CODE **8010 S** NAME **PURGEABLE HALOCARBONS-SOIL**
Date & Time Collected **07/22/91** Category

Notes and Definitions for this Report:

EXTRACTED 07/29/91
DATE RUN 07/29/91
ANALYST D/R
UNITS MG/KG

Received: 07/23/91

REPORT
Results by Sample

Work Order # 91-07-257

SAMPLE ID **PIT 2 44.1-44.3** FRACTION **06A** TEST CODE **8020** NAME **AROMATIC VOLATILE ORGANICS**
Date & Time Collected **07/22/91** Category ____

PARAMETER	RESULT	DET LIMIT
BENZENE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
ETHYL BENZENE	<0.1	0.1
TOLUENE	<0.1	0.1
XYLENES	<0.1	0.1

Notes and Definitions for this Report:

EXTRACTED 07/29/91
DATE RUN 07/29/91
ANALYST D/R
UNITS MG/KG

Received: 07/23/91

REPORT
Results by Sample

Work Order # 91-07-257

SAMPLE ID PIT 2 57.5-57.8 FRACTION 07A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL

Date & Time Collected 07/22/91 Category

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	<0.1	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	<0.1	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

Received: 07/23/91

REPORT
Results by Sample

Work Order # 91-07-257
Continued From Above

SAMPLE ID **PIT 2 57.5-57.8**

FRACTION **07A** TEST CODE **8010_S** NAME **PURGEABLE HALOCARBONS-SOIL**
Date & Time Collected **07/22/91** Category ____

Notes and Definitions for this Report:

EXTRACTED 07/29/91
DATE RUN 07/30/91
ANALYST D/R
UNITS MG/KG

Member: American Council of Independent Laboratories, Inc.

Received: 07/23/91

Results by Sample

SAMPLE ID **PIT 2 69.9-70.1** FRACTION **08A** TEST CODE **8010 S** NAME **PURGEABLE HALOCARBONS-SOIL**

Date & Time Collected **07/22/91** Category ______

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	<0.1	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	<0.1	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

Received: 07/23/91

REPORT
Results by Sample

Work Order # 91-07-257
Continued From Above

SAMPLE ID PIT 2 69.9-70.1 FRACTION 08A TEST CODE 8010_S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected 07/22/91 Category

Notes and Definitions for this Report:

EXTRACTED 07/29/91
DATE RUN 07/30/91
ANALYST D/R
UNITS MG/KG

2 through 4 as it relates to the red clay surface and the estimated zone for TRPH.

Bibliography

The following bibliographic sources document the methods utilized in performing laboratory analyses for the investigation. Specific laboratory tests performed are indicated in parentheses.

USEPA SW-846 Method #8010 - Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, SW-846, 3rd Edition, 1986. (Test 8010 for purgeable halocarbons).

USEPA SW-846 Method #8020 - Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, SW-846, 3rd Edition, 1986. (Test 8020 for aromatic volatile organics).

USEPA Method #602/8020 - Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, SW-846, 3rd Edition 1986 - Guidelines Establishing Test Procedures for the Analysis of Pollutants under the Clean Water Act 40 CFR Part 139, October 1984 (Test 8020 for BTEX).

USEPA Method #418.1 - Methods for Chemical Analysis of Water and Wastes, EPA 600/4-79-020, revised March 1983. (Test 418.1 for TRPH).

Page 1
Received: 07/18/91

REPORT
07/31/91 14:28:41

Work Order # 91-07-215

REPORT TO: ENRON/TRANSWESTERN PIPELINE
6381 N. MAIN STREET
P.O. BOX 1717
ROSWELL, NM 88202-1717
ATTEN: LARRY CAMPBELL

PREPARED BY: Assaigai Analytical Labs
7300 Jefferson NE
Albuquerque, NM 87109

ATTEN: SYED RIZVI
PHONE: (505)345-8964

Syed Rizvi
CERTIFIED BY

CONTACT: LAB_MANAGER

CLIENT: ENR03 SAMPLES 10
COMPANY: ENRON/TRANSWESTERN PIPELINE
FACILITY: ROSWELL, NEW MEXICO
ENR03

QUESTIONS ABOUT THIS REPORT SHOULD BE ADDRESSED TO:
LABORATORY OPERATIONS MANAGER/ASSAIGAI ANALYTICAL
7300 JEFFERSON N.E., ALBUQUERQUE, N.M. 87109

WORK ID: STATION 9 7752
TAKEN:
TRANS: FED X NEXT DAY
TYPE: SOIL
P.O. #:
INVOICE: under separate cover

SAMPLE IDENTIFICATION

01	
02	
03	PIT I 2.8-3.0
04	PIT I 9.2-9.4
05	PIT I 13.5-13.7
06	PIT I 18.8 - 19.0
07	PIT I 26.8 - 27.0
08	PIT I 30.6-30.8
09	PIT I 41.6 - 41.8
10	PIT I 43.5-43.7

TEST CODES and NAMES used on this workorder

8010_S	PURGEABLE HALOCARBONS-SOIL
8020	AROMATIC VOLATILE ORGANICS
BTEX	BENZENE,TOLUENE,EBENZ,XYLE
TRPH	TOTAL REC PET HYDROCARBONS

Member: American Council of Independent Laboratories, Inc.

SAMPLE ID PIT I 2.8-3.0 FRACTION 03A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected not specified Category

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	3.2	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	<0.1	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

Received: 07/18/91

REPORT
Results by Sample

Work Order # 91-07-215
Continued From Above

SAMPLE ID **PIT I 2.8-3.0**

FRACTION **03A** TEST CODE **8010 S** NAME **PURGEABLE HALOCARBONS-SOIL**
Date & Time Collected **not specified** Category

Notes and Definitions for this Report:

EXTRACTED 07/23/91
DATE RUN 07/23/91
ANALYST D/R
UNITS MG/KG

Received: 07/18/91

REPORT
Results by Sample

Work Order # 91-07-215

SAMPLE ID PIT I 9.2-9.4 FRACTION 04A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected not specified Category

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	01.
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	19	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	0.26	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

Received: 07/18/91

REPORT
Results by Sample

Work Order # 91-07-215
Continued From Above

SAMPLE ID **PIT I 9.2-9.4** FRACTION **04A** TEST CODE **8010 S** NAME **PURGEABLE HALOCARBONS-SOIL**
Date & Time Collected **not specified** Category

Notes and Definitions for this Report:

EXTRACTED 07/23/91
DATE RUN 07/23/91
ANALYST D/R
UNITS MG/KG

Received: 07/18/91

REPORT
Results by Sample

Work Order # 91-07-215

SAMPLE ID PIT I 13.5-13.7

FRACTION 05A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL

Date & Time Collected not specified Category ______

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	0.20	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	0.59	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	18	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	0.33	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

Received: 07/18/91

REPORT
Results by Sample

Work Order # 91-07-215
Continued From Above

SAMPLE ID PIT I 13.5-13.7 FRACTION 05A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected not specified Category

Notes and Definitions for this Report:

EXTRACTED 07/23/91
DATE RUN 07/23/91
ANALYST D/R
UNITS MG/KG

Received: 07/18/91

REPORT
Results by Sample

Work Order # 91-07-215

SAMPLE ID PIT I 18.8 - 19.0 FRACTION 06A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected not specified Category

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	0.33	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	0.87	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

Received: 07/18/91

REPORT
Results by Sample

Work Order # 91-07-215
Continued From Above

SAMPLE ID PIT I 18.8 - 19.0

FRACTION 06A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected not specified Category ____________

Notes and Definitions for this Report:

EXTRACTED 07/23/91
DATE RUN 07/23/91
ANALYST D/R
UNITS MG/KG

Member: American Council of Independent Laboratories, Inc.

Received: 07/18/91

REPORT
Results by Sample

Work Order # 91-07-215

SAMPLE ID PIT I 26.8 - 27.0 FRACTION 07A TEST CODE 8010_S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected not specified Category

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	<0.1	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	0.16	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

Received: 07/18/91

REPORT
Results by Sample

Work Order # 91-07-215
Continued From Above

SAMPLE ID PIT I 26.8 - 27.0

FRACTION 07A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected not specified Category

Notes and Definitions for this Report:

EXTRACTED 07/23/91
DATE RUN 07/23/91
ANALYST D/R
UNITS MG/KG

SAMPLE ID **PIT I 30.6-30.8** FRACTION **08A** TEST CODE **8010 S** NAME **PURGEABLE HALOCARBONS-SOIL**
Date & Time Collected **not specified** Category

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	<0.1	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	<0.1	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

REPORT
Results by Sample

Work Order # 91-07-215
Continued From Above

SAMPLE ID **PIT I 30.6-30.8** FRACTION **08A** TEST CODE **8010 S** NAME **PURGEABLE HALOCARBONS-SOIL**
Date & Time Collected **not specified** Category ____

Notes and Definitions for this Report:

EXTRACTED 07/23/91
DATE RUN 07/23/91
ANALYST D/R
UNITS MG/KG

REPORT
Results by Sample

Work Order # 91-07-215

SAMPLE ID PIT I 41.6 - 41.8 FRACTION 09A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected not specified Category ____________

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	<0.1	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	<0.1	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

?eceived: 07/18/91

REPORT
Results by Sample

Work Order # 91-07-215
Continued From Above

?AMPLE ID PIT I 41.6 - 41.8

FRACTION 09A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected not specified Category

Notes and Definitions for this Report:

EXTRACTED 07/23/91
DATE RUN 07/23/91
ANALYST D/R
UNITS MG/KG

?ember: American Council of
?ndependent Laboratories, Inc.

Received: 07/18/91

REPORT
Results by Sample

Work Order # 91-07-215

SAMPLE ID PIT I 41.6 - 41.8 FRACTION 09A TEST CODE 8020 NAME AROMATIC VOLATILE ORGANICS

Date & Time Collected not specified Category

PARAMETER	RESULT	DET LIMIT
BENZENE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
ETHYL BENZENE	<0.1	0.1
TOLUENE	<0.1	0.1
XYLENES	<0.1	0.1

Notes and Definitions for this Report:

EXTRACTED 07/23/91
DATE RUN 07/23/91
ANALYST DD
UNITS MG/KG

Received: 07/18/91

REPORT
Results by Sample

Work Order # 91-07-215

SAMPLE ID **PIT I 43.5-43.7** FRACTION **10A** TEST CODE **8010 S** NAME **PURGEABLE HALOCARBONS-SOIL**
Date & Time Collected **not specified** Category ________

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	<0.1	0.1
1,1,2 TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	<0.1	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

Member: American Council of Independent Laboratories, Inc.

SAMPLE ID PIT I 43.5-43.7 FRACTION 10A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected not specified Category

Notes and Definitions for this Report:

EXTRACTED 07/23/91
DATE RUN 07/23/91
ANALYST D/R
UNITS MG/KG

Received: 07/18/91

REPORT
Results by Sample

Work Order # 91-07-215

SAMPLE ID PIT I 43.5-43.7 FRACTION 10A TEST CODE 8020 NAME AROMATIC VOLATILE ORGANICS
Date & Time Collected not specified Category

PARAMETER	RESULT	DET LIMIT
BENZENE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
ETHYL BENZENE	<0.1	0.1
TOLUENE	<0.1	0.1
XYLENES	<0.1	0.1

Notes and Definitions for this Report:

EXTRACTED 07/23/91
DATE RUN 07/23/91
ANALYST DD
UNITS MG/KG

ASSAIGAI ANALYTICAL LABORATORIES

WORK ORDER
7752

HAZARDOUS ☐ NON-HAZARDOUS	DATE RECEIVED 7/18/91	ESTIMATED COST
USTOMER P.O. NUMBER	TIME RECEIVED 9:15	DUE DATE 8/1/91

ACCOUNT INFORMATION

USTOMER'S NAME [illegible]ON /Transwestern [illegible]	CONTACT Larry [illegible]
ADDRESS	PHONE NUMBER
/ STATE / ZIP Roswell.	

PARTY RESPONSIBLE FOR PAYMENT IF OTHER THAN ABOVE

E	CONTACT
ADDRESS	PHONE NUMBER
/ STATE / ZIP	

ACCOUNT STATUS

PAYMENT REC'D. ______
OPEN ACCOUNT X
CASH ______
CHECK NUMBER ______

PECIAL BILLING INSTRUCTIONS

SAMPLE INFORMATION

PE OF SAMPLE	NO. OF SAMPLES	*TURN AROUND TIME	SAMPLE IDENTIFICATION AND / OR SAMPLE SITE
☐ WATER ☒ SOIL ☐ OIL ☐ SLUDGE ☐ OTHER	10 NO. OF CONTAINERS 10	☐ REGULAR (10 WKG DAYS) ☐ RUSH (3 DAYS) ☐ EMERGENCY (STAT) *(SUBJECT TO WORK LOG)	Station 9 - Gas Tank Station 9 - Pit 1

PLE DELIVERED BY — SIGNATURE [illegible] — DATE 7/18/91

ANALYSIS REQUEST

WORK DESCRIPTION

TPH, BTEX 8010 8020 [illegible]

SPECIAL INSTRUCTIONS

LLING: ☐ PICKUP ☐ MAIL — LOGGED IN BY

TRANSWESTERN PIPELINE COMPANY

CHAIN OF CUSTODY

District: ROSWELL

Date: 7-17-91

Sample Location Valve or Receiver No.	Vol. Collect. During Flush	Sampler
STATION 9 - GAS TANK		
STATION 9 - PIT 1		

SAMPLE ID NUMBER	SOLVENT USED	SAMPLE ICED	ANALYSES REQUESTED
GAS TANK COMPOSITE 0-1.6, 3.8-4.2, 7.8-9.2		YES	TPH, BTEX
GAS TANK 16.0-16.3		YES	TPH, BTEX
PIT 1 2.8-3.0		YES	8010
PIT 1 9.2-9.4		YES	8010
PIT 1 13.5-13.7		YES	8010
PIT 1 18.8-19.0		YES	8010
PIT 1 26.8-27.0		YES	8010
PIT 1 30.6-30.8		YES	8010
PIT 1 41.6-41.8		YES	8010 8020
PIT 1 43.5-43.7		YES	8010, 8020

Relinquished By EARL CHANLEY / TW PL CO. Date 7-17-91
Relinquished To FED-X Date 7-17-91

Relinquished By FED-X Date
Relinquished To ASSAGAI LAB Date

Relinquished By Date
Relinquished To Date

Relinquished By Date
Relinquished By Date

Laboratory: ASSAIGAI LABS
Received: CG King Date 7/18/91

* MAIL TEST RESULTS TO: LARRY CAMPBELL
P.O. BOX 1717
ROSWELL N.M. 88202-1717

505-625-8022

TRANSWESTERN PIPELINE COMPANY

CHAIN OF CUSTODY

District: ROSWELL Date: 7-17-91

Sample Location Valve or Receiver No.	Vol. Collect. During Flush	Sampler
STATION 9 - GAS TANK		
STATION 9 - PIT 1		

SAMPLE ID NUMBER	SOLVENT USED	SAMPLE ICED	ANALYSES REQUESTED
GAS TANK [illegible]			
[illegible]		YES	TPH BTEX
GAS TANK [illegible]		YES	TPH BTEX
PIT 1 2.8 - 3.[illegible]		YES	8010
PIT 1 [illegible]		YES	8010
PIT 1 [illegible]		YES	8010
PIT 1 [illegible] - 19.0		YES	8010
PIT 1 [illegible] - 27.0		YES	8010
PIT 1 [illegible]		YES	8010
PIT 1 41.6 - [illegible]		YES	8010 [illegible]
PIT 1 43.[illegible] - 43.[illegible]		YES	8010, 8020

Relinquished By EARL CHANLEY / TW PL CO. Date 7-17-91
Relinquished To FED-X Date 7-[illegible]-91

Relinquished By FED-X Date
Relinquished To [illegible] LAB Date

Relinquished By Date
Relinquished To Date

Relinquished By Date
Relinquished By Date

Laboratory: [illegible]
Received: [illegible] Date [illegible]

* [illegible] TEST RESULTS TO LARRY CAMPBELL [illegible]
[illegible]
[illegible]

Received: 07/23/91

REPORT
Results by Sample

Work Order # 91-07-257

SAMPLE ID PIT 2 69.9-70.1 FRACTION 08A TEST CODE 8020 NAME AROMATIC VOLATILE ORGANICS
Date & Time Collected 07/22/91 Category

PARAMETER	RESULT	DET LIMIT
BENZENE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
ETHYL BENZENE	<0.1	0.1
TOLUENE	<0.1	0.1
XYLENES	<0.1	0.1

Notes and Definitions for this Report:

EXTRACTED 07/29/91
DATE RUN 07/30/91
ANALYST D/R
UNITS MG/KG

Received: 07/23/91

REPORT
Results by Sample

Work Order # 91-07-257

SAMPLE ID PIT 3 BH-2 25.0-25.2 FRACTION 11A TEST CODE 8010_S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected 07/22/91 Category ____

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	<0.1	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	<0.1	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

Received: 07/23/91

REPORT
Results by Sample

Work Order # 91-07-257
Continued From Above

SAMPLE ID **PIT 3 BH-2 25.0-25.2** FRACTION **11A** TEST CODE **8010 S** NAME **PURGEABLE HALOCARBONS-SOIL**
Date & Time Collected **07/22/91** Category ______

Notes and Definitions for this Report:

EXTRACTED 07/29/91
DATE RUN 07/30/91
ANALYST D/R
UNITS MG/KG

Member: American Council of Independent Laboratories, Inc.

[redacted]

Received: 07/23/91 Results by Sample

SAMPLE ID PIT 3 BH-2 25.0-25.2 FRACTION 11A TEST CODE 8020 NAME AROMATIC VOLATILE ORGANICS
Date & Time Collected 07/22/91 Category

PARAMETER	RESULT	DET LIMIT
BENZENE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
ETHYL BENZENE	<0.1	0.1
TOLUENE	<0.1	0.1
XYLENES	<0.1	0.1

Notes and Definitions for this Report:

EXTRACTED 07/29/91
DATE RUN 07/30/91
ANALYST D/R
UNITS MG/KG

Received: 07/23/91

REPORT
Results by Sample

Work Order # 91-07-257

SAMPLE ID **PIT 3 BH-1 30.7-30.9** FRACTION **12A** TEST CODE **8010 S** NAME **PURGEABLE HALOCARBONS-SOIL**
Date & Time Collected **07/22/91** Category

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	<0.1	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	<0.1	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

SAMPLE ID **PIT 3 BH-1 30.7-30.9** FRACTION **12A** TEST CODE **8010 S** NAME **PURGEABLE HALOCARBONS-SOIL**
Date & Time Collected **07/22/91** Category ______

Notes and Definitions for this Report:

EXTRACTED 07/29/91
DATE RUN 07/30/91
ANALYST D/R
UNITS MG/KG

Received: 07/23/91

REPORT
Results by Sample

Work Order # 91-07-257

SAMPLE ID PIT 3 BH-1 30.7-30.9 FRACTION 12A TEST CODE 8020 NAME AROMATIC VOLATILE ORGANICS
Date & Time Collected 07/22/91 Category

PARAMETER	RESULT	DET LIMIT
BENZENE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
ETHYL BENZENE	<0.1	0.1
TOLUENE	<0.1	0.1
XYLENES	<0.1	0.1

Notes and Definitions for this Report:

EXTRACTED 07/29/91
DATE RUN 07/30/91
ANALYST D/R
UNITS MG/KG

ASSAIGAI ANALYTICAL LABORATORIES

WORK ORDER 7784

☐ HAZARDOUS ☐ NON-HAZARDOUS	DATE RECEIVED 7/23/91	ESTIMATED COST
CUSTOMER P.O. NUMBER	TIME RECEIVED 4:30	DUE DATE 8/6/91

ACCOUNT INFORMATION

CUSTOMER'S NAME [illegible] / ENRON	CONTACT [illegible]
ADDRESS	PHONE NUMBER
CITY / STATE / ZIP	

PARTY RESPONSIBLE FOR PAYMENT IF OTHER THAN ABOVE

		ACCOUNT STATUS
NAME	CONTACT	PAYMENT REC'D.
ADDRESS	PHONE NUMBER	OPEN ACCOUNT ✓
CITY / STATE / ZIP		CASH
		CHECK NUMBER

SPECIAL BILLING INSTRUCTIONS

SAMPLE INFORMATION

TYPE OF SAMPLE	NO. OF SAMPLES	*TURN AROUND TIME	SAMPLE IDENTIFICATION AND / OR SAMPLE SITE
☐ WATER ☒ SOIL ☐ OIL ☐ SLUDGE ☐ OTHER	12 NO. OF CONTAINERS 12	☒ REGULAR (10 WKG DAYS) ☐ RUSH (3 DAYS) ☐ EMERGENCY (STAT) *(SUBJECT TO WORK LOG)	Station #9.

SAMPLE DELIVERED BY — SIGNATURE: FedX Next Day Air — DATE: 7/22/91

ANALYSIS REQUEST

WORK DESCRIPTION

8010 [illegible] TPH

SPECIAL INSTRUCTIONS

BILLING: ☐ PICKUP ☐ MAIL

LOGGED IN BY [signature]

TRANSWESTERN PIPELINE COMPANY

CHAIN OF CUSTODY

District: ROSWELL　　　　Date: 7-22-91

Sample Location Valve or Receiver No.	Vol. Collect. During Flush	Sampler
STATION 9 -		DISTRIC CORP

SAMPLE ID NUMBER	SOLVENT USED	SAMPLE ICED	ANALYSES REQUESTED
PIT 2 SAMPLE 001		YES	8010
PIT 2 SAMPLE 002		YES	8010
PIT 2 26.0 - 26.2		YES	8010
PIT 2 29.1 - 29.3		YES	8010
PIT 2 39.4 - 39.5		YES	8010
PIT 2 44.1 - 44.3		YES	8010 - 8020
PIT 2 57.5 - 57.8		YES	8010
PIT 2 69.9 - 70.1		YES	8010 - 8020
DIESEL TANK 4.3-4.5		YES	TPH
DIESEL TANK 7.4-7.9		YES	TPH
PIT 3 BH-2 25.0-25.2		YES	8010 - 8020
PIT 3 BH-1 30.7 - 30.9		YES	8010 - 8020

Relinquished By EARL CHANLEY - TWPLC　　Date 7-22-91
Relinquished To FED-X　　Date 7-22-91

Relinquished By ____　　Date ____
Relinquished To ____　　Date ____

Relinquished By ____　　Date ____
Relinquished To ____　　Date ____

Relinquished By ____　　Date ____
Relinquished By ____　　Date ____

Laboratory: ASSAGAI LABS
Received: [signature]　　Date 7/23/91

* MAIL RESULTS TO: LARRY CAMPBELL
P.O. BOX 1717
ROSWELL NM 88202-1717

(505-625-8022)

Received: 07/24/91 07/31/91 14:20:37

REPORT TO	ENRON/TRANSWESTERN PIPELINE 6381 N. MAIN STREET P.O. BOX 1717 ROSWELL, NM 88202-1717	PREPARED BY	Assaigai Analytical Labs 7300 Jefferson NE Albuquerque, NM 87109
ATTEN	LARRY CAMPBELL	ATTEN	SYED RIZVI
		PHONE	(505)345-8964

Syed Rizvi

CERTIFIED BY

CONTACT LAB_MANAGER

CLIENT ENR03 SAMPLES 6
COMPANY ENRON/TRANSWESTERN PIPELINE
FACILITY ROSWELL, NEW MEXICO
ENR03

QUESTIONS ABOUT THIS REPORT SHOULD BE ADDRESSED TO:
LABORATORY OPERATIONS MANAGER/ASSAIGAI ANALYTICAL
7300 JEFFERSON N.E.,ALBUQUERQUE,N.M. 87109

WORK ID STATION #9 7799
TAKEN
TRANS FED X
TYPE SOIL
P.O. #
INVOICE under separate cover

SAMPLE IDENTIFICATION

01	SG 91 28.6 - 28.8
02	SG 86 13.5 - 13.7
03	SG 86 18.7 - 18.9
04	SG 86 24.9 - 25.1
05	SG 86 35.0 - 35.2
06	SG 86 40.5 - 40.7

TEST CODES and NAMES used on this workorder

8010_S	PURGEABLE HALOCARBONS-SOIL
8020	AROMATIC VOLATILE ORGANICS

Member: American Council of Independent Laboratories, Inc.

Received: 07/24/91

REPORT
Results by Sample

Work Order # 91-07-276

SAMPLE ID SG 91 28.6 - 28.8 FRACTION 01A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected not specified Category

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	<0.1	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	<0.1	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

Received: 07/24/91 Results by Sample Continued From Above

SAMPLE ID SG 91 28.6 - 28.8 FRACTION 01A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected not specified Category

Notes and Definitions for this Report:

EXTRACTED 07/30/91
DATE RUN 07/30/91
ANALYST D/R
UNITS MG/KG

Received: 07/24/91

REPORT
Results by Sample

Work Order # 91-07-276

SAMPLE ID SG 91 28.6 - 28.8 FRACTION 01A TEST CODE 8020 NAME AROMATIC VOLATILE ORGANICS
Date & Time Collected not specified Category ______

PARAMETER	RESULT	DET LIMIT
BENZENE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
ETHYL BENZENE	<0.1	0.1
TOLUENE	<0.1	0.1
XYLENES	<0.1	0.1

Notes and Definitions for this Report:

EXTRACTED 07/30/91
DATE RUN 07/30/91
ANALYST D/R
UNITS MG/KG

P[redacted] 5 [redacted] REPORT [redacted] Work Order # 91-07-276
Received: 07/24/91 Results by Sample

SAMPLE ID SG 86 13.5 - 13.7 FRACTION 02A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected not specified Category ______

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	0.24	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	1.9	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

Received: 07/24/91

REPORT
Results by Sample

Work Order # 91-07-276
Continued From Above

SAMPLE ID SG 86 13.5 - 13.7

FRACTION 02A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected not specified Category ______

Notes and Definitions for this Report:

EXTRACTED 07/30/91
DATE RUN 07/30/91
ANALYST D/R
UNITS MG/KG

Received: 07/24/91

Results by Sample

SAMPLE ID SG 86 18.7 - 18.9 FRACTION 03A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected not specified Category

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	<0.1	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	0.23	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

Received: 07/24/91

REPORT
Results by Sample

Work Order # 91-07-276
Continued From Above

SAMPLE ID **SG 86 18.7 - 18.9** FRACTION **03A** TEST CODE **8010 S** NAME **PURGEABLE HALOCARBONS-SOIL**
Date & Time Collected **not specified** Category ______

Notes and Definitions for this Report:

EXTRACTED 07/30/91
DATE RUN 07/30/91
ANALYST D/R
UNITS MG/KG

Received: 07/24/91 **Results by Sample**

SAMPLE ID SG 86 24.9 - 25.1 FRACTION 04A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected not specified Category

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	<0.1	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	<0.1	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

SAMPLE ID SG 86 24.9 - 25.1

FRACTION 04A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected not specified Category

Notes and Definitions for this Report:

EXTRACTED 07/30/91
DATE RUN 07/30/91
ANALYST D/R
UNITS MG/KG

[redacted] REPORT [redacted] Work Order # 91-07-276

Received: 07/24/91

Results by Sample

SAMPLE ID SG 86 35.0 - 35.2 FRACTION 05A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL

Date & Time Collected not specified Category

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	<0.1	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	<0.1	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

REPORT
Results by Sample

Work Order # 91-07-276
Continued From Above

SAMPLE ID SG 86 35.0 - 35.2 FRACTION 05A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected not specified Category

Notes and Definitions for this Report:

EXTRACTED 07/30/91
DATE RUN 07/30/91
ANALYST D/R
UNITS MG/KG

[redacted]

Received: 07/24/91 REPORT Work Order # 91-07-276

Results by Sample

SAMPLE ID SG 86 40.5 - 40.7 FRACTION 06A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL

Date & Time Collected not specified Category

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	<0.1	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	<0.1	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

Received: 07/24/91

REPORT
Results by Sample

Work Order # 91-07-276
Continued From Above

SAMPLE ID SG 86 40.5 - 40.7

FRACTION 06A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected not specified Category

Notes and Definitions for this Report:

EXTRACTED 07/30/91
DATE RUN 07/30/91
ANALYST D/R
UNITS MG/KG

Received: 07/24/91 Results by Sample

SAMPLE ID SG 86 40.5 - 40.7 FRACTION 06A TEST CODE 8020 NAME AROMATIC VOLATILE ORGANICS

Date & Time Collected not specified Category

PARAMETER	RESULT	DET LIMIT
BENZENE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
ETHYL BENZENE	<0.1	0.1
TOLUENE	<0.1	0.1
XYLENES	<0.1	0.1

Notes and Definitions for this Report:

EXTRACTED 07/30/91
DATE RUN 07/30/91
ANALYST D/R
UNITS MG/KG

TRANSWESTERN PIPELINE COMPANY

CHAIN OF CUSTODY

District: ROSWELL   Date: 7-23-91

Sample Location Valve or Receiver No.	Vol. Collect. During Flush	Sampler
STATION 9		METRIC CORP.

SAMPLE ID NUMBER	SOLVENT USED	SAMPLE ICED	ANALYSES REQUESTED
SG 91 28.6-28.8		YES	8010 - 8020
SG 86 13.5-13.7		YES	8010
SG 86 18.7-18.9		YES	8010
SG 86 24.9-25.1		YES	8010
SG 86 35.0-35.2		YES	8010
SG 86 40.5-40.7		YES	8010 - 8020

Relinquished By EARL CHANLEY / TWPLC   Date 7-23-91
Relinquished To FED-X   Date 7-23-91

Relinquished By ______   Date ______
Relinquished To ______   Date ______

Relinquished By ______   Date ______
Relinquished To ______   Date ______

Relinquished By ______   Date ______
Relinquished By ______   Date ______

Laboratory: Assagai Labs
Received: [signature]   Date 7/24/91

* MAIL RESULTS TO: LARRY CAMPBELL (505-625-8022)
P.O. BOX 1717
ROSWELL N.M. 88202-1717

ASSAIGAI ANALYTICAL LABORATORIES

WORK ORDER 7799

☐ HAZARDOUS ☐ NON-HAZARDOUS	DATE RECEIVED 7/24/91	ESTIMATED COST
CUSTOMER P.O. NUMBER	TIME RECEIVED 4:25	DUE DATE 8/7/91

ACCOUNT INFORMATION

CUSTOMER'S NAME ENRON/TRANSWESTERN	CONTACT Larry Campbell
ADDRESS	PHONE NUMBER
CITY / STATE / ZIP	

PARTY RESPONSIBLE FOR PAYMENT IF OTHER THAN ABOVE

NAME	CONTACT
ADDRESS	PHONE NUMBER
CITY / STATE / ZIP	

ACCOUNT STATUS

PAYMENT REC'D. ____
OPEN ACCOUNT ✓
CASH ____
CHECK NUMBER ____

SPECIAL BILLING INSTRUCTIONS

SAMPLE INFORMATION

TYPE OF SAMPLE	NO. OF SAMPLES	*TURN AROUND TIME	SAMPLE IDENTIFICATION AND / OR SAMPLE SITE
☐ WATER ☑ SOIL ☐ OIL ☐ SLUDGE ☐ OTHER	6 NO. OF CONTAINERS 6	☑ REGULAR (10 WKG DAYS) ☐ RUSH (3 DAYS) ☐ EMERGENCY (STAT) *(SUBJECT TO WORK LOG)	Station 1

SAMPLE DELIVERED BY SIGNATURE L.A.Y DATE 7/24/91

ANALYSIS REQUEST

WORK DESCRIPTION

8010, 8020

SPECIAL INSTRUCTIONS

BILLING: ☐ PICKUP ☐ MAIL

LOGGED IN BY [illegible]

500 Jefferson NE • Albuquerque, New Mexico 87109 • (505) 345-8964 • FAX (505) 345-7259

CUSTOMER

age 1 | REPORT | Work Order # 91-07-330
eceived: 07/30/91 | 08/09/91 10:27:50

REPORT TO ENRON/TRANSWESTERN PIPELINE
6381 N. MAIN STREET
P.O. BOX 1717
ROSWELL, NM 88202-1717
ATTEN LARRY CAMPBELL

PREPARED BY Assaigai Analytical Labs
7300 Jefferson NE
Albuquerque, NM 87109
ATTEN SYED RIZVI
PHONE (505)345-8964

Syed Rizvi
CERTIFIED BY
CONTACT LAB_MANAGER

CLIENT ENR03 SAMPLES 22
COMPANY ENRON/TRANSWESTERN PIPELINE
ACILITY ROSWELL, NEW MEXICO
ENR03

QUESTIONS ABOUT THIS REPORT SHOULD BE ADDRESSED TO:
LABORATORY OPERATIONS MANAGER/ASSAIGAI ANALYTICAL
7300 JEFFERSON N.E.,ALBUQUERQUE,N.M. 87109

WORK ID STATION 9-O.S. YARD 7848
TAKEN 7/29/91
TRANS FEDERAL EXPRESS
TYPE SOIL
P.O. #
INVOICE under separate cover

SAMPLE IDENTIFICATION

1 OSBH3
2 SG349 0-1.8
3 SG349 2.9-4.6
4 SG349 9.0-10.0
5 SG349 14.0-14.8
6 SG349 20.3-21.3
7 SG349 25.3-26.3
8 SG349 29.7-30.4
9 SG360 0.0-2.5
0 SG360 4.0-5.0
1 SG360 9.0-9.9
2 SG360 14.0-14.7
3 SG360 19.0-20.0
4 SG360 24.0-25.0
5 SG360 29.0-29.4

TEST CODES and NAMES used on this workorder

8010_S PURGEABLE HALOCARBONS-SOIL
8020 AROMATIC VOLATILE ORGANICS

SAMPLE IDENTIFICATION

6	SG361 0-2.5
7	SG361 4.0-5.0
8	SG361 9.0-10.0
9	SG361 16.0-16.4
0	SG361 19.5-19.8
1	SG361 24.0-25.0
2	SG361 38.9-39.3

age 3
eceived: 07/30/91

REPORT
Results by Sample

Work Order # 91-07-330

AMPLE ID OSBH3 FRACTION 01A TEST CODE 8010_S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected 07/29/91 Category

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	<0.1	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	<0.1	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

eceived: 07/30/91

REPORT
Results by Sample

Work Order # 91-07-330
Continued From Above

AMPLE ID OSBH3

FRACTION 01A TEST CODE 8010_S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected 07/29/91 Category

Notes and Definitions for this Report:

EXTRACTED 08/05/91
DATE RUN 08/05/91
ANALYST D/R
UNITS MG/KG

eceived: 07/30/91

REPORT
Results by Sample

Work Order # 91-07-330

AMPLE ID OSBH3

FRACTION 01A TEST CODE 8020 NAME AROMATIC VOLATILE ORGANICS
Date & Time Collected 07/29/91 Category

PARAMETER	RESULT	DET LIMIT
BENZENE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
ETHYL BENZENE	<0.1	0.1
TOLUENE	<0.1	0.1
XYLENES	<0.1	0.1

Notes and Definitions for this Report:

EXTRACTED 08/05/91
DATE RUN 08/05/91
ANALYST D/R
UNITS MG/KG

eceived: 07/30/91

REPORT

Results by Sample

Work Order # 91-07-330

AMPLE ID SG349 0-1.8 FRACTION 02A TEST CODE 8010_S NAME PURGEABLE HALOCARBONS-SOIL

Date & Time Collected 07/29/91 Category

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	<0.1	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	<0.1	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

age 7 | REPORT | Work Order # 91-07-330
eceived: 07/30/91 | Results by Sample | Continued From Above

AMPLE ID SG349 0-1.8 FRACTION 02A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected 07/29/91 Category

Notes and Definitions for this Report:

EXTRACTED 08/05/91
DATE RUN 08/05/91
ANALYST D/R
UNITS MG/KG

REPORT
Results by Sample

Work Order # 91-07-330

AMPLE ID 8G349 2.9-4.6   FRACTION 03A   TEST CODE 8010 S   NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected 07/29/91   Category

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	<0.1	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	<0.1	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

eceived: 07/30/91

REPORT
Results by Sample

Work Order # 91-07-330
Continued From Above

AMPLE ID SG349 2.9-4.6

FRACTION 03A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected 07/29/91 Category

Notes and Definitions for this Report:

EXTRACTED 08/05/91
DATE RUN 08/05/91
ANALYST D/R
UNITS MG/KG

age 40
eceived: 07/30/91

REPORT
Results by Sample

Work Order # 91-07-330
Continued From Above

AMPLE ID SG361 9.0-10.0 FRACTION 18A TEST CODE 8010_S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected 07/29/91 Category

Notes and Definitions for this Report:

EXTRACTED 08/06/91
DATE RUN 08/06/91
ANALYST D/R
UNITS MG/KG

eceived: 07/30/91

REPORT
Results by Sample

Work Order # 91-07-330

AMPLE ID SG349 9.0-10.0 FRACTION 04A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected 07/29/91 Category

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	<0.1	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	<0.1	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

eceived: 07/30/91

REPORT
Results by Sample

Work Order # 91-07-330
Continued From Above

AMPLE ID SG349 9.0-10.0 FRACTION 04A TEST CODE 8010_S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected 07/29/91 Category

Notes and Definitions for this Report:

EXTRACTED 08/05/91
DATE RUN 08/05/91
ANALYST D/R
UNITS MG/KG

eceived: 07/30/91

REPORT
Results by Sample

Work Order # 91-07-330

AMPLE ID SG349 14.0-14.8 FRACTION 05A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected 07/29/91 Category

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	<0.1	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	<0.1	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

ɔceived: 07/30/91

REPORT
Results by Sample

Work Order # 91-07-330
Continued From Above

ᴧMPLE ID SG349 14.0-14.8

FRACTION 05A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected 07/29/91 Category

Notes and Definitions for this Report:

EXTRACTED 08/05/91
DATE RUN 08/05/91
ANALYST D/R
UNITS MG/KG

eceived: 07/30/91

REPORT
Results by Sample

Work Order # 91-07-330

AMPLE ID SG349 20.3-21.3   FRACTION 06A   TEST CODE 8010 S   NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected 07/29/91   Category

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	<0.1	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	<0.1	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

ceived: 07/30/91

REPORT
Results by Sample

Work Order # 91-07-330
Continued From Above

MPLE ID SG349 20.3-21.3 FRACTION 06A TEST CODE 8010_S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected 07/29/91 Category ____

Notes and Definitions for this Report:

EXTRACTED 08/05/91
DATE RUN 08/05/91
ANALYST D/R
UNITS MG/KG

ceived: 07/30/91

REPORT
Results by Sample

Work Order # 91-07-330

MPLE ID SG349 25.3-26.3 FRACTION 07A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected 07/29/91 Category

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	<0.1	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	<0.1	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

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ɔceived: 07/30/91

REPORT
Results by Sample

Work Order # 91-07-330
Continued From Above

\MPLE ID SG349 25.3-26.3 FRACTION 07A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected 07/29/91 Category

Notes and Definitions for this Report:

EXTRACTED 08/05/91
DATE RUN 08/05/91
ANALYST D/R
UNITS MG/KG

ge 18 REPORT Work Order # 91-07-330
ceived: 07/30/91 Results by Sample

MPLE ID SG349 29.7-30.4 FRACTION 08A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected 07/29/91 Category

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	<0.1	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	<0.1	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

ceived: 07/30/91

REPORT
Results by Sample

Work Order # 91-07-330
Continued From Above

MPLE ID 8G349 29.7-30.4

FRACTION 08A TEST CODE 8010_8 NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected 07/29/91 Category ______

Notes and Definitions for this Report:

EXTRACTED 08/05/91
DATE RUN 08/05/91
ANALYST D/R
UNITS MG/KG

ıALYTICAL LABORATORIES, INC. • 7300 Jefferson, N.E. • Albuquerque, New Mexico 87109

ıceived: 07/30/91

REPORT
Results by Sample

Work Order # 91-07-330

ıMPLE ID 8G349 29.7-30.4 FRACTION 08A TEST CODE 8020 NAME AROMATIC VOLATILE ORGANICS
Date & Time Collected 07/29/91 Category

PARAMETER	RESULT	DET LIMIT
BENZENE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
ETHYL BENZENE	<0.1	0.1
TOLUENE	<0.1	0.1
XYLENES	<0.1	0.1

Notes and Definitions for this Report:

EXTRACTED 08/05/91
DATE RUN 08/05/91
ANALYST D/R
UNITS MG/KG

ALYTICAL LABORATORIES, INC. • 7300 Jefferson, N.E. • Albuquerque, New Mexico 87109

ge 21 REPORT Work Order # 91-07-330

ceived: 07/30/91 Results by Sample

MPLE ID 8G360 0.0-2.5 FRACTION 09A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL

Date & Time Collected 07/29/91 Category

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	<0.1	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	<0.1	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

age 22 **REPORT** **Work Order # 91-07-330**

eceived: 07/30/91 **Results by Sample** Continued From Above

AMPLE ID 8G360 0.0-2.5 FRACTION 09A TEST CODE 8010_S NAME PURGEABLE HALOCARBONS-SOIL

Date & Time Collected 07/29/91 Category

Notes and Definitions for this Report:

EXTRACTED 08/05/91
DATE RUN 08/05/91
ANALYST D/R
UNITS MG/KG

:ceived: 07/30/91

REPORT
Results by Sample

Work Order # 91-07-330

ıMPLE ID 8G360 4.0-5.0 FRACTION 10A TEST CODE 8010 8 NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected 07/29/91 Category

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	<0.1	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	<0.1	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

ceived: 07/30/91

REPORT
Results by Sample

Work Order # 91-07-330
Continued From Above

MPLE ID SG360 4.0-5.0 FRACTION 10A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected 07/29/91 Category

Notes and Definitions for this Report:

EXTRACTED 08/05/91
DATE RUN 08/05/91
ANALYST D/R
UNITS MG/KG

[redacted]

SAMPLE ID OSBH2 22.5 - 22.6

FRACTION 04A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected not specified Category ____________

Notes and Definitions for this Report:

EXTRACTED 08/01/91
DATE RUN 08/01/91
ANALYST D/R
UNITS MG/KG

Received: 07/26/91

REPORT
Results by Sample

Work Order # 91-07-299

SAMPLE ID OSBH2 31.1 - 31.3 FRACTION 05A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected not specified Category

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	<0.1	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	<0.1	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

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Received: 07/26/91

REPORT
Results by Sample

Work Order # 91-07-299
Continued From Above

SAMPLE ID **OSBH2 31.1 - 31.3**

FRACTION **05A** TEST CODE **8010 S** NAME **PURGEABLE HALOCARBONS-SOIL**
Date & Time Collected **not specified** Category ______

Notes and Definitions for this Report:

EXTRACTED 08/01/91
DATE RUN 08/01/91
ANALYST D/R
UNITS MG/KG

Received: 07/26/91

REPORT
Results by Sample

Work Order # 91-07-299

SAMPLE ID OSBH2 41.8 - 42.0 FRACTION 06A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected not specified Category

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	<0.1	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	<0.1	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

SAMPLE ID OSBH2 41.8 - 42.0

FRACTION 06A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected not specified Category ____

Notes and Definitions for this Report:

EXTRACTED 08/01/91
DATE RUN 08/01/91
ANALYST D/R
UNITS MG/KG

Received: 07/26/91

REPORT
Results by Sample

Work Order # 91-07-299

SAMPLE ID 08BH2 55.2 - 55.4 FRACTION 07A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected not specified Category

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	<0.1	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	<0.1	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

Received: 07/26/91

REPORT
Results by Sample

Work Order # 91-07-299
Continued From Above

SAMPLE ID 08BH2 55.2 - 55.4

FRACTION 07A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected not specified Category ______

Notes and Definitions for this Report:

EXTRACTED 08/01/91
DATE RUN 08/01/91
ANALYST D/R
UNITS MG/KG

Received: 07/26/91

REPORT
Results by Sample

Work Order # 91-07-299

SAMPLE ID OSBH2 69.0 - 69.2 FRACTION 08A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected not specified Category

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	<0.1	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	<0.1	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

Received: 07/26/91

REPORT
Results by Sample

Work Order # 91-07-299
Continued From Above

SAMPLE ID OSBH2 69.0 - 69.2

FRACTION 08A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected not specified Category

Notes and Definitions for this Report:

EXTRACTED 08/01/91
DATE RUN 08/01/91
ANALYST D/R
UNITS MG/KG

TRANSWESTERN PIPELINE COMPANY

CHAIN OF CUSTODY

District: ROSWELL

Date: 7-25-91

Sample Location Valve or Receiver No.	Vol. Collect. During Flush	Sampler
STATION 9		METRIC CORP.

SAMPLE ID NUMBER	SOLVENT USED	SAMPLE ICED	ANALYSES REQUESTED
OSBH1 18.9-19.1		YES	8010
OSBH1 35.3-35.5		YES	8010
OSBH2 9.9-10.1		YES	8010
OSBH2 22.5-22.6		YES	8010
OSBH2 31.1-31.3		YES	8010
OSBH2 41.8-42.0		YES	8010
OSBH2 55.2-55.4		YES	8010
OSBH2 69.0-69.2		YES	8010

Relinquished By EARL CHANLEY / TWPLCO. Date 7-25-91
Relinquished To FED-X Date 7-25-91

Relinquished By ______ Date ______
Relinquished To ______ Date ______

Relinquished By ______ Date ______
Relinquished To ______ Date ______

Relinquished By ______ Date ______
Relinquished By ______ Date ______

Laboratory: ______
Received: ______ Date ______

MAIL RESULTS TO: LARRY CAMPBELL (505-625-8022)
P.O. BOX 1717
ROSWELL NM 88202-1717

ASSAIGAI ANALYTICAL LABORATORIES

WORK ORDER 7821

☐ HAZARDOUS ☐ NON-HAZARDOUS	DATE RECEIVED 7/26/91	ESTIMATED COST
CUSTOMER P.O. NUMBER	TIME RECEIVED 9 30	DUE DATE 8/14/91

ACCOUNT INFORMATION

CUSTOMER'S NAME [illegible]	CONTACT [illegible]
ADDRESS	PHONE NUMBER
CITY / STATE / ZIP Roswell	

PARTY RESPONSIBLE FOR PAYMENT IF OTHER THAN ABOVE

NAME	CONTACT
ADDRESS	PHONE NUMBER
CITY / STATE / ZIP	

ACCOUNT STATUS

PAYMENT REC'D. ____
OPEN ACCOUNT ____
CASH ____
CHECK NUMBER ____

SPECIAL BILLING INSTRUCTIONS

SAMPLE INFORMATION

TYPE OF SAMPLE	NO. OF SAMPLES	*TURN AROUND TIME	SAMPLE IDENTIFICATION AND / OR SAMPLE SITE
☐ WATER ☒ SOIL ☐ OIL ☐ SLUDGE ☐ OTHER	8 NO. OF CONTAINERS 8	☒ REGULAR (10 WKG DAYS) ☐ RUSH (3 DAYS) ☐ EMERGENCY (STAT) *(SUBJECT TO WORK LOG)	Station 9

SAMPLE DELIVERED BY FEDX SIGNATURE DATE 7/26/91

ANALYSIS REQUEST

WORK DESCRIPTION

8010

SPECIAL INSTRUCTIONS

BILLING: ☐ PICKUP ☐ MAIL

LOGGED IN BY

7300 Jefferson NE • Albuquerque, New Mexico 87109 • (505) 345-8964 • FAX (505) 345-7259

Received: 07/23/91

REPORT
Results by Sample

Work Order # 91-07-257

SAMPLE ID PIT 3 BH-1 30.7-30.9 FRACTION 12A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected 07/22/91 Category

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	<0.1	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	<0.1	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

[redacted]

Received: 07/23/91

REPORT
Results by Sample

Work Order # 91-07-257
Continued From Above

SAMPLE ID **PIT 3 BH-1 30.7-30.9** FRACTION **12A** TEST CODE **8010 S** NAME **PURGEABLE HALOCARBONS-SOIL**
Date & Time Collected **07/22/91** Category ____________

Notes and Definitions for this Report:

EXTRACTED 07/29/91
DATE RUN 07/30/91
ANALYST D/R
UNITS MG/KG

Received: 07/23/91

REPORT
Results by Sample

Work Order # 91-07-257

SAMPLE ID **PIT 3 BH-1 30.7-30.9** FRACTION **12A** TEST CODE **8020** NAME **AROMATIC VOLATILE ORGANICS**
Date & Time Collected **07/22/91** Category

PARAMETER	RESULT	DET LIMIT
BENZENE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
ETHYL BENZENE	<0.1	0.1
TOLUENE	<0.1	0.1
XYLENES	<0.1	0.1

Notes and Definitions for this Report:

EXTRACTED 07/29/91
DATE RUN 07/30/91
ANALYST D/R
UNITS MG/KG

ASSAIGAI ANALYTICAL LABORATORIES

WORK ORDER 7784

☐ HAZARDOUS ☐ NON-HAZARDOUS	DATE RECEIVED 7/23/91	ESTIMATED COST
CUSTOMER P.O. NUMBER	TIME RECEIVED 4:30	DUE DATE 8/6/91

ACCOUNT INFORMATION

CUSTOMER'S NAME Transwestern Pipeline / Enron	CONTACT Larry Campbell
ADDRESS	PHONE NUMBER
CITY / STATE / ZIP	

PARTY RESPONSIBLE FOR PAYMENT IF OTHER THAN ABOVE

NAME	CONTACT
ADDRESS	PHONE NUMBER
CITY / STATE / ZIP	

ACCOUNT STATUS

PAYMENT REC'D. ____
OPEN ACCOUNT ✓
CASH ____
CHECK NUMBER ____

SPECIAL BILLING INSTRUCTIONS

SAMPLE INFORMATION

TYPE OF SAMPLE	NO. OF SAMPLES	*TURN AROUND TIME	SAMPLE IDENTIFICATION AND / OR SAMPLE SITE
☐ WATER ☒ SOIL ☐ OIL ☐ SLUDGE ☐ OTHER	12 NO. OF CONTAINERS 12	☒ REGULAR (10 WKG DAYS) ☐ RUSH (3 DAYS) ☐ EMERGENCY (STAT) *(SUBJECT TO WORK LOG)	Station #9.

SAMPLE DELIVERED BY   SIGNATURE Fed X Next Day Air   DATE 7/23/91

ANALYSIS REQUEST

WORK DESCRIPTION

8010 8020 TPH

SPECIAL INSTRUCTIONS

BILLING: ☐ PICKUP ☐ MAIL   LOGGED IN BY [illegible]

7300 Jefferson NE • Albuquerque, New Mexico 87109 • (505) 345-8964 • FAX (505) 345-7259

TRANSWESTERN PIPELINE COMPANY

CHAIN OF CUSTODY

District: ROSWELL Date: 7-22-91

Sample Location Valve or Receiver No.	Vol. Collect. During Flush	Sampler
STATION 9 -		METRIC CORP.

SAMPLE ID NUMBER	SOLVENT USED	SAMPLE ICED	ANALYSES REQUESTED
PIT 2 SAMPLE 001		YES	8010
PIT 2 SAMPLE 002		YES	8010
PIT 2 26.0 - 26.2		YES	8010
PIT 2 29.1 - 29.3		YES	8010
PIT 2 39.8 - 39.9		YES	8010
PIT 2 44.1 - 44.3		YES	8010 - 8020
PIT 2 57.5 - 57.8		YES	8010
PIT 2 69.9 - 70.1		YES	8010 - 8020
DIESEL TANK 4.3 - 4.5		YES	TPH
DIESEL TANK 7.6 - 7.9		YES	TPH
PIT 3 BH-2 25.0 - 25.2		YES	8010 - 8020
PIT 3 BH-1 30.7 - 30.9		YES	8010 - 8020

Relinquished By EARL CHANLEY - TWPLC Date 7-22-91
Relinquished To FED-X Date 7-22-91

Relinquished By ______ Date ______
Relinquished To ______ Date ______

Relinquished By ______ Date ______
Relinquished To ______ Date ______

Relinquished By ______ Date ______
Relinquished By ______ Date ______

Laboratory: ASSAGAI LABS
Received: C. King Date 7/23/91

* MAIL RESULTS TO: LARRY CAMPBELL
P.O. BOX 1717
ROSWELL NM 88202-1717
(505-625-8022)

[redacted]

REPORT

Work Order # 91-07-276

Received: 07/24/91

07/31/91 14:20:37

REPORT TO: ENRON/TRANSWESTERN PIPELINE
6381 N. MAIN STREET
P.O. BOX 1717
ROSWELL, NM 88202-1717

ATTEN: LARRY CAMPBELL

PREPARED BY: Assaigai Analytical Labs
7300 Jefferson NE
Albuquerque, NM 87109

ATTEN: SYED RIZVI
PHONE: (505)345-8964

Syed Rizvi
CERTIFIED BY

CONTACT: LAB_MANAGER

CLIENT: ENR03 SAMPLES 6
COMPANY: ENRON/TRANSWESTERN PIPELINE
FACILITY: ROSWELL, NEW MEXICO
ENR03

QUESTIONS ABOUT THIS REPORT SHOULD BE ADDRESSED TO:
LABORATORY OPERATIONS MANAGER/ASSAIGAI ANALYTICAL
7300 JEFFERSON N.E.,ALBUQUERQUE,N.M. 87109

WORK ID: STATION #9 7799
TAKEN:
TRANS: FED X
TYPE: SOIL
P.O. #:
INVOICE: under separate cover

SAMPLE IDENTIFICATION

01	SG 91 28.6 - 28.8
02	SG 86 13.5 - 13.7
03	SG 86 18.7 - 18.9
04	SG 86 24.9 - 25.1
05	SG 86 35.0 - 35.2
06	SG 86 40.5 - 40.7

TEST CODES and NAMES used on this workorder

8010_S	PURGEABLE HALOCARBONS-SOIL
8020	AROMATIC VOLATILE ORGANICS

Member: American Council of Independent Laboratories, Inc.

Received: 07/24/91

REPORT
Results by Sample

Work Order # 91-07-276

SAMPLE ID SG 91 28.6 - 28.8 FRACTION 01A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected not specified Category

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	<0.1	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	<0.1	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

SAMPLE ID SG 91 28.6 - 28.8 FRACTION 01A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected not specified Category

Notes and Definitions for this Report:

EXTRACTED 07/30/91
DATE RUN 07/30/91
ANALYST D/R
UNITS MG/KG

QUESTIONS ABOUT THIS REPORT SHOULD BE ADDRESSED TO:
LABORATORY OPERATIONS MANAGER/ASSAIGAI ANALYTICAL
7300 JEFFERSON N.E.,ALBUQUERQUE,N.M. 87109

Syed Rizvi

Certified By
SYED N. RIZVI

Assaigai Analytical Labs
7300 Jefferson NE
Albuquerque, NM 87109

Attn: SYED RIZVI
Phone: (505)345-8964

ENRON/TRANSWESTERN PIPELINE
6381 N. MAIN STREET
P.O. BOX 1717
ROSWELL, NM 88202-1717
Attn: LARRY CAMPBELL
Invoice Number:

Order #: 91-08-024
Date: 08/16/91 14:31
Work ID: STATION 9 - O.S. YARD 7885
Date Received: 08/02/91
Date Completed: 08/16/91

SAMPLE IDENTIFICATION

Sample Number	Sample Description	Sample Number	Sample Description
01	OSBH3 44.1-44.3	02	OSBH3 54.8 - 55.0
03	OSBH4 27.5 - 27.7	04	OSBH5 14.0 - 14.2
05	OSBH5 19.6 - 19.9	06	OSBH5 23.4 - 23.6
07	OSBH6 13.6 - 13.8	08	OSBH6 47.0 - 47.2
09	OSBH6 52.6 - 52.8	10	OSBH6 70.0 - 71.0
11	OSBH7 22.1 - 22.3		

TEST RESULTS BY SAMPLE

Sample: 01A , OSBH3 44.1-44.3 **Collected:**

Test Description	Result	Limit	Units	Analyzed	By
PURGEABLE HALOCARBONS-SOIL		0.1			
BROMODICHLOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
BROMOFORM	<0.1	0.1	MG/KG	08/14/91	D/R
BROMOMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
CARBON TETRACHLORIDE	<0.1	0.1	MG/KG	08/14/91	D/R
CHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
CHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
CHLOROFORM	<0.1	0.1	MG/KG	08/14/91	D/R
2-CHLOROETHYL VINYL ETHER	<0.1	0.1	MG/KG	08/14/91	D/R
CHLOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
DIBROMOCHLOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
1,2-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,3-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,4-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
DICHLORODIFLUOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
1,1-DICHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
1,2-DICHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
1,1-DICHLOROETHENE	<0.1	0.1	MG/KG	08/14/91	D/R
trans-1,2-DICHLOROETHENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,2-DICHLOROPROPANE	<0.1	0.1	MG/KG	08/14/91	D/R
cis-1,3-DICHLOROPROPENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
trans-1,3-DICHLOROPROPENE	<0.1	0.1	MG/KG	08/14/91	D/R

Test Description	Result	Limit	Units	Analyzed	By
METHYLENE CHLORIDE	<0.1	0.1	MG/KG	08/14/91	D/R
1,1,1-TRICHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
1,1,2-TRICHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
TETRACHLOROETHENE	<0.1	0.1	MG/KG	08/14/91	D/R
TRICHLOROFLUOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
TRICHLOROETHENE	<0.1	0.1	MG/KG	08/14/91	D/R
VINYL CHLORIDE	<0.1	0.1	MG/KG	08/14/91	D/R

Sample: 02A OSBH3 54.8 - 55.0 Collected:

Test Description	Result	Limit	Units	Analyzed	By
AROMATIC VOLATILE ORGANICS		0.1			
BENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
CHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,4-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,3-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,2-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
ETHYL BENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
TOLUENE	<0.1	0.1	MG/KG	08/14/91	D/R
XYLENES	<0.1	0.1	MG/KG	08/14/91	D/R
PURGEABLE HALOCARBONS-SOIL		0.1			
BROMODICHLOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
BROMOFORM	<0.1	0.1	MG/KG	08/14/91	D/R
BROMOMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
CARBON TETRACHLORIDE	<0.1	0.1	MG/KG	08/14/91	D/R
CHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R

Order # 91-08-024 Assaigai Analytical Labs
08/16/91 14:31

Test Description	Result	Limit	Units	Analyzed	By
CHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
CHLOROFORM	<0.1	0.1	MG/KG	08/14/91	D/R
2-CHLOROETHYL VINYL ETHER	<0.1	0.1	MG/KG	08/14/91	D/R
CHLOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
DIBROMOCHLOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
1,2-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,3-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,4-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
DICHLORODIFLUOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
1,1-DICHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
1,2-DICHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
1,1-DICHLOROETHENE	<0.1	0.1	MG/KG	08/14/91	D/R
trans-1,2-DICHLOROETHENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,2-DICHLOROPROPANE	<0.1	0.1	MG/KG	08/14/91	D/R
cis-1,3-DICHLOROPROPENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
trans-1,3-DICHLOROPROPENE	<0.1	0.1	MG/KG	08/14/91	D/R
METHYLENE CHLORIDE	<0.1	0.1	MG/KG	08/14/91	D/R
1,1,1-TRICHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
1,1,2-TRICHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
TETRACHLOROETHENE	<0.1	0.1	MG/KG	08/14/91	D/R
TRICHLOROFLUOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
TRICHLOROETHENE	<0.1	0.1	MG/KG	08/14/91	D/R
VINYL CHLORIDE	<0.1	0.1	MG/KG	08/14/91	D/R

Sample: 03A OSBH4 27.5 - 27.7 Collected:

Test Description	Result	Limit	Units	Analyzed	By
AROMATIC VOLATILE ORGANICS		0.1			
BENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
CHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,4-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,3-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,2-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
ETHYL BENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
TOLUENE	<0.1	0.1	MG/KG	08/14/91	D/R
XYLENES	<0.1	0.1	MG/KG	08/14/91	D/R
PURGEABLE HALOCARBONS-SOIL		0.1			
BROMODICHLOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
BROMOFORM	<0.1	0.1	MG/KG	08/14/91	D/R
BROMOMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
CARBON TETRACHLORIDE	<0.1	0.1	MG/KG	08/14/91	D/R
CHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
CHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
CHLOROFORM	<0.1	0.1	MG/KG	08/14/91	D/R
2-CHLOROETHYL VINYL ETHER	<0.1	0.1	MG/KG	08/14/91	D/R
CHLOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
DIBROMOCHLOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
1,2-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,3-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,4-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
DICHLORODIFLUOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
1,1-DICHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R

Test Description	Result	Limit	Units	Analyzed	By
1,2-DICHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
1,1-DICHLOROETHENE	<0.1	0.1	MG/KG	08/14/91	D/R
trans-1,2-DICHLOROETHENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,2-DICHLOROPROPANE	<0.1	0.1	MG/KG	08/14/91	D/R
cis-1,3-DICHLOROPROPENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
trans-1,3-DICHLOROPROPENE	<0.1	0.1	MG/KG	08/14/91	D/R
METHYLENE CHLORIDE	<0.1	0.1	MG/KG	08/14/91	D/R
1,1,1-TRICHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
1,1,2-TRICHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
TETRACHLOROETHENE	<0.1	0.1	MG/KG	08/14/91	D/R
TRICHLOROFLUOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
TRICHLOROETHENE	<0.1	0.1	MG/KG	08/14/91	D/R
VINYL CHLORIDE	<0.1	0.1	MG/KG	08/14/91	D/R

Sample: 04A OSBH5 14.0 - 14.2 Collected:

Test Description	Result	Limit	Units	Analyzed	By
PURGEABLE HALOCARBONS-SOIL		0.1			
BROMODICHLOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
BROMOFORM	<0.1	0.1	MG/KG	08/14/91	D/R
BROMOMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
CARBON TETRACHLORIDE	<0.1	0.1	MG/KG	08/14/91	D/R
CHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
CHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
CHLOROFORM	<0.1	0.1	MG/KG	08/14/91	D/R

Test Description	Result	Limit	Units	Analyzed	By
2-CHLOROETHYL VINYL ETHER	<0.1	0.1	MG/KG	08/14/91	D/R
CHLOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
DIBROMOCHLOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
1,2-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,3-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,4-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
DICHLORODIFLUOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
1,1-DICHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
1,2-DICHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
1,1-DICHLOROETHENE	<0.1	0.1	MG/KG	08/14/91	D/R
trans-1,2-DICHLOROETHENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,2-DICHLOROPROPANE	<0.1	0.1	MG/KG	08/14/91	D/R
cis-1,3-DICHLOROPROPENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
trans-1,3-DICHLOROPROPENE	<0.1	0.1	MG/KG	08/14/91	D/R
METHYLENE CHLORIDE	<0.1	0.1	MG/KG	08/14/91	D/R
1,1,1-TRICHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
1,1,2-TRICHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
TETRACHLOROETHENE	<0.1	0.1	MG/KG	08/14/91	D/R
TRICHLOROFLUOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
TRICHLOROETHENE	<0.1	0.1	MG/KG	08/14/91	D/R
VINYL CHLORIDE	<0.1	0.1	MG/KG	08/14/91	D/R

Sample: 05A OSBH5 19.6 - 19.9 Collected:

Test Description	Result	Limit	Units	Analyzed	By
PURGEABLE HALOCARBONS-SOIL		0.1			
BROMODICHLOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
BROMOFORM	<0.1	0.1	MG/KG	08/14/91	D/R
BROMOMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
CARBON TETRACHLORIDE	<0.1	0.1	MG/KG	08/14/91	D/R
CHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
CHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
CHLOROFORM	<0.1	0.1	MG/KG	08/14/91	D/R
2-CHLOROETHYL VINYL ETHER	<0.1	0.1	MG/KG	08/14/91	D/R
CHLOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
DIBROMOCHLOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
1,2-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,3-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,4-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
DICHLORODIFLUOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
1,1-DICHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
1,2-DICHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
1,1-DICHLOROETHENE	<0.1	0.1	MG/KG	08/14/91	D/R
trans-1,2-DICHLOROETHENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,2-DICHLOROPROPANE	<0.1	0.1	MG/KG	08/14/91	D/R
cis-1,3-DICHLOROPROPENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
trans-1,3-DICHLOROPROPENE	<0.1	0.1	MG/KG	08/14/91	D/R
METHYLENE CHLORIDE	<0.1	0.1	MG/KG	08/14/91	D/R
1,1,1-TRICHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R

Test Description	Result	Limit	Units	Analyzed	By
1,1,2-TRICHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
TETRACHLOROETHENE	<0.1	0.1	MG/KG	08/14/91	D/R
TRICHLOROFLUOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
TRICHLOROETHENE	<0.1	0.1	MG/KG	08/14/91	D/R
VINYL CHLORIDE	<0.1	0.1	MG/KG	08/14/91	D/R

Sample: 06A OSBH5 23.4 - 23.6 **Collected:**

Test Description	Result	Limit	Units	Analyzed	By
AROMATIC VOLATILE ORGANICS		0.1			
BENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
CHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,4-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,3-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,2-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
ETHYL BENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
TOLUENE	<0.1	0.1	MG/KG	08/14/91	D/R
XYLENES	<0.1	0.1	MG/KG	08/14/91	D/R
PURGEABLE HALOCARBONS-SOIL		0.1			
BROMODICHLOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
BROMOFORM	<0.1	0.1	MG/KG	08/14/91	D/R
BROMOMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
CARBON TETRACHLORIDE	<0.1	0.1	MG/KG	08/14/91	D/R
CHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
CHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
CHLOROFORM	<0.1	0.1	MG/KG	08/14/91	D/R

Test Description	Result	Limit	Units	Analyzed	By
2-CHLOROETHYL VINYL ETHER	<0.1	0.1	MG/KG	08/14/91	D/R
CHLOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
DIBROMOCHLOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
1,2-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,3-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,4-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
DICHLORODIFLUOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
1,1-DICHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
1,2-DICHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
1,1-DICHLOROETHENE	<0.1	0.1	MG/KG	08/14/91	D/R
trans-1,2-DICHLOROETHENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,2-DICHLOROPROPANE	<0.1	0.1	MG/KG	08/14/91	D/R
cis-1,3-DICHLOROPROPENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
trans-1,3-DICHLOROPROPENE	<0.1	0.1	MG/KG	08/14/91	D/R
METHYLENE CHLORIDE	<0.1	0.1	MG/KG	08/14/91	D/R
1,1,1-TRICHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
1,1,2-TRICHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
TETRACHLOROETHENE	<0.1	0.1	MG/KG	08/14/91	D/R
TRICHLOROFLUOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
TRICHLOROETHENE	<0.1	0.1	MG/KG	08/14/91	D/R
VINYL CHLORIDE	<0.1	0.1	MG/KG	08/14/91	D/R

Sample: 07A OSBH6 13.6 - 13.8 Collected:

Test Description	Result	Limit	Units	Analyzed	By
PURGEABLE HALOCARBONS-SOIL		0.1			
BROMODICHLOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
BROMOFORM	<0.1	0.1	MG/KG	08/14/91	D/R
BROMOMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
CARBON TETRACHLORIDE	<0.1	0.1	MG/KG	08/14/91	D/R
CHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
CHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
CHLOROFORM	<0.1	0.1	MG/KG	08/14/91	D/R
2-CHLOROETHYL VINYL ETHER	<0.1	0.1	MG/KG	08/14/91	D/R
CHLOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
DIBROMOCHLOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
1,2-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,3-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,4-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
DICHLORODIFLUOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
1,1-DICHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
1,2-DICHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
1,1-DICHLOROETHENE	<0.1	0.1	MG/KG	08/14/91	D/R
trans-1,2-DICHLOROETHENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,2-DICHLOROPROPANE	<0.1	0.1	MG/KG	08/14/91	D/R
cis-1,3-DICHLOROPROPENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
trans-1,3-DICHLOROPROPENE	<0.1	0.1	MG/KG	08/14/91	D/R
METHYLENE CHLORIDE	<0.1	0.1	MG/KG	08/14/91	D/R
1,1,1-TRICHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R

Received: 07/30/91

REPORT
Results by Sample

Work Order # 91-07-330

SAMPLE ID SG360 9.0-9.9 FRACTION 11A TEST CODE 8010_S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected 07/29/91 Category

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	<0.1	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	<0.1	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

Received: 07/30/91

REPORT
Results by Sample

Work Order # 91-07-330
Continued From Above

SAMPLE ID SG360 9.0-9.9 FRACTION 11A TEST CODE 8010_S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected 07/29/91 Category

Notes and Definitions for this Report:

EXTRACTED 08/05/91
DATE RUN 08/05/91
ANALYST D/R
UNITS MG/KG

REPORT
Results by Sample

Work Order # 91-07-330

SAMPLE ID 8G360 14.0-14.7 FRACTION 12A TEST CODE 8010_8 NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected 07/29/91 Category

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	<0.1	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	<0.1	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

?age 28 REPORT Work Order # 91-07-330
?eceived: 07/30/91 Results by Sample Continued From Above

SAMPLE ID SG360 14.0-14.7 FRACTION 12A TEST CODE 8010_S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected 07/29/91 Category ______

Notes and Definitions for this Report:

EXTRACTED 08/06/91
DATE RUN 08/06/91
ANALYST D/R
UNITS MG/KG

Received: 07/30/91

REPORT
Results by Sample

Work Order # 91-07-330

SAMPLE ID SG360 19.0-20.0   FRACTION 13A   TEST CODE 8010_S   NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected 07/29/91   Category

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	<0.1	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	<0.1	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

REPORT
Results by Sample

Work Order # 91-07-330
Continued From Above

SAMPLE ID SG360 19.0-20.0

FRACTION 13A TEST CODE 8010_S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected 07/29/91 Category ______

Notes and Definitions for this Report:

EXTRACTED 08/06/91
DATE RUN 08/06/91
ANALYST D/R
UNITS MG/KG

ANALYTICAL LABORATORIES, INC. • 7300 Jefferson, N.E. • Albuquerque, New Mexico 87109

Received: 07/30/91

REPORT
Results by Sample

Work Order # 91-07-330

SAMPLE ID SG360 24.0-25.0 FRACTION 14A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected 07/29/91 Category

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	<0.1	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	<0.1	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

:eceived: 07/30/91

REPORT
Results by Sample

Work Order # 91-07-330
Continued From Above

:AMPLE ID 8G360 24.0-25.0   FRACTION 14A   TEST CODE 8010_S   NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected 07/29/91   Category

Notes and Definitions for this Report:

EXTRACTED 08/06/91
DATE RUN 08/06/91
ANALYST D/R
UNITS MG/KG

Received: 07/30/91

REPORT
Results by Sample

Work Order # 91-07-330

SAMPLE ID SG360 29.0-29.4 FRACTION 15A TEST CODE 8010_S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected 07/29/91 Category

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	<0.1	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	<0.1	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

Member: American Council of Independent Laboratories, Inc.

Received: 07/30/91 Results by Sample Continued From Above

SAMPLE ID 8G360 29.0-29.4 FRACTION 15A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected 07/29/91 Category ______

Notes and Definitions for this Report:

EXTRACTED 08/06/91
DATE RUN 08/06/91
ANALYST D/R
UNITS MG/KG

Member: American Council of Independent Laboratories, Inc.

Received: 07/30/91

REPORT
Results by Sample

Work Order # 91-07-330

SAMPLE ID SG361 0-2.5 FRACTION 16A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected 07/29/91 Category

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	<0.1	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	<0.1	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

eceived: 07/30/91

REPORT
Results by Sample

Work Order # 91-07-330
Continued From Above

AMPLE ID SG361 0-2.5

FRACTION 16A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected 07/29/91 Category

Notes and Definitions for this Report:

EXTRACTED 08/06/91
DATE RUN 08/06/91
ANALYST D/R
UNITS MG/KG

A[illegible]A[illegible]
[A]NALYTICAL LABORATORIES, INC. • 7300 Jefferson, N.E. • Albuquerque, New Mexico 87109

[R]eceived: 07/30/91

REPORT
Results by Sample

Work Order # 91-07-330

[S]AMPLE ID 8G361 4.0-5.0 FRACTION 17A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected 07/29/91 Category

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	<0.1	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	<0.1	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

AMPLE ID SG361 4.0-5.0 FRACTION 17A TEST CODE 8010_S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected 07/29/91 Category

Notes and Definitions for this Report:

EXTRACTED 08/06/91
DATE RUN 08/06/91
ANALYST D/R
UNITS MG/KG

Received: 07/30/91

REPORT
Results by Sample

Work Order # 91-07-330

SAMPLE ID SG361 9.0-10.0   FRACTION 18A   TEST CODE 8010_S   NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected 07/29/91   Category

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	<0.1	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	<0.1	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

Received: 07/30/91

REPORT
Results by Sample

Work Order # 91-07-330

SAMPLE ID **SG361 16.0-16.4** FRACTION **19A** TEST CODE **8010_S** NAME **PURGEABLE HALOCARBONS-SOIL**
Date & Time Collected **07/29/91** Category ______

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	<0.1	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	<0.1	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

REPORT
Results by Sample

SAMPLE ID **SG361 16.0-16.4** FRACTION **19A** TEST CODE **8010_S** NAME **PURGEABLE HALOCARBONS-SOIL**
Date & Time Collected **07/29/91** Category

Notes and Definitions for this Report:

EXTRACTED 08/06/91
DATE RUN 08/06/91
ANALYST D/R
UNITS MG/KG

Received: 07/30/91

REPORT
Results by Sample

Work Order # 91-07-330

SAMPLE ID SG361 19.5-19.8 FRACTION 20A TEST CODE 8010_S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected 07/29/91 Category

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	<0.1	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	<0.1	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

Received: 07/30/91

REPORT
Results by Sample

Work Order # 91-07-330
Continued From Above

SAMPLE ID SG361 19.5-19.8

FRACTION 20A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected 07/29/91 Category

Notes and Definitions for this Report:

EXTRACTED 08/06/91
DATE RUN 08/06/91
ANALYST D/R
UNITS MG/KG

[redacted]

Received: 07/30/91

REPORT

Results by Sample

Work Order # 91-07-330

SAMPLE ID SG361 24.0-25.0 FRACTION 21A TEST CODE 8010_S NAME PURGEABLE HALOCARBONS-SOIL

Date & Time Collected 07/29/91 Category

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	<0.1	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	<0.1	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

Received: 07/30/91

REPORT
Results by Sample

Work Order # 91-07-330
Continued From Above

SAMPLE ID SG361 24.0-25.0 FRACTION 21A TEST CODE 8010_S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected 07/29/91 Category ________

Notes and Definitions for this Report:

EXTRACTED 08/06/91
DATE RUN 08/06/91
ANALYST D/R
UNITS MG/KG

Member: American Council of Independent Laboratories, Inc.

SAMPLE ID 8G361 38.9-39.3 FRACTION 22A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected 07/29/91 Category

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	<0.1	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	<0.1	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

Received: 07/30/91

REPORT
Results by Sample

Work Order # 91-07-330
Continued From Above

SAMPLE ID SG361 38.9-39.3 FRACTION 22A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected 07/29/91 Category

Notes and Definitions for this Report:

EXTRACTED 08/06/91
DATE RUN 08/06/91
ANALYST D/R
UNITS MG/KG

TRANSWESTERN PIPELINE COMPANY

CHAIN OF CUSTODY

District: ROSWELL   Date: 7-29-91

Sample Location Valve or Receiver No.	Vol. Collect. During Flush	Sampler
STATION 9 - O.S YARD		METRIC CORP

SAMPLE ID NUMBER	SOLVENT USED	SAMPLE ICED	ANALYSES REQUESTED
OSBH3		YES	8010, 8020
SG349 0-1.8		YES	8010, ~~[illegible]~~
SG349 2.9-4.6		YES	8010
SG349 9.0-10.0		YES	8010
SG349 14.0-14.8		YES	8010
SG349 20.3-21.3		YES	8010
SG349 25.3-26.3		YES	8010
SG349 29.7-30.4		YES	8010, 8020
SG360 0.0-2.5		YES	8010
SG360 4.0-5.0		YES	8010
SG360 9.0-9.9		YES	8010

Relinquished By EARL CHANLEY - TWPL CO.   Date 7-29-91
Relinquished To FED-X   Date 7-29-91

Relinquished By ____________________   Date ________
Relinquished To ____________________   Date ________

Relinquished By ____________________   Date ________
Relinquished To ____________________   Date ________

Relinquished By ____________________   Date ________
Relinquished By ____________________   Date ________

Laboratory: ASSAIGAI LABS
Received: [signature] BURCK   Date 7/30/91

MAIL RESULTS TO: LARRY CAMPBELL   (505-625-8022)
P.O. BOX 1717
ROSWELL N MEX. 88202-1717

Received: 07/26/91

REPORT 08/05/91 09:26:18

Work Order # 91-07-299

REPORT TO	ENRON/TRANSWESTERN PIPELINE 6381 N. MAIN STREET P.O. BOX 1717 ROSWELL, NM 88202-1717	PREPARED BY	Assaigai Analytical Labs 7300 Jefferson NE Albuquerque, NM 87109
ATTEN	LARRY CAMPBELL	ATTEN	SYED RIZVI
		PHONE	(505)345-8964

Syed Rizvi
CERTIFIED BY

CONTACT LAB_MANAGER

CLIENT ENR03 SAMPLES 8
COMPANY ENRON/TRANSWESTERN PIPELINE
FACILITY ROSWELL, NEW MEXICO
ENR03

QUESTIONS ABOUT THIS REPORT SHOULD BE ADDRESSED TO:
LABORATORY OPERATIONS MANAGER/ASSAIGAI ANALYTICAL
7300 JEFFERSON N.E., ALBUQUERQUE, N.M. 87109

WORK ID STATION 9 7821
TAKEN
TRANS FED X
TYPE SOIL
P.O. #
INVOICE under separate cover

SAMPLE IDENTIFICATION

01	OSBH1 18.9 - 19.1
02	OSBH1 34.3 - 34.5
03	OSBH2 9.9 - 10.1
04	OSBH2 22.5 - 22.6
05	OSBH2 31.1 - 31.3
06	OSBH2 41.8 - 42.0
07	OSBH2 55.2 - 55.4
08	OSBH2 69.0 - 69.2

TEST CODES and NAMES used on this workorder

8010_S PURGEABLE HALOCARBONS-SOIL

Member: American Council of Independent Laboratories, Inc.

Received: 07/26/91

Results by Sample

SAMPLE ID OSBH1 18.9 - 19.1   FRACTION 01A   TEST CODE 8010 S   NAME PURGEABLE HALOCARBONS-SOIL

Date & Time Collected not specified   Category ______

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	<0.1	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	<0.1	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

Page 5
Received: 07/26/91

REPORT
Results by Sample

Work Order # 91-07-299
Continued From Above

SAMPLE ID **OSBH1 34.3 - 34.5**

FRACTION **02A** TEST CODE **8010 S** NAME **PURGEABLE HALOCARBONS-SOIL**
Date & Time Collected **not specified** Category

Notes and Definitions for this Report:

EXTRACTED 08/01/91
DATE RUN 08/01/91
ANALYST D/R
UNITS MG/KG

Received: 07/26/91

Results by Sample

SAMPLE ID OSBH2 9.9 - 10.1 FRACTION 03A TEST CODE 8010 S NAME PURGEABLE HALOCARBONS-SOIL
Date & Time Collected not specified Category

PARAMETER	RESULT	LIMIT
BROMODICHLOROMETHANE	<0.1	0.1
BROMOFORM	<0.1	0.1
BROMOMETHANE	<0.1	0.1
CARBON TETRACHLORIDE	<0.1	0.1
CHLOROBENZENE	<0.1	0.1
CHLOROETHANE	<0.1	0.1
CHLOROFORM	<0.1	0.1
2-CHLOROETHYL VINYL ETHER	<0.1	0.1
CHLOROMETHANE	<0.1	0.1
DIBROMOCHLOROMETHANE	<0.1	0.1
1,2-DICHLOROBENZENE	<0.1	0.1
1,3-DICHLOROBENZENE	<0.1	0.1
1,4-DICHLOROBENZENE	<0.1	0.1
DICHLORODIFLUOROMETHANE	<0.1	0.1
1,1-DICHLOROETHANE	<0.1	0.1
1,2-DICHLOROETHANE	<0.1	0.1
1,1-DICHLOROETHENE	<0.1	0.1
trans-1,2-DICHLOROETHENE	<0.1	0.1
1,2-DICHLOROPROPANE	<0.1	0.1
cis-1,3-DICHLOROPROPENE	<0.1	0.1
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1
trans-1,3-DICHLOROPROPENE	<0.1	0.1
METHYLENE CHLORIDE	<0.1	0.1
1,1,1-TRICHLOROETHANE	<0.1	0.1
1,1,2-TRICHLOROETHANE	<0.1	0.1
TETRACHLOROETHENE	<0.1	0.1
TRICHLOROFLUOROMETHANE	<0.1	0.1
TRICHLOROETHENE	<0.1	0.1
VINYL CHLORIDE	<0.1	0.1

Test Description	Result	Limit	Units	Analyzed	By
1,1,2-TRICHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
TETRACHLOROETHENE	<0.1	0.1	MG/KG	08/14/91	D/R
TRICHLOROFLUOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
TRICHLOROETHENE	<0.1	0.1	MG/KG	08/14/91	D/R
VINYL CHLORIDE	<0.1	0.1	MG/KG	08/14/91	D/R

Sample: 08A OSBH6 47.0 - 47.2 Collected:

Test Description	Result	Limit	Units	Analyzed	By
PURGEABLE HALOCARBONS-SOIL		0.1			
BROMODICHLOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
BROMOFORM	<0.1	0.1	MG/KG	08/14/91	D/R
BROMOMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
CARBON TETRACHLORIDE	<0.1	0.1	MG/KG	08/14/91	D/R
CHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
CHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
CHLOROFORM	<0.1	0.1	MG/KG	08/14/91	D/R
2-CHLOROETHYL VINYL ETHER	<0.1	0.1	MG/KG	08/14/91	D/R
CHLOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
DIBROMOCHLOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
1,2-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,3-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,4-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
DICHLORODIFLUOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
1,1-DICHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
1,2-DICHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R

Test Description	Result	Limit	Units	Analyzed	By
1,1-DICHLOROETHENE	<0.1	0.1	MG/KG	08/14/91	D/R
trans-1,2-DICHLOROETHENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,2-DICHLOROPROPANE	<0.1	0.1	MG/KG	08/14/91	D/R
cis-1,3-DICHLOROPROPENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
trans-1,3-DICHLOROPROPENE	<0.1	0.1	MG/KG	08/14/91	D/R
METHYLENE CHLORIDE	<0.1	0.1	MG/KG	08/14/91	D/R
1,1,1-TRICHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
1,1,2-TRICHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
TETRACHLOROETHENE	<0.1	0.1	MG/KG	08/14/91	D/R
TRICHLOROFLUOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
TRICHLOROETHENE	<0.1	0.1	MG/KG	08/14/91	D/R
VINYL CHLORIDE	<0.1	0.1	MG/KG	08/14/91	D/R

Sample: 09A OSBH6 52.6 - 52.8 Collected:

Test Description	Result	Limit	Units	Analyzed	By
PURGEABLE HALOCARBONS-SOIL		0.1			
BROMODICHLOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
BROMOFORM	<0.1	0.1	MG/KG	08/14/91	D/R
BROMOMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
CARBON TETRACHLORIDE	<0.1	0.1	MG/KG	08/14/91	D/R
CHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
CHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
CHLOROFORM	<0.1	0.1	MG/KG	08/14/91	D/R
2-CHLOROETHYL VINYL ETHER	<0.1	0.1	MG/KG	08/14/91	D/R

Test Description	Result	Limit	Units	Analyzed	By
CHLOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
DIBROMOCHLOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
1,2-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,3-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,4-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
DICHLORODIFLUOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
1,1-DICHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
1,2-DICHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
1,1-DICHLOROETHENE	<0.1	0.1	MG/KG	08/14/91	D/R
trans-1,2-DICHLOROETHENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,2-DICHLOROPROPANE	<0.1	0.1	MG/KG	08/14/91	D/R
cis-1,3-DICHLOROPROPENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
trans-1,3-DICHLOROPROPENE	<0.1	0.1	MG/KG	08/14/91	D/R
METHYLENE CHLORIDE	<0.1	0.1	MG/KG	08/14/91	D/R
1,1,1-TRICHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
1,1,2-TRICHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
TETRACHLOROETHENE	<0.1	0.1	MG/KG	08/14/91	D/R
TRICHLOROFLUOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
TRICHLOROETHENE	<0.1	0.1	MG/KG	08/14/91	D/R
VINYL CHLORIDE	<0.1	0.1	MG/KG	08/14/91	D/R

Sample: 10A OSBH6 70.0 - 71.0 Collected:

Test Description	Result	Limit	Units	Analyzed	By
AROMATIC VOLATILE ORGANICS		0.1			

Test Description	Result	Limit	Units	Analyzed	By
BENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
CHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,4-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,3-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,2-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
ETHYL BENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
TOLUENE	<0.1	0.1	MG/KG	08/14/91	D/R
XYLENES	<0.1	0.1	MG/KG	08/14/91	D/R
PURGEABLE HALOCARBONS-SOIL		0.1			
BROMODICHLOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
BROMOFORM	<0.1	0.1	MG/KG	08/14/91	D/R
BROMOMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
CARBON TETRACHLORIDE	<0.1	0.1	MG/KG	08/14/91	D/R
CHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
CHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
CHLOROFORM	<0.1	0.1	MG/KG	08/14/91	D/R
2-CHLOROETHYL VINYL ETHER	<0.1	0.1	MG/KG	08/14/91	D/R
CHLOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
DIBROMOCHLOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
1,2-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,3-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,4-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
DICHLORODIFLUOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
1,1-DICHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
1,2-DICHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
1,1-DICHLOROETHENE	<0.1	0.1	MG/KG	08/14/91	D/R
trans-1,2-DICHLOROETHENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,2-DICHLOROPROPANE	<0.1	0.1	MG/KG	08/14/91	D/R

Test Description	Result	Limit	Units	Analyzed	By
cis-1,3-DICHLOROPROPENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
trans-1,3-DICHLOROPROPENE	<0.1	0.1	MG/KG	08/14/91	D/R
METHYLENE CHLORIDE	<0.1	0.1	MG/KG	08/14/91	D/R
1,1,1-TRICHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
1,1,2-TRICHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
TETRACHLOROETHENE	<0.1	0.1	MG/KG	08/14/91	D/R
TRICHLOROFLUOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
TRICHLOROETHENE	<0.1	0.1	MG/KG	08/14/91	D/R
VINYL CHLORIDE	<0.1	0.1	MG/KG	08/14/91	D/R

Sample: 11A OSBH7 22.1 - 22.3 Collected:

Test Description	Result	Limit	Units	Analyzed	By
AROMATIC VOLATILE ORGANICS		0.1			
BENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
CHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,4-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,3-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,2-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
ETHYL BENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
TOLUENE	<0.1	0.1	MG/KG	08/14/91	D/R
XYLENES	<0.1	0.1	MG/KG	08/14/91	D/R
PURGEABLE HALOCARBONS-SOIL		0.1			
BROMODICHLOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
BROMOFORM	<0.1	0.1	MG/KG	08/14/91	D/R

Test Description	Result	Limit	Units	Analyzed	By
BROMOMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
CARBON TETRACHLORIDE	<0.1	0.1	MG/KG	08/14/91	D/R
CHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
CHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
CHLOROFORM	<0.1	0.1	MG/KG	08/14/91	D/R
2-CHLOROETHYL VINYL ETHER	<0.1	0.1	MG/KG	08/14/91	D/R
CHLOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
DIBROMOCHLOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
1,2-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,3-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,4-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/14/91	D/R
DICHLORODIFLUOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
1,1-DICHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
1,2-DICHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
1,1-DICHLOROETHENE	<0.1	0.1	MG/KG	08/14/91	D/R
trans-1,2-DICHLOROETHENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,2-DICHLOROPROPANE	<0.1	0.1	MG/KG	08/14/91	D/R
cis-1,3-DICHLOROPROPENE	<0.1	0.1	MG/KG	08/14/91	D/R
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
trans-1,3-DICHLOROPROPENE	<0.1	0.1	MG/KG	08/14/91	D/R
METHYLENE CHLORIDE	<0.1	0.1	MG/KG	08/14/91	D/R
1,1,1-TRICHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
1,1,2-TRICHLOROETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
TETRACHLOROETHENE	<0.1	0.1	MG/KG	08/14/91	D/R
TRICHLOROFLUOROMETHANE	<0.1	0.1	MG/KG	08/14/91	D/R
TRICHLOROETHENE	<0.1	0.1	MG/KG	08/14/91	D/R
VINYL CHLORIDE	<0.1	0.1	MG/KG	08/14/91	D/R

ASSAIGAI ANALYTICAL LABORATORIES

WORK ORDER
7885

☐ HAZARDOUS ☐ NON-HAZARDOUS	DATE RECEIVED 8/2/91	ESTIMATED COST
CUSTOMER P.O. NUMBER	TIME RECEIVED 10:00	DUE DATE 8/16/91

ACCOUNT INFORMATION

CUSTOMER'S NAME Exxon / Transwestern	CONTACT Kevin Campbell
ADDRESS	PHONE NUMBER
CITY / STATE / ZIP	

PARTY RESPONSIBLE FOR PAYMENT IF OTHER THAN ABOVE

NAME	CONTACT
ADDRESS	PHONE NUMBER
CITY / STATE / ZIP	

SPECIAL BILLING INSTRUCTIONS

ACCOUNT STATUS

PAYMENT REC'D. ____
OPEN ACCOUNT X
CASH ____
CHECK NUMBER ____

SAMPLE INFORMATION

TYPE OF SAMPLE	NO. OF SAMPLES	*TURN AROUND TIME	SAMPLE IDENTIFICATION AND / OR SAMPLE SITE
☐ WATER ☒ SOIL ☐ OIL ☐ SLUDGE ☐ OTHER	11 NO. OF CONTAINERS 11	☒ REGULAR (10 WKG DAYS) ☐ RUSH (3 DAYS) ☐ EMERGENCY (STAT) *(SUBJECT TO WORK LOG)	Station 9 - O.S. Yard.

SAMPLE DELIVERED BY Fed X SIGNATURE DATE 8/2/91

ANALYSIS REQUEST

WORK DESCRIPTION

8010

8020

SPECIAL INSTRUCTIONS

BILLING: ☐ PICKUP ☐ MAIL

LOGGED IN BY

7300 Jefferson NE • Albuquerque, New Mexico 87109 • (505) 345-8964 • FAX (505) 345-7259

CUSTOMER

Assaigai Analytical Labs
7300 Jefferson NE
Albuquerque, NM 87109

Attn: SYED RIZVI
Phone: (505)345-8964

ENRON/TRANSWESTERN PIPELINE
6381 N. MAIN STREET
P.O. BOX 1717
ROSWELL, NM 88202-1717
Attn: LARRY CAMPBELL
Invoice Number:

Order #: 91-08-048
Date: 08/20/91 14:21
Work ID: STA 9 O.S.YARD 7908
Date Received: 08/06/91
Date Completed: 08/20/91

SAMPLE IDENTIFICATION

Sample Number	Sample Description	Sample Number	Sample Description
01	OSBH7 33.5 - 33.7	02	OSBH7 37.0 - 37.2
03	OSHB8 4.6 - 4.9	04	OSBH8 33.9 - 34.1
05	OSBH8 49.7 - 49.9	06	OSBH9 4.5 - 4.9
07	OSBH9 32.0 - 32.5	08	OSBH9 49.5 - 49.7

QUESTIONS ABOUT THIS REPORT SHOULD BE ADDRESSED TO:
LABORATORY OPERATIONS MANAGER/ASSAIGAI ANALYTICAL
7300 JEFFERSON N.E.,ALBUQUERQUE,N.M. 87109

Syed Rizvi

Certified By
SYED N. RIZVI

TEST RESULTS BY SAMPLE

Sample: 01A OSBH7 33.5 - 33.7 Collected:

Test Description	Result	Limit	Units	Analyzed	By
PURGEABLE HALOCARBONS-SOIL		0.1			
BROMODICHLOROMETHANE	<0.1	0.1	MG/KG	08/15/91	SR
BROMOFORM	<0.1	0.1	MG/KG	08/15/91	SR
BROMOMETHANE	<0.1	0.1	MG/KG	08/15/91	SR
CARBON TETRACHLORIDE	<0.1	0.1	MG/KG	08/15/91	SR
CHLOROBENZENE	<0.1	0.1	MG/KG	08/15/91	SR
CHLOROETHANE	<0.1	0.1	MG/KG	08/15/91	SR
CHLOROFORM	<0.1	0.1	MG/KG	08/15/91	SR
2-CHLOROETHYL VINYL ETHER	<0.1	0.1	MG/KG	08/15/91	SR
CHLOROMETHANE	<0.1	0.1	MG/KG	08/15/91	SR
DIBROMOCHLOROMETHANE	<0.1	0.1	MG/KG	08/15/91	SR
1,2-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/15/91	SR
1,3-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/15/91	SR
1,4-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/15/91	SR
DICHLORODIFLUOROMETHANE	<0.1	0.1	MG/KG	08/15/91	SR
1,1-DICHLOROETHANE	<0.1	0.1	MG/KG	08/15/91	SR
1,2-DICHLOROETHANE	<0.1	0.1	MG/KG	08/15/91	SR
1,1-DICHLOROETHENE	<0.1	0.1	MG/KG	08/15/91	SR
trans-1,2-DICHLOROETHENE	<0.1	0.1	MG/KG	08/15/91	SR
1,2-DICHLOROPROPANE	<0.1	0.1	MG/KG	08/15/91	SR
cis-1,3-DICHLOROPROPENE	<0.1	0.1	MG/KG	08/15/91	SR
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1	MG/KG	08/15/91	SR
trans-1,3-DICHLOROPROPENE	<0.1	0.1	MG/KG	08/15/91	SR

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Test Description	Result	Limit	Units	Analyzed	By
METHYLENE CHLORIDE	<0.1	0.1	MG/KG	08/15/91	SR
1,1,1-TRICHLOROETHANE	<0.1	0.1	MG/KG	08/15/91	SR
1,1,2-TRICHLOROETHANE	<0.1	0.1	MG/KG	08/15/91	SR
TETRACHLOROETHENE	<0.1	0.1	MG/KG	08/15/91	SR
TRICHLOROFLUOROMETHANE	<0.1	0.1	MG/KG	08/15/91	SR
TRICHLOROETHENE	<0.1	0.1	MG/KG	08/15/91	SR
VINYL CHLORIDE	<0.1	0.1	MG/KG	08/15/91	SR

Sample: 02A OSBH7 37.0 - 37.2 Collected:

Test Description	Result	Limit	Units	Analyzed	By
AROMATIC VOLATILE ORGANICS		0.1			
BENZENE	<0.1	0.1	MG/KG	08/15/91	SR
CHLOROBENZENE	<0.1	0.1	MG/KG	08/15/91	SR
1,4-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/15/91	SR
1,3-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/15/91	SR
1,2-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/15/91	SR
ETHYL BENZENE	0.19	0.1	MG/KG	08/15/91	SR
TOLUENE	<0.1	0.1	MG/KG	08/15/91	SR
XYLENES	0.44	0.1	MG/KG	08/15/91	SR
PURGEABLE HALOCARBONS-SOIL		0.1			
BROMODICHLOROMETHANE	<0.1	0.1	MG/KG	08/15/91	SR
BROMOFORM	<0.1	0.1	MG/KG	08/15/91	SR
BROMOMETHANE	<0.1	0.1	MG/KG	08/15/91	SR
CARBON TETRACHLORIDE	<0.1	0.1	MG/KG	08/15/91	SR
CHLOROBENZENE	<0.1	0.1	MG/KG	08/15/91	SR

Test Description	Result	Limit	Units	Analyzed	By
CHLOROETHANE	<0.1	0.1	MG/KG	08/15/91	SR
CHLOROFORM	<0.1	0.1	MG/KG	08/15/91	SR
2-CHLOROETHYL VINYL ETHER	<0.1	0.1	MG/KG	08/15/91	SR
CHLOROMETHANE	<0.1	0.1	MG/KG	08/15/91	SR
DIBROMOCHLOROMETHANE	<0.1	0.1	MG/KG	08/15/91	SR
1,2-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/15/91	SR
1,3-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/15/91	SR
1,4-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/15/91	SR
DICHLORODIFLUOROMETHANE	<0.1	0.1	MG/KG	08/15/91	SR
1,1-DICHLOROETHANE	<0.1	0.1	MG/KG	08/15/91	SR
1,2-DICHLOROETHANE	<0.1	0.1	MG/KG	08/15/91	SR
1,1-DICHLOROETHENE	<0.1	0.1	MG/KG	08/15/91	SR
trans-1,2-DICHLOROETHENE	<0.1	0.1	MG/KG	08/15/91	SR
1,2-DICHLOROPROPANE	<0.1	0.1	MG/KG	08/15/91	SR
cis-1,3-DICHLOROPROPENE	<0.1	0.1	MG/KG	08/15/91	SR
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1	MG/KG	08/15/91	SR
trans-1,3-DICHLOROPROPENE	<0.1	0.1	MG/KG	08/15/91	SR
METHYLENE CHLORIDE	<0.1	0.1	MG/KG	08/15/91	SR
1,1,1-TRICHLOROETHANE	<0.1	0.1	MG/KG	08/15/91	SR
1,1,2-TRICHLOROETHANE	<0.1	0.1	MG/KG	08/15/91	SR
TETRACHLOROETHENE	0.17	0.1	MG/KG	08/15/91	SR
TRICHLOROFLUOROMETHANE	<0.1	0.1	MG/KG	08/15/91	SR
TRICHLOROETHENE	<0.1	0.1	MG/KG	08/15/91	SR
VINYL CHLORIDE	<0.1	0.1	MG/KG	08/15/91	SR

Sample: 03A OSHB8 4.6 - 4.9 Collected:

Test Description	Result	Limit	Units	Analyzed	By
PURGEABLE HALOCARBONS-SOIL		0.1			
BROMODICHLOROMETHANE	<0.1	0.1	MG/KG	08/15/91	SR
BROMOFORM	<0.1	0.1	MG/KG	08/15/91	SR
BROMOMETHANE	<0.1	0.1	MG/KG	08/15/91	SR
CARBON TETRACHLORIDE	<0.1	0.1	MG/KG	08/15/91	SR
CHLOROBENZENE	<0.1	0.1	MG/KG	08/15/91	SR
CHLOROETHANE	<0.1	0.1	MG/KG	08/15/91	SR
CHLOROFORM	<0.1	0.1	MG/KG	08/15/91	SR
2-CHLOROETHYL VINYL ETHER	<0.1	0.1	MG/KG	08/15/91	SR
CHLOROMETHANE	<0.1	0.1	MG/KG	08/15/91	SR
DIBROMOCHLOROMETHANE	<0.1	0.1	MG/KG	08/15/91	SR
1,2-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/15/91	SR
1,3-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/15/91	SR
1,4-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/15/91	SR
DICHLORODIFLUOROMETHANE	<0.1	0.1	MG/KG	08/15/91	SR
1,1-DICHLOROETHANE	<0.1	0.1	MG/KG	08/15/91	SR
1,2-DICHLOROETHANE	<0.1	0.1	MG/KG	08/15/91	SR
1,1-DICHLOROETHENE	<0.1	0.1	MG/KG	08/15/91	SR
trans-1,2-DICHLOROETHENE	<0.1	0.1	MG/KG	08/15/91	SR
1,2-DICHLOROPROPANE	<0.1	0.1	MG/KG	08/15/91	SR
cis-1,3-DICHLOROPROPENE	<0.1	0.1	MG/KG	08/15/91	SR
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1	MG/KG	08/15/91	SR
trans-1,3-DICHLOROPROPENE	<0.1	0.1	MG/KG	08/15/91	SR
METHYLENE CHLORIDE	<0.1	0.1	MG/KG	08/15/91	SR
1,1,1-TRICHLOROETHANE	<0.1	0.1	MG/KG	08/15/91	SR

Test Description	Result	Limit	Units	Analyzed	By
1,1,2-TRICHLOROETHANE	<0.1	0.1	MG/KG	08/15/91	SR
TETRACHLOROETHENE	<0.1	0.1	MG/KG	08/15/91	SR
TRICHLOROFLUOROMETHANE	<0.1	0.1	MG/KG	08/15/91	SR
TRICHLOROETHENE	<0.1	0.1	MG/KG	08/15/91	SR
VINYL CHLORIDE	<0.1	0.1	MG/KG	08/15/91	SR

Sample: 04A OSBH8 33.9 - 34.1 Collected:

Test Description	Result	Limit	Units	Analyzed	By
PURGEABLE HALOCARBONS-SOIL		0.1			
BROMODICHLOROMETHANE	<0.1	0.1	MG/KG	08/15/91	SR
BROMOFORM	<0.1	0.1	MG/KG	08/15/91	SR
BROMOMETHANE	<0.1	0.1	MG/KG	08/15/91	SR
CARBON TETRACHLORIDE	<0.1	0.1	MG/KG	08/15/91	SR
CHLOROBENZENE	0.12	0.1	MG/KG	08/15/91	SR
CHLOROETHANE	<0.1	0.1	MG/KG	08/15/91	SR
CHLOROFORM	<0.1	0.1	MG/KG	08/15/91	SR
2-CHLOROETHYL VINYL ETHER	<0.1	0.1	MG/KG	08/15/91	SR
CHLOROMETHANE	<0.1	0.1	MG/KG	08/15/91	SR
DIBROMOCHLOROMETHANE	<0.1	0.1	MG/KG	08/15/91	SR
1,2-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/15/91	SR
1,3-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/15/91	SR
1,4-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/15/91	SR
DICHLORODIFLUOROMETHANE	<0.1	0.1	MG/KG	08/15/91	SR
1,1-DICHLOROETHANE	<0.1	0.1	MG/KG	08/15/91	SR
1,2-DICHLOROETHANE	<0.1	0.1	MG/KG	08/15/91	SR

Test Description	Result	Limit	Units	Analyzed	By
1,1-DICHLOROETHENE	<0.1	0.1	MG/KG	08/15/91	SR
trans-1,2-DICHLOROETHENE	<0.1	0.1	MG/KG	08/15/91	SR
1,2-DICHLOROPROPANE	<0.1	0.1	MG/KG	08/15/91	SR
cis-1,3-DICHLOROPROPENE	<0.1	0.1	MG/KG	08/15/91	SR
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1	MG/KG	08/15/91	SR
trans-1,3-DICHLOROPROPENE	<0.1	0.1	MG/KG	08/15/91	SR
METHYLENE CHLORIDE	<0.1	0.1	MG/KG	08/15/91	SR
1,1,1-TRICHLOROETHANE	<0.1	0.1	MG/KG	08/15/91	SR
1,1,2-TRICHLOROETHANE	<0.1	0.1	MG/KG	08/15/91	SR
TETRACHLOROETHENE	0.16	0.1	MG/KG	08/15/91	SR
TRICHLOROFLUOROMETHANE	<0.1	0.1	MG/KG	08/15/91	SR
TRICHLOROETHENE	<0.1	0.1	MG/KG	08/15/91	SR
VINYL CHLORIDE	<0.1	0.1	MG/KG	08/15/91	SR

Sample: 05A OSBH8 49.7 - 49.9 Collected:

Test Description	Result	Limit	Units	Analyzed	By
AROMATIC VOLATILE ORGANICS		0.1			
BENZENE	<0.1	0.1	MG/KG	08/15/91	SR
CHLOROBENZENE	<0.1	0.1	MG/KG	08/15/91	SR
1,4-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/15/91	SR
1,3-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/15/91	SR
1,2-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/15/91	SR
ETHYL BENZENE	0.14	0.1	MG/KG	08/15/91	SR
TOLUENE	<0.1	0.1	MG/KG	08/15/91	SR
XYLENES	0.3	0.1	MG/KG	08/15/91	SR

Test Description	Result	Limit	Units	Analyzed	By
PURGEABLE HALOCARBONS-SOIL		0.1			
BROMODICHLOROMETHANE	<0.1	0.1	MG/KG	08/15/91	SR
BROMOFORM	<0.1	0.1	MG/KG	08/15/91	SR
BROMOMETHANE	<0.1	0.1	MG/KG	08/15/91	SR
CARBON TETRACHLORIDE	<0.1	0.1	MG/KG	08/15/91	SR
CHLOROBENZENE	<0.1	0.1	MG/KG	08/15/91	SR
CHLOROETHANE	<0.1	0.1	MG/KG	08/15/91	SR
CHLOROFORM	<0.1	0.1	MG/KG	08/15/91	SR
2-CHLOROETHYL VINYL ETHER	<0.1	0.1	MG/KG	08/15/91	SR
CHLOROMETHANE	<0.1	0.1	MG/KG	08/15/91	SR
DIBROMOCHLOROMETHANE	<0.1	0.1	MG/KG	08/15/91	SR
1,2-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/15/91	SR
1,3-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/15/91	SR
1,4-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/15/91	SR
DICHLORODIFLUOROMETHANE	<0.1	0.1	MG/KG	08/15/91	SR
1,1-DICHLOROETHANE	<0.1	0.1	MG/KG	08/15/91	SR
1,2-DICHLOROETHANE	<0.1	0.1	MG/KG	08/15/91	SR
1,1-DICHLOROETHENE	<0.1	0.1	MG/KG	08/15/91	SR
trans-1,2-DICHLOROETHENE	<0.1	0.1	MG/KG	08/15/91	SR
1,2-DICHLOROPROPANE	<0.1	0.1	MG/KG	08/15/91	SR
cis-1,3-DICHLOROPROPENE	<0.1	0.1	MG/KG	08/15/91	SR
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1	MG/KG	08/15/91	SR
trans-1,3-DICHLOROPROPENE	<0.1	0.1	MG/KG	08/15/91	SR
METHYLENE CHLORIDE	<0.1	0.1	MG/KG	08/15/91	SR
1,1,1-TRICHLOROETHANE	<0.1	0.1	MG/KG	08/15/91	SR
1,1,2-TRICHLOROETHANE	<0.1	0.1	MG/KG	08/15/91	SR
TETRACHLOROETHENE	<0.1	0.1	MG/KG	08/15/91	SR
TRICHLOROFLUOROMETHANE	<0.1	0.1	MG/KG	08/15/91	SR
TRICHLOROETHENE	<0.1	0.1	MG/KG	08/15/91	SR
VINYL CHLORIDE	<0.1	0.1	MG/KG	08/15/91	SR

Sample: 06A OSBH9 4.5 - 4.9

Collected:

Test Description	Result	Limit	Units	Analyzed	By
PURGEABLE HALOCARBONS-SOIL		0.1			
BROMODICHLOROMETHANE	<0.1	0.1	MG/KG	08/15/91	SR
BROMOFORM	<0.1	0.1	MG/KG	08/15/91	SR
BROMOMETHANE	<0.1	0.1	MG/KG	08/15/91	SR
CARBON TETRACHLORIDE	<0.1	0.1	MG/KG	08/15/91	SR
CHLOROBENZENE	<0.1	0.1	MG/KG	08/15/91	SR
CHLOROETHANE	<0.1	0.1	MG/KG	08/15/91	SR
CHLOROFORM	<0.1	0.1	MG/KG	08/15/91	SR
2-CHLOROETHYL VINYL ETHER	<0.1	0.1	MG/KG	08/15/91	SR
CHLOROMETHANE	<0.1	0.1	MG/KG	08/15/91	SR
DIBROMOCHLOROMETHANE	<0.1	0.1	MG/KG	08/15/91	SR
1,2-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/15/91	SR
1,3-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/15/91	SR
1,4-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/15/91	SR
DICHLORODIFLUOROMETHANE	<0.1	0.1	MG/KG	08/15/91	SR
1,1-DICHLOROETHANE	<0.1	0.1	MG/KG	08/15/91	SR
1,2-DICHLOROETHANE	<0.1	0.1	MG/KG	08/15/91	SR
1,1-DICHLOROETHENE	<0.1	0.1	MG/KG	08/15/91	SR
trans-1,2-DICHLOROETHENE	<0.1	0.1	MG/KG	08/15/91	SR
1,2-DICHLOROPROPANE	<0.1	0.1	MG/KG	08/15/91	SR
cis-1,3-DICHLOROPROPENE	<0.1	0.1	MG/KG	08/15/91	SR
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1	MG/KG	08/15/91	SR
trans-1,3-DICHLOROPROPENE	<0.1	0.1	MG/KG	08/15/91	SR
METHYLENE CHLORIDE	<0.1	0.1	MG/KG	08/15/91	SR
1,1,1-TRICHLOROETHANE	<0.1	0.1	MG/KG	08/15/91	SR

Test Description	Result	Limit	Units	Analyzed	By
1,1,2-TRICHLOROETHANE	<0.1	0.1	MG/KG	08/15/91	SR
TETRACHLOROETHENE	<0.1	0.1	MG/KG	08/15/91	SR
TRICHLOROFLUOROMETHANE	<0.1	0.1	MG/KG	08/15/91	SR
TRICHLOROETHENE	<0.1	0.1	MG/KG	08/15/91	SR
VINYL CHLORIDE	<0.1	0.1	MG/KG	08/15/91	SR

Sample: 07A OSBH9 32.0 - 32.5 Collected:

Test Description	Result	Limit	Units	Analyzed	By
PURGEABLE HALOCARBONS-SOIL		0.1			
BROMODICHLOROMETHANE	<0.1	0.1	MG/KG	08/15/91	SR
BROMOFORM	<0.1	0.1	MG/KG	08/15/91	SR
BROMOMETHANE	<0.1	0.1	MG/KG	08/15/91	SR
CARBON TETRACHLORIDE	<0.1	0.1	MG/KG	08/15/91	SR
CHLOROBENZENE	<0.1	0.1	MG/KG	08/15/91	SR
CHLOROETHANE	<0.1	0.1	MG/KG	08/15/91	SR
CHLOROFORM	<0.1	0.1	MG/KG	08/15/91	SR
2-CHLOROETHYL VINYL ETHER	<0.1	0.1	MG/KG	08/15/91	SR
CHLOROMETHANE	<0.1	0.1	MG/KG	08/15/91	SR
DIBROMOCHLOROMETHANE	<0.1	0.1	MG/KG	08/15/91	SR
1,2-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/15/91	SR
1,3-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/15/91	SR
1,4-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/15/91	SR
DICHLORODIFLUOROMETHANE	<0.1	0.1	MG/KG	08/15/91	SR
1,1-DICHLOROETHANE	<0.1	0.1	MG/KG	08/15/91	SR
1,2-DICHLOROETHANE	<0.1	0.1	MG/KG	08/15/91	SR

Test Description	Result	Limit	Units	Analyzed	By
1,1-DICHLOROETHENE	<0.1	0.1	MG/KG	08/15/91	SR
trans-1,2-DICHLOROETHENE	<0.1	0.1	MG/KG	08/15/91	SR
1,2-DICHLOROPROPANE	<0.1	0.1	MG/KG	08/15/91	SR
cis-1,3-DICHLOROPROPENE	<0.1	0.1	MG/KG	08/15/91	SR
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1	MG/KG	08/15/91	SR
trans-1,3-DICHLOROPROPENE	<0.1	0.1	MG/KG	08/15/91	SR
METHYLENE CHLORIDE	<0.1	0.1	MG/KG	08/15/91	SR
1,1,1-TRICHLOROETHANE	<0.1	0.1	MG/KG	08/15/91	SR
1,1,2-TRICHLOROETHANE	<0.1	0.1	MG/KG	08/15/91	SR
TETRACHLOROETHENE	<0.1	0.1	MG/KG	08/15/91	SR
TRICHLOROFLUOROMETHANE	<0.1	0.1	MG/KG	08/15/91	SR
TRICHLOROETHENE	<0.1	0.1	MG/KG	08/15/91	SR
VINYL CHLORIDE	<0.1	0.1	MG/KG	08/15/91	SR

Sample: 08A OSBH9 49.5 - 49.7 Collected:

Test Description	Result	Limit	Units	Analyzed	By
AROMATIC VOLATILE ORGANICS		0.1			
BENZENE	<0.1	0.1	MG/KG	08/15/91	SR
CHLOROBENZENE	<0.1	0.1	MG/KG	08/15/91	SR
1,4-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/15/91	SR
1,3-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/15/91	SR
1,2-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/15/91	SR
ETHYL BENZENE	<0.1	0.1	MG/KG	08/15/91	SR
TOLUENE	<0.1	0.1	MG/KG	08/15/91	SR
XYLENES	<0.1	0.1	MG/KG	08/15/91	SR

Test Description	Result	Limit	Units	Analyzed	By
PURGEABLE HALOCARBONS-SOIL		0.1			
BROMODICHLOROMETHANE	<0.1	0.1	MG/KG	08/15/91	SR
BROMOFORM	<0.1	0.1	MG/KG	08/15/91	SR
BROMOMETHANE	<0.1	0.1	MG/KG	08/15/91	SR
CARBON TETRACHLORIDE	<0.1	0.1	MG/KG	08/15/91	SR
CHLOROBENZENE	<0.1	0.1	MG/KG	08/15/91	SR
CHLOROETHANE	<0.1	0.1	MG/KG	08/15/91	SR
CHLOROFORM	<0.1	0.1	MG/KG	08/15/91	SR
2-CHLOROETHYL VINYL ETHER	<0.1	0.1	MG/KG	08/15/91	SR
CHLOROMETHANE	<0.1	0.1	MG/KG	08/15/91	SR
DIBROMOCHLOROMETHANE	<0.1	0.1	MG/KG	08/15/91	SR
1,2-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/15/91	SR
1,3-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/15/91	SR
1,4-DICHLOROBENZENE	<0.1	0.1	MG/KG	08/15/91	SR
DICHLORODIFLUOROMETHANE	<0.1	0.1	MG/KG	08/15/91	SR
1,1-DICHLOROETHANE	<0.1	0.1	MG/KG	08/15/91	SR
1,2-DICHLOROETHANE	<0.1	0.1	MG/KG	08/15/91	SR
1,1-DICHLOROETHENE	<0.1	0.1	MG/KG	08/15/91	SR
trans-1,2-DICHLOROETHENE	<0.1	0.1	MG/KG	08/15/91	SR
1,2-DICHLOROPROPANE	<0.1	0.1	MG/KG	08/15/91	SR
cis-1,3-DICHLOROPROPENE	<0.1	0.1	MG/KG	08/15/91	SR
1,1,2,2-TETRACHLOROETHANE	<0.1	0.1	MG/KG	08/15/91	SR
trans-1,3-DICHLOROPROPENE	<0.1	0.1	MG/KG	08/15/91	SR
METHYLENE CHLORIDE	<0.1	0.1	MG/KG	08/15/91	SR
1,1,1-TRICHLOROETHANE	<0.1	0.1	MG/KG	08/15/91	SR
1,1,2-TRICHLOROETHANE	<0.1	0.1	MG/KG	08/15/91	SR
TETRACHLOROETHENE	<0.1	0.1	MG/KG	08/15/91	SR
TRICHLOROFLUOROMETHANE	<0.1	0.1	MG/KG	08/15/91	SR
TRICHLOROETHENE	<0.1	0.1	MG/KG	08/15/91	SR
VINYL CHLORIDE	<0.1	0.1	MG/KG	08/15/91	SR

TEST METHODOLOGIES

8010_S = USEPA SW-846 METHOD # 8010

8020 = USEPA SW-846 METHOD # 8020

ASSAIGAI ANALYTICAL LABORATORIES

WORK ORDER 7908

☐ HAZARDOUS ☐ NON-HAZARDOUS	DATE RECEIVED 8/6/91	ESTIMATED COST
CUSTOMER P.O. NUMBER	TIME RECEIVED 10:00	DUE DATE 8/20/91

ACCOUNT INFORMATION

CUSTOMER'S NAME [illegible]	CONTACT [illegible]
ADDRESS	PHONE NUMBER [illegible]
CITY / STATE / ZIP [illegible]	

PARTY RESPONSIBLE FOR PAYMENT IF OTHER THAN ABOVE

		ACCOUNT STATUS
NAME	CONTACT	PAYMENT REC'D.
ADDRESS	PHONE NUMBER	OPEN ACCOUNT
CITY / STATE / ZIP		CASH
		CHECK NUMBER

SPECIAL BILLING INSTRUCTIONS

SAMPLE INFORMATION

TYPE OF SAMPLE	NO. OF SAMPLES	*TURN AROUND TIME	SAMPLE IDENTIFICATION AND / OR SAMPLE SITE
☐ WATER ☑ SOIL ☐ OIL ☐ SLUDGE ☐ OTHER	6 NO. OF CONTAINERS 6	☑ REGULAR (10 WKG DAYS) ☐ RUSH (3 DAYS) ☐ EMERGENCY (STAT) *(SUBJECT TO WORK LOG)	STA 9 OS Yard

SAMPLE DELIVERED BY [illegible] SIGNATURE DATE 8/6/91

ANALYSIS REQUEST

WORK DESCRIPTION

[illegible]

SPECIAL INSTRUCTIONS

BILLING: ☐ PICKUP ☐ MAIL

LOGGED IN BY [illegible]

300 Jefferson NE • Albuquerque, New Mexico 87109 • (505) 345-8964 • FAX (505) 345-7259

CUSTOMER

TRANSWESTERN PIPELINE COMPANY

CHAIN OF CUSTODY

District: ROSWELL

Date: 8-5-91

Sample Location Valve or Receiver No.	Vol. Collect. During Flush	Sampler
STAT. 9 - O.S. YARD		METRIC

SAMPLE ID NUMBER	SOLVENT USED	SAMPLE ICED	ANALYSES REQUESTED
OSBH7 33.5-33.7		YES	8010
OSBH7 37.0-37.2		YES	8010, 8020
OSBH8 4.6-4.9		YES	8010
OSBH8 33.9-34.1		YES	8010
OSBH8 49.7-49.9		YES	8010, 8020
OSBH9 4.5-4.9		YES	8010
OSBH9 32.0-32.5		YES	8010
OSBH9 47.5-49.7		YES	8010, 8020

Relinquished By EARL CHANLEY / TWPL Date 8-5-91
Relinquished To FED-X Date 8-5-91

Relinquished By ______ Date ______
Relinquished To ______ Date ______

Relinquished By ______ Date ______
Relinquished To ______ Date ______

Relinquished By ______ Date ______
Relinquished By ______ Date ______

Laboratory: ASSAIGAI LABS
Received: [signature] Date 8/6/91

APPENDIX C

LABORATORY RESULTS
AND
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Assaigai Analytical Labs
7300 Jefferson NE
Albuquerque, NM 87109

Attn: SYED RIZVI
Phone: (505)345-8964

ENRON/TRANSWESTERN PIPELINE
6381 N. MAIN STREET
P.O. BOX 1717
ROSWELL, NM 88202-1717
Attn: LARRY CAMPBELL
Invoice Number: 911774

Order #: 91-08-239
Date: 09/05/91 12:15
Work ID: STATION 9 7752
Date Received: 08/22/91
Date Completed: 09/05/91

****
* REFERENCE WO#: 91-07-215 *
****

SAMPLE IDENTIFICATION

Sample Number	Sample Description	Sample Number	Sample Description
03	PIT I 2.8 - 3.0	04	PIT I 9.2 - 9.4
05	PIT I 13.5 - 13.7	06	PIT I 18.8 - 19.0
07	PIT I 26.8 - 27.0	08	PIT I 30.6 - 30.8
09	PIT I 41.6 - 41.8	10	PIT I 43.5 - 43.7

QUESTIONS ABOUT THIS REPORT SHOULD BE ADDRESSED TO:
LABORATORY OPERATIONS MANAGER/ASSAIGAI ANALYTICAL
7300 JEFFERSON N.E., ALBUQUERQUE, N.M. 87109

Syed Rizvi

Certified By
SYED N. RIZVI

Member: American Council of Independent Laboratories, Inc.

REGULAR TEST RESULTS BY TEST

TOTAL REC PET HYDROCARBONS Minimum: 5.0 Maximum: 100
Method: EPA 418.1

Sample	Sample Description	Result	Units	Extracted	Analyzed	By
03A	PIT I 2.8 - 3.0	25,000	MG/KG	08/30/91	09/05/91	PV
04A	PIT I 9.2 - 9.4	39,000	MG/KG	08/30/91	09/05/91	PV
05A	PIT I 13.5 - 13.7	55,000	MG/KG	08/30/91	09/05/91	PV
06A	PIT I 18.8 - 19.0	20,000	MG/KG	08/30/91	09/05/91	PV
07A	PIT I 26.8 - 27.0	11,000	MG/KG	08/30/91	09/05/91	PV
08A	PIT I 30.6 - 30.8	16	MG/KG	08/30/91	09/05/91	PV
09A	PIT I 41.6 - 41.8	16	MG/KG	08/30/91	09/05/91	PV
10A	PIT I 43.5 - 43.7	56	MG/KG	08/30/91	09/05/91	PV

[redacted]

Assaigai Analytical Labs
7300 Jefferson NE
Albuquerque, NM 87109

Attn: SYED RIZVI
Phone: (505)345-8964

ENRON/TRANSWESTERN PIPELINE
6381 N. MAIN STREET
P.O. BOX 1717
ROSWELL, NM 88202-1717
Attn: LARRY CAMPBELL
Invoice Number: 911769

Order #: 91-08-240
Date: 09/03/91 13:53
Work ID: STATION #9 7784
Date Received: 08/22/91
Date Completed: 09/03/91
REFERENCE WO#: 91-07-257

SAMPLE IDENTIFICATION

Sample Number	Sample Description	Sample Number	Sample Description
01	PIT 2 SAMPLE 001	02	PIT 2 SAMPLE 002
03	PIT 2 26.0 - 26.2	04	PIT 2 29.1 - 29.3
05	PIT 2 39.8 - 39.9	06	PIT 2 44.1 - 44.3
07	PIT 2 57.5 - 57.8	08	PIT 2 69.9 - 70.1
09		10	
11	PIT 3 BH-2 25.0 - 25.2	12	PIT 3 BH-1 30.7 - 30.9

QUESTIONS ABOUT THIS REPORT SHOULD BE ADDRESSED TO:
LABORATORY OPERATIONS MANAGER/ASSAIGAI ANALYTICAL
7300 JEFFERSON N.E.,ALBUQUERQUE,N.M. 87109

Syed Rizvi

Certified By
SYED N. RIZVI

REGULAR TEST RESULTS BY TEST

TOTAL REC PET HYDROCARBONS Minimum: 5.0 Maximum: 100
Method: EPA 418.1

Sample	Sample Description	Result	Units	Extracted	Analyzed	By
01A	PIT 2 SAMPLE 001	<5.0	MG/KG	08/30/91	09/03/91	PV
02A	PIT 2 SAMPLE 002	13,000	MG/KG	08/30/91	09/03/91	PV
03A	PIT 2 26.0 - 26.2	170	MG/KG	08/30/91	09/03/91	PV
04A	PIT 2 29.1 - 29.3	<5.0	MG/KG	08/30/91	09/03/91	PV
05A	PIT 2 39.8 - 39.9	2600	MG/KG	08/30/91	09/03/91	PV
06A	PIT 2 44.1 - 44.3	44	MG/KG	08/30/91	09/03/91	PV
07A	PIT 2 57.5 - 57.8	250	MG/KG	08/30/91	09/03/91	PV
08A	PIT 2 69.9 - 70.1	<5.0	MG/KG	08/30/91	09/03/91	PV
09A						
10A						
11A	PIT 3 BH-2 25.0 - 25.2	<5.0	MG/KG	08/30/91	09/03/91	PV
12A	PIT 3 BH-1 30.7 - 30.9	<5.0	MG/KG	08/30/91	09/03/91	PV

Assaigai Analytical Labs
7300 Jefferson NE
Albuquerque, NM 87109

Attn: SYED RIZVI
Phone: (505)345-8964

ENRON/TRANSWESTERN PIPELINE
6381 N. MAIN STREET
P.O. BOX 1717
ROSWELL, NM 88202-1717
Attn: LARRY CAMPBELL
Invoice Number: 911768

Order #: 91-08-241
Date: 09/03/91 13:52
Work ID: STATION #9 7799
Date Received: 08/22/91
Date Completed: 09/03/91
REFERENCE WO#: 91-07-276

SAMPLE IDENTIFICATION

Sample Number	Sample Description	Sample Number	Sample Description
01	SG 91 28.6 - 28.8	02	SG 86 13.5 - 13.7
03	SG 86 18.7 - 18.9	04	SG 86 24.9 - 25.1
05	SG 86 35.0 - 35.2	06	SG 86 40.5 - 40.7

QUESTIONS ABOUT THIS REPORT SHOULD BE ADDRESSED TO:
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7300 JEFFERSON N.E.,ALBUQUERQUE,N.M. 87109

Syed Rizvi

Certified By
SYED N. RIZVI

REGULAR TEST RESULTS BY TEST

TOTAL REC PET HYDROCARBONS Minimum: 5.0 Maximum: 100
Method: EPA 418.1

Sample	Sample Description	Result	Units	Extracted	Analyzed	By
01A	SG 91 28.6 - 28.8	<5.0	MG/KG	08/30/91	09/03/91	PV
02A	SG 86 13.5 - 13.7	18,000	MG/KG	08/30/91	09/03/91	PV
03A	SG 86 18.7 - 18.9	5200	MG/KG	08/30/91	09/03/91	PV
04A	SG 86 24.9 - 25.1	<5.0	MG/KG	08/30/91	09/03/91	PV
05A	SG 86 35.0 - 35.2	8.0	MG/KG	08/30/91	09/03/91	PV
06A	SG 86 40.5 - 40.7	<5.0	MG/KG	08/30/91	09/03/91	PV

Assaigai Analytical Labs
7300 Jefferson NE
Albuquerque, NM 87109

Attn: SYED RIZVI
Phone: (505)345-8964

ENRON/TRANSWESTERN PIPELINE
6381 N. MAIN STREET
P.O. BOX 1717
ROSWELL, NM 88202-1717
Attn: LARRY CAMPBELL
Invoice Number: 911773

Order #: 91-08-246
Date: 09/05/91 12:13
Work ID: STATION #9 O.S. YARD 7848
Date Received: 08/22/91
Date Completed: 09/05/91

****
* REFERENCE WO#: 91-07-330 *
****

SAMPLE IDENTIFICATION

Sample Number	Sample Description	Sample Number	Sample Description
01	OSBH3	02	SG349 0-1.8
03	SG349 2.9-4.6	04	SG349 9.0-10.0
05	SG349 14.0-14.8	06	SG349 20.3-21.3
07	SG349 25.3-26.3	08	SG349 29.7-30.4
09	SG360 0.0-2.5	10	SG360 4.0-5.0
11	SG360 9.0-9.9	12	SG360 14.0-14.7
13	SG360 19.0-20.0	14	SG360 24.0-25.0
15	SG360 29.0-29.4	16	SG361 0-2.5
17	SG361 4.0-5.0	18	SG361 9.0-10.0

SAMPLE IDENTIFICATION

Sample Number	Sample Description	Sample Number	Sample Description
19	SG361 16.0-16.4	20	SG361 19.5-19.8
21	SG361 24.0-25.0	22	SG361 38.9-39.3

QUESTIONS ABOUT THIS REPORT SHOULD BE ADDRESSED TO:
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7300 JEFFERSON N.E.,ALBUQUERQUE,N.M. 87109

Syed Rizvi

Certified By
SYED N. RIZVI

[redacted]

REGULAR TEST RESULTS BY TEST

TOTAL REC PET HYDROCARBONS Minimum: 5.0 Maximum: 100
Method: EPA 418.1

Sample	Sample Description	Result	Units	Extracted	Analyzed	By
01A	OSBH3	<5.0	MG/KG	08/30/91	09/04/91	PV
02A	SG349 0-1.8	<5.0	MG/KG	08/30/91	09/05/91	PV
03A	SG349 2.9-4.6	<5.0	MG/KG	08/30/91	09/05/91	PV
04A	SG349 9.0-10.0	<5.0	MG/KG	08/30/91	09/04/91	PV
05A	SG349 14.0-14.8	<5.0	MG/KG	08/30/91	09/04/91	PV
06A	SG349 20.3-21.3	<5.0	MG/KG	08/30/91	09/04/91	PV
07A	SG349 25.3-26.3	<5.0	MG/KG	08/30/91	09/04/91	PV
08A	SG349 29.7-30.4	8.0	MG/KG	08/30/91	09/04/91	PV
09A	SG360 0.0-2.5	<5.0	MG/KG	08/30/91	09/04/91	PV
10A	SG360 4.0-5.0	<5.0	MG/KG	08/30/91	09/04/91	PV
11A	SG360 9.0-9.9	<5.0	MG/KG	08/30/91	09/04/91	PV
12A	SG360 14.0-14.7	8.0	MG/KG	08/30/91	09/04/91	PV
13A	SG360 19.0-20.0	<5.0	MG/KG	08/30/91	09/04/91	PV
14A	SG360 24.0-25.0	<5.0	MG/KG	08/30/91	09/04/91	PV
15A	SG360 29.0-29.4	20	MG/KG	08/30/91	09/04/91	PV
16A	SG361 0-2.5	<5.0	MG/KG	08/30/91	09/04/91	PV
17A	SG361 4.0-5.0	<5.0	MG/KG	08/30/91	09/04/91	PV
18A	SG361 9.0-10.0	<5.0	MG/KG	08/30/91	09/04/91	PV
19A	SG361 16.0-16.4	<5.0	MG/KG	08/30/91	09/04/91	PV
20A	SG361 19.5-19.8	<5.0	MG/KG	08/30/91	09/04/91	PV
21A	SG361 24.0-25.0	<5.0	MG/KG	08/30/91	09/04/91	PV
22A	SG361 38.9-39.3	<5.0	MG/KG	08/30/91	09/04/91	PV

Assaigai Analytical Labs
7300 Jefferson NE
Albuquerque, NM 87109

Attn: SYED RIZVI
Phone: (505)345-8964

ENRON/TRANSWESTERN PIPELINE
6381 N. MAIN STREET
P.O. BOX 1717
ROSWELL, NM 88202-1717
Attn: LARRY CAMPBELL
Invoice Number: 911790

Order #: 91-08-245
Date: 09/06/91 08:52
Work ID: STATION #9 7821
Date Received: 08/22/91
Date Completed: 09/06/91

****
* REFERENCE WO#: 91-07-299 *
****

SAMPLE IDENTIFICATION

Sample Number	Sample Description	Sample Number	Sample Description
01	OSBH1 18.9 - 19.1	02	OSBH1 34.3 - 34.5
03	OSBH2 9.9 - 10.1	04	OSBH2 22.5 - 22.6
05	OSBH2 31.1 - 31.3	06	OSBH2 41.8 - 42.0
07	OSBH2 55.2 - 55.4	08	OSBH2 69.0 - 69.2

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[redacted]

QUESTIONS ABOUT THIS REPORT SHOULD BE ADDRESSED TO:
LABORATORY OPERATIONS MANAGER/ASSAIGAI ANALYTICAL
7300 JEFFERSON N.E.,ALBUQUERQUE,N.M. 87109

Syed Rizvi

Certified By
SYED N. RIZVI

REGULAR TEST RESULTS BY TEST

TOTAL REC PET HYDROCARBONS Minimum: 5.0 Maximum: 100
Method: EPA 418.1

Sample	Sample Description	Result	Units	Extracted	Analyzed	By
01A	OSBH1 18.9 - 19.1	12	MG/KG	08/28/91	09/04/91	PV
02A	OSBH1 34.3 - 34.5	<5.0	MG/KG	08/28/91	09/04/91	PV
03A	OSBH2 9.9 - 10.1	<5.0	MG/KG	08/28/91	09/04/91	PV
04A	OSBH2 22.5 - 22.6	<5.0	MG/KG	08/28/91	09/04/91	PV
05A	OSBH2 31.1 - 31.3	68	MG/KG	08/28/91	09/04/91	PV
06A	OSBH2 41.8 - 42.0	24	MG/KG	08/28/91	09/04/91	PV
07A	OSBH2 55.2 - 55.4	16	MG/KG	08/30/91	09/05/91	PV
08A	OSBH2 69.0 - 69.2	16	MG/KG	08/30/91	09/05/91	PV

Assaigai Analytical Labs
7300 Jefferson NE
Albuquerque, NM 87109

Attn: SYED RIZVI
Phone: (505)345-8964

ENRON/TRANSWESTERN PIPELINE
6381 N. MAIN STREET
P.O. BOX 1717
ROSWELL, NM 88202-1717
Attn: LARRY CAMPBELL
Invoice Number: 911791

Order #: 91-08-247
Date: 09/06/91 09:01
Work ID: STATION 9 O.S. YARD 7885
Date Received: 08/22/91
Date Completed: 09/05/91

****
* REFERENCE WO#: 91-08-024 *
****

SAMPLE IDENTIFICATION

Sample Number	Sample Description	Sample Number	Sample Description
01	OSBH3 44.1-44.3	02	OSBH3 54.8-55.0
03	OSBH4 27.5-27.7	04	OSBH5 14.0-14.2
05	OSBH5 19.6-19.9	06	OSBH5 23.4-23.6
07	OSBH6 13.6-13.8	08	OSBH6 47.0-47.2
09	OSBH6 52.6-52.8	10	OSBH6 70.0-71.0
11	OSBH7 22.1-22.3		

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QUESTIONS ABOUT THIS REPORT SHOULD BE ADDRESSED TO:
LABORATORY OPERATIONS MANAGER/ASSAIGAI ANALYTICAL
7300 JEFFERSON N.E.,ALBUQUERQUE,N.M. 87109

Syed Rizvi

Certified By
SYED N. RIZVI

REGULAR TEST RESULTS BY TEST

TOTAL REC PET HYDROCARBONS Minimum: 5.0 Maximum: 100
Method: EPA 418.1

Sample	Sample Description	Result	Units	Extracted	Analyzed	By
01A	OSBH3 44.1-44.3	16	MG/KG	08/29/91	09/03/91	PV
02A	OSBH3 54.8-55.0	16	MG/KG	08/29/91	09/03/91	PV
03A	OSBH4 27.5-27.7	<5.0	MG/KG	08/29/91	09/03/91	PV
04A	OSBH5 14.0-14.2	<5.0	MG/KG	08/29/91	09/03/91	PV
05A	OSBH5 19.6-19.9	16	MG/KG	08/29/91	09/03/91	PV
06A	OSBH5 23.4-23.6	12	MG/KG	08/29/91	09/03/91	PV
07A	OSBH6 13.6-13.8	12	MG/KG	08/29/91	09/03/91	PV
08A	OSBH6 47.0-47.2	<5.0	MG/KG	08/29/91	09/03/91	PV
09A	OSBH6 52.6-52.8	<5.0	MG/KG	08/29/91	09/03/91	PV
10A	OSBH6 70.0-71.0	<5.0	MG/KG	08/29/91	09/03/91	PV
11A	OSBH7 22.1-22.3	<5.0	MG/KG	08/29/91	09/03/91	PV

Assaigai Analytical Labs
7300 Jefferson NE
Albuquerque, NM 87109

Attn: SYED RIZVI
Phone: (505)345-8964

ENRON/TRANSWESTERN PIPELINE
6381 N. MAIN STREET
P.O. BOX 1717
ROSWELL, NM 88202-1717
Attn: LARRY CAMPBELL
Invoice Number: 911792

Order #: 91-08-248
Date: 09/06/91 09:02
Work ID: STATION 9 O.S. YARD 7908
Date Received: 08/22/91
Date Completed: 09/05/91

****
* REFERENCE WO#: 91-08-048 *
****

SAMPLE IDENTIFICATION

Sample Number	Sample Description	Sample Number	Sample Description
01	OSBH7 33.5-33.7	02	OSBH7 37.0-37.2
03	OSHB8 4.6-4.9	04	OSBH8 33.9-34.1
05	OSBH8 49.7-49.9	06	OSBH9 4.5-4.9
07	OSBH9 32.0-32.5	08	OSBH9 47.5-49.7

[redacted]

QUESTIONS ABOUT THIS REPORT SHOULD BE ADDRESSED TO:
LABORATORY OPERATIONS MANAGER/ASSAIGAI ANALYTICAL
7300 JEFFERSON N.E.,ALBUQUERQUE,N.M. 87109

Syed Rizvi

Certified By
SYED N. RIZVI

Member: American Council of
Independent Laboratories, Inc.

REGULAR TEST RESULTS BY TEST

TOTAL REC PET HYDROCARBONS Minimum: 5.0 Maximum: 100
Method: EPA 418.1

Sample	Sample	Description	Result	Units	Extracted	Analyzed	By
01A	OSBH7	33.5-33.7	<5.0	MG/KG	08/28/91	09/04/91	PV
02A	OSBH7	37.0-37.2	12	MG/KG	08/28/91	09/04/91	PV
03A	OSHB8	4.6-4.9	12	MG/KG	08/28/91	09/04/91	PV
04A	OSBH8	33.9-34.1	<5.0	MG/KG	08/28/91	09/04/91	PV
05A	OSBH8	49.7-49.9	12	MG/KG	08/28/91	09/04/91	PV
06A	OSBH9	4.5-4.9	8.0	MG/KG	08/28/91	09/04/91	PV
07A	OSBH9	32.0-32.5	150	MG/KG	08/28/91	09/04/91	PV
08A	OSBH9	47.5-49.7	8.0	MG/KG	08/28/91	09/04/91	PV

[redacted]

Test Description	Result	Limit	Units	Analyzed	By
TOTAL REC PET HYDROCARBONS	8.0	5.0	MG/KG	11/19/91	PV

TEST METHODOLOGIES

BENZENE, TOLUENE, ETHYLBENZENE, XYLENES: USEPA METHOD # 602/8020

TOTAL RECOVERABLE PETROLEUM HYDROCARBONS(IN SOIL) = USEPA METHOD # 418.1

Metric Corporation
1991 Soil TRPH Analytical Results

TABLE 4

SUMMARY OF ANALYTICAL RESULTS FOR TOTAL RECOVERABLE PETROLEUM HYDROCARBON OCCURRENCE AT ROSWELL COMPRESSOR STATION

PARAMETER	SAMPLE NUMBER									
	Pit 1 2.8'-3.0'	Pit 1 9.2'-9.4'	Pit 1 13.5'-13.7'	Pit 1 18.8'-19.0'	Pit 1 26.8'-27.0'	Pit 1 30.6'-30.8'	Pit 1 41.6'-41.8'	Pit 1 43.5'-43.7'	Pit 2 001	Pit 2 002 (18.7'-18.9')
Total Recoverable Petroleum Hydrocarbons (mg/kg) Method 418.1	25,000	39,000	55,000	20,000	11,000	16	16	56	BDL	13,000

PARAMETER	SAMPLE NUMBER							
	Pit 2 26.0'-26.2'	Pit 2 29.1'-29.3'	Pit 2 39.8'-39.9'	Pit 2 44.1'-44.3'	Pit 2 57.5'-57.8'	Pit 2 69.9'-70.1'	Pit 3, BH-1 30.7'-30.9'	Pit 3, BH-2 25.0'-25.2'
Total Recoverable Petroleum Hydrocarbons (mg/kg) Method 418.1	170	BDL	2600	44	250	BDL	BDL	BDL

PARAMETER	SAMPLE NUMBER									
	SG 86 13.5'-13.7'	SG 86 18.7'-18.9'	SG 86 24.9'-25.1'	SG 86 35.0'-35.2'	SG 86 40.5'-40.7'	SG 91 28.6'-28.8'	SG 349 0.0'-1.8'	SG 349 2.9'-4.6'	SG 349 9.0'-10.0'	SG 349 14.0'-14.8'
Total Recoverable Petroleum Hydrocarbons (mg/kg) Method 418.1	18,000	5200	BDL	8.0	BDL	BDL	BDL	BDL	BDL	BDL

TABLE 4 (Continued)

SUMMARY OF ANALYTICAL RESULTS FOR
TOTAL RECOVERABLE PETROLEUM HYDROCARBON OCCURRENCE
AT ROSWELL COMPRESSOR STATION

PARAMETER	SAMPLE NUMBER								
	SG 349 20.3'-21.3'	SG 349 25.3'-26.3'	SG 349 29.7'-30.4'	SG 349 0.0'-2.5'	SG 360 4.0'-5.0'	SG 360 9.0'-9.9'	SG 360 14.0'-14.7'	SG 360 19.0'-20.0'	SG 360 24.0'-25.0'
Total Recoverable Petroleum Hydrocarbons (mg/kg) Method 418.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

PARAMETER	SAMPLE NUMBER								
	SG 360 29.0'-29.4'	SG 361 0.0'-2.5'	SG 361 4.0'-5.0'	SG 361 9.0'-10.0'	SG 361 16.0'-16.4'	SG 361 19.5'-19.8'	SG 361 24.0'-25.0'	SG 361 38.9'-39.3'	OS BH-1 18.9'-19.1'
Total Recoverable Petroleum Hydrocarbons (mg/kg) Method 418.1	2.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	12

PARAMETER	SAMPLE NUMBER							
	OS BH-1 34.3'-34.5'	OS BH-2 9.9'-10.1'	OS BH-2 22.5'-22.6'	OS BH-2 31.1'-31.3'	OS BH-2 41.8'-42.0'	OS BH-2 55.2'-55.4'	OS BH-2 69.0'-69.2'	OS BH-3 21.0'-21.2'
Total Recoverable Petroleum Hydrocarbons (mg/kg) Method 418.1	BDL	BDL	BDL	68	24	16	16	BDL

TABLE 4 (Continued)

SUMMARY OF ANALYTICAL RESULTS FOR
TOTAL RECOVERABLE PETROLEUM HYDROCARBON OCCURRENCE
AT ROSWELL COMPRESSOR STATION

PARAMETER	SAMPLE NUMBER							
	OS BH-3 44.1'-44.3'	OS BH-3 54.8'-55.0'	OS BH-4 27.5'-27.2'	OS BH-5 14.0'-14.2'	OS BH-5 19.6'-19.9'	OS BH-5 23.4'-23.6'	OS BH-6 13.6'-13.8'	OS BH-6 47.0'-47.2'
Total Recoverable Petroleum Hydrocarbons (mg/kg) Method 418.1	16	16	BDL	BDL	16	12	12	BDL

PARAMETER	SAMPLE NUMBER						
	OS BH-6 52.6'-52.8'	OS BH-6 70.0'-71.0'	OS BH-7 22.1'-22.3'	OS BH-7 33.5'-33.7'	OS BH-7 37.0'-37.2'	OS BH-8 4.6'-4.9'	OS BH-8 33.9'-34.1'
Total Recoverable Petroleum Hydrocarbons (mg/kg) Method 418.1	BDL	BDL	BDL	BDL	12	12	BDL

PARAMETER	SAMPLE NUMBER					
	OS BH-8 49.7'-49.9'	OS BH-9 4.5'-4.9'	OS BH-9 32.0'-32.5'	OS BH-9 47.5'-49.7'	BH-10 37.3'-37.6'	BH-11 36.3'-36.7'
Total Recoverable Petroleum Hydrocarbons (mg/kg) Method 418.1	12	8	150	8	BDL	8

BDL = below detection limit of 5.0 mg/kg.

Halliburton NUS
1992 Ground-Water Analytical Results

CHAIN OF CUSTODY

HALLIBURTON NUS
Environmental Corporation

GEMINI AVENUE, CLEAR LAKE CITY
STON, TEXAS 77058-2796
186-4810

REPORT TO		INVOICE TO	
COMPANY	TRANSWESTERN	COMPANY	
ADDRESS	6381 N. Main	ADDRESS	
CITY	Roswell STATE NM ZIP 88201	CITY STATE ZIP	
ATT. PHONE #		ATT. PHONE #	

☐ CHECK BOX IF INVOICE TO ADDRESS AND REPORT TO ADDRESS ARE SAME

P.O. # 6250DA

RELEASE #

PROJECT NAME/SITE NAME	CLIENT COMMENTS	HALLIBURTON NUS COMMENTS & SAMPLE #'S
Park Ten monitor well Resample	Attn. D. Meyers for analytical parameters	ty. J. Attieri

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REQUESTED ANALYSIS — BOTTLE TYPE

DATE	TIME	COMPOSITE	GRAB	SAMPLE SOURCE & DESCRIPTION	NUMBER CONTAINERS	VOCs (2 sets)	general SLCS (?)	metals	REMARKS
9/21/92	1405		X	monitor well "Hill"	8	X	X	X	ICE applied to Samples
									Yes no JA

RELINQUISHED BY: (SIGN) [signature] 9-21-92 DATE/TIME 1530 RECEIVED BY: (SIGN) [signature]

APPENDIX E

ANALYTICAL LABORATORY REPORTS

HALLIBURTON NUS
Environmental Corporation
Environmental Laboratories

5350 Campbells Run Road
Pittsburgh, PA 15205

900 Gemini Avenue
Houston, TX 77058

October 01, 1992
Report No.: 00020808
Section A Page 1

LABORATORY ANALYSIS REPORT

CLIENT NAME: ENRON GAS PIPELINE/TRANSWESTERN
ADDRESS: P.O. BOX 1717
ROSWELL, NM 88201-
ATTENTION: LARRY CAMPBELL

NUS CLIENT NO: 0065 0044
WORK ORDER NO: 55880
VENDOR NO:

SAMPLE ID: STATION 9 - PIT
NUS SAMPLE NO: H0219130
P.O. NO.: E51201

DATE SAMPLED: 21-SEP-92
DATE RECEIVED: 22-SEP-92
APPROVED BY: L Beyer

LN	TEST CODE	DETERMINATION	RESULT	UNIT
1	OSVIXW	APPENDIX IX SEMIVOLATILES IN WATER		
		1,2,4-Trichlorobenzene	< 33	ug/L
		1,2-Dichlorobenzene	< 33	ug/L
		1,3-Dichlorobenzene	< 33	ug/L
		1,4-Dichlorobenzene	< 33	ug/L
		2,4,5-Trichlorophenol	< 66	ug/L
		2,4,6-Trichlorophenol	< 33	ug/L
		2,4-Dichlorophenol	< 33	ug/L
		2,4-Dimethylphenol	< 33	ug/L
		2,4-Dinitrophenol	< 160	ug/L
		2,4-Dinitrotoluene	< 33	ug/L
		2,6-Dinitrotoluene	< 33	ug/L
		2-Chloronaphthalene	< 33	ug/L
		2-Chlorophenol	< 33	ug/L
		2-Methylnaphthalene	51	ug/L
		2-Methylphenol (o-Cresol)	< 33	ug/L
		2-Nitroaniline	< 160	ug/L
		2-Nitrophenol	< 33	ug/L
		3,3'-Dichlorobenzidine	< 66	ug/L
		3-Methylphenol	< 33	ug/L
		3-Nitroaniline	< 160	ug/L
		4,6-Dinitro-2-methylphenol	< 160	ug/L
		4-Bromophenyl phenyl ether	< 33	ug/L
		4-Chloro-3-methylphenol	< 33	ug/L
		4-Chloroaniline	< 33	ug/L
		4-Chlorophenyl phenyl ether	< 33	ug/L
		4-Methylphenol	250	ug/L
		4-Nitroaniline	< 160	ug/L
		4-Nitrophenol	< 160	ug/L
		Acenaphthene	< 33	ug/L
		Acenaphthylene	< 33	ug/L

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Section A Page 2

LABORATORY ANALYSIS REPORT

CLIENT NAME: ENRON GAS PIPELINE/TRANSWESTERN
SAMPLE ID: STATION 9 - PIT
NUS SAMPLE NO: H0219130

LN	TEST CODE	DETERMINATION	RESULT	UNITS
		Acetophenone	< 33	ug/L
		Aniline	< 33	ug/L
		Anthracene	< 33	ug/L
		Benzidine	< 160	ug/L
		Benzo(a)anthracene	< 33	ug/L
		Benzo(a)pyrene	< 33	ug/L
		Benzo(b)fluoranthene	< 33	ug/L
		Benzo(ghi)perylene	< 33	ug/L
		Benzo(k)fluoranthene	< 33	ug/L
		Benzoic Acid	< 160	ug/L
		Benzyl alcohol	< 33	ug/L
		Benzyl butyl phthalate	< 33	ug/L
		Bis(2-Chloroethoxy)methane	< 33	ug/L
		Bis(2-Chloroethyl)ether	< 33	ug/L
		Bis(2-Chloroisopropyl)ether	< 33	ug/L
		Bis(2-Ethylhexyl)phthalate	< 33	ug/L
		Chrysene	< 33	ug/L
		Di-n-buthyl phthalate	< 33	ug/L
		Di-n-octyl phthalate	< 33	ug/L
		Dibenzofuran	< 33	ug/L
		Diethyl phthalate	< 33	ug/L
		Dimethyl phthalate	< 33	ug/L
		Fluoranthene	< 33	ug/L
		Fluorene	< 33	ug/L
		Hexachlorobenzene	< 33	ug/L
		Hexachlorobutadiene	< 33	ug/L
		Hexachlorocyclopentadiene	< 33	ug/L
		Hexachloroethane	< 33	ug/L
		Indeno(1,2,3-cd)pyrene	< 33	ug/L
		Isophorone	< 33	ug/L
		N-Nitrosodimethylamine	< 33	ug/L
		N-Nitrosodiphenylamine	< 33	ug/L
		Naphthalene	34	ug/L
		Nitrobenzene	< 33	ug/L
		Pentachlorophenol	< 160	ug/L
		Phenanthrene	< 33	ug/L
		Phenol	< 33	ug/L
		Pyrene	< 33	ug/L
		Pyridine	< 66	ug/L

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LABORATORY ANALYSIS REPORT

CLIENT NAME: ENRON GAS PIPELINE/TRANSWESTERN
SAMPLE ID: STATION 9 - PIT
NUS SAMPLE NO: H0219130

LN	TEST CODE	DETERMINATION	RESULT	UNITS
		n-Nitroso-di-n-propylamine	< 33	ug/L
3	OVIXW	APPENDIX IX VOLATILES IN WATER		
		1,1,1-Trichloroethane	180	ug/L
		1,1,2,2-Tetrachloroethane	< 30	ug/L
		1,1,2-Trichloroethane	< 30	ug/L
		1,1-Dichloroethane	580	ug/L
		1,1-Dichloroethene	< 30	ug/L
		1,2,3-Trichloropropane	< 30	ug/L
		1,2-Dichloroethane	< 30	ug/L
		1,2-Dichloropropane	< 30	ug/L
		1,4-Dichloro-2-butene	< 60	ug/L
		2-Butanone (MEK)	220	ug/L
		2-Chloroethylvinyl Ether	< 60	ug/L
		2-Hexanone	< 60	ug/L
		4-Methyl-2-Pentanone (MIBK)	< 60	ug/L
		Acetone	< 60	ug/L
		Acrolein	< 600	ug/L
		Acrylonitrile	< 600	ug/L
		Benzene	370	ug/L
		Bromodichloromethane	< 30	ug/L
		Bromoform	< 30	ug/L
		Bromomethane	< 60	ug/L
		Carbon disulfide	< 30	ug/L
		Carbon tetrachloride	< 30	ug/L
		Chlorobenzene	< 30	ug/L
		Chlorodibromomethane	< 30	ug/L
		Chloroethane	< 60	ug/L
		Chloroform	< 30	ug/L
		Chloromethane	< 60	ug/L
		Dibromomethane	< 30	ug/L
		Dichlorodifluoromethane	< 120	ug/L
		Ethanol	*	ug/L
		Ethyl methacrylate	< 60	ug/L
		Ethylbenzene	110	ug/L
		Iodomethane (Methyl iodide)	< 60	ug/L
		Methylene chloride	< 30	ug/L
		P/M Xylene	820	ug/L
		Styrene	< 30	ug/L
		Tetrachloroethene	< 30	ug/L

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LABORATORY ANALYSIS REPORT

CLIENT NAME: ENRON GAS PIPELINE/TRANSWESTERN
SAMPLE ID: STATION 9 - PIT
NUS SAMPLE NO: H0219130

LN	TEST CODE	DETERMINATION	RESULT	UNITS
		Toluene	61	ug/L
		Trichloroethene	< 30	ug/L
		Trichlorofluoromethane	< 30	ug/L
		Vinyl acetate	< 60	ug/L
		Vinyl chloride	< 60	ug/L
		cis-1,2-Dichloroethene	< 30	ug/L
		cis-1,3-Dichloropropene	< 30	ug/L
		o-Xylene	120	ug/L
		trans-1,2-Dichloroethene	< 30	ug/L
		trans-1,3-Dichloropropene	< 30	ug/L
5	AASW	Arsenic, Total (As)	0.19	mg/L
6	ABAW	Barium, Total (Ba)	4.4	mg/L
7	ACDW	Cadmium, Total (Cd)	< 0.005	mg/L
8	ACRW	Chromium, Total (Cr)	0.01	mg/L
9	AHGW	Mercury, Total (Hg)	< 0.0002	mg/L
10	AAGW	Silver, Total (Ag)	< 0.01	mg/L
11	APBW	Lead, Total (Pb)	< 0.05	mg/L
12	ASEW	Selenium, Total (Se)	< 0.003	mg/L
13	I685	Petroleum Hydrocarbons	37	mg/L

COMMENTS: * This analyte was not detected by a computerized search of the chromatogram.

CLIENT DUPLICATE

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October 01, 1992
Report No.: 00020808
Section 8 Page 1

QUALITY CONTROL REPORT
SUPPLEMENTAL INFORMATION

.N	TEST CODE	PREP BATCH	SAMPLE PREPARATION LR-METHOD	DATE/TIME	ANALYST	SAMPLE ANALYSIS LR-METHOD	DATE/TIME	ANALYST	ANLS BATCH	INSTRUMENT
:AMPLE ID:	STATION 9 - PIT					NUS SAMPLE NO:	H0219130			
	OSVIXW	26261	19-3520	23-SEP-92 0400	RDQ	19-8270	25-SEP-92 1205	GMW	26145	GCMST
	OVIXW	26366	NA			19-8240	25-SEP-92 1615	GBF	26278	GCMS9
	AASW	26313	19-7060	23-SEP-92 0930	TM	19-7060	24-SEP-92 2224	CMG		405MET
	ABAW	26312	19-3010			19-6010	24-SEP-92 1215	JSP		400MET
	ACDW	26312	19-3010	23-SEP-92 0900	TM	19-7130	24-SEP-92 1942	PBA		300MET
	ACRW	26312	19-3010			19-6010	24-SEP-92 1405	JSP		400MET
	AHGW	26333	NA			19-7470	24-SEP-92 1000	RAS		124WAT
0	AAGW	26313	19-7060			19-7760	26-SEP-92 1004	CMG		300MET
1	APBW	26312	19-3010			19-6010	24-SEP-92 1405	JSP		400MET
2	ASEW	26313	19-7740			19-7740	24-SEP-92 1837	CMG		305MET
3	I685	26286	02-418.1			02-418.1	22-SEP-92 1159	LJH		302WAT

R Method Literature Reference
2 EPA-Methods for Chemical Analysis of Water & Wastes, 1984.
9 EPA-Test Methods for Evaluating Solid Waste, 3rd ed, Nov. 1986

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October 01, 1992
Report No.: 00020808
Section C Page 1

QUALITY CONTROL REPORT
SURROGATE STANDARD RECOVERY

LN	TEST CODE	SURROGATE COMPOUND	PERCENT RECOVERY	ACCEPTANCE LIMITS	REF LN
SAMPLE ID:	STATION 9 - PIT		NUS SAMPLE NO: H0219130		
2	$BNAW	GC/MS BNA SURROGATES			1
		2,4,6-Tribromophenol	83	-	
		2-Fluorobiphenyl	87	-	
		2-Fluorophenol	28	-	
		Nitrobenzene-d5	53	-	
		Phenol-d5	28	-	
		p-Terphenyl-d14	53	-	
4	$VOAW	GC/MS VOLATILES SURROGATES			3
		1,2-Dichloroethane-d4	102	-	
		4-Bromofluorobenzene	109	-	
		Toluene-d8	98	-	

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Section D Page 1

QUALITY CONTROL REPORT
LABORATORY CONTROL SAMPLE RECOVERY

TEST CODE	DETERMINATION	PERCENT RECOVERY	ACCEPTANCE LIMITS
BATCH: 26286	SAMPLE ID: Lab Control Sample	NUS SAMPLE NO:	H0219864
I685	Petroleum Hydrocarbons	94.0	-
I685	Petroleum Hydrocarbons	94.0	-
BATCH: 26312	SAMPLE ID: Lab Control Sample	NUS SAMPLE NO:	H0219893
ABAW	Barium, Total (Ba)	90.0	-
ACDW	Cadmium, Total (Cd)	106.0	-
ACRW	Chromium, Total (Cr)	95.0	-
APBW	Lead, Total (Pb)	96.0	-
BATCH: 26313	SAMPLE ID: Lab Control Sample	NUS SAMPLE NO:	H0219895
AAGW	Silver, Total (Ag)	105.0	-
AASW	Arsenic, Total (As)	115.0	-
ASEW	Selenium, Total (Se)	110.0	-
BATCH: 26333	SAMPLE ID: Lab Control Sample	NUS SAMPLE NO:	H0219924
AHGW	Mercury, Total (Hg)	95.0	-

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October 01, 1992
Report No.: 00020808

QUALITY CONTROL REPORT
METHOD BLANK DATA

BATCH: 26281 SAMPLE ID: Method Blank NUS SAMPLE NO: H0219838

TEST CODE	Determination	RESULT	UNITS
OSVIXW	APPENDIX IX SEMIVOLATILES IN WATER		
	Di-n-buthyl phthalate	< 10	ug/L
	Di-n-octyl phthalate	< 10	ug/L
	Dibenzofuran	< 10	ug/L
	Diethyl phthalate	< 10	ug/L
	Dimethyl phthalate	< 10	ug/L
	Fluoranthene	< 10	ug/L
	Fluorene	< 10	ug/L
	Hexachlorobenzene	< 10	ug/L
	Hexachlorobutadiene	< 10	ug/L
	Hexachlorocyclopentadiene	< 10	ug/L
	Hexachloroethane	< 10	ug/L
	Indeno(1,2,3-cd)pyrene	< 10	ug/L
	1,2,4-Trichlorobenzene	< 10	ug/L
	1,2-Dichlorobenzene	< 10	ug/L
	1,3-Dichlorobenzene	< 10	ug/L
	1,4-Dichlorobenzene	< 10	ug/L
	2,4,5-Trichlorophenol	< 50	ug/L
	2,4,6-Trichlorophenol	< 10	ug/L
	2,4-Dichlorophenol	< 10	ug/L
	2,4-Dimethylphenol	< 10	ug/L
	2,4-Dinitrophenol	< 50	ug/L
	2,4-Dinitrotoluene	< 10	ug/L
	2,6-Dinitrotoluene	< 10	ug/L
	2-Chloronaphthalene	< 10	ug/L
	2-Chlorophenol	< 10	ug/L
	2-Methylnaphthalene	< 10	ug/L
	2-Methylphenol (o-Cresol)	< 10	ug/L
	2-Nitroaniline	< 50	ug/L
	2-Nitrophenol	< 10	ug/L
	4-Methylphenol	< 10	ug/L
	3,3'-Dichlorobenzidine	< 20	ug/L
	3-Nitroaniline	< 50	ug/L
	4,6-Dinitro-2-methylphenol	< 50	ug/L
	4-Bromophenyl phenyl ether	< 10	ug/L
	4-Chloro-3-methylphenol	< 10	ug/L
	Isophorone	< 10	ug/L
	N-Nitrosodimethylamine	< 10	ug/L
	N-Nitrosodiphenylamine	< 10	ug/L
	Naphthalene	< 10	ug/L

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Section E Page 2

QUALITY CONTROL REPORT
METHOD BLANK DATA

TEST CODE	Determination	RESULT	UNITS
	Nitrobenzene	< 10	ug/L
	Pentachlorophenol	< 50	ug/L
	Phenanthrene	< 10	ug/L
	Phenol	< 10	ug/L
	Pyrene	< 10	ug/L
	Pyridine	< 20	ug/L
	n-Nitroso-di-n-propylamine	< 10	ug/L
	3-Methylphenol	< 10	ug/L
	4-Chloroaniline	< 10	ug/L
	4-Chlorophenyl phenyl ether	< 10	ug/L
	4-Nitroaniline	< 50	ug/L
	4-Nitrophenol	< 50	ug/L
	Acenaphthene	< 10	ug/L
	Acenaphthylene	< 10	ug/L
	Acetophenone	< 10	ug/L
	Aniline	< 10	ug/L
	Anthracene	< 10	ug/L
	Benzidine	< 50	ug/L
	Benzo(a)anthracene	< 10	ug/L
	Benzo(a)pyrene	< 10	ug/L
	Benzo(b)fluoranthene	< 10	ug/L
	Benzo(ghi)perylene	< 10	ug/L
	Benzo(k)fluoranthene	< 10	ug/L
	Benzoic Acid	< 50	ug/L
	Benzyl alcohol	< 10	ug/L
	Benzyl butyl phthalate	< 10	ug/L
	Bis(2-Chloroethoxy)methane	< 10	ug/L
	Bis(2-Chloroethyl)ether	< 10	ug/L
	Bis(2-Chloroisopropyl)ether	< 10	ug/L
	Bis(2-Ethylhexyl)phthalate	< 10	ug/L
	Chrysene	< 10	ug/L

BATCH: 26288 SAMPLE ID: Method Blank NUS SAMPLE NO: H0219865

TEST CODE	Determination	RESULT	UNITS
I685	Petroleum Hydrocarbons	< 0.2	mg/L
I685	Petroleum Hydrocarbons	< 0.2	mg/L

BATCH: 26312 SAMPLE ID: Method Blank NUS SAMPLE NO: H0219894

TEST CODE	Determination	RESULT	UNITS
ABAW	Barium, Total (Ba)	< 0.1	mg/L
ACDW	Cadmium, Total (Cd)	< 0.005	mg/L
ACRW	Chromium, Total (Cr)	< 0.01	mg/L
APBW	Lead, Total (Pb)	< 0.05	mg/L

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Report No.: 00020808
Section E Page 3

QUALITY CONTROL REPORT
METHOD BLANK DATA

TEST CODE	Determination	RESULT	UNITS
BATCH: 28313	SAMPLE ID: Method Blank	NUS SAMPLE NO:	H0219896
AAGW	Silver, Total (Ag)	< 0.01	mg/L
AASW	Arsenic, Total (As)	< 0.003	mg/L
ASEW	Selenium, Total (Se)	< 0.003	mg/L
BATCH: 28388	SAMPLE ID: Method Blank	NUS SAMPLE NO:	H0219963
OVIXW	APPENDIX IX VOLATILES IN WATER		
	1,1,1-Trichloroethane	< 5	ug/L
	1,1,2,2-Tetrachloroethane	< 5	ug/L
	1,1,2-Trichloroethane	< 5	ug/L
	1,1-Dichloroethane	< 5	ug/L
	1,1-Dichloroethene	< 5	ug/L
	1,2,3-Trichloropropane	< 5	ug/L
	1,2-Dichloroethane	< 5	ug/L
	1,2-Dichloropropane	< 5	ug/L
	1,4-Dichloro-2-butene	< 10	ug/L
	2-Butanone (MEK)	< 10	ug/L
	2-Chloroethylvinyl Ether	< 10	ug/L
	2-Hexanone	< 10	ug/L
	4-Methyl-2-Pentanone (MIBK)	< 10	ug/L
	Acetone	< 10	ug/L
	Acrolein	< 100	ug/L
	Acrylonitrile	< 100	ug/L
	Benzene	< 5	ug/L
	Bromodichloromethane	< 5	ug/L
	Bromoform	< 5	ug/L
	Bromomethane	< 10	ug/L
	Carbon disulfide	< 5	ug/L
	Carbon tetrachloride	< 5	ug/L
	Chlorobenzene	< 5	ug/L
	Chlorodibromomethane	< 5	ug/L
	Chloroethane	< 10	ug/L
	Chloroform	< 5	ug/L
	Chloromethane	< 10	ug/L
	Dibromomethane	< 5	ug/L
	Dichlorodifluoromethane	< 20	ug/L
	Ethanol	*	ug/L
	Ethyl methacrylate	< 10	ug/L
	Ethylbenzene	< 5	ug/L
	Iodomethane (Methyl iodide)	< 10	ug/L

CLIENT DUPLICA

HALLIBURTON NUS
Environmental Corporation
Environmental Laboratories

5350 Campbells Run Road
Pittsburgh, PA 15205

900 Gemini Avenue
Houston, TX 77058

October 01, 1992
Report No.: 00020808
Section E Page 4

QUALITY CONTROL REPORT
METHOD BLANK DATA

TEST CODE	Determination	RESULT	UNITS
	Methylene chloride	< 5	ug/L
	P/M Xylene	< 5	ug/L
	Styrene	< 5	ug/L
	Tetrachloroethene	< 5	ug/L
	Toluene	< 5	ug/L
	Trichloroethene	< 5	ug/L
	Trichlorofluoromethane	< 5	ug/L
	Vinyl acetate	< 10	ug/L
	Vinyl chloride	< 10	ug/L
	cis-1,2-Dichloroethene	< 5	ug/L
	cis-1,3-Dichloropropene	< 5	ug/L
	o-Xylene	< 5	ug/L
	trans-1,2-Dichloroethene	< 5	ug/L
	trans-1,3-Dichloropropene	< 5	ug/L

* This analyte was not detected by a computerized search of the chromatogram.

CLIENT DUPLICAT

HALLIBURTON NUS
Environmental Corporation
Environmental Laboratories

5350 Campbells Run Road
Pittsburgh, PA 15205

900 Gemini Avenue
Houston, TX 77058

October 01, 1992
Report No.: 00020808
Section F Page 1

QUALITY CONTROL REPORT
DUPLICATE AND MATRIX SPIKE DATA

BATCH: 28313 NUS SAMPLE NO: H0219130

TEST	DETERMINATION	ORIGINAL RESULT	DUPLICATE RESULT	UNITS	RANGE / RPD	UNITS	MS RESULT	MS % RCVRY
AASW	Arsenic, Total (As)	0.19	0.20	mg/L	5.1	mg/L	0.20	— *

* The concentration of the analyte prevented accurate determination of the matrix spike recovery.

TEST	DETERMINATION	ORIGINAL RESULT	DUPLICATE RESULT	UNITS	RANGE / RPD	UNITS	MS RESULT	MS % RCVRY
AAGW	Silver, Total (Ag)	< 0.01	< 0.01	mg/L	—	mg/L	0.04	20.C

* Recovery of the spike indicates the presence of a matrix interference. This should be considered in evaluating the data.

TEST	DETERMINATION	ORIGINAL RESULT	DUPLICATE RESULT	UNITS	RANGE / RPD	UNITS	MS RESULT	MS % RCVRY
ASEW	Selenium, Total (Se)	< 0.003	< 0.003	mg/L	—	mg/L	< 0.003*	—

* Recovery of the spike indicates the presence of a matrix interference. This should be considered in evaluating the data.

BATCH: 28312 NUS SAMPLE NO: H0219127

TEST	DETERMINATION	ORIGINAL RESULT	DUPLICATE RESULT	UNITS	RANGE / RPD	UNITS	MS RESULT	MS % RCVRY
ABAW	Barium, Total (Ba)	< 0.1	< 0.1	mg/L	—	mg/L	1.9	95.0
ACDW	Cadmium, Total (Cd)	< 0.005	< 0.005	mg/L	—	mg/L	0.027 *	54.0

* Recovery of the spike indicates the presence of a matrix interference. This should be considered in evaluating the data.

TEST	DETERMINATION	ORIGINAL RESULT	DUPLICATE RESULT	UNITS	RANGE / RPD	UNITS	MS RESULT	MS % RCVRY
ACRW	Chromium, Total (Cr)	0.01	0.01	mg/L	0.0	mg/L	0.20	95.0
APBW	Lead, Total (Pb)	< 0.05	< 0.05	mg/L	—	mg/L	0.48	96.0

BATCH: 28333 NUS SAMPLE NO: H0219127

TEST	DETERMINATION	ORIGINAL RESULT	DUPLICATE RESULT	UNITS	RANGE / RPD	UNITS	MS RESULT	MS % RCVRY
AHGW	Mercury, Total (Hg)	< 0.0002	< 0.0002	mg/L	—	mg/L	0.0037	92.5

Brown & Root Environmental
1993 Ground-Water Analytical Results

TABLE 3-1

TOTAL PETROLEUM HYDROCARBONS
SOIL ANALYTICAL DATA IN mg/kg
TRANSWESTERN COMPRESSOR STATION NO. 9
ROSWELL, NEW MEXICO

BORING NO.	DEPTH (FT)	TPH
SB-5	19-21	< 20
SB-5	64-66	< 20
SB-1C	25-26	< 20

REPORT OF LABORATORY ANALYSIS

pace INCORPORATED
THE ASSURANCE OF QUALITY

January 03, 1995
Report No.: 00037170
Section A Page 1

LABORATORY ANALYSIS REPORT

CLIENT NAME: TRANSWESTERN PIPELINE COMPANY
ADDRESS: P.O. BOX 1717
ROSWELL, NM 88202-1717
ATTENTION: LARRY CAMPBELL

LIMS CLIENT: 0734 0050
PACE PROJECT:
PACE CLIENT: 620562
P.O. NO: VERBAL

SAMPLE ID: GROUNDWATER MW-2, STATION 9
SAMPLE NO: H254783

DATE SAMPLED: 09-OCT-93
DATE RECEIVED: 15-OCT-93

LN	TEST CODE	DETERMINATION	RESULT	UNITS
1	OVTCW	TCL - Volatiles in Water		
		1,1,1-Trichloroethane	< 300	ug/L
		1,1,2,2-Tetrachloroethane	< 300	ug/L
		1,1,2-Trichloroethane	< 300	ug/L
		1,1-Dichloroethane	< 300	ug/L
		1,1-Dichloroethene	< 300	ug/L
		1,2-Dichloroethane	< 300	ug/L
		1,2-Dichloroethene (total)	< 300	ug/L
		1,2-Dichloropropane	< 300	ug/L
		2-Butanone	< 600	ug/L
		2-Hexanone	< 600	ug/L
		4-Methyl-2-pentanone	< 600	ug/L
		Acetone	< 600	ug/L
		Benzene	6,500	ug/L
		Bromodichloromethane	< 300	ug/L
		Bromoform	< 300	ug/L
		Bromomethane	< 600	ug/L
		Carbon disulfide	< 300	ug/L
		Carbon tetrachloride	< 300	ug/L
		Chlorobenzene	< 300	ug/L
		Chloroethane	< 600	ug/L
		Chloroform	< 300	ug/L
		Chloromethane	< 600	ug/L
		Dibromochloromethane	< 300	ug/L
		Ethylbenzene	2,100	ug/L
		Methylene chloride	< 300	ug/L
		Styrene	< 300	ug/L
		Tetrachloroethene	< 300	ug/L
		Toluene	15,000	ug/L
		Trichloroethene	< 300	ug/L
		Vinyl acetate	< 600	ug/L
		Vinyl chloride	< 600	ug/L
		Xylene(total)	13,000	ug/L
		cis-1,3-Dichloropropene	< 300	ug/L
		trans-1,3-Dichloropropene	< 300	ug/L

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FAX: 713-488-4661

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REPORT OF LABORATORY ANALYSIS

January 03, 1995
Report No.: 00037170
Section B Page 1

SUPPLEMENTAL INFORMATION

LN	TEST CODE	LCSR BLNK BATCH	DUP/MS MS/MSD BATCH	SAMPLE PREPARATION LR-METHOD	SAMPLE PREPARATION DATE/TIME	SAMPLE PREPARATION ANALYST	SAMPLE ANALYSIS LR-METHOD	SAMPLE ANALYSIS DATE/TIME	SAMPLE ANALYSIS ANALYST	INSTRUMENT
SAMPLE ID: GROUNDWATER MW-2, STATION 9								SAMPLE NO: H254783		
1	OVTCW	34916	34915	NA			05-624	21-OCT-93 1939	JBP	GCMSR

LR Method Literature Reference

05 EPA-40 CFR 136, October 26, 1984.

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REPORT OF LABORATORY ANALYSIS

January 03, 1995
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Section C Page 1

SURROGATE STANDARD RECOVERY

LN	TEST CODE	SURROGATE COMPOUND	PERCENT RECOVERY	ACCEPTANCE LIMITS	REF LN

SAMPLE ID: GROUNDWATER MW-2, STATION 9 SAMPLE NO: H254783

LN	TEST CODE	SURROGATE COMPOUND	PERCENT RECOVERY	ACCEPTANCE LIMITS	REF LN
2	$VOAW	GC/MS Volatiles Surrogates			1
		1,2-Dichloroethane-d4	92	-	
		4-Bromofluorobenzene	98	-	
		Toluene-d8	95	-	

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REPORT OF LABORATORY ANALYSIS

January 03, 1995
Report No.: 00037170
Section D Page 1

LABORATORY CONTROL SAMPLE RECOVERY

TEST CODE	DETERMINATION	LCS % RECOVERY	ACCEPTANCE LIMITS
BATCH NO: 34916			SAMPLE NO: H256681
OVTCW	TCL - Volatiles in Water		
	1,1-Dichloroethene	104	-
	Benzene	118	-
	Chlorobenzene	121	-
	Toluene	108	-
	Trichloroethene	115	-

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REPORT OF LABORATORY ANALYSIS

January 03, 1995
Report No.: 00037170
Section E Page 1

METHOD BLANK DATA

TEST CODE	DETERMINATION	RESULT	UNIT
BATCH NO: 34916		SAMPLE NO:	H256682
OVTCW	TCL - Volatiles in Water		
	1,1,1-Trichloroethane	< 5	ug/L
	1,1,2,2-Tetrachloroethane	< 5	ug/L
	1,1,2-Trichloroethane	< 5	ug/L
	1,1-Dichloroethane	< 5	ug/L
	1,1-Dichloroethene	< 5	ug/L
	1,2-Dichloroethane	< 5	ug/L
	1,2-Dichloroethene (total)	< 5	ug/L
	1,2-Dichloropropane	< 5	ug/L
	2-Butanone	< 10	ug/L
	2-Hexanone	< 10	ug/L
	4-Methyl-2-pentanone	< 10	ug/L
	Acetone	< 10	ug/L
	Benzene	< 5	ug/L
	Bromodichloromethane	< 5	ug/L
	Bromoform	< 5	ug/L
	Bromomethane	< 10	ug/L
	Carbon disulfide	< 5	ug/L
	Carbon tetrachloride	< 5	ug/L
	Chlorobenzene	< 5	ug/L
	Chloroethane	< 10	ug/L
	Chloroform	< 5	ug/L
	Chloromethane	< 10	ug/L
	Dibromochloromethane	< 5	ug/L
	Ethylbenzene	< 5	ug/L
	Methylene chloride	< 5	ug/L
	Styrene	< 5	ug/L
	Tetrachloroethene	< 5	ug/L
	Toluene	< 5	ug/L
	Trichloroethene	< 5	ug/L
	Vinyl acetate	< 10	ug/L
	Vinyl chloride	< 10	ug/L
	Xylene(total)	< 5	ug/L
	cis-1,3-Dichloropropene	< 5	ug/L
	trans-1,3-Dichloropropene	< 5	ug/L

REPORT OF LABORATORY ANALYSIS

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January 03, 1995
Report No.: 00037170

MATRIX SPIKE AND MATRIX SPIKE DUPLICATE DATA

TEST CODE	DETERMINATION	MS RESULT	MSD RESULT	UNITS	RPD	MS PCT RCVRY	MSD PCT RCVRY
BATCH NO: 34915						SAMPLE NO: H254552	
OVPPW	Volatiles in Water						
	1,1-Dichloroethene	49.6	52.4	ug/L	5.45	99	105
	Benzene	48.5	49.7	ug/L	2.56	97	99
	Chlorobenzene	47.5	52.8	ug/L	10.5	95	106
	Toluene	46.0	49.7	ug/L	7.58	92	99
	Trichloroethene	48.3	49.5	ug/L	2.46	97	99

900 Gemini Avenue
Houston, TX 77058
TEL: 713-488-1810
FAX: 713-488-4661

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contact Susanne Richard for
Billing address (713)-759-0999 (work)

128100

CHAIN-OF-CUSTODY RECORD
Analytical Request

Client: Transwestern - Station 9
Address:
Phone:

Report To: Susanne Richard Brown & Caldwell
Bill To: Transwestern
P.O. # / Billing Reference:
Project Name / No.: Station 9

Pace Client No.:
Pace Project Manager:
Pace Project No.:
*Requested Due Date:

Sampled By (PRINT): Susanne Richard 10/9/93
Sampler Signature: for S. Richard by Alan J. Fen
Date Sampled:

ITEM NO.	SAMPLE DESCRIPTION	TIME	MATRIX	PACE NO.	NO. OF CONTAINERS	PRESERVATIVES: UNPRESERVED	H_2SO_4	HNO_3	VOA	HCL		ANALYSES REQUEST: VOA 8240	Semi 8270	REMARKS
1	Groundwater	1200	wtr	1 pt.	2	0				X		X		
2	Ground water	1200	wtr	VOA	1	0	X						X	Semi 8270 cannot run w/ preservative per Susanne Fen Diane Meyer 10-15-93
3														
4														
5														
6														
7														
8														

COOLER NOS.	BAILERS	SHIPMENT METHOD OUT / DATE	RETURNED / DATE

ITEM NUMBER	RELINQUISHED BY / AFFILIATION	ACCEPTED BY / AFFILIATION	DATE	TIME
	Alan J. Fen	R. Knight / Pace	10/15/93	9:30
		#4254783		

Additional Comments

ORIGINAL

SEE REVERSE SIDE FOR INSTRUCTIONS

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REPORT OF LABORATORY ANALYSIS

May 12, 1993
Report No.: 00024452
Section A Page 1

LABORATORY ANALYSIS REPORT

CLIENT NAME: TRANSWESTERN PIPELINE COMPANY
ADDRESS: P.O. BOX 1717
ROSWELL, NM 88202-1717
ATTENTION: LARRY CAMPBELL

LSG CLIENT NO: 0734 0002
PACE PROJECT: H07340002
PACE CLIENT: 620562

SAMPLE ID: MW-3
LSG SAMPLE NO: H0235758
P.O. NO.: VERBAL

DATE SAMPLED: 30-APR-93
DATE RECEIVED: 03-MAY-93
APPROVED BY: L Beyer

LN	TEST CODE	DETERMINATION	RESULT	UNIT
1	OVPPW	Volatiles in Water		
		1,1,1-Trichloroethane	< 5	ug/L
		1,1,2,2-Tetrachloroethane	< 5	ug/L
		1,1,2-Trichloroethane	< 5	ug/L
		1,1-Dichloroethane	< 5	ug/L
		1,1-Dichloroethene	< 5	ug/L
		1,2-Dichloroethane	< 5	ug/L
		1,2-Dichloroethene (total)	< 5	ug/L
		1,2-Dichloropropane	< 5	ug/L
		2-Chloroethylvinylether	< 10	ug/L
		Acrolein	< 100	ug/L
		Acrylonitrile	< 100	ug/L
		Benzene	< 5	ug/L
		Bromoform	< 5	ug/L
		Bromomethane	< 10	ug/L
		Carbon tetrachloride	< 5	ug/L
		Chlorobenzene	< 5	ug/L
		Chlorodibromomethane	< 5	ug/L
		Chloroethane	< 10	ug/L
		Chloroform	< 5	ug/L
		Chloromethane	< 10	ug/L
		Dichlorobromomethane	< 5	ug/L
		Ethylbenzene	< 5	ug/L
		Methylene chloride	< 5	ug/L
		Tetrachloroethene	< 5	ug/L
		Toluene	< 5	ug/L
		Trichloroethene	< 5	ug/L
		Vinyl chloride	< 10	ug/L
		cis-1,3-Dichloropropene	< 5	ug/L
		trans-1,3-Dichloropropene	< 5	ug/L

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REPORT OF LABORATORY ANALYSIS

May 12, 1993
Report No.: 00024452
Section A Page 2

LABORATORY ANALYSIS REPORT

CLIENT NAME: TRANSWESTERN PIPELINE COMPANY
SAMPLE ID: MW-3
LSG SAMPLE NO: H0235758

LN	TEST CODE	DETERMINATION	RESULT	UNITS
3	I590	Solids, Dissolved at 180C	3,400	mg/L
4	I685	Petroleum Hydrocarbons	< 0.2	mg/L

COMMENTS:

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REPORT OF LABORATORY ANALYSIS

May 12, 1993
Report No.: 00024452
Section A Page 3

LABORATORY ANALYSIS REPORT

CLIENT NAME: TRANSWESTERN PIPELINE COMPANY
ADDRESS: P.O. BOX 1717
ROSWELL, NM 88202-1717
ATTENTION: LARRY CAMPBELL

LSG CLIENT NO: 0734 0002
PACE PROJECT: H07340002
PACE CLIENT: 620562

SAMPLE ID: MW-5
LSG SAMPLE NO: H0235759
P.O. NO.: E51209/ROSWELL

DATE SAMPLED: 30-APR-93
DATE RECEIVED: 03-MAY-93
APPROVED BY: L Beyer

LN	TEST CODE	DETERMINATION	RESULT	UNITS
1	OVPPW	Volatiles in Water		
		1,1,1-Trichloroethane	< 5	ug/L
		1,1,2,2-Tetrachloroethane	< 5	ug/L
		1,1,2-Trichloroethane	< 5	ug/L
		1,1-Dichloroethane	< 5	ug/L
		1,1-Dichloroethene	< 5	ug/L
		1,2-Dichloroethane	< 5	ug/L
		1,2-Dichloroethene (total)	< 5	ug/L
		1,2-Dichloropropane	< 5	ug/L
		2-Chloroethylvinylether	< 10	ug/L
		Acrolein	< 100	ug/L
		Acrylonitrile	< 100	ug/L
		Benzene	< 5	ug/L
		Bromoform	< 5	ug/L
		Bromomethane	< 10	ug/L
		Carbon tetrachloride	< 5	ug/L
		Chlorobenzene	< 5	ug/L
		Chlorodibromomethane	< 5	ug/L
		Chloroethane	< 10	ug/L
		Chloroform	< 5	ug/L
		Chloromethane	< 10	ug/L
		Dichlorobromomethane	< 5	ug/L
		Ethylbenzene	< 5	ug/L
		Methylene chloride	< 5	ug/L
		Tetrachloroethene	< 5	ug/L
		Toluene	< 5	ug/L
		Trichloroethene	< 5	ug/L
		Vinyl chloride	< 10	ug/L
		cis-1,3-Dichloropropene	< 5	ug/L
		trans-1,3-Dichloropropene	< 5	ug/L
3	1590	Solids, Dissolved at 180C	3,800	mg/L
4	1685	Petroleum Hydrocarbons	< 0.2	mg/L

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REPORT OF LABORATORY ANALYSIS

May 12, 1993
Report No.: 00024452
Section A Page 4

LABORATORY ANALYSIS REPORT

CLIENT NAME: TRANSWESTERN PIPELINE COMPANY
SAMPLE ID: MW-5
LSG SAMPLE NO: H0235759

LN	TEST CODE	DETERMINATION	RESULT	UNITS

COMMENTS:

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REPORT OF LABORATORY ANALYSIS

May 12, 1993
Report No.: 00024452
Section A Page 5

LABORATORY ANALYSIS REPORT

CLIENT NAME: TRANSWESTERN PIPELINE COMPANY
ADDRESS: P.O. BOX 1717
ROSWELL, NM 88202-1717
ATTENTION: LARRY CAMPBELL

LSG CLIENT NO: 0734 0002
PACE PROJECT: H07340002
PACE CLIENT: 620562

SAMPLE ID: SB-5-1921
LSG SAMPLE NO: H0235760
P.O. NO.: E51209/ROSWELL

DATE SAMPLED: 29-APR-93
DATE RECEIVED: 03-MAY-93
APPROVED BY: L Beyer

LN	TEST CODE	DETERMINATION	RESULT	UNITS
1	I685S	Petroleum Hydrocarbons	< 20	mg/kg

COMMENTS:

900 Gemini Avenue
Houston, TX 77058
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REPORT OF LABORATORY ANALYSIS

May 12, 1993
Report No.: 00024452
Section A Page 6

LABORATORY ANALYSIS REPORT

CLIENT NAME: TRANSWESTERN PIPELINE COMPANY
ADDRESS: P.O. BOX 1717
ROSWELL, NM 88202-1717
ATTENTION: LARRY CAMPBELL

LSG CLIENT NO: 0734 0002
PACE PROJECT: H07340002
PACE CLIENT: 620562

SAMPLE ID: SB-5-6466
LSG SAMPLE NO: H0235761
P.O. NO.: E51209/ROSWELL

DATE SAMPLED: 29-APR-93
DATE RECEIVED: 03-MAY-93
APPROVED BY: L Beyer

LN	TEST CODE	DETERMINATION	RESULT	UNITS
1	1685S	Petroleum Hydrocarbons	< 20	mg/kg

COMMENTS:

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REPORT OF LABORATORY ANALYSIS

May 12, 1993
Report No.: 00024452
Section A Page 7

LABORATORY ANALYSIS REPORT

CLIENT NAME: TRANSWESTERN PIPELINE COMPANY
ADDRESS: P.O. BOX 1717
ROSWELL, NM 88202-1717
ATTENTION: LARRY CAMPBELL

LSG CLIENT NO: 0734 0002
PACE PROJECT: H07340002
PACE CLIENT: 620562

SAMPLE ID: SB1C-2526
LSG SAMPLE NO: H0235762
P.O. NO.: E51209/ROSWELL

DATE SAMPLED: 29-APR-93
DATE RECEIVED: 03-MAY-93
APPROVED BY: L Beyer

LN	TEST CODE	DETERMINATION	RESULT	UNITS
1	1685S	Petroleum Hydrocarbons	< 20	mg/kg

COMMENTS:

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REPORT OF LABORATORY ANALYSIS

May 12, 1993
Report No.: 00024452
Section 8 Page 1

QUALITY CONTROL REPORT
SUPPLEMENTAL INFORMATION

			SAMPLE PREPARATION			SAMPLE ANALYSIS				
LN	TEST CODE	BATCH	LR-METHOD	DATE/TIME	ANALYST	LR-METHOD	DATE/TIME	ANALYST	ANLS BATCH	INSTRUMENT

SAMPLE ID: MW-3 LSG SAMPLE NO: H0235758

LN	TEST CODE	BATCH	LR-METHOD	DATE/TIME	ANALYST	LR-METHOD	DATE/TIME	ANALYST	ANLS BATCH	INSTRUMENT
1	OVPPW	30795	NA			05-624	06-MAY-93 2037	J P	30724	GCMSR
3	I590	30720	NA			02-160.1	03-MAY-93 2300	D P	0	005WAT
4	I685	30692	02-418.1			02-418.1	04-MAY-93 700	Rac	0	302WAT

LR Method Literature Reference
02 EPA-Methods for Chemical Analysis of Water & Wastes, 1984.
05 EPA-40 CFR 136, October 26, 1984.

SAMPLE ID: MW-5 LSG SAMPLE NO: H0235759

LN	TEST CODE	BATCH	LR-METHOD	DATE/TIME	ANALYST	LR-METHOD	DATE/TIME	ANALYST	ANLS BATCH	INSTRUMENT
1	OVPPW	30795	NA			05-624	06-MAY-93 2107	J P	30724	GCMSR
3	I590	30720	NA			02-160.1	03-MAY-93 2300	D P	0	005WAT
4	I685	30692	02-418.1			02-418.1	04-MAY-93 700	Rac	0	302WAT

LR Method Literature Reference
02 EPA-Methods for Chemical Analysis of Water & Wastes, 1984.
05 EPA-40 CFR 136, October 26, 1984.

SAMPLE ID: SB-5-1921 LSG SAMPLE NO: H0235760

LN	TEST CODE	BATCH	LR-METHOD	DATE/TIME	ANALYST	LR-METHOD	DATE/TIME	ANALYST	ANLS BATCH	INSTRUMENT
1	I685S	30691	19-3550			02-418.1	04-MAY-93 700	Rac	0	302WAT

LR Method Literature Reference
02 EPA-Methods for Chemical Analysis of Water & Wastes, 1984.
19 EPA-Test Methods for Evaluating Solid Waste, 3rd ed, Nov. 1986

SAMPLE ID: SB-5-6466 LSG SAMPLE NO: H0235761

LN	TEST CODE	BATCH	LR-METHOD	DATE/TIME	ANALYST	LR-METHOD	DATE/TIME	ANALYST	ANLS BATCH	INSTRUMENT
1	I685S	30691	19-3550			02-418.1	04-MAY-93 700	Rac	0	302WAT

LR Method Literature Reference

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REPORT OF LABORATORY ANALYSIS

May 12, 1993
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Section B Page 2

QUALITY CONTROL REPORT
SUPPLEMENTAL INFORMATION

			SAMPLE PREPARATION			SAMPLE ANALYSIS				
LN	TEST CODE	BATCH	LR-METHOD	DATE/TIME	ANALYST	LR-METHOD	DATE/TIME	ANALYST	ANLS BATCH	INSTRUMENT

LR Method Literature Reference

02 EPA-Methods for Chemical Analysis of Water & Wastes, 1984.
19 EPA-Test Methods for Evaluating Solid Waste, 3rd ed, Nov. 1986

SAMPLE ID: SB1C-2526 LSG SAMPLE NO: H0235762

LN	TEST CODE	BATCH	LR-METHOD	DATE/TIME	ANALYST	LR-METHOD	DATE/TIME	ANALYST	ANLS BATCH	INSTRUMENT
1	I685S	30691	19-3550			02-418.1	04-MAY-93 700	Rac	0	302WAT

LR Method Literature Reference
02 EPA-Methods for Chemical Analysis of Water & Wastes, 1984.
19 EPA-Test Methods for Evaluating Solid Waste, 3rd ed, Nov. 1986

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL REPORT
SURROGATE STANDARD RECOVERY

LN	TEST CODE	SURROGATE COMPOUND	PERCENT RECOVERY	ACCEPTANCE LIMITS	REF LN
SAMPLE ID: MW-3			LSG SAMPLE NO: H0235758		
2	$VOAW	GC/MS Volatiles Surrogates			1
		1,2-Dichloroethane-d4	107	-	
		4-Bromofluorobenzene	107	-	
		Toluene-d8	99	-	
SAMPLE ID: MW-5			LSG SAMPLE NO: H0235759		
2	$VOAW	GC/MS Volatiles Surrogates			1
		1,2-Dichloroethane-d4	108	-	
		4-Bromofluorobenzene	106	-	
		Toluene-d8	96	-	

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QUALITY CONTROL REPORT
LABORATORY CONTROL SAMPLE RECOVERY

TEST CODE	DETERMINATION	PERCENT RECOVERY	ACCEPTANCE LIMITS
BATCH: 30691	SAMPLE ID: Lab Control Sample		LSG SAMPLE NO: H0236448
I685S	Petroleum Hydrocarbons	102.0	-
BATCH: 30692	SAMPLE ID: Lab Control Sample		LSG SAMPLE NO: H0236450
I685	Petroleum Hydrocarbons	104.0	-

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL REPORT
METHOD BLANK DATA

	TEST CODE	Determination	RESULT	UNITS
BATCH: 30691	SAMPLE ID: Method Blank		LSG SAMPLE NO:	H0236449
	I685S	Petroleum Hydrocarbons	< 20	mg/kg
BATCH: 30692	SAMPLE ID: Method Blank		LSG SAMPLE NO:	H0236451
	I685	Petroleum Hydrocarbons	< 0.2	mg/L
BATCH: 30720	SAMPLE ID: Method Blank		LSG SAMPLE NO:	H0236491
	I590	Solids, Dissolved at 180C	< 10	mg/L
BATCH: 30795	SAMPLE ID: Method Blank		LSG SAMPLE NO:	H0237606
	OVPPW	Volatiles in Water		
		1,1,1-Trichloroethane	< 5	ug/L
		1,1,2,2-Tetrachloroethane	< 5	ug/L
		1,1,2-Trichloroethane	< 5	ug/L
		1,1-Dichloroethane	< 5	ug/L
		1,1-Dichloroethene	< 5	ug/L
		1,2-Dichloroethane	< 5	ug/L
		1,2-Dichloroethene (total)	< 5	ug/L
		1,2-Dichloropropane	< 5	ug/L
		1,3-Dichloropropylene	< 5	ug/L
		2-Chloroethylvinylether	< 10	ug/L
		Acrolein	< 100	ug/L
		Acrylonitrile	< 100	ug/L
		Benzene	< 2	ug/L
		Bromoform	< 5	ug/L
		Bromomethane	< 10	ug/L
		Carbon tetrachloride	< 5	ug/L
		Chlorobenzene	< 2	ug/L
		Chlorodibromomethane	< 5	ug/L
		Chloroethane	< 10	ug/L
		Chloroform	< 5	ug/L
		Chloromethane	< 10	ug/L
		Dichlorobromomethane	< 5	ug/L
		Ethylbenzene	< 5	ug/L
		Methylene chloride	< 5	ug/L
		Tetrachloroethene	< 5	ug/L
		Toluene	< 2	ug/L
		Trichloroethene	< 5	ug/L

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REPORT OF LABORATORY ANALYSIS

May 12, 1993
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Section E Page 2

QUALITY CONTROL REPORT
METHOD BLANK DATA

TEST CODE	Determination	RESULT	UNITS
	Vinyl chloride	< 10	ug/L
	cis-1,3-Dichloropropene	< 5	ug/L
	trans-1,3-Dichloropropene	< 5	ug/L

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REPORT OF LABORATORY ANALYSIS

May 12, 1993
Report No.: 00024452
Section F Page 1

QUALITY CONTROL REPORT
DUPLICATE AND MATRIX SPIKE DATA

PREP BATCH: 30720 LSG SAMPLE NO: H0235758

TEST	DETERMINATION	ORIGINAL RESULT	DUPLICATE RESULT	UNITS	RANGE / RPD	UNITS	MS RESULT	MS % RCVRY
1590	Solids, Dissolved at 180C	3,400	3,400	mg/L	0.0	mg/L		

PREP BATCH: 30691 LSG SAMPLE NO: H0235762

TEST	DETERMINATION	ORIGINAL RESULT	DUPLICATE RESULT	UNITS	RANGE / RPD	UNITS	MS RESULT	MS % RCVRY
1685S	Petroleum Hydrocarbons	< 20	< 20	mg/kg	---	mg/kg	360	111.0

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REPORT OF LABORATORY ANALYSIS

May 12, 1993
Report No.: 00024452
Section H Page 1

QUALITY CONTROL REPORT
MATRIX SPIKE AND MATRIX SPIKE DUPLICATE DATA

ANLS BATCH: 30724 LSG SAMPLE NO: H0235403

TEST	DETERMINATION	MS RESULT	MSD RESULT	UNITS	RPD	MS PCT RECOVERY	MSD PCT RECOVERY
OVPPW	1,1-Dichloroethene	51.9	43.1	ug/L	18.7	104	86
OVPPW	Benzene	50.8	46.3	ug/L	9.29	102	93
OVPPW	Chlorobenzene	49.0	46.3	ug/L	5.75	98	93
OVPPW	Toluene	49.5	45.3	ug/L	8.81	99	91
OVPPW	Trichloroethene	49.9	44.5	ug/L	11.5	100	89

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Copy: S. RICHARD B&R ENV.

CHAIN-OF-CUSTODY RECORD
Analytical Request

Client: TRANSWESTERN PIPELINE CO.
Address: PO BOX 1717
ROSWELL, NM 88202-1717
Phone: (505) 625-8022

Report To: LARRY CAMPBELL
Bill To: SAME
P.O. # / Billing Reference:
Project Name / No.: ROSWELL / 5T72

Pace Client No.
Pace Project Manager
Pace Project No.
*Requested Due Date:

Sampled By (PRINT): SUZANNE RICHARD
Sampler Signature: Suzanne Richard
Date Sampled: 4-30-93 (29)

ITEM NO.	SAMPLE DESCRIPTION	TIME	MATRIX	PACE NO.	NO. OF CONTAINERS	UNPRESERVED	H_2SO_4	HNO_3	VOA		TPH	TDS	VOC 8240	REMARKS
1	MW-3	1310	LIQUID		4	1	1		2		1	1	2	CLEAN?
2	MW-5	1515	LIQUID		4	1	1		2		1	1	2	CLEAN?
3	SB-5-1921	1330	SOIL		1	1					1			
4	SB5-6466	1415	SOIL		1	1					1			
5	SB1C-762526	1317	SOIL		1	1					1			
6	762													
7														
8														

COOLER NOS.	BAILERS	SHIPMENT METHOD OUT / DATE	RETURNED / DATE

ITEM NUMBER	RELINQUISHED BY / AFFILIATION	ACCEPTED BY / AFFILIATION	DATE	TIME
	Suzanne Richard	[illegible] / PACE	5/3	0930

Additional Comments

2

SEE REVERSE SIDE FOR INSTRUCTIONS

06/29/93 13:36 ☎713 484 4661 PACE INC ☑002

Cypress Engineering Services
1994 Ground-Water Analytical Results

NATIONAL ENVIRONMENTAL TESTING, INC.

Dallas Division
1548 Valwood Parkway
Suite 118
Carrollton, TX 75006
Tel: (214) 406-8100
Fax: (214) 484-2969

ANALYTICAL REPORT

James Robinson
CYPRESS ENGINEERING SERVICES
16300 KATY FWY., STE. 105
HOUSTON, TX 77094

04/06/1994
Job No.: 94.01407

Page: 1

Project Name: TPC ROSWELL; OPL MIVIDA

Date Received: 03/25/1994

223790 TPC ROSWELL MW-3
Taken: 02/23/1994 11:00

Arsenic, ICP	<0.03	mg/L
Arsenic, Dissolved, ICP	<0.03	mg/L
Barium, ICP	0.09	mg/L
Barium, Dissolved, ICP	0.02	mg/L
Cadmium, ICP	<0.01	mg/L
Cadmium, Dissolved, ICP	<0.01	mg/L
Chromium, ICP	<0.01	mg/L
Chromium, Dissolved, ICP	<0.01	mg/L
Lead, ICP	0.04	mg/L
Lead, Dissolved, ICP	<0.03	mg/L
Mercury, CVAA	<0.0002	mg/L
Mercury, Dissolved, CVAA	<0.0002	mg/L
Selenium, ICP	<0.04	mg/L
Selenium, Dissolved, ICP	<0.04	mg/L
Silver, ICP	<0.01	mg/L
Silver, Dissolved, ICP	<0.01	mg/L

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ANALYTICAL REPORT

James Robinson
CYPRESS ENGINEERING SERVICES
16300 KATY FWY., STE. 105
HOUSTON, TX 77094

04/06/1994
Job No.: 94.01407

Page: 2

Project Name: TPC ROSWELL; OPL MIVIDA

Date Received: 03/25/1994

223791 TPC ROSWELL MW-5
Taken: 02/23/1994 11:00

Arsenic, ICP	<0.03	mg/L
Arsenic, Dissolved, ICP	<0.03	mg/L
Barium, ICP	0.38	mg/L
Barium, Dissolved, ICP	0.01	mg/L
Cadmium, ICP	<0.01	mg/L
Cadmium, Dissolved, ICP	<0.01	mg/L
Chromium, ICP	0.03	mg/L
Chromium, Dissolved, ICP	<0.01	mg/L
Lead, ICP	0.04	mg/L
Lead, Dissolved, ICP	<0.03	mg/L
Mercury, CVAA	<0.0002	mg/L
Mercury, Dissolved, CVAA	<0.0002	mg/L
Selenium, ICP	<0.04	mg/L
Selenium, Dissolved, ICP	<0.04	mg/L
Silver, ICP	<0.01	mg/L
Silver, Dissolved, ICP	<0.01	mg/L

Jerry E. Pressley, Jr.
Project Manager
Dallas Division

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STANDARD QUALITY CONTROL REPORT

JOB NUMBER: 94.01407

PARAMETER	ANALYST	DATE ANALYZED	METHOD	CCV RESULT	CCV TRUE CONCENTRATION	% REC.
TPH - Nonaqueous	dwr	03/28/1994	E-418.1	87	90	97
Arsenic, ICP	cbw	03/30/1994	E-200.7	1.09	1.00	109
Barium, ICP	cbw	03/30/1994	E-200.7	1.01	1.00	101
Cadmium, ICP	cbw	03/30/1994	E-200.7	1.06	1.00	106
Chromium, ICP	cbw	03/30/1994	E-200.7	1.02	1.00	102
Lead, ICP	cbw	03/30/1994	E-200.7	1.06	1.00	106
Mercury, CVAA	dwt	03/30/1994	E-245.1	0.517	0.500	103
Selenium, ICP	cbw	03/30/1994	E-200.7	1.05	1.00	105
Silver, ICP	cbw	03/30/1994	E-200.7	1.02	1.00	102

Method References and Codes

E-100 through 493: "Methods for Chemical Analysis of Water & Wastes", U.S. EPA, 600/4-79-020, rev. 1983.

E-601 through 625: "Guidelines Establishing Test Procedures for the Analysis of Pollutants", U.S. EPA, 40CFR, Part 136, rev. 1990.

S-1000 through 9999: "Test Methods for Evaluating Solid Waste", U.S. EPA SW-846, 3rd Edition, 1986.

A: "Standard Methods for the Examination of Water and Wastewater", 16th Edition, APHA, 1985.

SM: "Standard Methods for the Examination of Water and Wastewater", 17th Edition, APHA, 1989.

D: ASTM Method

M: Method has been modified

*: Other Reference

CCV - Continuing Calibration Verification

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QUALITY CONTROL REPORT
BLANKS

JOB NUMBER: 94.01407

PARAMETER	DATE ANALYZED	BLANK	UNITS	REPORTING LIMIT
TPH - Nonaqueous	03/28/1994	<10	ug/g	10
Arsenic, ICP	03/30/1994	<0.03	mg/L	0.03
Barium, ICP	03/30/1994	<0.01	mg/L	0.01
Cadmium, ICP	03/30/1994	<0.01	mg/L	0.01
Chromium, ICP	03/30/1994	<0.01	mg/L	0.01
Lead, ICP	03/30/1994	<0.03	mg/L	0.03
Mercury, CVAA	03/30/1994	<0.0002	mg/L	0.0002
Selenium, ICP	03/30/1994	<0.04	mg/L	0.04
Silver, ICP	03/30/1994	<0.01	mg/L	0.01

Advisory Control Limits for Blanks

Metals/Wet Chemistry/Conventionals/GC - All compounds should be less than the Reporting Limit.

GC/MS Semi-Volatiles - All compounds should be less than the Reporting Limit except for phthalates which should be less than 5 times the Reporting Limit.

GC/MS Volatiles - Toluene, Methylene chloride, Acetone and Chloroform should be less than 5 times the Reporting Limit. All other volatile compounds should be less than the Reporting Limit.

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STANDARD QUALITY CONTROL REPORT

JOB NUMBER: 94.01407

PARAMETER	ANALYST	DATE ANALYZED	METHOD	CCV RESULT	CCV TRUE CONCENTRATION	% REC.
TPH - Nonaqueous	dwr	03/28/1994	E-418.1	87	90	97
Arsenic, ICP	cbw	03/30/1994	E-200.7	1.09	1.00	109
Barium, ICP	cbw	03/30/1994	E-200.7	1.01	1.00	101
Cadmium, ICP	cbw	03/30/1994	E-200.7	1.06	1.00	106
Chromium, ICP	cbw	03/30/1994	E-200.7	1.02	1.00	102
Lead, ICP	cbw	03/30/1994	E-200.7	1.06	1.00	106
Mercury, CVAA	dwt	03/30/1994	E-245.1	0.517	0.500	103
Selenium, ICP	cbw	03/30/1994	E-200.7	1.05	1.00	105
Silver, ICP	cbw	03/30/1994	E-200.7	1.02	1.00	102

Method References and Codes

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E-601 through 625: "Guidelines Establishing Test Procedures for the Analysis of Pollutants", U.S. EPA, 40CFR, Part 136, rev. 1990.

S-1000 through 9999: "Test Methods for Evaluating Solid Waste", U.S. EPA SW-846, 3rd Edition, 1986.

A: "Standard Methods for the Examination of Water and Wastewater", 16th Edition, APHA, 1985.

SM: "Standard Methods for the Examination of Water and Wastewater", 17th Edition, APHA, 1989.

D: ASTM Method

M: Method has been modified

*: Other Reference

CCV - Continuing Calibration Verification

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QUALITY CONTROL REPORT
BLANKS

JOB NUMBER: 94.01407

PARAMETER	DATE ANALYZED	BLANK	UNITS	REPORTING LIMIT
TPH - Nonaqueous	03/28/1994	<10	ug/g	10
Arsenic, ICP	03/30/1994	<0.03	mg/L	0.03
Barium, ICP	03/30/1994	<0.01	mg/L	0.01
Cadmium, ICP	03/30/1994	<0.01	mg/L	0.01
Chromium, ICP	03/30/1994	<0.01	mg/L	0.01
Lead, ICP	03/30/1994	<0.03	mg/L	0.03
Mercury, CVAA	03/30/1994	<0.0002	mg/L	0.0002
Selenium, ICP	03/30/1994	<0.04	mg/L	0.04
Silver, ICP	03/30/1994	<0.01	mg/L	0.01

Advisory Control Limits for Blanks

Metals/Wet Chemistry/Conventionals/GC - All compounds should be less than the Reporting Limit.

GC/MS Semi-Volatiles - All compounds should be less than the Reporting Limit except for phthalates which should be less than 5 times the Reporting Limit.

GC/MS Volatiles - Toluene, Methylene chloride, Acetone and Chloroform should be less than 5 times the Reporting Limit. All other volatile compounds should be less than the Reporting Limit.

Daniel B. Stephens & Associates, Inc.
1994 Soil and Ground-Water
Analytical Results

Hall Environmental Analysis Laboratory

Hall Environmental Analysis Laboratory
2403 San Mateo NE, Suite P-13
Albuquerque, NM 87110

12/9/94

Daniel B. Stephens and Associates, Inc.
6020 Academy NE, Suite 100
Albuquerque, NM 87109

Dear Mr. Jeff Forbes,

Enclosed are the results for the analyses that were requested. These were done according to EPA procedures or the equivalent.

Detection limits are determined by EPA methodology. Unless noted on sample page, all criteria for QA/QC acceptance levels fall within established parameters. These parameters are modeled from the EPA-600 14-79 019, March 1979, "Handbook for Analytical Quality Control in Water and Waste Water."

Please don't hesitate to contact me for any additional information or clarifications

Sincerely,

Scott Hallenbeck 12/12/94

Scott Hallenbeck, Lab Manager

Project: ENRON - Roswell

Results for sample: MW-6 (64.5'-65.0')

Date collected: 11/30/94	Date received: 12/5/94
Date extracted: 12/5/94	Date analyzed: 12/6/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON -Roswell	HEAL #: 9412008-1
Project Manager: Jeff Forbes	Sampled by: Bill Casadevall
Matrix: Non-Aqueous	

Test: EPA 8010/8020

Analyte:	Results	Detection Limit	Units
Benzene	nd	0.05	PPM (MG/KG)
Bromodichloromethane	nd	0.01	PPM (MG/KG)
Bromoform	nd	0.05	PPM (MG/KG)
Bromomethane	nd	0.05	PPM (MG/KG)
Carbon Tetrachloride	nd	0.01	PPM (MG/KG)
Chlorobenzene	nd	0.01	PPM (MG/KG)
Chloroethane	nd	0.01	PPM (MG/KG)
Chloroform	nd	0.01	PPM (MG/KG)
Chloromethane	nd	0.01	PPM (MG/KG)
2-Chloroethylvinyl Ether	nd	0.05	PPM (MG/KG)
Dibromochloromethane	nd	0.01	PPM (MG/KG)
1,3-Dichlorobenzene	nd	0.01	PPM (MG/KG)
1,2-Dichlorobenzene	nd	0.01	PPM (MG/KG)
1,4-Dichlorobenzene	nd	0.01	PPM (MG/KG)
Dichlorodifluoromethane	nd	0.01	PPM (MG/KG)
1,1-Dichloroethane	nd	0.01	PPM (MG/KG)
1,2-Dichloroethane	nd	0.01	PPM (MG/KG)
1,1-Dichloroethene	nd	0.01	PPM (MG/KG)
1,2-Dichloroethene (Cis)	nd	0.01	PPM (MG/KG)
1,2-Dichloroethene (Trans)	nd	0.01	PPM (MG/KG)
1,2-Dichloropropane	nd	0.01	PPM (MG/KG)
cis-1,3-Dichloropropene	nd	0.01	PPM (MG/KG)
trans-1,3-Dichloropropene	nd	0.01	PPM (MG/KG)
Ethylbenzene	nd	0.05	PPM (MG/KG)
Dichloromethane	nd	0.1	PPM (MG/KG)
1,1,2,2-Tetrachloroethane	nd	0.01	PPM (MG/KG)
Tetrachloroethene (PCE)	nd	0.01	PPM (MG/KG)
Toluene	nd	0.05	PPM (MG/KG)
1,1,1-Trichloroethane	nd	0.01	PPM (MG/KG)
1,1,2-Trichloroethane	nd	0.01	PPM (MG/KG)
Trichloroethene (TCE)	nd	0.01	PPM (MG/KG)
Vinyl Chloride	nd	0.01	PPM (MG/KG)
Xylenes (Total)	nd	0.05	PPM (MG/KG)
Trichlorofluoromethane	nd	0.1	PPM (MG/KG)

BFB (Surrogate) Recovery = 79 %
BCM (Surrogate) Recovery = 98 %
Dilution Factor = 1

Results for sample: MW-6 (64.5'-65.0')

Date collected: 11/30/94	Date received: 12/5/94
Date extracted: 12/6/94	Date analyzed: 12/6/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON -Roswell	HEAL #: 9412008-1
Project Manager: Jeff Forbes	Sampled by: Bill Casadevall
Matrix: Non-Aqueous	

Test: EPA 418.1

Compound	Result	Detection Limit	Units
TPH	nd	20	PPM(MG/KG)

Dilution Factor = 1

Results for sample: MW-6

Date collected: 12/2/94	Date received: 12/5/94
Date extracted: NA	Date analyzed: 12/5/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON -Roswell	Heal #: 9412008-2
Project Manager: Jeff Forbes	Sampled by:Bill Casadevall
Matrix: Aqueous	

Test: EPA 8010/8020

Analyte:	Results	Detection Limit	Units
Benzene	nd	0.5	PPB (UG/L)
Bromodichloromethane	nd	0.2	PPB (UG/L)
Bromoform	nd	1.0	PPB (UG/L)
Bromomethane	nd	1.0	PPB (UG/L)
Carbon Tetrachloride	nd	0.2	PPB (UG/L)
Chlorobenzene	nd	0.2	PPB (UG/L)
Chloroethane	nd	0.2	PPB (UG/L)
Chloroform	nd	0.2	PPB (UG/L)
Chloromethane	nd	0.2	PPB (UG/L)
2-Chloroethylvinyl Ether	nd	1.0	PPB (UG/L)
Dibromochloromethane	nd	0.2	PPB (UG/L)
1,3-Dichlorobenzene	nd	0.2	PPB (UG/L)
1,2-Dichlorobenzene	nd	0.2	PPB (UG/L)
1,4-Dichlorobenzene	nd	0.2	PPB (UG/L)
Dichlorodifluoromethane	nd	0.2	PPB (UG/L)
1,1-Dichloroethane	nd	0.2	PPB (UG/L)
1,2-Dichloroethane	nd	0.2	PPB (UG/L)
1,1-Dichloroethene	nd	0.2	PPB (UG/L)
1,2-Dichloroethene (Cis)	nd	0.2	PPB (UG/L)
1,2-Dichloroethene (Trans)	nd	0.2	PPB (UG/L)
1,2-Dichloropropane	nd	0.2	PPB (UG/L)
cis-1,3-Dichloropropene	nd	0.2	PPB (UG/L)
trans-1,3-Dichloropropene	nd	0.2	PPB (UG/L)
Ethylbenzene	nd	0.5	PPB (UG/L)
Dichloromethane	nd	2.0	PPB (UG/L)
1,1,2,2-Tetrachloroethane	nd	0.2	PPB (UG/L)
Tetrachloroethene (PCE)	nd	0.2	PPB (UG/L)
Toluene	nd	0.5	PPB (UG/L)
1,1,1-Trichloroethane	nd	0.2	PPB (UG/L)
1,1,2-Trichloroethane	nd	0.2	PPB (UG/L)
Trichloroethene (TCE)	nd	0.2	PPB (UG/L)
Vinyl Chloride	nd	0.2	PPB (UG/L)
Xylenes (Total)	nd	0.5	PPB (UG/L)
Trichlorofluoromethane	nd	0.2	PPB (UG/L)

BFB (Surrogate) Recovery = 95%
BCM (Surrogate) Recovery = 102 %
Dilution Factor = 1

Results for sample: MW-6

Date collected: 12/2/94	Date received: 12/5/94
Date extracted: 12/9/94	Date analyzed: 12/9/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON -Roswell	Heal #: 9412008-2
Project Manager: Jeff Forbes	Sampled by:Bill Casadevall
Matrix: Aqueous	

Test: EPA 418.1

Compound	Result	Detection Limit	Units
TPH	nd	2.5	PPM (MG/L)

Dilution Factor = 1

Results for sample: Trip Blank

Date collected: 11/30/94	Date received: 12/5/94
Date extracted: NA	Date analyzed: 12/6/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON -Roswell	Heal #: 9412008-3
Project Manager: Jeff Forbes	Sampled by:Bill Casadevall
Matrix: Aqueous	

Test: EPA 8010/8020

Analyte:	Results	Detection Limit	Units
Benzene	nd	0.5	PPB (UG/L)
Bromodichloromethane	0.7	0.2	PPB (UG/L)
Bromoform	nd	1.0	PPB (UG/L)
Bromomethane	nd	1.0	PPB (UG/L)
Carbon Tetrachloride	nd	0.2	PPB (UG/L)
Chlorobenzene	nd	0.2	PPB (UG/L)
Chloroethane	nd	0.2	PPB (UG/L)
Chloroform	4.1	0.2	PPB (UG/L)
Chloromethane	nd	0.2	PPB (UG/L)
2-Chloroethylvinyl Ether	nd	1.0	PPB (UG/L)
Dibromochloromethane	0.2	0.2	PPB (UG/L)
1,3-Dichlorobenzene	nd	0.2	PPB (UG/L)
1,2-Dichlorobenzene	nd	0.2	PPB (UG/L)
1,4-Dichlorobenzene	nd	0.2	PPB (UG/L)
Dichlorodifluoromethane	nd	0.2	PPB (UG/L)
1,1-Dichloroethane	nd	0.2	PPB (UG/L)
1,2-Dichloroethane	nd	0.2	PPB (UG/L)
1,1-Dichloroethene	nd	0.2	PPB (UG/L)
1,2-Dichloroethene (Cis)	nd	0.2	PPB (UG/L)
1,2-Dichloroethene (Trans)	nd	0.2	PPB (UG/L)
1,2-Dichloropropane	nd	0.2	PPB (UG/L)
cis-1,3-Dichloropropene	nd	0.2	PPB (UG/L)
trans-1,3-Dichloropropene	nd	0.2	PPB (UG/L)
Ethylbenzene	nd	0.5	PPB (UG/L)
Dichloromethane	nd	2.0	PPB (UG/L)
1,1,2,2-Tetrachloroethane	nd	0.2	PPB (UG/L)
Tetrachloroethene (PCE)	nd	0.2	PPB (UG/L)
Toluene	nd	0.5	PPB (UG/L)
1,1,1-Trichloroethane	nd	0.2	PPB (UG/L)
1,1,2-Trichloroethane	nd	0.2	PPB (UG/L)
Trichloroethene (TCE)	nd	0.2	PPB (UG/L)
Vinyl Chloride	nd	0.2	PPB (UG/L)
Xylenes (Total)	nd	0.5	PPB (UG/L)
Trichlorofluoromethane	nd	0.2	PPB (UG/L)

BFB (Surrogate) Recovery = 93 %
BCM (Surrogate) Recovery = 104 %
Dilution Factor = 1

Results for sample: Trip Blank

Date collected: 12/2/94	Date received: 12/5/94
Date extracted: 12/9/94	Date analyzed: 12/9/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON -Roswell	Heal #: 9412008-3
Project Manager: Jeff Forbes	Sampled by:Bill Casadevall
Matrix: Aqueous	

Test: EPA 418.1

Compound	Result	Detection Limit	Units
TPH	nd	2.5	PPM (MG/L)

Dilution Factor = 1

Results for sample: Reagent Blank

Date extracted: NA	Date analyzed: 12/6/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON -Roswell	HEAL #:RB 12/5
Project Manager: Jeff Forbes	
Matrix: Non-Aqueous	

Test: EPA 8010/8020

Analyte:	Results	Detection Limit	Units
Benzene	nd	0.05	PPM (MG/KG)
Bromodichloromethane	nd	0.01	PPM (MG/KG)
Bromoform	nd	0.05	PPM (MG/KG)
Bromomethane	nd	0.05	PPM (MG/KG)
Carbon Tetrachloride	nd	0.01	PPM (MG/KG)
Chlorobenzene	nd	0.01	PPM (MG/KG)
Chloroethane	nd	0.01	PPM (MG/KG)
Chloroform	nd	0.01	PPM (MG/KG)
Chloromethane	nd	0.01	PPM (MG/KG)
2-Chloroethylvinyl Ether	nd	0.05	PPM (MG/KG)
Dibromochloromethane	nd	0.01	PPM (MG/KG)
1,3-Dichlorobenzene	nd	0.01	PPM (MG/KG)
1,2-Dichlorobenzene	nd	0.01	PPM (MG/KG)
1,4-Dichlorobenzene	nd	0.01	PPM (MG/KG)
Dichlorodifluoromethane	nd	0.01	PPM (MG/KG)
1,1-Dichloroethane	nd	0.01	PPM (MG/KG)
1,2-Dichloroethane	nd	0.01	PPM (MG/KG)
1,1-Dichloroethene	nd	0.01	PPM (MG/KG)
1,2-Dichloroethene (Cis)	nd	0.01	PPM (MG/KG)
1,2-Dichloroethene (Trans)	nd	0.01	PPM (MG/KG)
1,2-Dichloropropane	nd	0.01	PPM (MG/KG)
cis-1,3-Dichloropropene	nd	0.01	PPM (MG/KG)
trans-1,3-Dichloropropene	nd	0.01	PPM (MG/KG)
Ethylbenzene	nd	0.05	PPM (MG/KG)
Dichloromethane	nd	0.1	PPM (MG/KG)
1,1,2,2-Tetrachloroethane	nd	0.01	PPM (MG/KG)
Tetrachloroethene (PCE)	nd	0.01	PPM (MG/KG)
Toluene	nd	0.05	PPM (MG/KG)
1,1,1-Trichloroethane	nd	0.01	PPM (MG/KG)
1,1,2-Trichloroethane	nd	0.01	PPM (MG/KG)
Trichloroethene (TCE)	nd	0.01	PPM (MG/KG)
Vinyl Chloride	nd	0.01	PPM (MG/KG)
Xylenes (Total)	nd	0.05	PPM (MG/KG)
Trichlorofluoromethane	nd	0.1	PPM (MG/KG)

BFB (Surrogate) Recovery = 84 %
BCM (Surrogate) Recovery = 98 %
Dilution Factor = 1

Results for sample: Reagent Blank

Date extracted: 12/6/94	Date analyzed: 12/6/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON -Roswell	HEAL #:RB 12/6
Project Manager: Jeff Forbes	
Matrix: Non-Aqueous	

Test: EPA 418.1

Compound	Result	Detection Limit	Units
TPH	nd	20	PPM (MG/KG)

Dilution Factor = 1

Results for QC: Reagent Blank

Date extracted: NA	Date analyzed: 12/5/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON -Roswell	HEAL #: RB 12/5
Project Manager: Jeff Forbes	
Matrix: Aqueous	

Test: EPA 8010/8020

Analyte:	Results	Detection Limit	Units
Benzene	nd	0.5	PPB (UG/L)
Bromodichloromethane	nd	0.2	PPB (UG/L)
Bromoform	nd	1.0	PPB (UG/L)
Bromomethane	nd	1.0	PPB (UG/L)
Carbon Tetrachloride	nd	0.2	PPB (UG/L)
Chlorobenzene	nd	0.2	PPB (UG/L)
Chloroethane	nd	0.2	PPB (UG/L)
Chloroform	nd	0.2	PPB (UG/L)
Chloromethane	nd	0.2	PPB (UG/L)
2-Chloroethylvinyl Ether	nd	1.0	PPB (UG/L)
Dibromochloromethane	nd	0.2	PPB (UG/L)
1,3-Dichlorobenzene	nd	0.2	PPB (UG/L)
1,2-Dichlorobenzene	nd	0.2	PPB (UG/L)
1,4-Dichlorobenzene	nd	0.2	PPB (UG/L)
Dichlorodifluoromethane	nd	0.2	PPB (UG/L)
1,1-Dichloroethane	nd	0.2	PPB (UG/L)
1,2-Dichloroethane	nd	0.2	PPB (UG/L)
1,1-Dichloroethene	nd	0.2	PPB (UG/L)
1,2-Dichloroethene (Cis)	nd	0.2	PPB (UG/L)
1,2-Dichloroethene (Trans)	nd	0.2	PPB (UG/L)
1,2-Dichloropropane	nd	0.2	PPB (UG/L)
cis-1,3-Dichloropropene	nd	0.2	PPB (UG/L)
trans-1,3-Dichloropropene	nd	0.2	PPB (UG/L)
Ethylbenzene	nd	0.5	PPB (UG/L)
Dichloromethane	nd	2.0	PPB (UG/L)
1,1,2,2-Tetrachloroethane	nd	0.2	PPB (UG/L)
Tetrachloroethene (PCE)	nd	0.2	PPB (UG/L)
Toluene	nd	0.5	PPB (UG/L)
1,1,1-Trichloroethane	nd	0.2	PPB (UG/L)
1,1,2-Trichloroethane	nd	0.2	PPB (UG/L)
Trichloroethene (TCE)	nd	0.2	PPB (UG/L)
Vinyl Chloride	nd	0.2	PPB (UG/L)
Xylenes (Total)	nd	0.5	PPB (UG/L)
Trichlorofluoromethane	nd	0.2	PPB (UG/L)

BFB (Surrogate) Recovery = 95 %
BCM (Surrogate) Recovery = 96 %
Dilution Factor = 1

Results for QC: Reagent Blank

Date extracted: 12/9/94	Date analyzed: 12/9/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON -Roswell	Heal #: RB 12/9
Project Manager: Jeff Forbes	
Matrix: Aqueous	

Test: EPA 418.1

Compound	Result	Detection Limit	Units
TPH	nd	2.5	PPM (MG/L)

Dilution Factor = 1

Results for QC: Matrix Spike / Matrix Spike Dup

Date extracted: 12/5,6/94	Date analyzed: 12/6,7/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON -Roswell	HEAL #: 9412008-1 MS/MSD
Project Manager: Jeff Forbes	9412008-1 Dup, BS 12/6
Matrix: Non-Aqueous	Units: PPM (MG/KG)

Test: EPA 8010/8020

Compound	Sample Result	Amount Added	Matrix Recov.	MS %	MSD Recov.	MSD %	RPD
Chlorobenzene	<0.01	1.00	0.98	98	0.98	98	0
Ethylbenzene	<0.05	1.00	0.97	97	0.95	95	2
1,1-DCE	<0.01	1.00	0.85	85	0.96	96	12
Trans-1,2-DCE	<0.01	1.00	0.90	90	1.01	101	12
1,2-DCA	<0.01	1.00	1.18	118	1.17	117	1
PCE	<0.01	1.00	1.15	115	1.17	117	2
1,3-Dichloro-benzene	<0.01	1.00	1.02	102	1.00	100	2
1,4-Dichloro-benzene	<0.01	1.00	1.04	104	1.11	111	7

Test: EPA 418.1

Compound	Sample Result	Dup Result	RPD	Blank	Blank Spike	BS Recov	BS %
TPH	<20	<20	NA	<20	100	110	110

Results for QC: Matrix Spike / Matrix Spike Dup

Date extracted: NA	Date analyzed: 12/5/94
Client: Daniel B. Stephens and Associates, Inc.	
Project Name: ENRON -Roswell	HEAL #: 9412008-1 MS/MSD
Project Manager: Jeff Forbes	
Matrix: Aqueous	Units: PPB (UG/L), PPM (MG/L)

Test: EPA 8010/8020

Compound	Sample Result	Amount Added	Matrix Recov.	MS %	MSD Recov.	MSD %	RPD
Chlorobenzene	<0.2	20.0	19.7	99	21.0	105	6
Ethylbenzene	<0.5	20.0	19.8	99	20.6	103	4
1,1-DCE	<0.2	20.0	22.2	111	20.5	103	8
Trans-1,2-DCE	<0.2	20.0	19.1	96	19.4	97	2
Carbon Tet.	<0.2	20.0	18.3	92	16.9	85	8
1,2-DCA	<0.2	20.0	16.2	81	17.0	85	5
1,2-Dichloro-propane	<0.2	20.0	20.7	104	20.4	102	1
1,1,2-TCA	<0.2	20.0	19.2	96	18.4	92	4
PCE	<0.2	20.0	21.6	108	20.4	102	6
1,3-Dichloro-benzene	<0.2	20.0	19.8	99	19.6	98	1
1,4-Dichloro-benzene	<0.2	20.0	20.8	104	18.5	93	12

Test: EPA 418.1

Compound	Sample Result	Amount Added	Matrix Recov.	MS %
TPH	<1.0	5.0	5.0	100

CHAIN-OF-CUSTODY RECORD

HALL ENVIRONMENTAL ANALYSIS LABORATORY
2403 San Mateo NE, Suite P-13
Albuquerque, New Mexico 87110
505.880.1803

Client: Daniel B. Stephens Assoc.	Project Name: ENRON – Roswell
Address: 6020 Academy NE #100 Albuq. NM 87109	Project #: 4115.2
	Project Manager: Jeff Forbes
Phone # : 822-9400	Sampler: Bill Casadevall
Fax # : 822-8877	Samples Cold? ☒ Yes ☐ No

Date	Time	Matrix	Sample I.D. No.	Number/Volume	Preservative $HgCl_2$	Preservative HCl	Preservative Other	HEAL No.
11-30-94	1426	soil	MW-6 (64.5-65.0)	2×3" rings				9412008-1
12-2-94	1405	H_2O	MW-6	4× 40ml VoA	X			9412008-2
11-30-94	0800	↓	Trip Blank	3×40ml VOA	X			9412008-3

ANALYSIS REQUEST

HEAL No.	BTEX (Method 602/8020)	BTEX + MTBE (602/8020)	TPH Method 8015 MOD (Gas/Diesel)	BTEX + TPH + MTBE (Gasoline Only)	BTEX + MTBE + TPH (Gas + Diesel)	TPH (Method 418.1)	601/602 Volatiles	EDB (Method 504.1)	EDC	610 (PNA or PAH)				Air Bubbles or Headspace (Y or N)
9412008-1	~~X~~					X	X							
9412008-2						X	X							
9412008-3							X							

Date:	Time:	Relinquished By: (Signature)	Received By: (Signature)
12-5-94	0800	Jeffrey Forbes	Theresa Lowe
Date:	Time:	Relinquished By: (Signature)	Received By: (Signature)

Remarks: Pls. fax prelims. as soon as available.

22 DECEMBER 94

0805: arrive Roswell - stop for supplies

0830: WELL 5: wellhead sealed. Electric pump can be turned on at power pole. Discharge to pond w/totalizer.

0845: WELL TRANSWESTERN - water level = 65.41 from TOC. Clayton Barnwell and ? are setting up and preparing to decon.

1049: calibrate SpC 10340 μmhos (10,000 std) 3168. pH = 7.0/10.0 - DO calib (16° @ 3600'): 8.67 mg/L.

1056: totalizer = ~~16775~~ BC 16710

1105: recalibrate pH 7.0/10.0 after initial readings - maybe rubber in hose.

286' of water in casing (4 5/8")

Assume well is 9 5/8" to TD - reduced hole size after setting casing ∴ 3.8 gal/ft & 3 casing vol = 3,260 gal.

		Temp	SpC	pH	Eh.	DO.
1058	16730	19.1	2010	9.62	-251	
1110	16840	19.4	2260	7.81	-241	
1119	16940	19.5	2240	7.37	-212	
1152	17230 500 gal.	19.6	2230	7.28		
1239	1000	19.7	2230	7.24		
1328	1500	23.3	2290	7.24		
1422	2000	19.7	2240	7.20		
1515	2500	19.6	2240	7.17	-179	1.9
1607	3000	19.5	2250	7.13	-197	1.3

pump is set at 200' bTOC in Transwestern well.

1200: totalizer on Well 5 = 2234500

	Temp °F	pH	SpC	Vol.	DO
1201	68.6	7.59	4260	2234550	cloudy red or.
1208	70.0	7.05	3840	2235000	4.3
1216	69.5	7.00	3820	2235500	5.5
1226	69.0	6.91	3830	2236000	3.6/2.8*
1235	69.0	6.91	3770	2236500	3.8
1244	70.2	7.25	3760	2237000	3.5
1252	68.4	6.97	3710	2237500	3.6
1301	69.0	6.92	3740	223800	

adj. "salinity" to TDS value.

12/22/94

Assume water level = 65' bgs.
TDD = 370' casing = 8.25 fm. $\frac{160-370}{\cancel{200}-3}$ = 2.8 gal/ft.
" = 10" fm 0-160' = 4.1 gal/ft.

8" casing = 1,764 gal (3 cas. vol.) - 210'
10" " 1,169 gal (" " ") - 95'
2933 gal.

PHOTO 9 - view N of well #5 - well is to right of power pole. Totalizer is by red water level indicator. Pumping 55-60 gpm.

1305 SAMPLE "WELL No. 5"
3×40 mL for App. IX VOCs
1×500 mL w/ HNO_3 for App. IX metals + cations.
1×500 mL
1×500 mL
1×500 mL

1307 - turn off well 5 - 2238300.

1325 - collect sample for field alkalinity & turn off pump - 2238910.

12/22/94

PHOTO 10: view N of VOAs from well 5. Water was crystal clear w/ no particulates or suspended particles.

PHOTO 11 - view N of well 5. Power at left, well head at center, and totalizer at right. Discharge behind photographer.

Field alkalinity 200.

1340: leave well ~~HW~~ 5 and return to Transwestern well where purging continues at 1500 gal.

1410 - Dennis Karnes and field person come out to see progress.

1425 - Go to Fed Ex. to pick up turbidity meter.

1500 - Call Jeff - will ship samples on Monday.

12/22/94

1615: alkalinity = 160 (32 drops x 5).

Well TW-1 is purged by Jetsub 3.5" redi-flo by Grundfos. Sampled w/ poly bailer.

1645: SAMPLE TW-1
3x40 mL for App. IX VOCs w/ HCl
1x1L for App. IX SVOCs
1x1L for App IX pest./PCBs
1x500 mL for App. IX metals w/ cations.
1x500 mL for cyanide
1x500 mL for sulfide
1x500 mL for nitrogen compounds.
1x500 mL for alkalinity, TDS, chloride, sulfate.

1710: leave site TW-1 to measure water levels in MW-3, -5, and -6.

1715: MW-6 water level = 63.59

1721: MW-3 " " 64.58

1728: MW-5 " " 62.64

1740: leave Enron to return to Albuquerque.

12/22/94

CORE LAB

CORE LABORATORIES

CORE LABORATORIES
A N A L Y T I C A L   R E P O R T

Job Number: 943236
Prepared For:

DANIEL B. STEPHENS & ASSOCIATES
JEFF FORBES
6020 ACADEMY NE, #100
ALBUQUERQUE, NM 87109

Date: 01/09/95

Signature

Date: 1/9/95

Name: Ron Fuller

Title: LABORATORY MANAGER

Core Laboratories
10703 East Bethany Drive
Aurora, CO 80014

CORELAB

CORE LABORATORIES, INC.

No. 2[illegible]743

CHAIN OF CUSTODY RECORD

CUSTOMER INFORMATION	PROJECT INFORMATION
COMPANY: DANIEL B. STEPHENS & ASSOC.	PROJECT NAME/NUMBER: 4115.2
SEND REPORT TO: JEFF FORBES	**BILLING INFORMATION**
ADDRESS: 6020 ACADEMY NE, #100	BILL TO:
ALBUQUERQUE, NM 87109	ADDRESS:
PHONE: 505/822-9400	PHONE:
FAX: 505/	FAX: PO NO.:

NUMBER OF CONTAINERS

ANALYSIS / METHOD REQUEST: (1) APP. IX VOCS – 8240; (2) APP IX SVOCS – 8270; (3) APP IX PEST/PCBS – 8080; (4) APP IX METALS + Ca, K, Mg, Na, Fe, Mn (6010); (5) CYANIDE; (6) SULFIDE; (7) NO2 + NO3; (8) TDS, Alkalinity, Chloride, & Sulfate

LAB JOB NO. 943236

SAMPLE NO.	SAMPLE ID/DESCRIPTION	SAMPLE DATE	SAMPLE TIME	SAMPLE MATRIX	CONTAINER TYPE	PRESERV.	NUMBER OF CONTAINERS	1	2	3	4	5	6	7	8	REMARKS / PRECAUTIONS
	TRIP BLANK	12/22/94	0800	WATER	1×40 mL	HCL		X								USE APPENDIX IX
took	WELL #5	↓		↓	3×40 mL	HCL		X								ANALYSES FOR
sample	~~TW-1~~ BC		~~1645~~ BC		2×1L				X	X						VOCS, SVOCS, METALS,
time from	bottles ↓ 12/28 F		↓		5×500 mL	Various					X	X	X	X	X	AND PESTICIDES/PCBs
	TW-1		1645		3×40 mL	HCL		X								
	↓	↓	↓	↓	5×500 mL	Various					X	X	X	X	X	

talked w/ Jeff Forbes 12/28/94
– Sample bottles sent for App IX SVOC + App IX pest/pcb's are actually sample TW-1 (not well #5) 12/28 F

SAMPLER: BILL CASADEVALL
SHIPMENT METHOD: FEDERAL EXPRESS
AIRBILL NO.: 3325357781

REQUIRED TURNAROUND:* [ ] SAME DAY [ ] 24 HOURS [ ] 48 HOURS [ ] 72 HOURS [ ] 5 DAYS [X] 10 DAYS [ ] ROUTINE OTHER

1. RELINQUISHED BY:	DATE	2. RELINQUISHED BY:	DATE	3. RELINQUISHED BY:	DATE
SIGNATURE: Bill Casadevall	12/27/94	SIGNATURE:		SIGNATURE:	
PRINTED NAME/COMPANY: DBS&A.	TIME 0930	PRINTED NAME/COMPANY:	TIME	PRINTED NAME/COMPANY:	TIME
1. RECEIVED BY:	DATE	**2. RECEIVED BY:**	DATE	**3. RECEIVED BY:**	DATE
SIGNATURE: Amy Murray	12/28/94	SIGNATURE:		SIGNATURE:	
PRINTED NAME/COMPANY: CORE	TIME 1115	PRINTED NAME/COMPANY:	TIME	PRINTED NAME/COMPANY:	TIME

* RUSH TURNAROUND MAY REQUIRE SURCHARGE

[ ] **Anaheim, California** 1250 E. Gene Autry Way, Anaheim, California 92805, (714) 937-1094, (800) 404-2673

[ ] **Long Beach, California** 3700 Cherry Avenue, Long Beach, California 90807, (310) 595-8401, (800) 814-3433

[X] **Denver (Aurora), Colorado** 10703 E. Bethany Drive, Aurora, Colorado 80014, (303) 751-1780, (800) 972-2673

[ ] **Casper, Wyoming** 420 West 1st Street, Casper, Wyoming 82601, (307) 235-5741, (800) 666-0306

[ ] **Houston, Texas** 8210 Mosley Road, Houston, Texas 77075, (713) 943-9776, (800) 734-2673

[ ] **Corpus Christi, Texas** 1733 North Padre Island Drive, Corpus Christi, Texas 78408, (512) 289-2673, (800) 548-8228

[ ] **Lake Charles, Louisiana** 3645 Beglis Parkway, Sulphur, Louisiana 70663, (318) 583-4926, (800) 259-4926

CORE LABORATORIES

SAMPLE DELIVERY GROUP NARRATIVE

January 9, 1995

Customer: Daniel B. Stephens & Associates
Project: 4115.2
Core Laboratories Project Number: 943236

On 12-28-94 Core Laboratories received samples for analysis. The following information is pertinent to the interpretation of the data package.

Organic Analysis:

During analysis for semivolatiles, a spike blank and spike blank duplicate were analyzed. The spike blank had a high percent recovery for 4-chloro-3-methylphenol at 99%. The EPA recommended criteria for 4-chloro-3-methylphenol is 23% to 97%.

Linda L. Benkers
Linda L. Benkers
QA/QC Coordinator

Doug Georgic
Douglas Georgic
Laboratory Supervisor

CORELAB

CORE LABORATORIES

L A B O R A T O R Y   T E S T S   R E S U L T S
01/09/95

JOB NUMBER: 943236   CUSTOMER: DANIEL B. STEPHENS & ASSOCIATES   ATTN: JEFF FORBES

LIENT I.D.........: 4115.2
ATE SAMPLED.......: 12/22/94
TIME SAMPLED.......: 08:00
ORK DESCRIPTION...: TRIP BLANK

LABORATORY I.D...: 943236-0001
DATE RECEIVED....: 12/28/94
TIME RECEIVED....: 14:15
REMARKS..........:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
PPENDIX IX VOLATILE ORGANICS		*1		8240 (2)	12/30/94	MLA
Acetone	ND	100	ug/L			
Acetonitrile	ND	100	ug/L			
Acrolein	ND	50	ug/L			
Acrylonitrile	ND	20	ug/L			
Allyl chloride	ND	20	ug/L			
Benzene	ND	1	ug/L			
Bromodichloromethane	ND	5	ug/L			
Bromoform	ND	5	ug/L			
Bromomethane	ND	10	ug/L			
Carbon Disulfide	ND	5	ug/L			
Carbon tetrachloride	ND	5	ug/L			
Chlorobenzene	ND	5	ug/L			
Chloroethane	ND	10	ug/L			
Chloroform	ND	5	ug/L			
Chloromethane	ND	5	ug/L			
Chloroprene	ND	5	ug/L			
Dibromochloromethane	ND	5	ug/L			
1,2-Dibromo-3-chloropropane	ND	20	ug/L			
1,2-Dibromoethane	ND	20	ug/L			
Dibromomethane	ND	5	ug/L			
trans-1,4-Dichloro-2-butene	ND	50	ug/L			
Dichlorodifluoromethane	ND	10	ug/L			
1,1-Dichloroethane	ND	5	ug/L			
1,2-Dichloroethane	ND	5	ug/L			
1,1-Dichloroethene	ND	5	ug/L			
1,2-Dichloroethene (total)	ND	5	ug/L			
Dichloromethane	ND	5	ug/L			
1,2-Dichloropropane	ND	5	ug/L			
cis-1,3-Dichloropropene	ND	5	ug/L			
trans-1,3-Dichloropropene	ND	5	ug/L			
Ethyl benzene	ND	5	ug/L			
Ethyl methacrylate	ND	5	ug/L			
2-Hexanone	ND	50	ug/L			
Iodomethane	ND	5	ug/L			
Isobutyl alcohol	ND	50	ug/L			
Methylacrylonitrile	ND	50	ug/L			
2-Butanone	ND	100	ug/L			
Methyl isobutyl ketone	ND	50	ug/L			
Methyl methacrylate	ND	5	ug/L			
Propionitrile	ND	100	ug/L			
Styrene	ND	5	ug/L			
1,1,1,2-Tetrachloroethane	ND	5	ug/L			
1,1,2,2-Tetrachloroethane	ND	5	ug/L			

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LABORATORY TESTS RESULTS
01/09/95

JOB NUMBER: 943236 CUSTOMER: DANIEL B. STEPHENS & ASSOCIATES ATTN: JEFF FORBES

CLIENT I.D.........: 4115.2
DATE SAMPLED.......: 12/22/94
TIME SAMPLED.......: 08:00
WORK DESCRIPTION...: TRIP BLANK

LABORATORY I.D...: 943236-0001
DATE RECEIVED....: 12/28/94
TIME RECEIVED....: 14:15
REMARKS..........:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Tetrachloroethene	ND	5	ug/L			
Toluene	ND	5	ug/L			
1,1,1-Trichloroethane	ND	5	ug/L			
1,1,2-Trichloroethane	ND	5	ug/L			
Trichloroethene	ND	5	ug/L			
Trichlorofluoromethane	ND	5	ug/L			
1,2,3-Trichloropropane	ND	5	ug/L			
Vinyl acetate	ND	50	ug/L			
Vinyl chloride	ND	10	ug/L			
Xylenes-total	ND	5	ug/L			
Dibromofluoromethane (Surrogate)	107	0	% Recovery	86-118% Limit		
Toluene-d8 (Surrogate)	104	0	% Recovery	88-110% Limit		
4-Bromofluorobenzene (Surrogate)	102	0	% Recovery	86-115% Limit		
Time Analyzed	1823	0				

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LABORATORY TESTS RESULTS
01/09/95

JOB NUMBER: 943236 CUSTOMER: DANIEL B. STEPHENS & ASSOCIATES ATTN: JEFF FORBES

CLIENT I.D.........: 4115.2
DATE SAMPLED.......: 12/22/94
TIME SAMPLED.......: 13:05
WORK DESCRIPTION...: WELL #5

LABORATORY I.D...: 943236-0002
DATE RECEIVED....: 12/28/94
TIME RECEIVED....: 14:15
REMARKS..........:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Alkalinity, Total (Unfilt.)	154	5	mg/L CaCO3	310.1 (1)	12/30/94	RPK
Chloride (Unfilt.)	750	5	mg/L	325.2 (1)	01/05/95	DME
Cyanide, Total (Unfilt.)	<0.02	0.02	mg/L	335.2 (1)	01/04/95	RJC
Nitrate + Nitrite (as N) [Unfilt.]	1.74	0.05	mg/L (as N)	353.2 (1)	01/03/95	DME
Solids, Total Dissolved (TDS)	2420	10	mg/L	160.1 (1)	12/28/94	RJC
Sulfate (Unfilt.)	768	200	mg/L	375.2 (1)	01/04/95	DME
Sulfide (Unfilt.)	<0.05	0.05	mg/L	376.2 (1)	12/29/94	SLS
Antimony, Total (Sb)	<0.1	0.1	mg/L	6010 (2)	12/30/94	WGL
Arsenic, Total (As)	<0.05	0.05	mg/L	6010 (2)	12/30/94	WGL
Barium, Total (Ba)	0.02	0.01	mg/L	6010 (2)	12/30/94	WGL
Beryllium, Total (Be)	<0.005	0.005	mg/L	6010 (2)	12/30/94	WGL
Cadmium, Total (Cd)	<0.005	0.005	mg/L	6010 (2)	12/30/94	WGL
Calcium, Total (Ca)	297	1	mg/L	6010 (2)	12/30/94	WGL
Chromium, Total (Cr)	<0.01	0.01	mg/L	6010 (2)	12/30/94	WGL
Cobalt, Total (Co)	<0.03	0.03	mg/L	6010 (2)	12/30/94	WGL
Copper, Total (Cu)	<0.01	0.01	mg/L	6010 (2)	12/30/94	WGL
Iron, Total (Fe)	0.32	0.03	mg/L	6010 (2)	12/30/94	WGL
Lead, Total (Pb)	<0.05	0.05	mg/L	6010 (2)	12/30/94	WGL
Mercury, Total (Hg)	<0.0002	0.0002	mg/L	7470 (2)	12/30/94	BPB
Magnesium, Total (Mg)	80.5	0.1	mg/L	6010 (2)	12/30/94	WGL
Manganese, Total (Mn)	<0.01	0.01	mg/L	6010 (2)	12/30/94	WGL
Nickel, Total (Ni)	<0.04	0.04	mg/L	6010 (2)	12/30/94	WGL
Potassium, Total (K)	1.7	0.1	mg/L	7610 (2)	01/04/95	BPB

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LABORATORY TESTS RESULTS
01/09/95

JOB NUMBER: 943236 CUSTOMER: DANIEL B. STEPHENS & ASSOCIATES ATTN: JEFF FORBES

CLIENT I.D.........: 4115.2
DATE SAMPLED.......: 12/22/94
TIME SAMPLED.......: 13:05
WORK DESCRIPTION...: WELL #5

LABORATORY I.D...: 943236-0002
DATE RECEIVED....: 12/28/94
TIME RECEIVED....: 14:15
REMARKS..........:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Selenium, Total (Se)	<0.1	0.1	mg/L	6010 (2)	12/30/94	WGL
Silver, Total (Ag)	<0.01	0.01	mg/L	6010 (2)	12/30/94	WGL
Sodium, Total (Na)	502	10	mg/L	6010 (2)	12/30/94	WGL
Thallium, Total (Tl)	<0.1	0.1	mg/L	6010 (2)	12/30/94	WGL
Tin, Total (Sn)	<0.05	0.05	mg/L	6010 (2)	12/30/94	WGL
Vanadium, Total (V)	<0.05	0.05	mg/L	6010 (2)	12/30/94	WGL
Zinc, Total (Zn)	<0.01	0.01	mg/L	6010 (2)	12/30/94	WGL
APPENDIX IX VOLATILE ORGANICS		*1		8240 (2)	12/30/94	MLA
Acetone	ND	100	ug/L			
Acetonitrile	ND	100	ug/L			
Acrolein	ND	50	ug/L			
Acrylonitrile	ND	20	ug/L			
Allyl chloride	ND	20	ug/L			
Benzene	ND	1	ug/L			
Bromodichloromethane	ND	5	ug/L			
Bromoform	ND	5	ug/L			
Bromomethane	ND	10	ug/L			
Carbon Disulfide	ND	5	ug/L			
Carbon tetrachloride	ND	5	ug/L			
Chlorobenzene	ND	5	ug/L			
Chloroethane	ND	10	ug/L			
Chloroform	ND	5	ug/L			
Chloromethane	ND	5	ug/L			
Chloroprene	ND	5	ug/L			
Dibromochloromethane	ND	5	ug/L			
1,2-Dibromo-3-chloropropane	ND	20	ug/L			
1,2-Dibromoethane	ND	20	ug/L			
Dibromomethane	ND	5	ug/L			
trans-1,4-Dichloro-2-butene	ND	50	ug/L			
Dichlorodifluoromethane	ND	10	ug/L			
1,1-Dichloroethane	ND	5	ug/L			
1,2-Dichloroethane	ND	5	ug/L			
1,1-Dichloroethene	ND	5	ug/L			
1,2-Dichloroethene (total)	ND	5	ug/L			
Dichloromethane	ND	5	ug/L			
1,2-Dichloropropane	ND	5	ug/L			
cis-1,3-Dichloropropene	ND	5	ug/L			

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LABORATORY TESTS RESULTS
01/09/95

JOB NUMBER: 943236 CUSTOMER: DANIEL B. STEPHENS & ASSOCIATES ATTN: JEFF FORBES

CLIENT I.D.........: 4115.2
DATE SAMPLED.......: 12/22/94
TIME SAMPLED.......: 13:05
WORK DESCRIPTION...: WELL #5

LABORATORY I.D...: 943236-0002
DATE RECEIVED....: 12/28/94
TIME RECEIVED....: 14:15
REMARKS..........:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
trans-1,3-Dichloropropene	ND	5	ug/L			
Ethyl benzene	ND	5	ug/L			
Ethyl methacrylate	ND	5	ug/L			
2-Hexanone	ND	50	ug/L			
Iodomethane	ND	5	ug/L			
Isobutyl alcohol	ND	50	ug/L			
Methylacrylonitrile	ND	50	ug/L			
2-Butanone	ND	100	ug/L			
Methyl isobutyl ketone	ND	50	ug/L			
Methyl methacrylate	ND	5	ug/L			
Propionitrile	ND	100	ug/L			
Styrene	ND	5	ug/L			
1,1,1,2-Tetrachloroethane	ND	5	ug/L			
1,1,2,2-Tetrachloroethane	ND	5	ug/L			
Tetrachloroethene	ND	5	ug/L			
Toluene	ND	5	ug/L			
1,1,1-Trichloroethane	ND	5	ug/L			
1,1,2-Trichloroethane	ND	5	ug/L			
Trichloroethene	ND	5	ug/L			
Trichlorofluoromethane	ND	5	ug/L			
1,2,3-Trichloropropane	ND	5	ug/L			
Vinyl acetate	ND	50	ug/L			
Vinyl chloride	ND	10	ug/L			
Xylenes-total	ND	5	ug/L			
Dibromofluoromethane (Surrogate)	110	0	% Recovery	86-118% Limit		
Toluene-d8 (Surrogate)	104	0	% Recovery	88-110% Limit		
4-Bromofluorobenzene (Surrogate)	102	0	% Recovery	86-115% Limit		
Time Analyzed	1859	0				

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01/09/95

JOB NUMBER: 943236   CUSTOMER: DANIEL B. STEPHENS & ASSOCIATES   ATTN: JEFF FORBES

LIENT I.D.........: 4115.2
ATE SAMPLED.......: 12/22/94
TIME SAMPLED.......: 16:45
ORK DESCRIPTION...: TW-1

LABORATORY I.D...: 943236-0003
DATE RECEIVED....: 12/28/94
TIME RECEIVED....: 14:15
REMARKS..........:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
lkalinity, Total (Unfilt.)	10	5	mg/L CaCO3	310.1 (1)	12/30/94	RPK
Chloride (Unfilt.)	631	5	mg/L	325.2 (1)	01/05/95	DME
yanide, Total (Unfilt.)	<0.02	0.02	mg/L	335.2 (1)	01/04/95	RJC
Nitrate + Nitrite (as N) [Unfilt.]	0.16	0.05	mg/L (as N)	353.2 (1)	01/03/95	DME
olids, Total Dissolved (TDS)	1290	10	mg/L	160.1 (1)	12/28/94	RJC
ulfate (Unfilt.)	140	10	mg/L	375.2 (1)	01/04/95	DME
ulfide (Unfilt.)	0.13	0.05	mg/L	376.2 (1)	12/29/94	SLS
ntimony, Total (Sb)	<0.1	0.1	mg/L	6010 (2)	12/30/94	WGL
Arsenic, Total (As)	<0.05	0.05	mg/L	6010 (2)	12/30/94	WGL
arium, Total (Ba)	0.14	0.01	mg/L	6010 (2)	12/30/94	WGL
Beryllium, Total (Be)	<0.005	0.005	mg/L	6010 (2)	12/30/94	WGL
admium, Total (Cd)	<0.005	0.005	mg/L	6010 (2)	12/30/94	WGL
Calcium, Total (Ca)	184	0.1	mg/L	6010 (2)	12/30/94	WGL
hromium, Total (Cr)	<0.01	0.01	mg/L	6010 (2)	12/30/94	WGL
obalt, Total (Co)	<0.03	0.03	mg/L	6010 (2)	12/30/94	WGL
opper, Total (Cu)	0.01	0.01	mg/L	6010 (2)	12/30/94	WGL
ron, Total (Fe)	4.22	0.03	mg/L	6010 (2)	12/30/94	WGL
Lead, Total (Pb)	0.06	0.05	mg/L	6010 (2)	12/30/94	WGL
ercury, Total (Hg)	<0.0002	0.0002	mg/L	7470 (2)	12/30/94	BPB
Magnesium, Total (Mg)	23.5	0.1	mg/L	6010 (2)	12/30/94	WGL
anganese, Total (Mn)	0.39	0.01	mg/L	6010 (2)	12/30/94	WGL
Nickel, Total (Ni)	<0.04	0.04	mg/L	6010 (2)	12/30/94	WGL
otassium, Total (K)	20.2	0.5	mg/L	7610 (2)	01/04/95	BPB

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LABORATORY TESTS RESULTS
01/09/95

JOB NUMBER: 943236 CUSTOMER: DANIEL B. STEPHENS & ASSOCIATES ATTN: JEFF FORBES

CLIENT I.D.........: 4115.2
DATE SAMPLED.......: 12/22/94
TIME SAMPLED.......: 16:45
WORK DESCRIPTION...: TW-1

LABORATORY I.D...: 943236-0003
DATE RECEIVED....: 12/28/94
TIME RECEIVED....: 14:15
REMARKS..........:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Selenium, Total (Se)	<0.1	0.1	mg/L	6010 (2)	12/30/94	WGL
Silver, Total (Ag)	<0.01	0.01	mg/L	6010 (2)	12/30/94	WGL
Sodium, Total (Na)	264	10	mg/L	6010 (2)	12/30/94	WGL
Thallium, Total (Tl)	<0.1	0.1	mg/L	6010 (2)	12/30/94	WGL
Tin, Total (Sn)	<0.05	0.05	mg/L	6010 (2)	12/30/94	WGL
Vanadium, Total (V)	<0.05	0.05	mg/L	6010 (2)	12/30/94	WGL
Zinc, Total (Zn)	0.05	0.01	mg/L	6010 (2)	12/30/94	WGL
APPENDIX IX VOLATILE ORGANICS		*1		8240 (2)	12/30/94	MLA
Acetone	ND	100	ug/L			
Acetonitrile	ND	100	ug/L			
Acrolein	ND	50	ug/L			
Acrylonitrile	ND	20	ug/L			
Allyl chloride	ND	20	ug/L			
Benzene	ND	1	ug/L			
Bromodichloromethane	ND	5	ug/L			
Bromoform	ND	5	ug/L			
Bromomethane	ND	10	ug/L			
Carbon Disulfide	ND	5	ug/L			
Carbon tetrachloride	ND	5	ug/L			
Chlorobenzene	ND	5	ug/L			
Chloroethane	ND	10	ug/L			
Chloroform	ND	5	ug/L			
Chloromethane	ND	5	ug/L			
Chloroprene	ND	5	ug/L			
Dibromochloromethane	ND	5	ug/L			
1,2-Dibromo-3-chloropropane	ND	20	ug/L			
1,2-Dibromoethane	ND	20	ug/L			
Dibromomethane	ND	5	ug/L			
trans-1,4-Dichloro-2-butene	ND	50	ug/L			
Dichlorodifluoromethane	ND	10	ug/L			
1,1-Dichloroethane	ND	5	ug/L			
1,2-Dichloroethane	ND	5	ug/L			
1,1-Dichloroethene	ND	5	ug/L			
1,2-Dichloroethene (total)	ND	5	ug/L			
Dichloromethane	ND	5	ug/L			
1,2-Dichloropropane	ND	5	ug/L			
cis-1,3-Dichloropropene	ND	5	ug/L			

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LABORATORY TESTS RESULTS
01/09/95

JOB NUMBER: 943236 CUSTOMER: DANIEL B. STEPHENS & ASSOCIATES ATTN: JEFF FORBES

CLIENT I.D.........: 4115.2
DATE SAMPLED.......: 12/22/94
TIME SAMPLED.......: 16:45
WORK DESCRIPTION...: TW-1

LABORATORY I.D...: 943236-0003
DATE RECEIVED....: 12/28/94
TIME RECEIVED....: 14:15
REMARKS..........:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
trans-1,3-Dichloropropene	ND	5	ug/L			
Ethyl benzene	ND	5	ug/L			
Ethyl methacrylate	ND	5	ug/L			
2-Hexanone	ND	50	ug/L			
Iodomethane	ND	5	ug/L			
Isobutyl alcohol	ND	50	ug/L			
Methylacrylonitrile	ND	50	ug/L			
2-Butanone	ND	100	ug/L			
Methyl isobutyl ketone	ND	50	ug/L			
Methyl methacrylate	ND	5	ug/L			
Propionitrile	ND	100	ug/L			
Styrene	ND	5	ug/L			
1,1,1,2-Tetrachloroethane	ND	5	ug/L			
1,1,2,2-Tetrachloroethane	ND	5	ug/L			
Tetrachloroethene	ND	5	ug/L			
Toluene	ND	5	ug/L			
1,1,1-Trichloroethane	ND	5	ug/L			
1,1,2-Trichloroethane	ND	5	ug/L			
Trichloroethene	ND	5	ug/L			
Trichlorofluoromethane	ND	5	ug/L			
1,2,3-Trichloropropane	ND	5	ug/L			
Vinyl acetate	ND	50	ug/L			
Vinyl chloride	ND	10	ug/L			
Xylenes-total	ND	5	ug/L			
Dibromofluoromethane (Surrogate)	111	0	% Recovery	86-118% Limit		
Toluene-d8 (Surrogate)	104	0	% Recovery	88-110% Limit		
4-Bromofluorobenzene (Surrogate)	102	0	% Recovery	86-115% Limit		
Time Analyzed	1936	0				
APPENDIX IX BNA ORGANICS		*1		8270 (2)	01/03/95	JMC
Acenaphthene	ND	10	ug/L			
Acenaphthylene	ND	10	ug/L			
2-Acetylaminofluorene	ND	10	ug/L			
Acetophenone	ND	10	ug/L			
4-Aminobiphenyl	ND	10	ug/L			
Aniline	ND	10	ug/L			
Anthracene	ND	10	ug/L			
Aramite	ND	10	ug/L			
Benzo(a)anthracene	ND	10	ug/L			
Benzo(b)fluoranthene	ND	10	ug/L			
Benzo(k)fluoranthene	ND	10	ug/L			
Benzo(a)pyrene	ND	10	ug/L			
Benzo(ghi)perylene	ND	10	ug/L			
Benzyl Alcohol	ND	20	ug/L			

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LABORATORY TESTS RESULTS
01/09/95

JOB NUMBER: 943236 CUSTOMER: DANIEL B. STEPHENS & ASSOCIATES ATTN: JEFF FORBES

CLIENT I.D.........: 4115.2
DATE SAMPLED.......: 12/22/94
TIME SAMPLED.......: 16:45
WORK DESCRIPTION...: TW-1

LABORATORY I.D...: 943236-0003
DATE RECEIVED....: 12/28/94
TIME RECEIVED....: 14:15
REMARKS..........:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Bis(2-chloroethoxy)methane	ND	10	ug/L			
Bis(2-chloroethyl)ether	ND	10	ug/L			
Bis(2-chloro-1-methylethyl)ether	ND	10	ug/L			
Bis(2-ethylhexyl)phthalate	18	10	ug/L			
4-Bromophenyl phenyl ether	ND	10	ug/L			
Butyl benzyl phthalate	ND	10	ug/L			
4-Chloroaniline	ND	20	ug/L			
2-Chloronaphthalene	ND	10	ug/L			
4-Chlorophenyl phenyl ether	ND	10	ug/L			
Chrysene	ND	10	ug/L			
Dibenzo(a,h)anthracene	ND	10	ug/L			
Dibenzofuran	ND	10	ug/L			
Di-n-butyl phthalate	ND	10	ug/L			
1,2-Dichlorobenzene	ND	10	ug/L			
1,3-Dichlorobenzene	ND	10	ug/L			
1,4-Dichlorobenzene	ND	10	ug/L			
3,3-Dichlorobenzidine	ND	20	ug/L			
Diethyl phthalate	ND	10	ug/L			
p-Dimethylaminoazobenzene	ND	10	ug/L			
7,12-Dimethylbenz(a)anthracene	ND	10	ug/L			
3,3-Dimethylbenzidine	ND	10	ug/L			
alpha,alpha-Dimethylphenethylamine	ND	10	ug/L			
Dimethyl phthalate	ND	10	ug/L			
m-Dinitrobenzene	ND	10	ug/L			
2,4-Dinitrotoluene	ND	10	ug/L			
2,6-Dinitrotoluene	ND	10	ug/L			
Di-n-octyl phthalate	ND	10	ug/L			
Diphenylamine	ND	10	ug/L			
Fluoranthene	ND	10	ug/L			
Fluorene	ND	10	ug/L			
Hexachlorobenzene	ND	10	ug/L			
Hexachlorobutadiene	ND	10	ug/L			
Hexachlorocyclopentadiene	ND	10	ug/L			
Hexachloroethane	ND	10	ug/L			
Hexachloropropene	ND	10	ug/L			
Indeno(1,2,3-cd)pyrene	ND	10	ug/L			
Isodrin	ND	10	ug/L			
Isophorone	ND	10	ug/L			
Isosafrole	ND	10	ug/L			
Kepone	ND	50	ug/L			
Methapyrilene	ND	10	ug/L			
3-Methylcholanthrene	ND	10	ug/L			
2-Methylnaphthalene	ND	10	ug/L			
Naphthalene	ND	10	ug/L			
1,4-Naphthoquinone	ND	10	ug/L			

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LABORATORY TESTS RESULTS
01/09/95

JOB NUMBER: 943236 CUSTOMER: DANIEL B. STEPHENS & ASSOCIATES ATTN: JEFF FORBES

CLIENT I.D.........: 4115.2
DATE SAMPLED.......: 12/22/94
TIME SAMPLED.......: 16:45
WORK DESCRIPTION...: TW-1

LABORATORY I.D...: 943236-0003
DATE RECEIVED....: 12/28/94
TIME RECEIVED....: 14:15
REMARKS..........:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
1-Naphthylamine	ND	10	ug/L			
2-Naphthylamine	ND	10	ug/L			
o-Nitroaniline	ND	50	ug/L			
m-Nitroaniline	ND	50	ug/L			
p-Nitroaniline	ND	50	ug/L			
Nitrobenzene	ND	10	ug/L			
4-Nitroquinoline 1-oxide	ND	10	ug/L			
N-Nitrosodi-n-butylamine	ND	10	ug/L			
N-Nitrosodiethylamine	ND	10	ug/L			
N-Nitrosodimethylamine	ND	10	ug/L			
N-Nitrosodiphenylamine	ND	10	ug/L			
N-Nitrosodipropylamine	ND	10	ug/L			
N-Nitrosomethylethylamine	ND	10	ug/L			
N-Nitrosomorpholine	ND	10	ug/L			
N-Nitrosopiperidine	ND	10	ug/L			
N-Nitrosopyrrolidine	ND	10	ug/L			
5-Nitro-o-toluidine	ND	10	ug/L			
Pentachlorobenzene	ND	10	ug/L			
Pentachloroethane	ND	10	ug/L			
Pentachloronitrobenzene	ND	10	ug/L			
Phenacetin	ND	10	ug/L			
p-Phenylenediamine	ND	10	ug/L			
Phenanthrene	ND	10	ug/L			
2-Picoline	ND	10	ug/L			
Pronamide	ND	10	ug/L			
Pyrene	ND	10	ug/L			
Pyridine	ND	10	ug/L			
Safrole	ND	10	ug/L			
1,2,4,5 Tetrachlorobenzene	ND	10	ug/L			
o-Toluidine	ND	10	ug/L			
1,2,4-Trichlorobenzene	ND	10	ug/L			
sym-Trinitrobenzene	ND	10	ug/L			
Chlorobenzilate	ND	10	ug/L			
4-Chloro-3-methylphenol	ND	20	ug/L			
2-Chlorophenol	ND	10	ug/L			
o-Cresol (2-Methylphenol)	ND	10	ug/L			
m & p-Cresol (3 & 4-Methylphenol)	ND	10	ug/L			
Diallate	ND	10	ug/L			
2,4-Dichlorophenol	ND	10	ug/L			
2,6-Dichlorophenol	ND	10	ug/L			
2,4-Dimethylphenol	ND	10	ug/L			
4,6-Dinitro-o-cresol	ND	50	ug/L			
2,4-Dinitrophenol	ND	50	ug/L			
Ethyl methanesulfonate	ND	10	ug/L			
Hexachlorophene	ND	200	ug/L			

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CORE LABORATORIES

L A B O R A T O R Y   T E S T S   R E S U L T S

01/09/95

JOB NUMBER: 943236   CUSTOMER: DANIEL B. STEPHENS & ASSOCIATES   ATTN: JEFF FORBES

CLIENT I.D.........: 4115.2	LABORATORY I.D...: 943236-0003
DATE SAMPLED.......: 12/22/94	DATE RECEIVED....: 12/28/94
TIME SAMPLED.......: 16:45	TIME RECEIVED....: 14:15
WORK DESCRIPTION...: TW-1	REMARKS..........:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Methyl methanesulfonate	ND	10	ug/L			
2-Nitrophenol	ND	10	ug/L			
4-Nitrophenol	ND	50	ug/L			
Pentachlorophenol	ND	50	ug/L			
Phenol	ND	10	ug/L			
2,3,4,6-Tetrachlorophenol	ND	10	ug/L			
2,4,5-Trichlorophenol	ND	10	ug/L			
2,4,6-Trichlorophenol	ND	10	ug/L			
Nitrobenzene-d5 (Surrogate)	99	0	% Recovery	35-114% Limit		
2-Fluorobiphenyl (Surrogate)	96	0	% Recovery	43-116% Limit		
4-Terphenyl-d14 (Surrogate)	94	0	% Recovery	33-141% Limit		
Phenol-d6 (Surrogate)	84	0	% Recovery	10-94% Limit		
2-Fluorophenol (Surrogate)	95	0	% Recovery	21-100% Limit		
2,4,6-Tribromophenol (Surrogate)	91	0	% Recovery	10-123% Limit		
Time Analyzed	1821	0				
Date Extracted	12/28/94	0				
APPENDX IX ORGANOCHLORINE PEST		*10		8080 (2)	12/29/94	LB
Aldrin	ND	0.040	ug/L			
alpha-BHC	ND	0.030	ug/L			
beta-BHC	ND	0.060	ug/L			
delta-BHC	ND	0.090	ug/L			
gamma-BHC	ND	0.040	ug/L			
Chlordane	ND	0.140	ug/L			
4,4'-DDD	ND	0.110	ug/L			
4,4'-DDE	ND	0.040	ug/L			
4,4'-DDT	ND	0.120	ug/L			
Dieldrin	ND	0.020	ug/L			
Endosulfan I	ND	0.140	ug/L			
Endosulfan II	ND	0.040	ug/L			
Endosulfan sulfate	ND	0.660	ug/L			
Endrin	ND	0.060	ug/L			
Endrin aldehyde	ND	0.230	ug/L			
Heptachlor	ND	0.030	ug/L			
Heptachlor epoxide	ND	0.830	ug/L			
Methoxychlor	ND	1.8	ug/L			
Toxaphene	ND	2.4	ug/L			
Aroclor 1016	ND	0.50	ug/L			
Aroclor 1221	ND	0.50	ug/L			
Aroclor 1232	ND	0.50	ug/L			
Aroclor 1242	ND	0.50	ug/L			
Aroclor 1248	ND	0.50	ug/L			
Aroclor 1254	ND	0.50	ug/L			
Aroclor 1260	ND	0.50	ug/L			

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CORE LABORATORIES

LABORATORY TESTS RESULTS
01/09/95

JOB NUMBER: 943236 CUSTOMER: DANIEL B. STEPHENS & ASSOCIATES ATTN: JEFF FORBES

CLIENT I.D.........: 4115.2
DATE SAMPLED.......: 12/22/94
TIME SAMPLED.......: 16:45
WORK DESCRIPTION...: TW-1

LABORATORY I.D...: 943236-0003
DATE RECEIVED....: 12/28/94
TIME RECEIVED....: 14:15
REMARKS..........:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
2,4,5,6-Tetrachloro-m-xylene(Surr)	100	0	% Recovery	60-150% Limit		
Decachlorobiphenyl (Surrogate)	83	0	% Recovery	60-150% Limit		
Time Analyzed	1610	0				
Date Extracted	12/28/94	0				

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CORE LABORATORIES

LABORATORY TESTS RESULTS
01/09/95

JOB NUMBER: 943236 CUSTOMER: DANIEL B. STEPHENS & ASSOCIATES ATTN: JEFF FORBES

CLIENT I.D.........:
DATE SAMPLED.......: / /
TIME SAMPLED.......: :
WORK DESCRIPTION...: METHOD BLANK

LABORATORY I.D...: 943236-0004
DATE RECEIVED....: / /
TIME RECEIVED....: :
REMARKS..........:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
APPENDIX IX VOLATILE ORGANICS		*1		8240 (2)	12/30/94	MLA
Acetone	ND	100	ug/L			
Acetonitrile	ND	100	ug/L			
Acrolein	ND	50	ug/L			
Acrylonitrile	ND	20	ug/L			
Allyl chloride	ND	20	ug/L			
Benzene	ND	1	ug/L			
Bromodichloromethane	ND	5	ug/L			
Bromoform	ND	5	ug/L			
Bromomethane	ND	10	ug/L			
Carbon Disulfide	ND	5	ug/L			
Carbon tetrachloride	ND	5	ug/L			
Chlorobenzene	ND	5	ug/L			
Chloroethane	ND	10	ug/L			
Chloroform	ND	5	ug/L			
Chloromethane	ND	5	ug/L			
Chloroprene	ND	5	ug/L			
Dibromochloromethane	ND	5	ug/L			
1,2-Dibromo-3-chloropropane	ND	20	ug/L			
1,2-Dibromoethane	ND	20	ug/L			
Dibromomethane	ND	5	ug/L			
trans-1,4-Dichloro-2-butene	ND	50	ug/L			
Dichlorodifluoromethane	ND	10	ug/L			
1,1-Dichloroethane	ND	5	ug/L			
1,2-Dichloroethane	ND	5	ug/L			
1,1-Dichloroethene	ND	5	ug/L			
1,2-Dichloroethene (total)	ND	5	ug/L			
Dichloromethane	ND	5	ug/L			
1,2-Dichloropropane	ND	5	ug/L			
cis-1,3-Dichloropropene	ND	5	ug/L			
trans-1,3-Dichloropropene	ND	5	ug/L			
Ethyl benzene	ND	5	ug/L			
Ethyl methacrylate	ND	5	ug/L			
2-Hexanone	ND	50	ug/L			
Iodomethane	ND	5	ug/L			
Isobutyl alcohol	ND	50	ug/L			
Methylacrylonitrile	ND	50	ug/L			
2-Butanone	ND	100	ug/L			
Methyl isobutyl ketone	ND	50	ug/L			
Methyl methacrylate	ND	5	ug/L			
Propionitrile	ND	100	ug/L			
Styrene	ND	5	ug/L			
1,1,1,2-Tetrachloroethane	ND	5	ug/L			
1,1,2,2-Tetrachloroethane	ND	5	ug/L			

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L A B O R A T O R Y   T E S T S   R E S U L T S
01/09/95

JOB NUMBER: 943236   CUSTOMER: DANIEL B. STEPHENS & ASSOCIATES   ATTN: JEFF FORBES

CLIENT I.D.........:
DATE SAMPLED.......: / /
TIME SAMPLED.......: :
WORK DESCRIPTION...: METHOD BLANK

LABORATORY I.D...: 943236-0004
DATE RECEIVED....: / /
TIME RECEIVED....: :
REMARKS..........:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Tetrachloroethene	ND	5	ug/L			
Toluene	ND	5	ug/L			
1,1,1-Trichloroethane	ND	5	ug/L			
1,1,2-Trichloroethane	ND	5	ug/L			
Trichloroethene	ND	5	ug/L			
Trichlorofluoromethane	ND	5	ug/L			
1,2,3-Trichloropropane	ND	5	ug/L			
Vinyl acetate	ND	50	ug/L			
Vinyl chloride	ND	10	ug/L			
Xylenes-total	ND	5	ug/L			
Dibromofluoromethane (Surrogate)	108	0	% Recovery	86-118% Limit		
Toluene-d8 (Surrogate)	103	0	% Recovery	88-110% Limit		
4-Bromofluorobenzene (Surrogate)	102	0	% Recovery	86-115% Limit		
Time Analyzed	1746	0				
APPENDIX IX BNA ORGANICS		*1		8270 (2)	01/03/95	JMC
Acenaphthene	ND	10	ug/L			
Acenaphthylene	ND	10	ug/L			
2-Acetylaminofluorene	ND	10	ug/L			
Acetophenone	ND	10	ug/L			
4-Aminobiphenyl	ND	10	ug/L			
Aniline	ND	10	ug/L			
Anthracene	ND	10	ug/L			
Aramite	ND	10	ug/L			
Benzo(a)anthracene	ND	10	ug/L			
Benzo(b)fluoranthene	ND	10	ug/L			
Benzo(k)fluoranthene	ND	10	ug/L			
Benzo(a)pyrene	ND	10	ug/L			
Benzo(ghi)perylene	ND	10	ug/L			
Benzyl Alcohol	ND	20	ug/L			
Bis(2-chloroethoxy)methane	ND	10	ug/L			
Bis(2-chloroethyl)ether	ND	10	ug/L			
Bis(2-chloro-1-methylethyl)ether	ND	10	ug/L			
Bis(2-ethylhexyl)phthalate	ND	10	ug/L			
4-Bromophenyl phenyl ether	ND	10	ug/L			
Butyl benzyl phthalate	ND	10	ug/L			
4-Chloroaniline	ND	20	ug/L			
2-Chloronaphthalene	ND	10	ug/L			
4-Chlorophenyl phenyl ether	ND	10	ug/L			
Chrysene	ND	10	ug/L			
Dibenzo(a,h)anthracene	ND	10	ug/L			
Dibenzofuran	ND	10	ug/L			
Di-n-butyl phthalate	ND	10	ug/L			
1,2-Dichlorobenzene	ND	10	ug/L			

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LABORATORY TESTS RESULTS
01/09/95

JOB NUMBER: 943236 CUSTOMER: DANIEL B. STEPHENS & ASSOCIATES ATTN: JEFF FORBES

CLIENT I.D.........:
DATE SAMPLED.......: / /
TIME SAMPLED.......: :
WORK DESCRIPTION...: METHOD BLANK

LABORATORY I.D...: 943236-0004
DATE RECEIVED....: / /
TIME RECEIVED....: :
REMARKS..........:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
1,3-Dichlorobenzene	ND	10	ug/L			
1,4-Dichlorobenzene	ND	10	ug/L			
3,3-Dichlorobenzidine	ND	20	ug/L			
Diethyl phthalate	ND	10	ug/L			
p-Dimethylaminoazobenzene	ND	10	ug/L			
7,12-Dimethylbenz(a)anthracene	ND	10	ug/L			
3,3-Dimethylbenzidine	ND	10	ug/L			
alpha,alpha-Dimethylphenethylamine	ND	10	ug/L			
Dimethyl phthalate	ND	10	ug/L			
m-Dinitrobenzene	ND	10	ug/L			
2,4-Dinitrotoluene	ND	10	ug/L			
2,6-Dinitrotoluene	ND	10	ug/L			
Di-n-octyl phthalate	ND	10	ug/L			
Diphenylamine	ND	10	ug/L			
Fluoranthene	ND	10	ug/L			
Fluorene	ND	10	ug/L			
Hexachlorobenzene	ND	10	ug/L			
Hexachlorobutadiene	ND	10	ug/L			
Hexachlorocyclopentadiene	ND	10	ug/L			
Hexachloroethane	ND	10	ug/L			
Hexachloropropene	ND	10	ug/L			
Indeno(1,2,3-cd)pyrene	ND	10	ug/L			
Isodrin	ND	10	ug/L			
Isophorone	ND	10	ug/L			
Isosafrole	ND	10	ug/L			
Kepone	ND	50	ug/L			
Methapyrilene	ND	10	ug/L			
3-Methylcholanthrene	ND	10	ug/L			
2-Methylnaphthalene	ND	10	ug/L			
Naphthalene	ND	10	ug/L			
1,4-Naphthoquinone	ND	10	ug/L			
1-Naphthylamine	ND	10	ug/L			
2-Naphthylamine	ND	10	ug/L			
o-Nitroaniline	ND	50	ug/L			
m-Nitroaniline	ND	50	ug/L			
p-Nitroaniline	ND	50	ug/L			
Nitrobenzene	ND	10	ug/L			
4-Nitroquinoline 1-oxide	ND	10	ug/L			
N-Nitrosodi-n-butylamine	ND	10	ug/L			
N-Nitrosodiethylamine	ND	10	ug/L			
N-Nitrosodimethylamine	ND	10	ug/L			
N-Nitrosodiphenylamine	ND	10	ug/L			
N-Nitrosodipropylamine	ND	10	ug/L			
N-Nitrosomethylethylamine	ND	10	ug/L			
N-Nitrosomorpholine	ND	10	ug/L			

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CORE LABORATORIES

LABORATORY TESTS RESULTS
01/09/95

JOB NUMBER: 943236 CUSTOMER: DANIEL B. STEPHENS & ASSOCIATES ATTN: JEFF FORBES

CLIENT I.D.........:
DATE SAMPLED.......: / /
TIME SAMPLED.......: :
WORK DESCRIPTION...: METHOD BLANK

LABORATORY I.D...: 943236-0004
DATE RECEIVED....: / /
TIME RECEIVED....: :
REMARKS..........:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
N-Nitrosopiperidine	ND	10	ug/L			
N-Nitrosopyrrolidine	ND	10	ug/L			
5-Nitro-o-toluidine	ND	10	ug/L			
Pentachlorobenzene	ND	10	ug/L			
Pentachloroethane	ND	10	ug/L			
Pentachloronitrobenzene	ND	10	ug/L			
Phenacetin	ND	10	ug/L			
p-Phenylenediamine	ND	10	ug/L			
Phenanthrene	ND	10	ug/L			
2-Picoline	ND	10	ug/L			
Pronamide	ND	10	ug/L			
Pyrene	ND	10	ug/L			
Pyridine	ND	10	ug/L			
Safrole	ND	10	ug/L			
1,2,4,5 Tetrachlorobenzene	ND	10	ug/L			
o-Toluidine	ND	10	ug/L			
1,2,4-Trichlorobenzene	ND	10	ug/L			
sym-Trinitrobenzene	ND	10	ug/L			
Chlorobenzilate	ND	10	ug/L			
4-Chloro-3-methylphenol	ND	20	ug/L			
2-Chlorophenol	ND	10	ug/L			
o-Cresol (2-Methylphenol)	ND	10	ug/L			
m & p-Cresol (3 & 4-Methylphenol)	ND	10	ug/L			
Diallate	ND	10	ug/L			
2,4-Dichlorophenol	ND	10	ug/L			
2,6-Dichlorophenol	ND	10	ug/L			
2,4-Dimethylphenol	ND	10	ug/L			
4,6-Dinitro-o-cresol	ND	50	ug/L			
2,4-Dinitrophenol	ND	50	ug/L			
Ethyl methanesulfonate	ND	10	ug/L			
Hexachlorophene	ND	200	ug/L			
Methyl methanesulfonate	ND	10	ug/L			
2-Nitrophenol	ND	10	ug/L			
4-Nitrophenol	ND	50	ug/L			
Pentachlorophenol	ND	50	ug/L			
Phenol	ND	10	ug/L			
2,3,4,6-Tetrachlorophenol	ND	10	ug/L			
2,4,5-Trichlorophenol	ND	10	ug/L			
2,4,6-Trichlorophenol	ND	10	ug/L			
Nitrobenzene-d5 (Surrogate)	100	0	% Recovery	35-114% Limit		
2-Fluorobiphenyl (Surrogate)	96	0	% Recovery	43-116% Limit		
4-Terphenyl-d14 (Surrogate)	94	0	% Recovery	33-141% Limit		
Phenol-d6 (Surrogate)	83	0	% Recovery	10-94% Limit		
2-Fluorophenol (Surrogate)	97	0	% Recovery	21-100% Limit		
2,4,6-Tribromophenol (Surrogate)	88	0	% Recovery	10-123% Limit		

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CORE LABORATORIES

LABORATORY TESTS RESULTS
01/09/95

JOB NUMBER: 943236 CUSTOMER: DANIEL B. STEPHENS & ASSOCIATES ATTN: JEFF FORBES

CLIENT I.D.........:
DATE SAMPLED.......: / /
TIME SAMPLED.......: :
WORK DESCRIPTION...: METHOD BLANK

LABORATORY I.D...: 943236-0004
DATE RECEIVED....: / /
TIME RECEIVED....: :
REMARKS..........:

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Time Analyzed	1625	0				
Date Extracted	12/28/94	0				
APPENDX IX ORGANOCHLORINE PEST		*10		8080 (2)	12/29/94	LB
Aldrin	ND	0.040	ug/L			
alpha-BHC	ND	0.030	ug/L			
beta-BHC	ND	0.060	ug/L			
delta-BHC	ND	0.090	ug/L			
gamma-BHC	ND	0.040	ug/L			
Chlordane	ND	0.140	ug/L			
4,4'-DDD	ND	0.110	ug/L			
4,4'-DDE	NC	0.040	ug/L			
4,4'-DDT	ND	0.120	ug/L			
Dieldrin	ND	0.020	ug/L			
Endosulfan I	ND	0.140	ug/L			
Endosulfan II	ND	0.040	ug/L			
Endosulfan sulfate	ND	0.660	ug/L			
Endrin	ND	0.060	ug/L			
Endrin aldehyde	ND	0.230	ug/L			
Heptachlor	ND	0.030	ug/L			
Heptachlor epoxide	ND	0.830	ug/L			
Methoxychlor	ND	1.8	ug/L			
Toxaphene	ND	2.4	ug/L			
Aroclor 1016	ND	0.50	ug/L			
Aroclor 1221	ND	0.50	ug/L			
Aroclor 1232	ND	0.50	ug/L			
Aroclor 1242	ND	0.50	ug/L			
Aroclor 1248	ND	0.50	ug/L			
Aroclor 1254	ND	0.50	ug/L			
Aroclor 1260	ND	0.50	ug/L			
2,4,5,6-Tetrachloro-m-xylene(Surr)	102	0	% Recovery	60-150% Limit		
Decachlorobiphenyl (Surrogate)	90	0	% Recovery	60-150% Limit		
Time Analyzed	1512	0				
Date Extracted	12/28/94	0				

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CORE LABORATORIES

QUALITY CONTROL REPORT
01/09/95

JOB NUMBER: 943236 CUSTOMER: DANIEL B. STEPHENS & ASSOCIATES ATTN: JEFF FORBES

ANALYSIS				DUPLICATES		REFERENCE STANDARDS		MATRIX SPIKES		
ANALYSIS TYPE	ANALYSIS SUB-TYPE	ANALYSIS I.D.	ANALYZED VALUE (A)	DUPLICATE VALUE (B)	RPD or (|A-B|)	TRUE VALUE	PERCENT RECOVERY	ORIGINAL VALUE	SPIKE ADDED	PERCENT RECOVERY
PARAMETER:Sulfide (Unfilt.) REPORTING LIMIT/DF: 0.05 UNITS:mg/L				DATE/TIME ANALYZED:12/29/94 10:30 METHOD REFERENCE :376.2 (1)				QC BATCH NUMBER:317418 TECHNICIAN:SLS		
BLANK	ICB	S0	<0.05							
BLANK	CCB	S0	<0.05							
STANDARD	ICV	S0.40	0.41			0.40	102			
STANDARD	CCV	S0.80	0.83			0.80	104			
SPIKE	MS	943236-2	0.73					<0.05	0.92	79
DUPLICATE	MD	943236-2	<0.05	<0.05	NC					
PARAMETER:Solids, Total Dissolved (TDS) REPORTING LIMIT/DF: 10 UNITS:mg/L				DATE/TIME ANALYZED:12/28/94 15:00 METHOD REFERENCE :160.1 (1)				QC BATCH NUMBER:317433 TECHNICIAN:RJC		
BLANK	MB	941228	<10							
STANDARD	LCS	G941121A	494			500	99			
DUPLICATE	MD	943222-1	9150	9200	1					
DUPLICATE	MD	943236-2	2420	2430	0					
DUPLICATE	MD	943197-1	169	172	2					
PARAMETER:Mercury, Total (Hg) REPORTING LIMIT/DF: 0.0002UNITS:mg/L				DATE/TIME ANALYZED:12/30/94 10:30 METHOD REFERENCE :7470 (2)				QC BATCH NUMBER:317483 TECHNICIAN:BPB		
BLANK	ICB	12304	<0.0002							
BLANK	CCB	12304	<0.0002							
BLANK	CCB	12304	<0.0002							
BLANK	CCB	12304	<0.0002							
STANDARD	ICV	1121H	0.0041			0.0040	103			
STANDARD	CCV	1013P	0.0024			0.0025	96			
STANDARD	CCV	1013P	0.0024			0.0025	96			
STANDARD	CCV	1013P	0.0024			0.0025	96			
SPIKE	MS	943236-003	0.0049					<0.0002	0.0050	98
DUPLICATE	MD	943236-002	<0.0002	<0.0002	NC					
PARAMETER:Alkalinity, Total (Unfilt.) REPORTING LIMIT/DF: 5 UNITS:mg/L CaCO3				DATE/TIME ANALYZED:12/30/94 08:00 METHOD REFERENCE :310.1 (1)				QC BATCH NUMBER:317488 TECHNICIAN:RPK		
BLANK	MB	941230	<5							
STANDARD	LCS	G941027A	167			167	100			
DUPLICATE	MD	943197-9	54	50	8					
DUPLICATE	MD	943197-18	54	55	2					
DUPLICATE	MD	943197-24	60	58	3					
DUPLICATE	MD	943197-28	70	70	0					
DUPLICATE	MD	943230-14	116	110	5					
PARAMETER:Silver, Total (Ag) REPORTING LIMIT/DF: 0.01 UNITS:mg/L				DATE/TIME ANALYZED:12/30/94 13:24 METHOD REFERENCE :6010 (2)				QC BATCH NUMBER:317511 TECHNICIAN:WGL		
BLANK	ICB	1212J	<0.01							
BLANK	CCB	1212J	<0.01							

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JOB NUMBER: 943236 CUSTOMER: DANIEL B. STEPHENS & ASSOCIATES ATTN: JEFF FORBES

ANALYSIS				DUPLICATES		REFERENCE STANDARDS		MATRIX SPIKES		
ANALYSIS TYPE	ANALYSIS SUB-TYPE	ANALYSIS I.D.	ANALYZED VALUE (A)	DUPLICATE VALUE (B)	RPD or (|A-B|)	TRUE VALUE	PERCENT RECOVERY	ORIGINAL VALUE	SPIKE ADDED	PERCENT RECOVERY
PARAMETER:Silver, Total (Ag) REPORTING LIMIT/DF: 0.01 UNITS:mg/L				DATE/TIME ANALYZED:12/30/94 13:24 METHOD REFERENCE :6010 (2)				QC BATCH NUMBER:317511 TECHNICIAN:WGL		
BLANK	MB	1229	<0.01							
BLANK	MB	1229	<0.01							
BLANK	CCB	1212J	<0.01							
BLANK	CCB	1212J	<0.01							
BLANK	CCB	1212J	<0.01							
BLANK	CCB	1212J	<0.01							
BLANK	CCB	1212J	<0.01							
STANDARD	CCV	0913K	2.47			2.50	99			
STANDARD	ICV	0801S	1.03			1.00	103			
STANDARD	CCV	0913K	2.47			2.50	99			
STANDARD	ISB	1123J	0.97			1.00	97			
STANDARD	CCV	0913K	2.49			2.50	100			
STANDARD	CCV	0913K	2.48			2.50	99			
STANDARD	CCV	0913K	2.54			2.50	102			
STANDARD	ISB	1123J	1.09			1.00	109			
STANDARD	CCV	0913K	2.57			2.50	103			
STANDARD	LCS	1222G	1.15			1.00	115			
STANDARD	LCS	1222G	1.16			1.00	116			
SPIKE	MS	943176-002	1.12					<0.01	1.00	112
SPIKE	MS	943227-001	1.13					<0.01	1.00	113
DUPLICATE	MD	943176-001	<0.01	<0.01	NC					
DUPLICATE	MD	943212-006	<0.01	<0.01	NC					
PARAMETER:Arsenic, Total (As) REPORTING LIMIT/DF: 0.05 UNITS:mg/L				DATE/TIME ANALYZED:12/30/94 10:28 METHOD REFERENCE :6010 (2)				QC BATCH NUMBER:317512 TECHNICIAN:WGL		
BLANK	ICB	1212J	<0.05							
BLANK	CCB	1212J	<0.05							
BLANK	MB	1229	<0.05							
BLANK	MB	1229	<0.05							
BLANK	CCB	1212J	<0.05							
BLANK	CCB	1212J	<0.05							
BLANK	CCB	1212J	<0.05							
BLANK	CCB	1212J	<0.05							
BLANK	CCB	1212J	<0.05							
STANDARD	CCV	1017J	2.55			2.50	102			
STANDARD	ICV	1122D	2.07			2.00	103			
STANDARD	CCV	1017J	2.60			2.50	104			
STANDARD	ISB	1123J	1.00			1.00	100			
STANDARD	CCV	1017J	2.58			2.50	103			
STANDARD	CCV	1017J	2.53			2.50	101			
STANDARD	CCV	1017J	2.65			2.50	106			
STANDARD	ISB	1123J	1.03			1.00	103			
STANDARD	CCV	1017J	2.68			2.50	107			
STANDARD	LCS	1222G	1.03			1.00	103			
STANDARD	LCS	1222G	1.03			1.00	103			

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JOB NUMBER: 943236 CUSTOMER: DANIEL B. STEPHENS & ASSOCIATES ATTN: JEFF FORBES

ANALYSIS				DUPLICATES		REFERENCE STANDARDS		MATRIX SPIKES		
ANALYSIS TYPE	ANALYSIS SUB-TYPE	ANALYSIS I.D.	ANALYZED VALUE (A)	DUPLICATE VALUE (B)	RPD or (|A-B|)	TRUE VALUE	PERCENT RECOVERY	ORIGINAL VALUE	SPIKE ADDED	PERCENT RECOVERY
PARAMETER:Arsenic, Total (As) REPORTING LIMIT/DF: 0.05 UNITS:mg/L				DATE/TIME ANALYZED:12/30/94 10:28 METHOD REFERENCE :6010 (2)				QC BATCH NUMBER:317512 TECHNICIAN:WGL		
SPIKE	MS	943176-002	0.97					<0.05	1.00	97
SPIKE	MS	943227-001	0.96					<0.05	1.00	96
DUPLICATE	MD	943212-006	<0.05	<0.05	NC					
DUPLICATE	MD	943176-001	<0.05	<0.05	NC					
PARAMETER:Barium, Total (Ba) REPORTING LIMIT/DF: 0.01 UNITS:mg/L				DATE/TIME ANALYZED:12/30/94 13:24 METHOD REFERENCE :6010 (2)				QC BATCH NUMBER:317513 TECHNICIAN:WGL		
BLANK	ICB	1212J	<0.01							
BLANK	CCB	1212J	<0.01							
BLANK	MB	1229	<0.01							
BLANK	MB	1229	<0.01							
BLANK	CCB	1212J	<0.01							
BLANK	CCB	1212J	<0.01							
BLANK	CCB	1212J	<0.01							
BLANK	CCB	1212J	<0.01							
BLANK	CCB	1212J	<0.01							
STANDARD	CCV	1017J	5.01			5.00	100			
STANDARD	ICV	0801S	1.03			1.00	103			
STANDARD	CCV	1017J	5.10			5.00	102			
STANDARD	ISB	1123J	0.49			0.50	98			
STANDARD	CCV	1017J	5.04			5.00	101			
STANDARD	CCV	1017J	4.95			5.00	99			
STANDARD	CCV	1017J	5.17			5.00	103			
STANDARD	ISB	1123J	0.50			0.50	100			
STANDARD	CCV	1017J	5.06			5.00	101			
STANDARD	LCS	1222G	1.04			1.00	104			
STANDARD	LCS	1222G	1.04			1.00	104			
SPIKE	MS	943176-002	1.08					0.14	1.00	94
SPIKE	MS	943227-001	1.02					0.06	1.00	96
DUPLICATE	MD	943176-001	0.14	0.15	7					
DUPLICATE	MD	943212-006	<0.01	<0.01	NC					
PARAMETER:Beryllium, Total (Be) REPORTING LIMIT/DF: 0.005 UNITS:mg/L				DATE/TIME ANALYZED:12/30/94 13:24 METHOD REFERENCE :6010 (2)				QC BATCH NUMBER:317514 TECHNICIAN:WGL		
BLANK	ICB	1212J	<0.005							
BLANK	CCB	1212J	<0.005							
BLANK	MB	1229	<0.005							
BLANK	MB	1229	<0.005							
BLANK	CCB	1212J	<0.005							
BLANK	CCB	1212J	<0.005							
BLANK	CCB	1212J	<0.005							
BLANK	CCB	1212J	<0.005							
BLANK	CCB	1212J	<0.005							
STANDARD	CCV	1017J	2.52			2.50	101			

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ANALYSIS				DUPLICATES		REFERENCE STANDARDS		MATRIX SPIKES		
ANALYSIS TYPE	ANALYSIS SUB-TYPE	ANALYSIS I.D.	ANALYZED VALUE (A)	DUPLICATE VALUE (B)	RPD or (|A-B|)	TRUE VALUE	PERCENT RECOVERY	ORIGINAL VALUE	SPIKE ADDED	PERCENT RECOVERY
PARAMETER:Beryllium, Total (Be) REPORTING LIMIT/DF: 0.005 UNITS:mg/L				DATE/TIME ANALYZED:12/30/94 13:24 METHOD REFERENCE :6010 (2)				QC BATCH NUMBER:317514 TECHNICIAN:WGL		
STANDARD	ICV	1122D	2.10			2.00	105			
STANDARD	CCV	1017J	2.60			2.50	104			
STANDARD	ISB	1123J	0.481			0.500	96			
STANDARD	CCV	1017J	2.53			2.50	101			
STANDARD	CCV	1017J	2.51			2.50	100			
STANDARD	CCV	1017J	2.52			2.50	101			
STANDARD	ISB	1123J	0.481			0.500	96			
STANDARD	CCV	1017J	2.57			2.50	103			
STANDARD	LCS	1222G	1.05			1.00	105			
STANDARD	LCS	1222G	1.04			1.00	104			
SPIKE	MS	943176-002	0.946					<0.005	1.00	95
SPIKE	MS	943227-001	0.949					<0.005	1.00	95
DUPLICATE	MD	943176-001	<0.005	<0.005	NC					
DUPLICATE	MD	943212-006	<0.005	<0.005	NC					
PARAMETER:Calcium, Total (Ca) REPORTING LIMIT/DF: 0.1 UNITS:mg/L				DATE/TIME ANALYZED:12/30/94 13:24 METHOD REFERENCE :6010 (2)				QC BATCH NUMBER:317515 TECHNICIAN:WGL		
BLANK	ICB	1212J	<0.1							
BLANK	CCB	1212J	<0.1							
BLANK	MB	1229	<0.1							
BLANK	MB	1229	<0.1							
BLANK	CCB	1212J	<0.1							
BLANK	CCB	1212J	<0.1							
BLANK	CCB	1212J	<0.1							
BLANK	CCB	1212J	<0.1							
BLANK	CCB	1212J	<0.1							
STANDARD	CCV	0913K	101			100	101			
STANDARD	CCV	0913K	100			100	100			
STANDARD	CCV	0913K	102			100	102			
STANDARD	ICV	0426G	105			100	105			
STANDARD	CCV	0913K	97.6			100	98			
STANDARD	ISA	09260	478			500	96			
STANDARD	CCV	0913K	103			100	103			
STANDARD	ISB	1123J	456			500	91			
STANDARD	ISA	09260	483			500	97			
STANDARD	ISB	1123J	460			500	92			
STANDARD	CCV	0913K	102			100	102			
STANDARD	LCS	1101S	109			100	109			
STANDARD	LCS	1101S	106			100	106			
SPIKE	MS	943176-002	125					75.0	50.0	100
SPIKE	MS	943227-001	63.4					11.4	50.0	104
DUPLICATE	MD	943176-001	72.8	74.7	3					
DUPLICATE	MD	943212-006	0.1	<0.1	0.1					

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JOB NUMBER: 943236 CUSTOMER: DANIEL B. STEPHENS & ASSOCIATES ATTN: JEFF FORBES

PARAMETER:Cadmium, Total (Cd) DATE/TIME ANALYZED:12/30/94 10:28 QC BATCH NUMBER:317516
REPORTING LIMIT/DF: 0.005 UNITS:mg/L METHOD REFERENCE :6010 (2) TECHNICIAN:WGL

ANALYSIS				DUPLICATES		REFERENCE STANDARDS		MATRIX SPIKES		
ANALYSIS TYPE	ANALYSIS SUB-TYPE	ANALYSIS I.D.	ANALYZED VALUE (A)	DUPLICATE VALUE (B)	RPD or (|A-B|)	TRUE VALUE	PERCENT RECOVERY	ORIGINAL VALUE	SPIKE ADDED	PERCENT RECOVERY
BLANK	ICB	1212J	<0.005							
BLANK	CCB	1212J	<0.005							
BLANK	MB	1229	<0.005							
BLANK	MB	1229	<0.005							
BLANK	CCB	1212J	<0.005							
BLANK	CCB	1212J	<0.005							
BLANK	CCB	1212J	<0.005							
BLANK	CCB	1212J	<0.005							
BLANK	CCB	1212J	<0.005							
STANDARD	CCV	1017J	0.971			1.00	97			
STANDARD	ICV	1122D	1.94			2.00	97			
STANDARD	CCV	1017J	0.990			1.00	99			
STANDARD	ISB	1123J	0.852			1.00	85			
STANDARD	CCV	1017J	0.990			1.00	99			
STANDARD	CCV	1017J	0.958			1.00	96			
STANDARD	CCV	1017J	1.03			1.00	103			
STANDARD	ISB	1123J	0.905			1.00	90			
STANDARD	CCV	1017J	1.04			1.00	104			
STANDARD	LCS	1222G	0.994			1.00	99			
STANDARD	LCS	1222G	0.997			1.00	100			
SPIKE	MS	943227-001	0.895					<0.005	1.00	90
DUPLICATE	MD	943212-006	<0.005	<0.005	NC					
DUPLICATE	MD	943176-001	<0.005	<0.005	NC					

PARAMETER:Cobalt, Total (Co) DATE/TIME ANALYZED:12/30/94 10:28 QC BATCH NUMBER:317517
REPORTING LIMIT/DF: 0.03 UNITS:mg/L METHOD REFERENCE :6010 (2) TECHNICIAN:WGL

ANALYSIS TYPE	ANALYSIS SUB-TYPE	ANALYSIS I.D.	ANALYZED VALUE (A)	DUPLICATE VALUE (B)	RPD or (|A-B|)	TRUE VALUE	PERCENT RECOVERY	ORIGINAL VALUE	SPIKE ADDED	PERCENT RECOVERY
BLANK	ICB	1212J	<0.03							
BLANK	CCB	1212J	<0.03							
BLANK	MB	1229	<0.03							
BLANK	MB	1229	<0.03							
BLANK	CCB	1212J	<0.03							
BLANK	CCB	1212J	<0.03							
BLANK	CCB	1212J	<0.03							
BLANK	CCB	1212J	<0.03							
BLANK	CCB	1212J	<0.03							
STANDARD	CCV	1017J	2.45			2.50	98			
STANDARD	ICV	1122D	2.04			2.00	102			
STANDARD	CCV	1017J	2.50			2.50	100			
STANDARD	ISB	1123J	0.45			0.50	90			
STANDARD	CCV	1017J	2.48			2.50	99			
STANDARD	CCV	1017J	2.45			2.50	98			
STANDARD	CCV	1017J	2.58			2.50	103			
STANDARD	ISB	1123J	0.45			0.50	90			
STANDARD	CCV	1017J	2.50			2.50	100			
STANDARD	LCS	1222G	1.02			1.00	102			

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ANALYSIS				DUPLICATES		REFERENCE STANDARDS		MATRIX SPIKES		
ANALYSIS TYPE	ANALYSIS SUB-TYPE	ANALYSIS I.D.	ANALYZED VALUE (A)	DUPLICATE VALUE (B)	RPD or (|A-B|)	TRUE VALUE	PERCENT RECOVERY	ORIGINAL VALUE	SPIKE ADDED	PERCENT RECOVERY
PARAMETER:Cobalt, Total (Co) REPORTING LIMIT/DF: 0.03 UNITS:mg/L				DATE/TIME ANALYZED:12/30/94 10:28 METHOD REFERENCE :6010 (2)				QC BATCH NUMBER:317517 TECHNICIAN:WGL		
STANDARD	LCS	1222G	1.03			1.00	103			
SPIKE	MS	943176-002	0.89					<0.03	1.00	89
SPIKE	MS	943227-001	0.90					<0.03	1.00	90
DUPLICATE	MD	943212-006	<0.03	<0.03	NC					
DUPLICATE	MD	943176-001	<0.03	<0.03	NC					
PARAMETER:Chromium, Total (Cr) REPORTING LIMIT/DF: 0.01 UNITS:mg/L				DATE/TIME ANALYZED:12/30/94 13:24 METHOD REFERENCE :6010 (2)				QC BATCH NUMBER:317518 TECHNICIAN:WGL		
BLANK	ICB	1212J	<0.01							
BLANK	CCB	1212J	<0.01							
BLANK	MB	1229	<0.01							
BLANK	MB	1229	<0.01							
BLANK	CCB	1212J	<0.01							
BLANK	CCB	1212J	<0.01							
BLANK	CCB	1212J	<0.01							
BLANK	CCB	1212J	<0.01							
BLANK	CCB	1212J	<0.01							
STANDARD	CCV	1017J	2.46			2.50	98			
STANDARD	ICV	1122D	2.05			2.00	102			
STANDARD	CCV	1017J	2.51			2.50	100			
STANDARD	ISB	1123J	0.45			0.50	90			
STANDARD	CCV	1017J	2.46			2.50	98			
STANDARD	CCV	1017J	2.44			2.50	98			
STANDARD	CCV	1017J	2.56			2.50	102			
STANDARD	ISB	1123J	0.45			0.50	90			
STANDARD	CCV	1017J	2.48			2.50	99			
STANDARD	LCS	1222G	1.04			1.00	104			
STANDARD	LCS	1222G	1.04			1.00	104			
SPIKE	MS	943176-002	0.88					0.01	1.00	87
SPIKE	MS	943227-001	1.00					0.09	1.00	91
DUPLICATE	MD	943176-001	<0.01	<0.01	NC					
DUPLICATE	MD	943212-006	<0.01	<0.01	NC					
PARAMETER:Copper, Total (Cu) REPORTING LIMIT/DF: 0.01 UNITS:mg/L				DATE/TIME ANALYZED:12/30/94 13:24 METHOD REFERENCE :6010 (2)				QC BATCH NUMBER:317519 TECHNICIAN:WGL		
BLANK	ICB	1212J	<0.01							
BLANK	CCB	1212J	<0.01							
BLANK	MB	1229	<0.01							
BLANK	MB	1229	<0.01							
BLANK	CCB	1212J	<0.01							
BLANK	CCB	1212J	<0.01							
BLANK	CCB	1212J	<0.01							
BLANK	CCB	1212J	<0.01							
BLANK	CCB	1212J	<0.01							

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PARAMETER:Copper, Total (Cu) DATE/TIME ANALYZED:12/30/94 13:24 QC BATCH NUMBER:317519
REPORTING LIMIT/DF: 0.01 UNITS:mg/L METHOD REFERENCE :6010 (2) TECHNICIAN:WGL

ANALYSIS				DUPLICATES		REFERENCE STANDARDS		MATRIX SPIKES		
ANALYSIS TYPE	ANALYSIS SUB-TYPE	ANALYSIS I.D.	ANALYZED VALUE (A)	DUPLICATE VALUE (B)	RPD or (|A-B|)	TRUE VALUE	PERCENT RECOVERY	ORIGINAL VALUE	SPIKE ADDED	PERCENT RECOVERY
STANDARD	CCV	1017J	2.62			2.50	105			
STANDARD	ICV	1122D	2.08			2.00	104			
STANDARD	CCV	1017J	2.58			2.50	103			
STANDARD	ISB	1123J	0.50			0.50	100			
STANDARD	CCV	1017J	2.61			2.50	104			
STANDARD	CCV	1017J	2.58			2.50	103			
STANDARD	CCV	1017J	2.64			2.50	106			
STANDARD	ISB	1123J	0.49			0.50	98			
STANDARD	CCV	1017J	2.62			2.50	105			
STANDARD	LCS	1222G	1.06			1.00	106			
STANDARD	LCS	1222G	1.07			1.00	107			
SPIKE	MS	943176-002	0.99					0.03	1.00	96
SPIKE	MS	943227-001	1.03					0.09	1.00	94
DUPLICATE	MD	943176-001	0.03	0.03	0.00					
DUPLICATE	MD	943212-006	<0.01	<0.01	NC					

PARAMETER:Iron, Total (Fe) DATE/TIME ANALYZED:12/30/94 13:24 QC BATCH NUMBER:317520
REPORTING LIMIT/DF: 0.03 UNITS:mg/L METHOD REFERENCE :6010 (2) TECHNICIAN:WGL

ANALYSIS TYPE	ANALYSIS SUB-TYPE	ANALYSIS I.D.	ANALYZED VALUE (A)	DUPLICATE VALUE (B)	RPD or (|A-B|)	TRUE VALUE	PERCENT RECOVERY	ORIGINAL VALUE	SPIKE ADDED	PERCENT RECOVERY
BLANK	ICB	1212J	<0.03							
BLANK	CCB	1212J	<0.03							
BLANK	MB	1229	<0.03							
BLANK	MB	1229	<0.03							
BLANK	CCB	1212J	<0.03							
BLANK	CCB	1212J	<0.03							
BLANK	CCB	1212J	<0.03							
BLANK	CCB	1212J	<0.03							
BLANK	CCB	1212J	<0.03							
STANDARD	CCV	1017J	5.01			5.00	100			
STANDARD	CCV	1017J	4.97			5.00	99			
STANDARD	CCV	1017J	5.09			5.00	102			
STANDARD	ICV	1122D	1.90			2.00	95			
STANDARD	CCV	1017J	5.00			5.00	100			
STANDARD	ISA	09260	214			200	107			
STANDARD	CCV	1017J	5.15			5.00	103			
STANDARD	ISB	1123J	205			200	102			
STANDARD	ISA	09260	211			200	106			
STANDARD	ISB	1123J	202			200	101			
STANDARD	CCV	1017J	5.10			5.00	102			
STANDARD	LCS	1222G	1.00			1.00	100			
STANDARD	LCS	1222G	0.96			1.00	96			
SPIKE	MS	943176-002	2.56					0.78	2.00	89
SPIKE	MS	943227-001	3.49					1.72	2.00	89
DUPLICATE	MD	943176-001	0.63	0.60	5					
DUPLICATE	MD	943212-006	0.03	0.04	0.01					

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JOB NUMBER: 943236 CUSTOMER: DANIEL B. STEPHENS & ASSOCIATES ATTN: JEFF FORBES

ANALYSIS				DUPLICATES		REFERENCE STANDARDS		MATRIX SPIKES		
ANALYSIS TYPE	ANALYSIS SUB-TYPE	ANALYSIS I.D.	ANALYZED VALUE (A)	DUPLICATE VALUE (B)	RPD or (|A-B|)	TRUE VALUE	PERCENT RECOVERY	ORIGINAL VALUE	SPIKE ADDED	PERCENT RECOVERY
PARAMETER:Magnesium, Total (Mg) REPORTING LIMIT/DF: 0.1 UNITS:mg/L				DATE/TIME ANALYZED:12/30/94 13:24 METHOD REFERENCE :6010 (2)				QC BATCH NUMBER:317522 TECHNICIAN:WGL		
BLANK	ICB	1212J	<0.1							
BLANK	CCB	1212J	<0.1							
BLANK	MB	1229	<0.1							
BLANK	MB	1229	<0.1							
BLANK	CCB	1212J	<0.1							
BLANK	CCB	1212J	<0.1							
BLANK	CCB	1212J	<0.1							
BLANK	CCB	1212J	<0.1							
BLANK	CCB	1212J	<0.1							
STANDARD	CCV	0913K	101			100	101			
STANDARD	CCV	0913K	101			100	101			
STANDARD	CCV	0913K	101			100	101			
STANDARD	ICV	0426G	105			100	105			
STANDARD	CCV	0913K	96.6			100	97			
STANDARD	ISA	09260	502			500	100			
STANDARD	CCV	0913K	103			100	103			
STANDARD	ISB	1123J	479			500	96			
STANDARD	ISA	09260	500			500	100			
STANDARD	ISB	1123J	478			500	96			
STANDARD	CCV	0913K	103			100	103			
STANDARD	LCS	1101S	108			100	108			
STANDARD	LCS	1101S	105			100	105			
SPIKE	MS	943176-002	69.5					19.9	50.0	99
SPIKE	MS	943227-001	54.8					3.1	50.0	103
DUPLICATE	MD	943176-001	20.4	21.0	3					
DUPLICATE	MD	943212-006	<0.1	<0.1	NC					
PARAMETER:Manganese, Total (Mn) REPORTING LIMIT/DF: 0.01 UNITS:mg/L				DATE/TIME ANALYZED:12/30/94 13:24 METHOD REFERENCE :6010 (2)				QC BATCH NUMBER:317523 TECHNICIAN:WGL		
BLANK	ICB	1212J	<0.01							
BLANK	CCB	1212J	<0.01							
BLANK	MB	1229	<0.01							
BLANK	MB	1229	<0.01							
BLANK	CCB	1212J	<0.01							
BLANK	CCB	1212J	<0.01							
BLANK	CCB	1212J	<0.01							
BLANK	CCB	1212J	<0.01							
BLANK	CCB	1212J	<0.01							
STANDARD	CCV	1017J	5.08			5.00	102			
STANDARD	ICV	1122D	2.08			2.00	104			
STANDARD	CCV	1017J	5.18			5.00	104			
STANDARD	ISB	1123J	0.45			0.50	90			
STANDARD	CCV	1017J	5.07			5.00	101			
STANDARD	CCV	1017J	5.04			5.00	101			
STANDARD	CCV	1017J	5.25			5.00	105			

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JOB NUMBER: 943236 CUSTOMER: DANIEL B. STEPHENS & ASSOCIATES ATTN: JEFF FORBES

ANALYSIS				DUPLICATES		REFERENCE STANDARDS		MATRIX SPIKES		
ANALYSIS TYPE	ANALYSIS SUB-TYPE	ANALYSIS I.D.	ANALYZED VALUE (A)	DUPLICATE VALUE (B)	RPD or (|A-B|)	TRUE VALUE	PERCENT RECOVERY	ORIGINAL VALUE	SPIKE ADDED	PERCENT RECOVERY
PARAMETER:Manganese, Total (Mn) REPORTING LIMIT/DF: 0.01 UNITS:mg/L				DATE/TIME ANALYZED:12/30/94 13:24 METHOD REFERENCE :6010 (2)				QC BATCH NUMBER:317523 TECHNICIAN:WGL		
STANDARD	ISB	1123J	0.45			0.50	90			
STANDARD	CCV	1017J	5.10			5.00	102			
STANDARD	LCS	1222G	1.06			1.00	106			
STANDARD	LCS	1222G	1.05			1.00	105			
SPIKE	MS	943176-002	0.96					0.05	1.00	91
SPIKE	MS	943227-001	0.96					0.02	1.00	94
DUPLICATE	MD	943176-001	0.05	0.05	0.00					
DUPLICATE	MD	943212-006	<0.01	<0.01	NC					
PARAMETER:Sodium, Total (Na) REPORTING LIMIT/DF: 1.0 UNITS:mg/L				DATE/TIME ANALYZED:12/30/94 10:44 METHOD REFERENCE :6010 (2)				QC BATCH NUMBER:317525 TECHNICIAN:WGL		
BLANK	ICB	1212J	<1.0							
BLANK	CCB	1212J	<1.0							
BLANK	MB	1229	<1.0							
BLANK	MB	1229	<1.0							
BLANK	CCB	1212J	<1.0							
BLANK	CCB	1212J	<1.0							
BLANK	CCB	1212J	<1.0							
BLANK	CCB	1212J	<1.0							
BLANK	CCB	1212J	<1.0							
STANDARD	CCV	0913K	47.4			50.0	95			
STANDARD	ISA	09260	554			500	111			
STANDARD	ISB	1123J	523			500	105			
STANDARD	CCV	0913K	45.2			50.0	90			
STANDARD	CCV	0913K	47.3			50.0	95			
STANDARD	CCV	0913K	49.1			50.0	98			
STANDARD	CCV	0913K	48.2			50.0	96			
STANDARD	ISA	09260	562			500	112			
STANDARD	ISB	1123J	537			500	107			
STANDARD	CCV	0913K	46.5			50.0	93			
STANDARD	ICV	0426G	48.6			50.0	97			
STANDARD	LCS	1101S	113			100	113			
STANDARD	LCS	1101S	109			100	109			
SPIKE	MS	943227-001	99.1					44.1	50.0	110
SPIKE	MS	943176-002	29.8					23.0	5.0	136
SPIKE	PDS	943176-002	73.6					23.0	50.0	101
DUPLICATE	MD	943176-001	23.6	23.9	1					
PARAMETER:Nickel, Total (Ni) REPORTING LIMIT/DF: 0.04 UNITS:mg/L				DATE/TIME ANALYZED:12/30/94 13:24 METHOD REFERENCE :6010 (2)				QC BATCH NUMBER:317526 TECHNICIAN:WGL		
BLANK	ICB	1212J	<0.04							
BLANK	CCB	1212J	<0.04							
BLANK	MB	1229	<0.04							
BLANK	MB	1229	<0.04							

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ANALYSIS				DUPLICATES		REFERENCE STANDARDS		MATRIX SPIKES		
ANALYSIS TYPE	ANALYSIS SUB-TYPE	ANALYSIS I.D.	ANALYZED VALUE (A)	DUPLICATE VALUE (B)	RPD or (|A-B|)	TRUE VALUE	PERCENT RECOVERY	ORIGINAL VALUE	SPIKE ADDED	PERCENT RECOVERY
PARAMETER:Nickel, Total (Ni) REPORTING LIMIT/DF: 0.04 UNITS:mg/L				DATE/TIME ANALYZED:12/30/94 13:24 METHOD REFERENCE :6010 (2)				QC BATCH NUMBER:317526 TECHNICIAN:WGL		
BLANK	CCB	1212J	<0.04							
BLANK	CCB	1212J	<0.04							
BLANK	CCB	1212J	<0.04							
BLANK	CCB	1212J	<0.04							
BLANK	CCB	1212J	<0.04							
STANDARD	CCV	1017J	2.47			2.50	99			
STANDARD	ICV	1122D	1.99			2.00	100			
STANDARD	CCV	1017J	2.53			2.50	101			
STANDARD	ISB	1123J	0.85			1.00	85			
STANDARD	CCV	1017J	2.44			2.50	98			
STANDARD	CCV	1017J	2.44			2.50	98			
STANDARD	CCV	1017J	2.50			2.50	100			
STANDARD	ISB	1123J	0.85			1.00	85			
STANDARD	CCV	1017J	2.54			2.50	102			
STANDARD	LCS	1222G	1.01			1.00	101			
STANDARD	LCS	1222G	1.02			1.00	102			
SPIKE	MS	943227-001	0.87					<0.04	1.00	87
DUPLICATE	MD	943176-001	0.13	0.13	0.00					
DUPLICATE	MD	943212-006	<0.04	<0.04	NC					
PARAMETER:Lead, Total (Pb) REPORTING LIMIT/DF: 0.05 UNITS:mg/L				DATE/TIME ANALYZED:12/30/94 10:28 METHOD REFERENCE :6010 (2)				QC BATCH NUMBER:317527 TECHNICIAN:WGL		
BLANK	ICB	1212J	<0.05							
BLANK	CCB	1212J	<0.05							
BLANK	MB	1229	<0.05							
BLANK	MB	1229	<0.05							
BLANK	CCB	1212J	<0.05							
BLANK	CCB	1212J	<0.05							
BLANK	CCB	1212J	<0.05							
BLANK	CCB	1212J	<0.05							
BLANK	CCB	1212J	<0.05							
STANDARD	CCV	1017J	0.98			1.00	98			
STANDARD	ICV	1122D	1.90			2.00	95			
STANDARD	CCV	1017J	0.99			1.00	99			
STANDARD	ISB	1123J	0.82			1.00	82			
STANDARD	CCV	1017J	1.00			1.00	100			
STANDARD	CCV	1017J	0.97			1.00	97			
STANDARD	CCV	1017J	1.05			1.00	105			
STANDARD	ISB	1123J	0.88			1.00	88			
STANDARD	CCV	1017J	1.04			1.00	104			
STANDARD	LCS	1222G	0.98			1.00	98			
STANDARD	LCS	1222G	1.00			1.00	100			
SPIKE	MS	943176-002	0.86					<0.05	1.00	86
SPIKE	MS	943227-001	0.94					<0.05	1.00	94
DUPLICATE	MD	943212-006	<0.05	<0.05	NC					

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ANALYSIS				DUPLICATES		REFERENCE STANDARDS		MATRIX SPIKES		
ANALYSIS TYPE	ANALYSIS SUB-TYPE	ANALYSIS I.D.	ANALYZED VALUE (A)	DUPLICATE VALUE (B)	RPD or (|A-B|)	TRUE VALUE	PERCENT RECOVERY	ORIGINAL VALUE	SPIKE ADDED	PERCENT RECOVERY
PARAMETER:Lead, Total (Pb) REPORTING LIMIT/DF: 0.05 UNITS:mg/L				DATE/TIME ANALYZED:12/30/94 10:28 METHOD REFERENCE :6010 (2)						QC BATCH NUMBER:317527 TECHNICIAN:WGL
DUPLICATE	MD	943176-001	<0.05	<0.05	NC					
PARAMETER:Antimony, Total (Sb) REPORTING LIMIT/DF: 0.1 UNITS:mg/L				DATE/TIME ANALYZED:12/30/94 13:24 METHOD REFERENCE :6010 (2)						QC BATCH NUMBER:317528 TECHNICIAN:WGL
BLANK	ICB	1212J	<0.1							
BLANK	CCB	1212J	<0.1							
BLANK	MB	1229	<0.1							
BLANK	MB	1229	<0.1							
BLANK	CCB	1212J	<0.1							
BLANK	CCB	1212J	<0.1							
BLANK	CCB	1212J	<0.1							
BLANK	CCB	1212J	<0.1							
BLANK	CCB	1212J	<0.1							
STANDARD	CCV	1017J	2.5			2.5	100			
STANDARD	ICV	1122D	2.0			2.0	100			
STANDARD	CCV	1017J	2.5			2.5	100			
STANDARD	ISB	1123J	1.0			1.0	100			
STANDARD	CCV	1017J	2.5			2.5	100			
STANDARD	CCV	1017J	2.4			2.5	96			
STANDARD	CCV	1017J	2.5			2.5	100			
STANDARD	ISB	1123J	1.0			1.0	100			
STANDARD	CCV	1017J	2.6			2.5	104			
STANDARD	LCS	1222G	1.0			1.0	100			
STANDARD	LCS	1222G	1.0			1.0	100			
SPIKE	MS	943176-002	1.0					<0.1	1.0	100
SPIKE	MS	943227-001	1.0					<0.1	1.0	100
DUPLICATE	MD	943176-001	<0.1	<0.1	NC					
DUPLICATE	MD	943212-006	<0.1	<0.1	NC					
PARAMETER:Selenium, Total (Se) REPORTING LIMIT/DF: 0.1 UNITS:mg/L				DATE/TIME ANALYZED:12/30/94 13:24 METHOD REFERENCE :6010 (2)						QC BATCH NUMBER:317529 TECHNICIAN:WGL
BLANK	ICB	1212J	<0.1							
BLANK	CCB	1212J	<0.1							
BLANK	MB	1229	<0.1							
BLANK	MB	1229	<0.1							
BLANK	CCB	1212J	<0.1							
BLANK	CCB	1212J	<0.1							
BLANK	CCB	1212J	<0.1							
BLANK	CCB	1212J	<0.1							
BLANK	CCB	1212J	<0.1							
STANDARD	CCV	1017J	2.4			2.5	96			
STANDARD	ICV	1122D	2.0			2.0	100			
STANDARD	CCV	1017J	2.4			2.5	96			
STANDARD	ISB	1123J	1.0			1.0	100			

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ANALYSIS				DUPLICATES		REFERENCE STANDARDS		MATRIX SPIKES		
ANALYSIS TYPE	ANALYSIS SUB-TYPE	ANALYSIS I.D.	ANALYZED VALUE (A)	DUPLICATE VALUE (B)	RPD or (|A-B|)	TRUE VALUE	PERCENT RECOVERY	ORIGINAL VALUE	SPIKE ADDED	PERCENT RECOVERY
PARAMETER:Selenium, Total (Se) REPORTING LIMIT/DF: 0.1 UNITS:mg/L				DATE/TIME ANALYZED:12/30/94 13:24 METHOD REFERENCE :6010 (2)				QC BATCH NUMBER:317529 TECHNICIAN:WGL		
STANDARD	CCV	1017J	2.7			2.5	108			
STANDARD	CCV	1017J	2.4			2.5	96			
STANDARD	CCV	1017J	2.7			2.5	108			
STANDARD	ISB	1123J	1.1			1.0	110			
STANDARD	CCV	1017J	2.7			2.5	108			
STANDARD	LCS	1222G	0.9			1.0	90			
STANDARD	LCS	1222G	0.9			1.0	90			
SPIKE	MS	943176-002	0.9					<0.1	1.0	90
SPIKE	MS	943227-001	1.0					<0.1	1.0	100
DUPLICATE	MD	943176-001	<0.1	<0.1	NC					
DUPLICATE	MD	943212-006	<0.1	<0.1	NC					
PARAMETER:Tin, Total (Sn) REPORTING LIMIT/DF: 0.05 UNITS:mg/L				DATE/TIME ANALYZED:12/30/94 13:24 METHOD REFERENCE :6010 (2)				QC BATCH NUMBER:317530 TECHNICIAN:WGL		
BLANK	ICB	1212J	<0.05							
BLANK	CCB	1212J	<0.05							
BLANK	MB	1229	<0.05							
BLANK	MB	1229	<0.05							
BLANK	CCB	1212J	<0.05							
BLANK	CCB	1212J	<0.05							
BLANK	CCB	1212J	<0.05							
BLANK	CCB	1212J	<0.05							
BLANK	CCB	1212J	<0.05							
STANDARD	CCV	1017J	2.58			2.50	103			
STANDARD	ICV	0426G	1.01			1.00	101			
STANDARD	CCV	1017J	2.63			2.50	105			
STANDARD	ISB	1123J	0.98			1.00	98			
STANDARD	CCV	1017J	2.62			2.50	105			
STANDARD	CCV	1017J	2.56			2.50	102			
STANDARD	CCV	1017J	2.71			2.50	108			
STANDARD	ISB	1123J	1.00			1.00	100			
STANDARD	CCV	1017J	2.73			2.50	109			
STANDARD	LCS	1101S	0.51			0.50	102			
STANDARD	LCS	1101S	0.51			0.50	102			
SPIKE	MS	943176-002	0.95					<0.05	1.00	95
SPIKE	MS	943227-001	1.00					<0.05	1.00	100
DUPLICATE	MD	943176-001	<0.05	<0.05	NC					
DUPLICATE	MD	943212-006	<0.05	<0.05	NC					
PARAMETER:Thallium, Total (Tl) REPORTING LIMIT/DF: 0.1 UNITS:mg/L				DATE/TIME ANALYZED:12/30/94 13:24 METHOD REFERENCE :6010 (2)				QC BATCH NUMBER:317531 TECHNICIAN:WGL		
BLANK	ICB	1212J	<0.1							
BLANK	CCB	1212J	<0.1							
BLANK	MB	1229	<0.1							

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PARAMETER:Thallium, Total (Tl) DATE/TIME ANALYZED:12/30/94 13:24 QC BATCH NUMBER:317531
REPORTING LIMIT/DF: 0.1 UNITS:mg/L METHOD REFERENCE :6010 (2) TECHNICIAN:WGL

ANALYSIS				DUPLICATES		REFERENCE STANDARDS		MATRIX SPIKES		
ANALYSIS TYPE	ANALYSIS SUB-TYPE	ANALYSIS I.D.	ANALYZED VALUE (A)	DUPLICATE VALUE (B)	RPD or (|A-B|)	TRUE VALUE	PERCENT RECOVERY	ORIGINAL VALUE	SPIKE ADDED	PERCENT RECOVERY
BLANK	MB	1229	<0.1							
BLANK	CCB	1212J	<0.1							
BLANK	CCB	1212J	<0.1							
BLANK	CCB	1212J	<0.1							
BLANK	CCB	1212J	<0.1							
BLANK	CCB	1212J	<0.1							
STANDARD	CCV	1017J	1.0			1.0	100			
STANDARD	ICV	1122D	1.9			2.0	95			
STANDARD	CCV	1017J	1.0			1.0	100			
STANDARD	ISB	1123J	0.8			1.0	80			
STANDARD	CCV	1017J	1.0			1.0	100			
STANDARD	CCV	1017J	0.9			1.0	90			
STANDARD	CCV	1017J	1.0			1.0	100			
STANDARD	ISB	1123J	0.8			1.0	80			
STANDARD	CCV	1017J	1.0			1.0	100			
STANDARD	LCS	1222G	0.9			1.0	90			
STANDARD	LCS	1222G	0.9			1.0	90			
SPIKE	MS	943176-002	0.9					<0.1	1.0	90
DUPLICATE	MD	943176-001	<0.1	<0.1	NC					
DUPLICATE	MD	943212-006	<0.1	<0.1	NC					

PARAMETER:Vanadium, Total (V) DATE/TIME ANALYZED:12/30/94 13:24 QC BATCH NUMBER:317532
REPORTING LIMIT/DF: 0.05 UNITS:mg/L METHOD REFERENCE :6010 (2) TECHNICIAN:WGL

ANALYSIS TYPE	ANALYSIS SUB-TYPE	ANALYSIS I.D.	ANALYZED VALUE (A)	DUPLICATE VALUE (B)	RPD or (|A-B|)	TRUE VALUE	PERCENT RECOVERY	ORIGINAL VALUE	SPIKE ADDED	PERCENT RECOVERY
BLANK	ICB	1212J	<0.05							
BLANK	CCB	1212J	<0.05							
BLANK	MB	1229	<0.05							
BLANK	MB	1229	<0.05							
BLANK	CCB	1212J	<0.05							
BLANK	CCB	1212J	<0.05							
BLANK	CCB	1212J	<0.05							
BLANK	CCB	1212J	<0.05							
BLANK	CCB	1212J	<0.05							
STANDARD	CCV	1017J	2.42			2.50	97			
STANDARD	ICV	1122D	1.99			2.00	100			
STANDARD	CCV	1017J	2.47			2.50	99			
STANDARD	ISB	1123J	0.46			0.50	92			
STANDARD	CCV	1017J	2.39			2.50	96			
STANDARD	CCV	1017J	2.40			2.50	96			
STANDARD	CCV	1017J	2.45			2.50	98			
STANDARD	ISB	1123J	0.46			0.50	92			
STANDARD	CCV	1017J	2.47			2.50	99			
STANDARD	LCS	1222G	1.00			1.00	100			
STANDARD	LCS	1222G	1.01			1.00	101			
SPIKE	MS	943176-002	0.90					<0.05	1.00	90
SPIKE	MS	943227-001	0.90					<0.05	1.00	90

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ANALYSIS				DUPLICATES		REFERENCE STANDARDS		MATRIX SPIKES		
ANALYSIS TYPE	ANALYSIS SUB-TYPE	ANALYSIS I.D.	ANALYZED VALUE (A)	DUPLICATE VALUE (B)	RPD or (|A-B|)	TRUE VALUE	PERCENT RECOVERY	ORIGINAL VALUE	SPIKE ADDED	PERCENT RECOVERY

PARAMETER:Vanadium, Total (V) DATE/TIME ANALYZED:12/30/94 13:24 QC BATCH NUMBER:317532
REPORTING LIMIT/DF: 0.05 UNITS:mg/L METHOD REFERENCE :6010 (2) TECHNICIAN:WGL

ANALYSIS TYPE	ANALYSIS SUB-TYPE	ANALYSIS I.D.	ANALYZED VALUE (A)	DUPLICATE VALUE (B)	RPD or (|A-B|)	TRUE VALUE	PERCENT RECOVERY	ORIGINAL VALUE	SPIKE ADDED	PERCENT RECOVERY
DUPLICATE	MD	943176-001	<0.05	<0.05	NC					
DUPLICATE	MD	943212-006	<0.05	<0.05	NC					

PARAMETER:Zinc, Total (Zn) DATE/TIME ANALYZED:12/30/94 13:24 QC BATCH NUMBER:317533
REPORTING LIMIT/DF: 0.01 UNITS:mg/L METHOD REFERENCE :6010 (2) TECHNICIAN:WGL

ANALYSIS TYPE	ANALYSIS SUB-TYPE	ANALYSIS I.D.	ANALYZED VALUE (A)	DUPLICATE VALUE (B)	RPD or (|A-B|)	TRUE VALUE	PERCENT RECOVERY	ORIGINAL VALUE	SPIKE ADDED	PERCENT RECOVERY
BLANK	ICB	1212J	<0.01							
BLANK	CCB	1212J	<0.01							
BLANK	MB	1229	<0.01							
BLANK	MB	1229	<0.01							
BLANK	CCB	1212J	<0.01							
BLANK	CCB	1212J	<0.01							
BLANK	CCB	1212J	<0.01							
BLANK	CCB	1212J	<0.01							
BLANK	CCB	1212J	<0.01							
STANDARD	CCV	1017J	2.55			2.50	102			
STANDARD	ICV	1122D	2.06			2.00	103			
STANDARD	CCV	1017J	2.62			2.50	105			
STANDARD	ISB	1123J	0.99			1.00	99			
STANDARD	CCV	1017J	2.52			2.50	101			
STANDARD	CCV	1017J	2.52			2.50	101			
STANDARD	CCV	1017J	2.57			2.50	103			
STANDARD	ISB	1123J	0.99			1.00	99			
STANDARD	CCV	1017J	2.54			2.50	102			
STANDARD	LCS	1222G	1.06			1.00	106			
STANDARD	LCS	1222G	1.05			1.00	105			
SPIKE	MS	943176-002	0.97					0.06	1.00	91
SPIKE	MS	943227-001	0.95					0.03	1.00	92
DUPLICATE	MD	943176-001	0.05	0.05	0.00					
DUPLICATE	MD	943212-006	<0.01	<0.01	NC					

PARAMETER:Nitrate + Nitrite (as N) [Unfilt.] DATE/TIME ANALYZED:01/03/95 11:30 QC BATCH NUMBER:317784
REPORTING LIMIT/DF: 0.05 UNITS:mg/L (as N) METHOD REFERENCE :353.2 (1) TECHNICIAN:DME

ANALYSIS TYPE	ANALYSIS SUB-TYPE	ANALYSIS I.D.	ANALYZED VALUE (A)	DUPLICATE VALUE (B)	RPD or (|A-B|)	TRUE VALUE	PERCENT RECOVERY	ORIGINAL VALUE	SPIKE ADDED	PERCENT RECOVERY
BLANK	ICB	950103	<0.05							
BLANK	CCB	950103	<0.05							
BLANK	CCB	950103	<0.05							
STANDARD	ICV/LCS	G941014A	0.96			1.00	96			
STANDARD	CCV	S3.00	2.83			3.00	94			
STANDARD	CCV	S3.00	2.79			3.00	93			
SPIKE	MS	943207-2	3.35					2.30	1.00	105
SPIKE	MS	943157-7	3.59					2.67	1.00	92
DUPLICATE	MD	943207-2	2.30	2.36	3					
DUPLICATE	MD	943157-7	2.67	2.83	6					

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QUALITY CONTROL REPORT
01/09/95

JOB NUMBER: 943236 CUSTOMER: DANIEL B. STEPHENS & ASSOCIATES ATTN: JEFF FORBES

ANALYSIS				DUPLICATES		REFERENCE STANDARDS		MATRIX SPIKES		
ANALYSIS TYPE	ANALYSIS SUB-TYPE	ANALYSIS I.D.	ANALYZED VALUE (A)	DUPLICATE VALUE (B)	RPD or (|A-B|)	TRUE VALUE	PERCENT RECOVERY	ORIGINAL VALUE	SPIKE ADDED	PERCENT RECOVERY
PARAMETER:Potassium, Total (K) REPORTING LIMIT/DF: 0.1 UNITS:mg/L				DATE/TIME ANALYZED:01/04/95 14:40 METHOD REFERENCE :7610 (2)				QC BATCH NUMBER:317851 TECHNICIAN:BPB		
BLANK	ICB	01045	<0.1							
BLANK	CCB	01045	<0.1							
BLANK	CCB	01045	<0.1							
BLANK	MB	1229	<0.1							
STANDARD	ICV	1021N	2.0			2.0	100			
STANDARD	CCV	1027C	4.6			5.0	92			
STANDARD	CCV	1027C	4.6			5.0	92			
STANDARD	LCS	S1101	2.0			2.0	100			
SPIKE	PDS	943236-002	4.2					1.7	2.5	100
DUPLICATE	MD	943236-003	4.0	4.1	2					
PARAMETER:Sulfate (Unfilt.) REPORTING LIMIT/DF: 10 UNITS:mg/L				DATE/TIME ANALYZED:01/04/95 09:00 METHOD REFERENCE :375.2 (1)				QC BATCH NUMBER:317853 TECHNICIAN:DME		
BLANK	ICB	950104	<10							
BLANK	CCB	950104	<10							
STANDARD	ICV/LCS	G940415A	153			150	102			
STANDARD	CCV	S200	197			200	98			
SPIKE	MS	940416-121	73					24	50	98
DUPLICATE	MD	940416-121	24	25	1					
PARAMETER:Chloride (Unfilt.) REPORTING LIMIT/DF: 0.5 UNITS:mg/L				DATE/TIME ANALYZED:01/05/95 09:00 METHOD REFERENCE :325.2 (1)				QC BATCH NUMBER:317954 TECHNICIAN:DME		
BLANK	ICB	950105	<0.5							
BLANK	CCB	950105	<0.5							
BLANK	CCB	950105	<0.5							
STANDARD	ICV/LCS	G950105B	52.5			50.0	105			
STANDARD	CCV	S120	123			120	102			
STANDARD	CCV	S120	123			120	102			
SPIKE	MS	943157-18	150					106	50.0	88
SPIKE	MS	943157-6	151					107	50.0	88
DUPLICATE	MD	943157-6	107	107	0					
DUPLICATE	MD	943157-18	106	107	1					
PARAMETER:Cyanide, Total (Unfilt.) REPORTING LIMIT/DF: 0.02 UNITS:mg/L				DATE/TIME ANALYZED:01/04/95 16:45 METHOD REFERENCE :335.2 (1)				QC BATCH NUMBER:318034 TECHNICIAN:RJC		
BLANK	ICB	S0	<0.02							
BLANK	MB	950104	<0.02							
BLANK	CCB	S0	<0.02							
BLANK	CCB	S0	<0.02							
STANDARD	ICV/LCS	G941114B	0.25			0.25	100			
STANDARD	DIST. CHK.	G941123B	0.46			0.50	92			
STANDARD	CCV	S0.30	0.29			0.30	97			
STANDARD	CCV	S0.30	0.29			0.30	97			

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JOB NUMBER: 943236 CUSTOMER: DANIEL B. STEPHENS & ASSOCIATES ATTN: JEFF FORBES

ANALYSIS				DUPLICATES		REFERENCE STANDARDS		MATRIX SPIKES		
ANALYSIS TYPE	ANALYSIS SUB-TYPE	ANALYSIS I.D.	ANALYZED VALUE (A)	DUPLICATE VALUE (B)	RPD or (|A-B|)	TRUE VALUE	PERCENT RECOVERY	ORIGINAL VALUE	SPIKE ADDED	PERCENT RECOVERY
PARAMETER:Cyanide, Total (Unfilt.) REPORTING LIMIT/DF: 0.02 UNITS:mg/L				DATE/TIME ANALYZED:01/04/95 16:45 METHOD REFERENCE :335.2 (1)				QC BATCH NUMBER:318034 TECHNICIAN:RJC		
SPIKE	MS	943236-2	0.23					<0.02	0.25	92
DUPLICATE	MD	943227-1	<0.02	<0.02	NC					

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QUALITY CONTROL REPORT
01/09/95

JOB NUMBER: 943236 CUSTOMER: DANIEL B. STEPHENS & ASSOCIATES ATTN: JEFF FORBES

BNA SPIKED ANALYSIS-WATER DATE ANALYZED: 01/03/95 TIME ANALYZED: 11:11 METHOD: 8270 (2) QC NUMBER:317901

BLANKS

TEST DESCRIPTION	ANALY SUB-TYPE	ANALYSIS I.D.	DILUTION FACTOR	ANALYZED VALUE	DETECTION LIMIT	UNITS OF MEASURE
Time Analyzed	SB	1918	1	0	0	
	SBD	2016	1	0	0	
Date Extracted	SB	12/28/94	1	0	0	
	SBD	12/28/94	1	0	0	

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JOB NUMBER: 943236 CUSTOMER: DANIEL B. STEPHENS & ASSOCIATES ATTN: JEFF FORBES

NA SPIKED ANALYSIS-WATER DATE ANALYZED: 01/03/95 TIME ANALYZED: 11:11 METHOD: 8270 (2) QC NUMBER:317901

REFERENCE STANDARDS

EST DESCRIPTION	ANALYSIS SUB-TYPE	ANALYSIS I. D.	DILUTION FACTOR	ANALYZED VALUE	TRUE VALUE	PERCENT RECOVERY	DETECTION LIMITS	UNITS OF MEASURE
henol	SB	B940331A	1	110	143	77	10	ug/L
	SBD	B940331A	1	100	143	70	10	ug/L
-Chlorophenol	SB	B940331A	1	110	143	77	10	ug/L
	SBD	B940331A	1	92	143	64	10	ug/L
,4-Dichlorobenzene	SB	B940331A	1	90	143	63	10	ug/L
	SBD	B940331A	1	76	143	53	10	ug/L
-Nitrosodi-n-propylamine	SB	B940331A	1	103	143	72	10	ug/L
	SBD	3940331A	1	100	143	70	10	ug/L
1,2,4-Trichlorobenzene	SB	B940331A	1	98	143	69	10	ug/L
	SBD	B940331A	1	87	143	61	10	ug/L
-Chloro-3-methylphenol	SB	B940331A	1	141	143	99	10	ug/L
	SBD	B940331A	1	136	143	95	10	ug/L
Acenaphthene	SB	B940331A	1	124	143	87	10	ug/L
	SBD	B940331A	1	122	143	85	10	ug/L
-Nitrophenol	SB	B940331A	1	81	143	57	50	ug/L
	SBD	B940331A	1	65	143	45	50	ug/L
2,4-Dinitrotoluene	SB	B940331A	1	132	143	92	10	ug/L
	SBD	B940331A	1	131	143	92	10	ug/L
entachlorophenol	SB	B940331A	1	94	143	66	50	ug/L
	SBD	B940331A	1	61	143	43	50	ug/L
yrene	SB	B940331A	1	124	143	87	10	ug/L
	SBD	B940331A	1	122	143	85	10	ug/L
itrobenzene-d5 (Surrogate)	SB	B940331A	1	101	100	101	0	35-114% Limit
	SBD	B940331A	1	92	100	92	0	35-114% Limit
-Fluorobiphenyl (Surrogate)	SB	B940331A	1	94	100	94	0	43-116% Limit
	SBD	B940331A	1	92	100	92	0	43-116% Limit
4-Terphenyl-d14 (Surrogate)	SB	B940331A	1	94	100	94	0	33-141% Limit
	SBD	B940331A	1	92	100	92	0	33-141% Limit
henol-d6 (Surrogate)	SB	B940331A	1	89	100	89	0	10-94% Limit
	SBD	B940331A	1	79	100	79	0	10-94% Limit
2-Fluorophenol (Surrogate)	SB	B940331A	1	82	100	82	0	21-100% Limit
	SBD	B940331A	1	62	100	62	0	21-100% Limit
,4,6-Tribromophenol (Surrogate)	SB	B940331A	1	86	100	86	0	10-123% Limit
	SBD	B940331A	1	61	100	61	0	10-123% Limit

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JOB NUMBER: 943236 CUSTOMER: DANIEL B. STEPHENS & ASSOCIATES ATTN: JEFF FORBES

VOLATILE SPIKED ANALYSIS-WATER DATE ANALYZED: 12/30/94 TIME ANALYZED: 12:50 METHOD: 8240 (2) QC NUMBER:318093

BLANKS

TEST DESCRIPTION	ANALY SUB-TYPE	ANALYSIS I.D.	DILUTION FACTOR	ANALYZED VALUE	DETECTION LIMIT	UNITS OF MEASURE
Time Analyzed	SB	2012	1	0	0	
	SBD	2048	1	0	0	

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JOB NUMBER: 943236 CUSTOMER: DANIEL B. STEPHENS & ASSOCIATES ATTN: JEFF FORBES

VOLATILE SPIKED ANALYSIS-WATER DATE ANALYZED: 12/30/94 TIME ANALYZED: 12:50 METHOD: 8240 (2) QC NUMBER:318093

REFERENCE STANDARDS

TEST DESCRIPTION	ANALYSIS SUB-TYPE	ANALYSIS I. D.	DILUTION FACTOR	ANALYZED VALUE	TRUE VALUE	PERCENT RECOVERY	DETECTION LIMITS	UNITS OF MEASURE
,1-Dichloroethene	SB	V941230M	1	52	50	104	5	ug/L
	SBD	V941230M	1	48	50	96	5	ug/L
richloroethene	SB	V941230M	1	47	50	94	5	ug/L
	SBD	V941230M	1	46	50	92	5	ug/L
enzene	SB	V941230M	1	50	50	100	1	ug/L
	SBD	V941230M	1	48	50	96	1	ug/L
oluene	SB	V941230M	1	52	50	104	5	ug/L
	SBD	V941230M	1	50	50	100	5	ug/L
Chlorobenzene	SB	V941230M	1	52	50	104	5	ug/L
	SBD	V941230M	1	50	50	100	5	ug/L
ibromofluoromethane (Surrogate)	SB	V941230M	1	110	100	110	0	86-118% Limit
	SBD	V941230M	1	110	100	110	0	86-118% Limit
Toluene-d8 (Surrogate)	SB	V941230M	1	104	100	104	0	88-110% Limit
	SBD	V941230M	1	104	100	104	0	88-110% Limit
-Bromofluorobenzene (Surrogate)	SB	V941230M	1	102	100	102	0	86-115% Limit
	SBD	V941230M	1	102	100	102	0	86-115% Limit

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METHOD REFERENCES

(1) EPA 600/4-79-020, Methods For Chemical Analysis Of Water And Wastes, March 1983

(2) EPA SW-846, Test Methods For Evaluating Solid Waste, Third Edition, November 1986

(3) Standard Methods For The Examination Of Water And Wastewater, 17th Edition, 1989

(4) EPA 600/4-80-032, Prescribed Procedures For Measurement Of Radioactivity In Drinking Water, August 1980

(5) EPA 600/8-78-017, Microbiological Methods For Monitoring The Environment, December 1978

(6) Federal Register, July 1, 1990 (40 CFR Part 136)

(7) EPA 600/4-88-039, Methods For The Determination Of Organics Compounds In Drinking Water, December 1988

(8) U.S.G.S. Methods For The Determination Of Inorganic Substances In Water And Fluvial Sediments, Book 5, Chapter A1, 1985

(9) Federal Register, Friday, June 7, 1991, (40 CFR Parts 141 and 142)

(10) Standard Methods For The Examination Of Water And Wastewater, 16th Edition, 1985

(11) ASTM, Section 11 Water And Environmental Technology, Volume 11.01 Water (1), 1991

(12) Methods Of Soil Analysis, American Society Of Agronomy, Agronomy No. 9, 1965

(13) EPA SW-846, Test Methods For Evaluating Solid Waste, Third Edition, Revision 1, November 1990

(14) ASTM, Section 5, Petroleum Products, Lubricants, and Fossil Fuels, Volume 05.05, Gaseous Fuels, Coal and Coke

(15) EPA 600/2-78-054, Field and Laboratory Methods Applicable To Overburdens and Mine Soils, March 1978

(16) ASTM, Part 19, Soils and Rock; Building Stones, 1981

Comments: Data in QA report may differ from final results due to digestion and/or dilution of sample into analytical ranges. The "Time Analyzed" in the QA report refers to the start time of the analytical batch which may not reflect the actual time of each analysis. The "Date Analyzed" is the actual date of analysis. Results for soil and sludge samples are reported on a wet weight basis (i.e. not corrected for percent moisture) unless otherwise indicated.
NC = Not Calculable Due To Value(s) Lower Than The Detection Limit.

Blank QC Sample Identification

MB	Method Blank
ICB	Initial Calibration Blank
CCB	Continuing Calibration Blank

Reference Standard QC Sample Identification

LCS	Laboratory Control Standard
RS	Reference Standard
ICV	Initial Calibration Verification Standard
CCV	Continuing Calibration Verification Standard
ISA/ISB	ICP Interference Check Samples

Spike QC Sample Identification

MS	Method (Matrix) Spike
MSD	Method (Matrix) Spike Duplicate
PDS	Post Digestion Spike
SB	Spiked Blank
SBD	Spiked Blank Duplicate

Duplicate QC Sample Identification

MD	Method (Matrix) Duplicate
ED	Extraction Duplicate
DD	Digestion Duplicate

Analyses performed by a subcontract laboratory are indicated on the analytical and/or quality control reports under "Technician" using the following codes:

Subcontract Laboratory	Code	Subcontract Laboratory	Code
Core Laboratories - Anaheim, CA	* AN	Core Laboratories - Lake Charles, LA	* LC
Core Laboratories - Casper, WY	* CA	Core Laboratories - Long Beach, CA	* LB
Core Laboratories - Corpus Christi, TX	* CC	Other Subcontract Laboratories	* XX
Core Laboratories - Houston, TX	* HP		

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Aurora, CO 80014
(303) 751-1780

DANIEL B. STEPHENS & ASSOCIATES, INC.

ENVIRONMENTAL SCIENTISTS AND ENGINEERS

CLOSURE PLAN FOR ROSWELL COMPRESSOR STATION SURFACE IMPOUNDMENTS

Volume III: Appendices F and G

Prepared for

ENRON Environmental Affairs

Houston, Texas

January 16, 1995

6020 ACADEMY NE • SUITE 100 • ALBUQUERQUE, NM 87109 • (505) 822-9400

DANIEL B. STEPHENS & ASSOCIATES, INC.

ENVIRONMENTAL SCIENTISTS AND ENGINEERS

CLOSURE PLAN FOR
ROSWELL COMPRESSOR STATION
SURFACE IMPOUNDMENTS
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TABLE OF CONTENTS

Appendix

APPENDIX F

DBS&A STANDARD OPERATING PROCEDURES

Section 13.3.1

Drilling Operations

1. PURPOSE

The following provides standard operating guidelines (SOGs) for drilling programs.

2. SCOPE

The SOGs included in this section are applicable to all DBS&A employees and its contractors and subcontractors for the conduct of all drilling activities described in this section. The scope of the guidelines described in this section includes the following topics:

- Drilling Methods
- Drilling Fluids
- Drilling Equipment
- Procedures to Follow During Drilling Programs

Standards for drilling methods and fluids are described in ASTM D 5092-90 ("Standard Practice for Design and Installation of Ground Water Monitoring Wells in Aquifers"). Refer to Driscoll (1986), EPA (September 1986) or Aller et al. (1989) for more detailed guidelines about the above subjects as they relate to the drilling of monitor and extraction wells and borings. Site-specific work plans or sampling plans should identify any special needs or circumstances beyond those described in this SOG.

3. GUIDELINES

3.1 Drilling Methods (ASTM D 5092-90)

The drilling method required to create a stable, open, vertical borehole for drilling a borehole or installation of a monitor or extraction well shall be selected according to the site geology, the site hydrology, and the intended use of the data. Tables 13.3.1-1 and 13.3.1-2 list common drilling methods and will aid in the selection of an appropriate drilling method. Table 13.3.1-1 lists the advantages and disadvantages of the different types of drilling methods. Table 13.3.1-2 assesses the performance of different drilling methods in various types of geologic formations.

3.2 Drilling Fluids (ASTM D 5092-90)

Whenever feasible, drilling procedures should be used that do not require the introduction of water or drilling fluids into the borehole and that optimize cuttings control at ground surface. Where the use of drilling fluids is unavoidable, the selected fluid should have as little impact as possible on the water samples for the constituents of interest. In addition, care should be taken to remove as much drilling fluid as possible from the well and the aquifer during the well development process (see Section 13.4.3). If an air compressor is used, it should be equipped with an oil air filter or oil trap.

Water-based drilling fluids are preferred if drilling fluids are needed for the drilling of monitor and extraction wells and borings. Water-based drilling fluids have the least influence on the ground-

d. Decrease water content of the foam system.

PROBLEM: The rate at which cuttings will drop out is too low because the inadvertent addition of native clays during drilling has produced excessive viscosity in the drilling fluid.

RECOMMENDED ACTION:

1. Add potable water to dilute the drilling fluid (Table 13.3.1-4).
2. Add commercial thinner to reduce the attractive forces between clay colloids.
3. If using clay additives, convert to a polymeric system.
4. Separate the solids from a clay-additive system with a shale shaker or shale shakers and desanders connected in series. A shale shaker or desander may be unnecessary when a polymeric system is being used.
5. Redesign or clean the pit system to increase rate of cuttings settlement.

PROBLEM: Gel strength becomes too great because of strong flocculation, high concentration of solids, or contamination from evaporite deposits or cement. (Excessive gel-strength problems do not occur with polymeric colloids.)

RECOMMENDED ACTION:

1. Add potable water to dilute the drilling fluid.
2. Add polyphosphate or commercial thinner to reduce electrical charges between clay colloids.
3. Use desander or shale shaker to remove solids from a clay-additive system.
4. Lower the pH.

PROBLEM: Excessive fluid loss into the formation causes thick filter cakes that can produce tight places in the hole, development problems, formation (clay) sloughing, and misinterpretation of electric or gamma-ray logs.

RECOMMENDED ACTION:

1. Increase viscosity by adding bentonite or polymeric colloids to any water-based system.
2. Add commercial viscosifiers such as CMC or HEC.
3. Reduce density of the drilling fluid.
4. Prevent drastic changes in downhole pressures and maintain downhole pressures at a minimum. Suggestions include (Bariod):
   a. Raise and lower the drill string slowly.
   b. Drill through any tight section; do not spud.
   c. Begin rotation of the drill pipe, and then start the pump at a low rate and gradually increase the rate.
   d. Operate the pump at the lowest rate that will assure adequate cooling of the bit and removal of cuttings from the bit face.

e. Prevent balling at the bit; do not drill soft formations so fast that the annulus becomes overloaded and pressure builds up.

PROBLEM: Lost circulation in permeable formations, faulted and jointed rock, solution cavities in dolomite and limestone, or fractures created by excessive borehole pressures in semiconsolidated or well consolidated rock can all create problems.

RECOMMENDED ACTION:

1. Reduce the density of the drilling fluid system.
2. Switch from a clay-additive drilling fluid system to an air-foam fluid, or add surfactant to a dry-air system.
3. Gel natural polymeric fluids at the point of fluid loss.
4. Use commercial sealing materials.
5. Drill remainder of the hole with a cable tool rig.
6. Case off, then resume rotary drilling.
7. Fill the borehole with clean sand to the point above lost circulation. Let the material stand in borehole overnight. Resume drilling, using low pump pressure.

PROBLEM: Confined pressures in the formation can contribute to a problem.

RECOMMENDED ACTION:

1. Increase density by adding heavy mineral additives such as barite to drilling fluid systems made with clay additives (Table 13.3.1-4). To suspend barite, the minimum Marsh funnel viscosity must equal four times the final (desired) drilling fluid weight (in lb/gal).

2. Increase density by adding a salt solution to polymeric drilling fluid systems.

PROBLEM: Hydration (swelling and dispersion), pore pressures, and overburden pressure can cause shale sloughing.

RECOMMENDED ACTION:

1. Use polymeric additive to isolate water from shale.
2. Maintain constant fluid pressures in the borehole.
3. Minimize uphole velocities.
4. Avoid pressure surges caused by raising or lowering drill rods rapidly.
5. Add 3 to 4 percent potassium chloride (KCl) to water-based systems.
6. Raise the pH of the drilling fluid to stiffen the clay.

PROBLEM: Contaminants are present. Contaminants usually consist of cement, soluble salts, and gases (hydrogen sulfide and carbon dioxide). Cement in the hole can cause polymeric drilling fluids to break down, thereby increasing fluid losses. Salts may cause drilling fluids with clay additives to separate into liquid and solid fractions. Gases in water may affect the physical condition of the drilling fluid.

RECOMMENDED ACTION:

1. For cement problems:
   a. Maintain the pH for natural polymeric drilling fluids at 7 or lower.
   b. Add commercial chemicals such as sodium acid pyrophosphate to drilling fluids with clay additives to restore original viscosity.
2. For salt problems:
   a. Change the clay additive from montmorillonite to attapulgite.
   b. Change to a natural polymeric drilling fluid additive.
3. For gas problems:
   a. Add a corrosion inhibitor.

PROBLEM: Drilling at air temperatures significantly below freezing, causing freeze-up of the recirculation system.

RECOMMENDED ACTION:

1. Add sodium chloride (NaCl) or calcium chloride ($CaCl_2$) to a natural polymeric drilling fluid. Salt must not be added to a drilling fluid made with bentonite.

3.3 Drilling Equipment

DBS&A Form Nos. 116 6/93 and 117 6/93, attached to this SOG, are checklists used for the preparation of drilling programs. These two checklists should be used as communication guides between DBS&A and the drilling subcontractor. They should be completed and checked prior to the field stage of the drilling program by both DBS&A and the drilling subcontractor. Form No. 116 6/93 summarizes important phone contacts, length of job, type of rig, underground utility survey, geologic material, sampling, disposal of cuttings, wells and soil borings, grouting, and health and safety issues. Form No. 117 6/93 identifies the drilling equipment and support vehicles that are needed for the drilling program.

3.4 Guidelines to Follow During Drilling Activities

1. A drilling method should be selected that will cause minimal disturbance to the subsurface materials and will not contaminate the subsurface and ground water (40 CFR 265.91(c)).

2. The drilling contractor is responsible for decontaminating the drilling equipment before it is transported onto the project site (ASTM D 5088-90).

3. A decontamination procedure should be followed before use and between borehole locations to prevent cross contamination of wells where contamination has been detected

or is suspected from the site characterization work that precedes the drilling activities (ASTM D 5088-90).

4. The drilling contractor shall be responsible for securing any and all boring or well drilling permits required by state or local authorities and for complying with any and all state or local regulations with regard to the submission of well logs, samples, etc.

5. The drilling contractor shall be responsible for complying with any and all (to include placement) regulations with regard to drilling safety and underground utility detection.

6. Air systems shall not be used for drilling, well installation, well development, or sampling without prior approval by the Project Manager. When used, air systems shall include an air line oil filter, frequently replaced, to remove essentially all oil residue from the air compressor. The use of any air system shall be fully described in the drillers log to include equipment description, manufacturer(s), model(s), air pressures used, frequency of oil filter change and evaluation of air line filtering.

7. When air is used as the drilling fluid, shrouds, canopies, bluooey lines, or directional pipes should be used to contain and direct the drill cuttings away from the drill crew.

8. Any water that is used during the drilling and installation of a well should be of a known chemical source and verified not to alter or impact the chemistry of the ground water of the operation of the well.

9. When using commercially available mud or additives for the drilling fluid, DBS&A Technical Representatives and Field Representative should make sure that the mud or additives to not alter or affect the chemistry of the ground water or the operation of the well.

10. During rotary drilling, the use of portable recirculation tanks is required. No dug sumps (lined or unlined) are allowed without prior approval by the Project Manager.

11. No dyes, tracers, or other substances shall be used or otherwise introduced into borings, wells, lysimeters, grout, backfill, ground water, or surface water unless specifically approved by the Technical Project Manager.

12. For wells over 100-feet deep, plumbness and alignment should be checked at preselected intervals during the drilling of the boreholes by the driller and verified by the DBS&A Field Representative.

13. Any contaminated materials (soil and/or water) should be collected and disposed of in an approved waste disposal container or facility.

14. Soil descriptions, collection of samples, field monitoring, and other pertinent information shall be recorded on the Boring Log Form during drilling operations. The Boring Log

Form, soil logging procedures, and instructions for completing the Boring Log Form are included in Section 13.3.2 of the Operations Manual

4. ATTACHMENTS

- Table 13.3.1-1, Drilling Methods for Monitor Wells
- Table 13.3.1-2, Relative Performance of Different Drilling Methods in Various Types of Geologic Formations
- Table 13.3.1-3, Typical Additive Concentrations, Resulting Viscosities, and Required Uphole Velocities for Major Types of Drilling Fluids Used in Various Aquifer Materials
- Table 13.3.1-4, Drilling Fluid Weight Adjustment with Barite or Water
- Drilling Information Checklist (DBS&A Form No. 116)
- Drilling Equipment and Support Vehicle Checklist (DBS&A Form No. 117)

5. REFERENCES

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Prepared by: Natalie L. Ala

Reviewed by: Larry M. Gom
Quality Assurance Manager

Approved by: DBS
Daniel B. Stephens

Reviewed by: Larry M. Gom
Systems Operations Manager

Table 13.3.1-1 Drilling Methods for Monitor Wells

Type	Advantages	Disadvantages
Hollow-stem auger	• No drilling fluid is used, eliminating contamination by drilling fluid additives • Formation waters can be sampled during drilling by using a screened auger or advancing a well point ahead of the augers • Formation samples taken by split-spoon or core-barrel methods are highly accurate • Natural gamma-ray logging can be done inside the augers • Hole caving can be overcome by setting the screen and casing before the augers are removed • Fast • Rigs are highly mobile and can reach most drilling sites • Usually less expensive than rotary or cable tool drilling	• Can be used only in unconsolidated materials • Limited to depths of 100 to 150 ft (30.5 to 45.7 m) • Possible problems in controlling heaving sands • May not be able to run a complete suite of geophysical logs
Direct rotary	• Can be used in both unconsolidated and consolidated formations • Capable of drilling to any depth • Core samples can be collected • A complete suite of geophysical logs can be obtained in the open hole • Casing is not required during drilling • Many options for well construction • Fast • Smaller rigs can reach most drilling sites • Relatively inexpensive	• Drilling fluid is required and contaminants are circulated with the fluid • Drilling fluid mixes with the formation water and invades the formation and is sometimes difficult to remove • Bentonitic fluids may absorb metals and may interfere with other parameters • Organic fluids may interfere with bacterial analyses and/or organic-related parameters • During drilling, no information can be obtained on the location of the water table and only limited information on water-producing zones • Formation samples may not be accurate

Table 13.3.1-1 Drilling Methods for Monitor Wells (continued)

Type	Advantages	Disadvantages
Air rotary	• No water-based drilling fluid is used, eliminating contaminantion by additives • Can be used in both unconsolidated and consolidated formations • Capable of drilling to any depth • Formation sampling is excellent in hard, dry formations • Formation water blown out of the hole makes it possible to determine when the first water-bearing zone is encountered • Field analysis of water blown from the hole can provide information regarding changes for some basic water-quality parameters such as chlorides • Fast	• Casing is required to keep the hole open when drilling in soft, caving formations below the water table • When more than one water-bearing zone is encountered and hydrostatic pressures are different, flow between zones occurs during the time drilling is being completed and before the borehole can be cased and grounted properly • Relatively more expensive than other methods • May not be economical for small jobs
Cable Tool	• Only small amounts of drilling fluid are required (generally water with no additives) • Can be used in both unconsolidated and consolidated formations; well suited for extremely permeable formations • Can drill to depths required for most monitoring wells • Highly representative formation samples can be obtained by an experienced driller • Changes in water level can be observed • Relative permeabilities for different zones can be determined by skilled drillers • A good seal between casing and formation is virtually assured if flush-jointed casing is used • Rigs can reach most drilling sites • Relatively inexpensive	• Minimum casing size is 4 in (102 mm) • Steel casing must be used • Cannot run a complete suite of geophysical logs • Usually a screen must be set before a water sample can be taken • Slow

(After Driscoll, 1987)

Table 13.3.1-2 Relative Performance of Different Drilling Methods in Various Types of Geologic Formations

Type of Formation	Cable Tool	Direct Rotary (with fluids)	Direct Rotary (with air)	Direct Rotary (Down-the-hole air hammer)	Direct Rotary (Drill-through casing hammer)	Reverse Rotary (with fluids)	Reverse Rotary (Dual Wall)	Hydraulic Percussion	Jetting	Driven	Auger
Dune sand	2	5	NR	NR	6	5*	6	5	5	3	1
Loose sand and gravel	2	5	NR	NR	6	5*	6	5	5	3	1
Quicksand	2	5	NR	NR	6	5*	6	5	5	NR	1
Loose boulders in alluvial fans or glacial drift	3-2	2-1	NR	NR	5	2-1	4	1	1	NR	1
Clay and silt	3	5	NR	NR	5	5	5	3	3	NR	3
Firm shale	5	5	NR	NR	5	5	5	3	NR	NR	2
Sticky shale	3	5	NR	NR	5	3	5	3	NR	NR	2
Brittle shale	5	5	NR	NR	5	5	5	3	NR	NR	NA
Sandstone-poorly cemented	3	4	NR	NR	NA	4	5	4	NR	NR	NA

*Assuming sufficient hydrostatic pressure is available to contain active sand (under high confining pressures)

NR = Not recommended
NA = Not applicable

Rate of Penetration:

1	Impossible	4	Medium
2	Difficult	5	Rapid
3	Slow	6	Very rapid

(After Driscoll, 1987)

Table 13.3.1-2 Relative Performance of Different Drilling Methods in Various Types of Geologic Formations (continued)

Type of Formation	Cable Tool	Direct Rotary (with fluids)	Direct Rotary (with air)	Direct Rotary (Down-the-hole air hammer)	Direct Rotary (Drill-through casing hammer)	Reverse Rotary (with fluids)	Reverse Rotary (Dual Wall)	Hydraulic Percussion	Jetting	Driven	Auger
Sandstone-well cemented	3	3	5	NR	NA	3	5	3	NR	NR	NA
Chert nodules	5	3	3	NR	NA	3	3	5	NR	NR	NA
Limestone	5	5	5	6	NA	5	5	5	NR	NR	NA
Limestone with chert nodules	5	3	5	6	NA	3	3	5	NR	NR	NA
Limestone with small cracks or fractures	5	3	5	6	NA	2	5	5	NR	NR	NA
Limestone, cavernous	5	3-1	2	5	NA	1	5	1	NR	NR	NA
Dolomite	5	5	5	6	NA	5	5	5	NR	NR	NA

*Assuming sufficient hydrostatic pressure is available to contain active sand (under high confining pressures)

NR = Not recommended
NA = Not applicable

Rate of Penetration:

1	Impossible	4	Medium
2	Difficult	5	Rapid
3	Slow	6	Very rapid

(After Driscoll, 1987)

Table 13.3.1-2 Relative Performance of Different Drilling Methods in Various Types of Geologic Formations (continued)

Type of Formation	Cable Tool	Direct Rotary (with fluids)	Direct Rotary (with air)	Direct Rotary (Down-the-hole air hammer)	Direct Rotary (Drill-through casing hammer)	Reverse Rotary (with fluids)	Reverse Rotary (Dual Wall)	Hydraulic Percussion	Jetting	Driven	Auger
Basalts, thin layers in sedimentary rocks	5	3	5	6	NA	3	5	5	NR	NR	NA
Basalts-thick layers	3	3	4	5	NA	3	4	3	NR	NR	NA
Basalts-highly fractured (lost circulation zones)	3	1	3	3	NA	1	4	1	NR	NR	NA
Metamorphic rocks	3	3	4	5	NA	3	4	3	NR	NR	NA
Granite	3	3	5	5	NA	3	4	3	NR	NR	NA

*Assuming sufficient hydrostatic pressure is available to contain active sand (under high confining pressures)

NR = Not recommended
NA = Not applicable

Rate of Penetration:

1	Impossible	4	Medium
2	Difficult	5	Rapid
3	Slow	6	Very rapid

(After Driscoll, 1987)

Table 13.3.1-3 Typical Additive Concentrations, Resulting Viscosities, and Required Uphole Velocities for Major Types of Drilling Fluids Used in Various Aquifer Materials

Base Fluid	Additive/Concentration	Marsh Funnel Viscosity (seconds)	Annular Uphole Velocity (ft/min)	Observations
Water	None	26 ± 0.5	100 - 120	For normal drilling (sand, silt, and clay)
Water	Clay (High-Grade Bentonite)			Increases viscosity (lifting capacity) of water significantly
	15-25 lb/100 gal	35 - 55	80 - 120	For normal drilling conditions (sand, silt, and clay)
	25-40 lb/100 gal	55 - 70	80 - 120	For gravel and other coarse-grained, poorly consolidated formations
	35-45 lb/100 gal	65 - 75	80 - 120	For excessive fluid losses
Water	Polymer (Natural)			Increases viscosity (lifting capacity) of water significantly
	4.0 lb/100 gal	35 - 55	80 - 120	For normal drilling conditions (sand, silt, and clay)
	6.1 lb/100 gal	65 - 75	80 - 120	For gravel and other coarse-grained, poorly consolidated formations
	6.5 lb/100 gal	75 - 85	80 - 120	For excessive fluid losses
				Cuttings should be removed from the annulus before the pump is shut down, because polymeric drilling fluids have very little gel strength
Air	None	N/A	3,000-5,000	Fast drilling and adequate cleaning of medium to fine cuttings, but may be dust problems at the surface
			4,500-6,000	This range of annular uphole velocities is required for the dual-wall method of drilling
Air	Water (Air Mist) 0.25-2 gpm	N/A	3,000-5,000	Controls dust at the surface and is suitable for formations that have limited entry of water

Table 13.3.1-3 Typical Additive Concentrations, Resulting Viscosities, and Required Uphole Velocities for Major Types of Drilling Fluids Used in Various Aquifer Materials (continued)

Base Fluid	Additive/ Concentration	Marsh Funnel Viscosity (seconds)	Annular Uphole Velocity (ft/min)	Observations
Air	Surfactant/Water (Air-Foam)	N/A	50-1,000	Extends the lifting capacity of the compressor
	1-2 qt/100 gal (0.25-0.5% surfactant)			For light drilling; small water inflow; also for sticky clay, wet sand, fine gravel, hard rock; few drilling problems
	2-3 qt/100 gal (0.5-0.75% surfactant)			For average drilling conditions; larger diameter, deeper holes; large cuttings; increasing volumes of water inflow; excellent hole cleaning
	3-4 qt/100 gal (0.75-1% surfactant)			For difficult drilling; deep, large-diameter holes; large, heavy cuttings; sticky and incompetent formations; large water inflows
				Injection rates of surfactant/water mixture: Unconsolidated formations 3-10 gpm Fractured rock 3-7 gpm Solid rock 3-5 gpm
Air	Surfactant/Colloids/Water (Stiff Foam)	N/A	50-100	Greatly extends lifting capacity of the compressor
	3-5 qt/100 gal (0.75-1% surfactant) plus 3-6 lb polymer/100 gal or 30-50 lb bentonite/100 gal			For difficult drilling; deep, large-diameter holes; large, heavy cuttings; sticky and incompetent formations; large water inflows
	4-8 qt/100 gal (1-2% surfactant) plus 3-6 lb polymer/100 gal or 30-50 lb bentonite/100 gal			For extremely difficult drilling; large, deep holes; lost dirculation; incompentent formations; excessive water inflows

(Compiled by Driscoll, 1984)

Table 13.3.1-4 Drilling Fluid Weight Adjustment with Barite or Water

Initial drilling fluid weight, lb/gal	Desired drilling fluid weight, lb/gal											
	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0	13.5	1.0	14.5	15.0
9.0	69	140	214	293	371	457	545	638	733	833	940	1050
9.5		69	143	219	298	381	467	557	650	750	855	964
10.0	43		71	145	221	305	390	479	569	667	769	876
10.5	85	30		74	148	229	312	398	488	583	683	788
11.0	128	60	23		74	152	233	319	407	500	598	700
11.5	171	90	46	19		76	157	240	326	417	512	614
12.0	214	120	69	37	16		79	160	245	333	426	526
12.5	256	150	92	56	32	14		81	162	250	343	438
13.0	299	180	115	75	48	27	12		81	167	257	350
13.5	342	210	138	94	63	41	24	11		83	171	264
14.0	385	240	161	112	78	54	36	21	10		86	176
14.5	427	270	185	131	95	68	48	32	19	9		88
15.0	470	300	208	150	110	82	60	43	29	18	8	

The lower left half of this table shows the number of gallons of water which must be added to 100 gal of drilling fluid to produce desired weight reductions. To use this portion of the table, locate the initial drilling fluid weight in the vertical column at the left, then locate the desired drilling fluid weight in the upper horizontal row. The number of gal of water to be added per 100 gal of drilling fluid is read directly across from the initial weight and directly below the desired weight. For example, to reduce an 11 lb/gal drilling fluid to a 9.5 lb/gal drilling fluid, 128 gal of water must be added for every 100 gal of drilling fluid in the system.

The upper right half of this table shows the number of pounds of barite which must be added to 100 gal of drilling fluid to produce desired weight increases. To use this portion of the table, locate the initial drilling fluid weight in the vertical column to the left, then locate the desired drilling fluid weight in the upper horizontal row. The number of pounds of barite to be added per 100 gal of drilling fluid is read directly across from the initial weight and directly below the desired weight. For example, to raise a 9 lb/gal drilling fluid to 10 lb/gal, 140 lb of barite must be added per 100 gal of drilling fluid in the system.

(*After Petroleum Extension Service, 1969*)

DANIEL B. STEPHENS & ASSOCIATES, INC.

Drilling Information Checklist

Project No. ____________ DBS&A Project Manager ____________

DBS&A Technical Representative ____________ DBS&A Field Representative(s) ____________

Drilling Company ____________

Drilling Company Contact ____________ Phone No. ____________

Date and Time for Work to Begin ____________

Estimated Work Days to Complete Job ____________ Access Agreements ____________

Drilling Rig ____________ Driller and Assistant(s) ____________

☐ Hollow Stem Auger ☐ Air/Mud Rotary ☐ Cable Tool ☐ Dual-Tube Air Percussion ☐ Coring Rig

Blu-Stake (NM call 1-800-321-2537 for most utilities) Contacted By ____________

One Week Authorization No. ____________ Date. ____________

Underdetection Services (Private Co.) ____________

Client Contact ____________ Phone No. ____________

Job Site ____________ Phone No. ____________

Location ____________

Surface ☐ Asphalt ☐ Concrete ☐ Dirt ☐ In Roadway

Geologic Material ____________

Sampling Device ☐ Splitspoon ☐ Thin-walled Tube ☐ 140 lb. Hammer (SPT) ☐ Coring

Sampling Length ☐ 12" ☐ 18" ☐ 24" With Rings ☐ 3" ☐ 6"

Sampling Interval(s) ____________

Disposal of Cuttings ☐ Drummed ☐ Leave On-site

Contain Decontamination Water ____________

Hole Diameter	No. of Borings	Total Footage	Maximum Depth	
Well Diameter	**No. of Wells**	**Total Footage**	**Depth to Water**	**Screen Length/Slot Size**

Grouting ☐ Place Bentonite Seal ☐ Grout to Surface ☐ Backfill

Mixed On-site by Drilling Co. ____________ Cement Truck Delivers Grout ____________

Poured from Surface Through Drill Pipe ____________

Pumped Through Tremie Pipe ____________

Water On-site ☐ Yes ☐ No Electricity ☐ Yes ☐ No

Level of Protection ☐ A ☐ B ☐ C ☐ D Health & Safety Plan By ____________

Potential Contaminants ____________ Other Hazards ____________

DBS&A Form No. 116 6/93

DANIEL B. STEPHENS & ASSOCIATES, INC.

Drilling Equipment and Support Vehicle Checklist

Project No. ____________________ DBS&A Project Manager ____________________

DBS&A Technical Representative ____________________ DBS&A Field Representative(s) ____________________

Drilling Company ____________________

Drilling Company Contact ____________________ Phone No. ____________________

Date and Time for Work to Begin ____________________

Material	Size	Quantity	Equipment Supplier*
Drill Bit			
Rotary Drilling Pipe			
Hollow Stem Auger (O.D. x I.D: 10"x6.25" or 8"x4.25" + Total Footage)			
Dual-Tube Pipe (O.D. / I.D)			
Water Tank			
Steam Cleaner			
Decontamination Trailer to Contain Water from Steam Cleaning			
Drums			
Tank to Mix Grout			
Tremie Pipe			
Grout Pump			
Wooden Plugs (Flowing Sand)			
Welder			
Concrete Saw (Other Subcontractor)			
Development Rig (Bailers, Surge Block, Pump)			
Plastic Sheeting			
Sampler (Length and Type)			
Core Catchers			
Rings - Brass			
Rings - Stainless Steel			
Endcaps			
Teflon Liners			
Tagline (Length and Type)			

*DBS&A or Other (specify)

Section 13.3.2

Soils Logging, Sampling, Handling, and Shipping for Geotechnical and Chemical Analyses

1. PURPOSE

The following SOP describes the appropriate procedures for the logging, sampling, handling, and shipping of soil during soil boring investigations. Sampling methodologies and shipping requirements are provided for collection of geotechnical, physical, and chemical soil samples.

2. SCOPE

This procedure is applicable to all DBS&A employees and subcontractors who are engaged in soil boring activities. It provides the minimum logging requirements, sampling protocols, and shipping requirements for soil boring investigations. The appropriate form for logging soil is included in this SOP as Attachment 1, Soil Boring Log (DBS&A Form No. 080). A soils classification chart is included as Attachment 2. Tables 13.3.2-1 and 13.3.2-2 provide handling and transport, and volume requirements for soil physical analysis samples, respectively.

3. PROCEDURES

3.1 Soils Logging

Soil descriptions and other pertinent information will be recorded on the Soil Boring Log form during boring operations. The Soil Boring Form contains a header for recording the boring specifics and a log for describing and classifying soil and tracking soil sampling. Soils will be identified and described in accordance with ASTM D 2488, Standard Practice for Description and Identification of Soil (Visual-Manual Practice). Table 13.3.2-3 provides a list of equipment that may be required for soils logging, sampling, handling, and shipping.

3.1.1 Completing the Header

Most of the header is self-explanatory. On the first page of the log, it is important to complete the entire header. If subsequent forms are necessary, complete the page number, the site, the client, the person logging the soil, the boring number, and the date. On the first page, sketch a location map for the boring, referencing it to known features or landmarks. When specifying the drilling method and drill rig, note the diameter of the drill bit or augers.

3.1.2 Completing the Boring Log

PID/FID - record head space measurements made with the PID/FID in this column in the appropriate depth interval from which the sample was collected.

Blow Counts - if driving a split-barrel sampling device with a hammer, record the number of hammer "blows" per 6 inches of penetration. Ensure that the driller marks the 6 inch intervals on the drill stem prior to hammering the split-barrel.

Sampling Device - specify the sampling device (i.e., split-barrel, split-barrel with brass or stainless steel rings, Shelby tube); specify the inside diameter of the sampling device.

Sample Interval - specify the sampling interval (starting and finishing) by placing an "X" across the appropriate depth interval in this column.

Sample Recovery - state, in tenths of feet, the amount of sample which is recovered.

Sample Number - record the designated sample number in this column.

Depth (Feet) - complete this column in 5-foot intervals to keep a running tally of the depth of the borehole.

USCS Symbol - provide the USCS symbol for the soil be described; draw a solid contact line at the appropriate depth to signify changes in soil type.

Soil Description - describe the soil in the format listed on the boring log; for non-cohesive soils, estimate the grain distribution, gradation, and grain shape; for cohesive soils, note the plasticity and clay consistency; if possible, a soil classification and geotechnical gauge and a color chart should be used to aid in describing soil.

3.2 Soil Sampling

Soil samples will typically be collected for geotechnical, physical, or chemical analysis. Geotechnical samples will be collected with a split-barrel sampler lined with brass rings or in the case of cohesive soils to be analyzed for compressive strength, a thin-walled tube sampler. Chemical samples will be collected with an unlined split-barrel sampler or a ring-lined split-barrel sampler. Regardless of which sampling device is employed, care should be taken to minimize slough in the borehole. Slow withdrawal of the drill bit prior to sampling will minimize slough. When drilling below the water table, ensure that the water level in the borehole (or within driven casing) is maintained at or above the water table elevation.

3.2.1 Geotechnical/Physical Properties Samples

Geotechnical and/or physical properties samples will be collected with either a ring-lined split-barrel sampler or a thin-walled Shelby tube. If possible, use a ring-lined sampler for physical properties analysis. For triaxial and unconfined compression tests, either a ring-lined sampler or a thin-walled tube sampler may be employed. For cohesive soils, the thin-walled tube sampler should be used for obtaining the least disturbed samples. In non-cohesive soils, a ring-lined sampler is required because of poor sample recovery experienced with a thin-walled sampler.

3.2.1.1 Ring-lined Split-Barrel Sampler (ASTM D 3350)

1. Assemble the sampler with the specified rings. For physical properties analysis, the typical ring is 3 inches in length and constructed of brass. Ring requirements will be specified in the Field Sampling Plan (FSP).

2. Attach the sampler to the drill stem and carefully lower it to the bottom of the borehole.

3. Hydraulically push the sampler into the soil in a rapid, continuous manner to a length not to exceed that of the sampler. In dense, non-cohesive soils, the sampler may have to be driven. If so, record the blow counts.

4. Carefully disassemble the sampler to minimize soil disturbance. Trim the individual rings flush with a clean knife, and place plastic caps over the ring ends. Use the soil in one of the rings for field classification. Secure the caps with tape and label the ring, including the vertical orientation.

5. The samples can be shipped in a dry cooler. If the possibility exists the samples will be handled roughly, pack them with shipping material in the cooler.

3.2.1.2 Thin-Walled Tube Sampler (ASTM D 1587)

1. Attach the sampling tube to the drill stem and carefully lower to the bottom of the borehole.

2. Rapidly and continuously hydraulically push the Shelby tube a distance of 5 to 10 times the tube diameter in non-cohesive soils and 10 to 15 times the diameter in cohesive soils. In dense, non-cohesive soils it is permissible to drive the sampler. Record the blow counts. It is permissible to "twist" the drill stem to shear the sample bottom prior to retrieval.

3. Carefully withdraw the sampler from the formation to minimize disturbance.

4. The sample can be shipped either unextruded or after extrusion at the site.

   Unextruded - Measure the length of the sample in the tube. Remove any slough from the top of the tube. Remove at least 1 inch of soil from the bottom of the tube for field classification. Seal the top and bottom of the tube with plastic caps and secure with tape.

   Extruded - Following extrusion, select a 12- to 15-inch segment of the sample which appears least disturbed. Carefully cut the ends with a clean knife, and immediately wrap the sample in cellophane wrap, then aluminum foil. Place the sample in a plastic tube, and cap the ends. Describe the soil with the remainder of the sample. Describe the prepared interval to the extent practicable. ***DO NOT*** cut or disturb the interval to be submitted to the laboratory.

5. The samples can be shipped in a similar manner as described in 3.2.1.1(5) above.

3.2.2 Soil Chemistry Samples

Soil chemistry samples can be collected with either the split-barrel sampler or with the ring-lined split-barrel sampler. The primary difference in the two methods is the preparation of the samples. In the case of samples obtained from the split-barrel, the soil must be transferred to soil containers (typically glass jars). In the case of the ring-lined sampler, the rings will be either stainless steel or brass which are capped with

Teflon-lined caps. The rings are labeled, secured with toluene-free tape, and submitted directly for analysis. Exact sample methods, volumes, containers, preservation, and chain of custody procedures will be outlined in the FSP. In general, for soil matrix samples, EPA SW-846 (EPA, 1986) methods will be specified. Both the split barrel sampler and the ring-lined sampler are hydraulically pushed or driven in the same manner described in 3.2.1.1(2-3) above.

3.2.2.1 Split-Barrel Samples (ASTM D 1586)

1. Upon retrieval of the sample, carefully open the split-barrel. Trim the sample with a decontaminated, sharp stainless-steel knife. Note the general soil type.

2. As quickly as possible, collect samples for volatile organic and semi-volatile organic analysis. Be sure that headspace is minimized in the volatile organic analysis samples. Collect field duplicates and specify that the laboratory perform matrix spike/matrix spike duplicates from the same interval as the sample. Place the samples in certified clean glass jars with Teflon-lined caps.

3. Collect samples for other required analyses. If the FSP specifies mixing the split barrel sample prior to filling additional sample containers, do so in a stainless-steel mixing bowl. Sample volumes and containers will be specified in the FSP.

4. Label the samples in accordance with the FSP. At a minimum, this will include: (1) the sample number; (2) boring number and interval (if different from the sample number); (3) time and date; and (4) required analysis. If chain of custody seals are required, secure them across the container lid.

5. Place the sample containers in "ziplock" bags and place on ice. Prior to shipment, the sample containers must be wrapped in bubble-pack, or other suitable packing material.

6. Fully describe the soil sample.

7. Log the sample information in the field log book for later transfer to the Chain-of-Custody Form (DBS&A Form No. 095), which is included as Attachment 3 in this SOP.

3.2.2.2 Ring-Lined Split-Barrel Samples (ASTM D 3350)

1. Upon retrieval of the sampler, carefully open the split-barrel. Trim the ends of the rings with a clean stainless-steel knife. Cap the rings with Teflon-lined caps and seal with toluene-free tape.

2. Using one or more of the rings (if possible), and soil trimmed from the ring ends, describe and log the soil.

3. Follow the steps described in 3.2.2.1(5-7) above. Packing material is optional for the ring samples.

3.3 Sample Shipment

Proper shipment of samples is critical for ensuring that reliable analytical results are obtained. In the case of geotechnical or physical properties analysis samples, this involves protecting the samples against excessive impacts which may disturb the samples. For soil chemical analyses, it is important to protect the samples from breakage if they were collected in glass jars. In addition, most chemical methods call for the samples being maintained at a constant 4°C.

3.3.1 Geotechnical and Physical Properties Samples

Shipping requirements for geotechnical and physical properties samples are listed in Table 13.3.2-2. In general, samples should be shipped in a dry cooler. If the cooler is not being hand-carried to the laboratory (i.e., shipped by overnight carrier) the samples should be protected with packing material to prevent sample disturbance. Plastic bubble-wrap, shredded paper, foam "peanuts", and vermiculite provide adequate sample protection when properly used. It is important to provide packing materials between all samples, such that samples do not come in contact. When shipping samples, it important to enclose a chain-of-custody form in the cooler as specified in the FSP.

3.3.2 Soil Chemistry Samples

Soil chemistry samples collected in glass containers must be protected from breakage. Individually wrapping the sample containers in plastic bubble-wrap provides excellent protection. After wrapping the samples in bubble-wrap, they should be placed in sealed "zip-lock" bags. Brass or stainless-steel ring samples need only be placed in sealed "zip-lock" bags. If the FSP calls for chain-of-custody seals to be placed on individual samples, place them across the jar lid or plastic ring cap. Chain-of-custody forms should be filled out in accordance with the FSP, placed in a "ziplock" bag, and taped to the inside of the cooler lid. It is important to use an ample volume of ice in order to maintain the required temperature of 4°C. Chain of custody seals will be placed across the front and back of the cooler lid such that they will be broken in the event of tampering. The cooler lid should be firmly taped shut with several layers of shipping tape encircling the ends of the cooler. Finally, for chemical analyses, *always* ship the samples by overnight carrier.

4.0 REFERENCES

ASTM D 1586-84 Standard Method for Penetration Test and Split-Barrel Sampling of Soils

ASTM D 1587-83 Standard Practice for Thin-Walled Tube Sampling of Soils

ASTM D 2488-90 Practice for Description and Identification of Soils (Visual-Manual)

ASTM D 3350-84 Standard Practice for Ring-Lined Barrel Sampling of Soils

U.S. EPA, 1986, Test Methods for Evaluation of Solid Wastes, SW-846, 3rd Ed.

5.0 ATTACHMENTS

1. Boring Log (DBS&A Form No. 080 3/92)
2. Unified Soil Classification System Chart (DBS&A Form No. 049)
    - Table 13.3.2-1, Soil Physical Sample Handling and Transport
    - Table 13.3.2-2, Soil Physical Sample Volume Requirements
    - Table 13.3.2-3, Soil Sampling Field Equipment List
3. Chain-of-Custody Form (DBS&A Form No. 95)

Prepared by: ____________

Approved by: ____________
Daniel B. Stephens

Reviewed by: ____________
Quality Assurance Manager

Reviewed by: ____________
Systems Operations Manager

DANIEL B. STEPHENS & ASSOCIATES, INC.

Boring Log

Page____of____

Site		Location Map
Logged by	Client/Project #	
Boring Number	Drilling Co.	
Drilling Method	Drill Rig	
Date Started	Date Completed	

PID/FID Reading	Blow Counts	Sampling Device	Sample Recovery	Sample Interval	Sample Number	USCS Symbol	Depth (feet)	Soil Description/Remarks Soil type, color, texture, grain size, sorting, roundness, plasticity, consistency, moisture content

DBS&A Form No. 080 3/92

USCS GROUP SYMBOLS

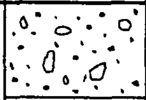
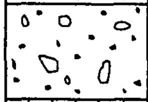
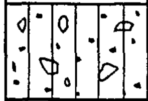
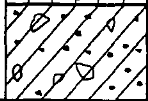
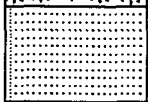
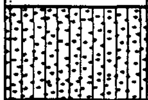
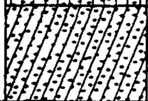
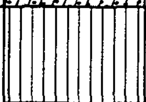
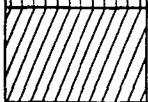
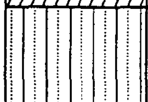
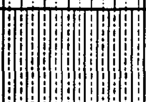
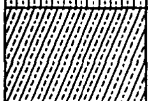
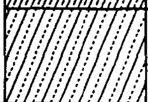
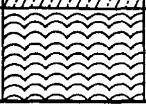
MAJOR DIVISIONS			GRAPH SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTIONS
Course Grained Soils More than 50% of Material is Larger than Silt (No. 200 Sieve Size)	Gravel and Gravelly Soils More than 50% of Course Fraction Retained on No. 4 Sieve	Clean Gravels (little or no fines <5%)		GW	Well-graded gravels, gravel-sand mixtures. Little or no fines.
				GP	Poorly-graded gravels. Gravel-sand mixtures. Little or no fines.
		Gravels with Fines (appreciable amount of fines >15%)		GM	Silty gravels. Gravel-sand-silt mixtures.
				GC	Clayey gravels. Gravel-sand-clay mixtures.
	Sand and Sandy Soils More than 50% of Course Fraction Passing No. 4 Sieve	Clean Sand (little or no fines <5%)		SW	Well-graded sands. Gravelly sands. Little or no fines.
				SP	Poorly-graded sands. Gravelly sands. Little or no fines.
		Sands with Fines (appreciable amount of fines >15%)		SM	Silty sands. Sand-silt mixtures.
				SC	Clayey sands. Sand-clay mixtures.
Fine Grained Soils More than 50% of Material is Smaller than Silt (No. 200 Sieve Size)	Silts and Clays	Liquid Limit Less than 50		ML	Inorganic silts and very fine sands. Rock flour. Silty or clayey fine sands or clayey silts with slight plasticity.
				CL	Inorganic clays of low to medium plasticity. Gravelly clays. Sandy clays, silty clays, lean clays.
				OL	Organic silts and organic silty clays or low plasticity.
	Silts and Clays	Liquid Limit Greater than 50		MH	Inorganic silts. Micaceous or diatomaceous fine sand or silty soils.
				CH	Inorganic clays of high plasticity. Fat clays.
				OH	Organic clays of medium to high plasticity. Organic silts.
Highly Organic				PT	Peat, humus, swamp soils with high organic content.

TABLE 13.3.2-1. SOIL PHYSICAL ANALYSIS SAMPLE REQUIREMENTS AND TRANSPORT

PHYSICAL PROPERTY TEST	SAMPLE REQUIREMENT	SHIPPING REQUIREMENT
Soil Moisture	2.5" O.D. x 3" long ring or in double plastic bag with air removed	Dry cooler
Hydraulic Conductivity	2.5" O.D. x 3" sealed ring	Dry cooler
Moisture Retention (Ψ-Θ)	2.5" O.D. x 3" sealed ring	Dry cooler with packing material
Air Permeability	2.5" O.D. x 3" sealed ring	Dry cooler with packing material
Bulk Density	2.5" O.D. x 3" sealed or waxed ring	Dry cooler with packing material
Porosity	2.5" O.D. x 3" sealed ring	Dry cooler with packing material
Specific Gravity	2.5" O.D. x 3" sealed ring or plastic bag for bulk sample	Dry cooler
Particle Size	2.5" O.D. x 3" sealed ring; plastic bag for gravelly soil	Dry cooler
Atterberg Limits	2.5" O.D. x 3" sealed ring or plastic bag	Dry cooler preferred
Proctor Tests	5 gallon plastic bucket or large plastic bags	No shipping requirements
Compression Tests	Unextruded in thin-walled tube; extruded wrapped in cellophane wrap and placed in plastic tube; or 2.5" O.D. x 6" sealed ring	Dry cooler with packing material

TABLE 13.3.2-2. SOIL PHYSICAL SAMPLE VOLUME REQUIREMENTS

SAMPLE REQUIREMENTS FOR ADDITIONAL TESTS	PRIMARY TEST REQUESTED											
	Moisture Content (volumetric)	Hydraulic Conductivity K_{sat}	Hydraulic Conductivity K_{unsat}	Moisture Retention $\Psi - \Theta$	Air Permeability K_{air}	Bulk Density	Porosity (Calculated)	Porosity (Air Pycnometer)	Particle Density	Particle Size Analysis	Atterberg Limits	Compaction (Proctor) Test
Moisture Content (Volumetric)		Same Sample	(3) Same Sample	Same Sample	Same Sample	Same Sample	Same Sample	Same Sample	(1) Same Sample	(1) Same Sample	Extra Sample	Extra Sample
Hydraulic Conductivity	Same Sample		(3) Same Sample	Same Sample	Same Sample	Same Sample	Same Sample	Same Sample	(1) Same Sample	(1) Same Sample	Extra Sample	Extra Sample
Hydraulic Conductivity	(3) Same Sample	Same Sample		Same Sample	Same Sample	Same Sample	Same Sample	Same Sample	(1) Same Sample	(1) Same Sample	Extra Sample	Extra Sample
Moisture Retention	Same Sample	Same Sample	(3) Same Sample		Same Sample	Same Sample	Same Sample	Same Sample	(1) Same Sample	(1) Same Sample	Extra Sample	Extra Sample
Air Permeability	Same Sample	Same Sample	(4) Same Sample	Same Sample		Same Sample	Same Sample	Same Sample	(1) Same Sample	(1) Same Sample	Extra Sample	Extra Sample
Bulk Density	Same Sample	Same Sample	(4) Same Sample	Same Sample	Same Sample		(5) Same Sample	Same Sample	(1) Same Sample	(1) Same Sample	Extra Sample	Extra Sample
Porosity (Calculated)	Same Sample	Same Sample	(4) Same Sample	Same Sample	Same Sample	Same Sample		Same Sample	(1) Same Sample	(1) Same Sample	Extra Sample	Extra Sample
Porosity (Air)	Same Sample	Same Sample	(4) Same Sample	Same Sample	Same Sample	Same Sample	Same Sample		(1) Same Sample	(1) Same Sample	Extra Sample	Extra Sample
Particle Density	Same Sample	Same Sample	Same Sample	Same Sample	Same Sample	Same Sample	(6) Same Sample	Same Sample		Same Sample	Same Sample	Extra Sample
Particle Size Analysis	(2) Extra Sample	(2) Extra Sample	(2) Extra Sample	(2) Extra Sample	(2) Extra Sample	(2) Extra Sample	(2) Extra Sample	(2) Extra Sample	(2) Extra Sample		Extra Sample	Extra Sample
Atterberg Limits	Extra Sample	Extra Sample	Extra Sample	Extra Sample	Extra Sample	Extra Sample	Extra Sample	Extra Sample	Same Sample	Extra Sample		Extra Sample
Compaction (Proctor)	Extra Sample	Extra Sample	Extra Sample	Extra Sample	Extra Sample	Extra Sample	Extra Sample	Extra Sample	Extra Sample	Extra Sample	Extra Sample	

(1) Same sample may be run for this additional test provided sample is in a sample ring and meets the sample size requirements for the additional test.

(2) Same sample may be used if sample meets sample size requirements for additional test (is there sufficient sample; usually only fine-grained samples will meet this requirement).

(3) Required for all unsaturated hydraulic conductivity calculations except column imbibition method.

(4) Same sample may be used except for column imbibition test.

(5) Additional test required to perform calculations of primary test.

(6) Additional test preferred for best results of primary test.

TABLE 13.3.2-3. SOIL SAMPLING FIELD EQUIPMENT LIST

ITEM	DESCRIPTION
1. Soil Kit	Geologic hammer Electrical and solvent-free tape Flagging tape Assorted sharpies Munsel Soil Color Chart Grain size chart USCS Soil Classification Guide Carpenter's rule (6 feet marked in tenths) Spatulas Dilute Hydrochloride acid
2. Boring Log forms and clip board	
3. Field book	
4. Meters:	Photoionization Detector MX25 explosivity meter Water level meter Flame Ionization Detector or methane meter Geiger-Mueller radiation meter
5. Tagline:	Fiberglass with weight taped OR Steel tape with steel weight and no tape to attach weight
6. 300-foot fiberglass tape	
7. Latex gloves (2 or more boxes)	
8. Health and Safety kits:	Earplugs Hard hat Steel-toed boots Safety glasses Tyvek, Respirator
9. Coolers:	One for food only 3 or more for samples

TABLE 13.3.2-3. SOILS SAMPLING FIELD EQUIPMENT LIST (CONTINUED)

ITEM	DESCRIPTION
10. Decontamination:	3 plastic tubs Plastic brushes Liquinox Distilled water, 10-15 gallons minimum Paper towels Garbage bags (large/small)
11. Soil sample containers:	Brass rings (for soil physical properties) Stainless steel rings (for organic chem analyses) Teflon liners (for organic chem analyses) Plastic endcaps Sealing tape and/or purifier wax Glass jars (4 or 8 oz for chemical analyses) Quart and gallon ziplock bags

DANIEL B. STEPHENS & ASSOCIATES, INC.

Chain of Custody

To:

______________________ Date __________ Project No. __________

______________________ Client ______________________

______________________ Relinquished by ______________________

Sent by: ☐ Fed Ex ☐ DHL ☐ Other ______________________

Purpose of Shipment ______________________

Possible Contaminants ______________________

Item No.	Sample No.	Analysis to be Done	Sample Container	Comments

Date Received __________ by ______________________
Company Representative

Received the above articles in good condition

Except as noted ______________________

DBS&A Form No. 095 5/92

Section 13.4

Well Design, Installation, and Abandonment

1. PURPOSE

This section provides standard operating procedures (SOPs) and standard operating guidelines (SOGs) for the design, installation, and abandonment of wells.

2. SCOPE

The SOPs and SOGs included in this section are applicable to all DBS&A employees, and its contractors and subcontractors, for the conduct of all activities listed in this section. **All SOPs and SOGs described in this section are proprietary in nature and shall not be copied or reproduced, or distributed to any person or organization not employed by DBS&A, without the expressed written approval of the Systems Operations Manager or President of DBS&A.** The scope of the procedures described in this section include the following:

13.4.1 Monitor Well Design and Installation
13.4.2 Extraction Well Design and Installation
13.4.3 Well Development
13.4.4 Well and Boring Abandonment
13.4.5 Well Grouting

3. PROCEDURES

These SOPs and SOGs shall be reviewed and updated at least once annually by the Systems Operations Manager (SOM), or person(s) designated by the SOM. Revisions and additions to these SOPs and SOGs shall be made as needed to assure consistency with industry standards and the collection of high quality data in the field. Requests for revisions shall be made on Form No. 127 in accordance with the procedure described in Section 0.2 of the DBS&A Operations Manual. Form No. 043 of Section 2.2 shall be used in requesting, authorizing, and documenting any SOP/SOG, or part of any SOP/SOG, copied or distributed for uses described in Section 13.4 of the Operations Manual. All or parts of the SOPs/SOGs described in this section may be reproduced and used in DBS&A reports, proposals, and work plans with the verbal consent of either the SOM or President of DBS&A. The SOM shall be responsible for filing and maintaining requests made on Form Nos. 127 and 043.

Prepared by: Larry M. C[illegible]

Reviewed by: Larry M. C[illegible]
Quality Assurance Manager

Approved by: Daniel B. Stephens
Daniel B. Stephens

Reviewed by: Larry M. C[illegible]
Systems Operations Manager

Section 13.4.1

Monitor Well Design and Installation

1. PURPOSE

This section provides standard operating guidelines (SOGs) for monitor well design and installation.

2. SCOPE

The SOGs included in this section are applicable to all DBS&A employees, and its contractors and subcontractors, for the conduct of all activities listed in this section. This procedure is applicable to all DBS&A employees and subcontractors who are engaged in monitor well design and installation activities. Tables 13.4.1-1 and 13.4.1-2 will aid in the selection of casing, screen and riser materials and bentonite or cement grouting materials. Figures 13.4.1-1 and 13.4.1-2 are respectively diagrams for typical shallow zone (single-cased) and deep zone (multi-cased) wells used at DBS&A. Attachment 1 to this SOG is a material supply list (Form No. 118, 6/93) and should be used in the preparation of monitor well design and installation activities. Also, a well completion record (Form No. 048) included as Attachment 2, which will be used to record well design and installation information in the field. The scope of the procedures described in this section include the following:

- Initial Site Characterization
- Monitor Well Design
- Monitor Well Installation

Standards for monitor well design and installation are described in ASTM D 5092-90 ("Standard Practice for Design and Installation of Ground Water Monitoring Wells in Aquifers"). Also, DBS&A technical representatives are required to follow all applicable state regulations pertaining to monitor well design and installation. Refer to Driscoll (1986), EPA (September 1986) or Aller et. al. (1989) for more detailed guidelines about the above subjects as they relate to the design and installation of monitor wells.

3. GUIDELINES

3.1 Initial Site Characterization (ASTM D 5092-90)

A conceptual hydrogeologic model that identifies potential flow paths and the target monitoring zone(s) should be developed prior to monitor well design and installation. The following steps for initial site characterization are recommended:

1. Conduct an initial visit to identify and locate aquifers and zones with the greatest potential to contain and transmit ground water and contaminants from the project area and study exposed soil and rocks within or near the project area for soil color and textural changes, landslides, faults, seeps, and springs.

2. Collect and review literature from previous investigations of the project area (i.e. topographic maps, aerial imagery, site ownership and utilization records, geologic and hydrogeologic maps

and reports, mineral resource surveys, water well logs, and personal information from local well drillers).

3. Develop a preliminary conceptual model of the project area using the information gathered during the initial site visit and literature search. Target specific aquifers and/or ground-water zones for additional characterization based on the known hydrogeology and potential contaminant characteristics (e.g., screen across water table for LNAPLs; include a sump for DNAPLs).

3.2 Monitor Well Materials and Design (ASTM D 5092-90)

The following materials and design are for typical shallow zone (single-cased) and deep zone (multi-cased) wells. Figure 13.4.1-1 is a diagram showing a typical design for a shallow zone (single-cased) well used at DBS&A. Figure 13.4.1-2 is a diagram showing a typical design for a deep zone (multi-cased) well used at DBS&A. Attachment 1 to this SOG is a material supply list (Form No. 118) for monitor well installation and should be completed and checked prior to the field stage of the drilling program by both DBS&A and the drilling subcontractor. Attachment 1 to this SOG should be used in conjunction with the "Drilling Information Checklist" and the "Drilling Equipment and Support Vehicles Checklist" (Form Nos. 116 and 117, Section 13.3.1 of the Operations Manual).

3.2.1 Water

Water used in the drilling process, to prepare grout mixtures and to decontaminate the well screen, riser, and annular sealant injection equipment, should be obtained from a source of known chemistry or should be characterized. The chemical analysis should confirm that the added water does not contain constituents that could compromise the integrity of the well installation or that may be potential contaminants.

3.2.2 Filter Pack

1. The grain-size distribution curve for the filter pack is selected by multiplying the 70% retained size of the finest formation sample by 3 or 4. Typically 10/20 silica sand is usually appropriate for the filter pack.

2. Do not select too fine a filter pack because this will reduce the yield of the well, causing longer sampling times.

3. Uniformity coefficients for filter pack materials should range from 1 to 3.

4. All filter pack material should be purchased from reputable suppliers who have properly cleaned and bagged the material.

5. To prevent downward migration of the bentonite or cement into the screen, the filter pack is extended at least 2 to 15 feet above the top of the screen.

6. The filter pack should not extend into an overlying water-bearing formation because this could permit downward vertical seepage in the pack and either dilute or add to the contamination of the water being monitored.

3.2.3 Well Screen

1. The well screen should be new, machine-slotted or continuous wrapped wire-wound, and composed of materials that are inert to the subsurface water being tested. Table 13.4.1-1 lists the advantages and disadvantages of several common screen materials.

2. The well screen material should be certified by the manufacturer as clean.

3. If not certified by the manufacturer as clean, the well screen should be steam cleaned or high-pressure water cleaned (if appropriate for the selected well screen materials) with water from a source of known chemistry immediately prior to installation.

4. The screen should be plugged at the bottom with the same material as the well screen.

5. The minimum nominal internal diameter of the well screen should be chosen based on the criteria that it will permit effective development and rapid sample recovery. In most instances, a minimal diameter of 2 inches (50 mm) is needed to allow for the introduction and withdrawal of sampling devices.

6. The slot size of the well screen should retain filter pack or natural formation along with permitting efficient development of the wells.

3.2.4 Riser

1. The riser should be new and composed of materials that are inert to the subsurface water being tested. Table 13.4.1-1 lists the advantages and disadvantages of riser materials.

2. The riser material should be certified by the manufacturer as clean.

3. If not certified by the manufacturer as clean, each section of the riser should be steam cleaned or high-pressure water cleaned (if appropriate for the selected material) using water from a source of known chemistry immediately prior to installation.

4. The minimal nominal internal diameter of the riser should be chosen based on the criteria that it will permit effective development and rapid sample recovery. In most instances, a minimum of 2 inches (50 mm) is needed to accommodate sampling devices.

5. Threaded joints are recommended. Alternatively, O-rings composed of materials that would not affect the subsurface water being sampled may be selected for use on flush joint threads.

3.2.5 Casing

1. The casing material should be new and composed of materials that are inert to the subsurface water being tested. Table 13.4.1-1 lists the advantages and disadvantages of casing materials. The exterior casing (temporary or permanent multi-cased wells) is generally constructed of steel although other appropriate materials may be used.

2. Where conditions warrant, the use of permanent casing installed to prevent communication between water-bearing zones is encouraged.

3. The casing material should be certified by the manufacturer as clean.

4. If not certified by the manufacturer as clean, the casing material should be steam cleaned or high-pressure water cleaned (if appropriate for the selected material) using water from a source of known chemistry immediately prior to installation.

5. The material type and minimum wall thickness of the casing should be adequate to withstand forces of installation.

6. All casing that is to remain as a permanent part of the installation (that is, multi-cased wells) should be new and cleaned of interior and exterior protective coatings.

7. The minimal nominal internal diameter of the riser should be chosen based on the criteria that it will permit effective development and rapid sample recovery. In most instances, a minimum of 2 inches (50 mm) is needed to accommodate sampling devices.

8. The diameter of the casing for filter packed wells should be selected so that a minimum annular space of 2 inches (50 mm) is maintained between the inside diameter of the casing and the outside diameter of the riser. In addition, the diameter of the casings in multi-cased wells should be selected so that a minimum annular space of 2 inches is maintained between the casing and the borehole (that is, a 2-inch diameter screen will require first setting a 6-inch (152-mm) diameter casing in a 10-inch (254-mm) diameter boring).

9. The ends of each casing section should be either flush-threaded or bevelled for welding.

3.2.6 Annular Sealants

The materials used to seal the annulus may be prepared as a slurry or used unmixed in a dry pellet, granular, or chip form. Sealants should be selected to be compatible with ambient geologic, hydrogeologic, and climatic conditions and any man-induced conditions anticipated to occur during the life of the well. Table 13.4.1-2 lists the advantages and disadvantages of using bentonite or cement as grouting material for monitor wells. The following guidelines for the bentonite seal and grout backfill should be considered:

1. A bentonite seal of at least 2 feet is placed above the filter pack. Bentonite should be powdered, granular, pelletized, or chipped sodium montmorillonite furnished in sacks or buckets from a commercial source and free of impurities which adversely impact the water quality in the well. The diameter of pellets or chips selected for monitoring well construction should be less than one fifth the width of the annular space into which they are placed to reduce the potential for bridging.

2. The grout backfill that is placed above the bentonite seal is ordinarily a liquid slurry consisting of either a bentonite (powder or granules, or both) base and water or a Portland cement base and water. A mixture of bentonite and Portland cement can be used for the grout backfill. Refer to ASTM D 5092-90 for standards in mixing and placing the grout backfill.

3.2.7 Annular Seal Equipment

Prior to use, the equipment used to inject the annular seals and filter pack should be steam cleaned or high-pressure water cleaned (if appropriate for the selected material) using water from a known chemical source. This procedure is performed to prevent the introduction of materials that may ultimately alter the water sample quality.

3.3 Monitor Well Installation (ASTM D 5092-90)

A well completion diagram (DBS&A Form No. 048, Attachment 2) should be completed as an on-going process during the installation of the monitor well. General steps for monitor well installation are as follows:

1. A stable borehole must be constructed prior to installing the monitor well casing, screen and riser (refer to Section 13.3.1 of the Operations Manual for drilling guidelines).

2. The well casing, screen, riser, and bottom plug materials should either be certified by the manufacturer as clean or cleaned with a steam cleaner or high-pressure water combined with a low-sudsing soap or detergent.

3. Working components of the drilling rig (drill pipe, subs, collars, belly, and all parts of the rig chasis near the borehole) should be cleaned as described in step no. 2.

4. All plastic screens and casing should be joined by threads and couplings or flush threads to prevent contamination from solvent glues.

5. The well screen and riser assembly can be lowered to the predetermined level and held into position by a ballast or hydraulic arms on the drilling rig. The assembly must be installed straight with the appropriate centralizers to allow for the introduction and withdrawal of sampling devices.

6. The riser should extend above grade and be capped temporarily to deter entrance of foreign materials during completion operations.

7. The volume of filter pack (gravel and/or silica sand) required to fill the annular space between the well screen and borehole should be estimated, measured during installation, and recorded on the well completion diagram during installation.

8. The filter pack is placed in the annulus from the bottom of the borehole up to 2 to 5 feet above the well screen.

9. If used, the temporary casing or hollow stem auger is withdrawn, usually in stipulated increments. Care should be taken to minimize lifting the riser with the withdrawal of the temporary casing/augers. To limit borehole collapse, the temporary casing or hollow stem auger is usually withdrawn until the lower most point on the temporary casing or hollow stem auger is at least 2 feet, but no more than 5 feet, above the filter pack for unconsolidated materials or at least 5 feet, but no more than 10 feet, for consolidated materials.

10. A bentonite pellet or a slurry seal is placed in the annulus between the borehole and the riser pipe on top of the filter pack. To be effective, the bentonite seal should extend above the filter pack a minimum of 2 feet, depending on local conditions.

11. Sufficient time should be allowed for the bentonite pellet seal to hydrate or the slurry annular seal to expand prior to grouting the remaining annulus. The volume and elevation of the bentonite seal material should be measured and recorded on the well completion diagram.

12. The volume and location of grout used to backfill the remaining annular space is recorded on the well completion diagram. An ample volume of grout should be premixed on site to compensate for unexpected losses.

13. Grout is introduced in one continuous operation until full strength grout flows out at the ground surface without evidence of drill cuttings or fluid.

14. The riser or casing or both should not be disturbed until the grout sets and cures for the amount of time necessary to prevent a break in the seal between the grout and riser, or grout and casing, or both.

15. Specific grouting procedures for single- and multi-cased wells are included in ASTM D 5092-90.

16. Well protection refers specifically to installations made at the ground surface to deter unauthorized entry to the monitor well and to prevent surface water from entering the annulus. Typically a concrete pad, protective shroud with a lock, and vented cap are placed on monitor wells constructed for DBS&A projects.

17. In areas where there is a high probability of damaging the well (high traffic, heavy equipment, poor visibility), it may be necessary to enhance the normal protection of the monitor well through the use of posts, markers, signs, etc.

18. Once the monitor well installation is complete, the well should be developed according to standards outlined in Section 13.4.3 of the Operations Manual.

19. The drilling subcontractor is required to file a well record with the State Engineer within 10 days after completion of the well.

4. ATTACHMENTS

- Table 13.4.1-1
- Table 13.4.1.2
- Figure 13.4.1-1
- Figure 13.4.1.2

1. Monitor Well Installation Supply List (DBS&A Form No. 118, 6/93)
2. Well Completion Record (DBS&A Form No. 048)

5. REFERENCES

Aller, L., T.W. Bennett, G. Hackett, R.J. Petty, J.H. Lehr, H. Sedoris, D.M. Nielson, and J.E. Denne. 1989. Handbook of Suggested Practices for the Design and Installation of Ground-Water Monitoring Well Design and Installation. National Well Water Association. Dublin, OH. 398 p.

Arizona Department of Water Resources. Undated. Well Construction and Licensing of Well Drillers, Handbook.

ASTM. 1990. Standard Practice for Design and Installation of Ground Water Monitoring Wells in Aquifers. Standard D 5092-90. Philadelphia, PA.

Driscoll, F.G. 1986. Groundwater and Wells. Johnson Division. St. Paul, MN. 1089 p.

EPA. 1986. RCRA Ground-Water Monitoring Technical Enforcement Guidance Document. U.S. EPA. Washington, D.C. September. 208 p. and 3 Appendices.

Prepared by: Natalyn K. Ala

Reviewed by: Larry M. Conn
Quality Assurance Manager

Approved by: DBStephens
Daniel B. Stephens

Reviewed by: Larry M. Conn
Systems Operations Manager

Table 13.4.1-1 Well Casing, Screen, and Riser Materials

Type	Advantages	Disadvantages
Stainless steel	• Least absorption of halogenated and aromatic hydrocarbons • High strength at a great range of temperatures • Excellent resistance to corrosion and oxidation • Readily available in all diameters and slot sizes	• Heavier than plastics • May corrode and leach some chromium in highly acidic waters • May act as a catalyst in some organic reactions • Screens are higher priced than plastic screens
PVC (Polyvinyl-chloride)	• Lightweight • Excellent chemical resistance to weak alkalies, alcohols, aliphatic hydrocarbons, and oils • Good chemical resistance to strong mineral acids, concentrated oxidizing acids, and strong alkalies • Readily available • Low priced compared to a stainless steel and Teflon	• Weaker, less rigid, and more temperature sensitive than metallic materials • May adsorb some constituents from ground water • May react with and leach some constituents from ground water • Poor chemical resistance to ketones, esters, and aromatic hydrocarbons
Teflon	• Good resistance to attack by most chemicals • Lightweight • High impact strength	• Screen slot openings may decrease in size over time • Tensile strength and wear resistance low compared to other engineering plastics • Expensive relative to other plastics and stainless steel
Mild steel	• Strong, rigid; temperature sensitivity not a problem • Readily available • Low priced relative to stainless steel and Teflon	• Heavier than plastics • May react with and leach some constituents into ground water • Not as chemically resistant as stainless steel

Table 13.4.1-1 Well Casing, Screen, and Riser Materials (Continued)

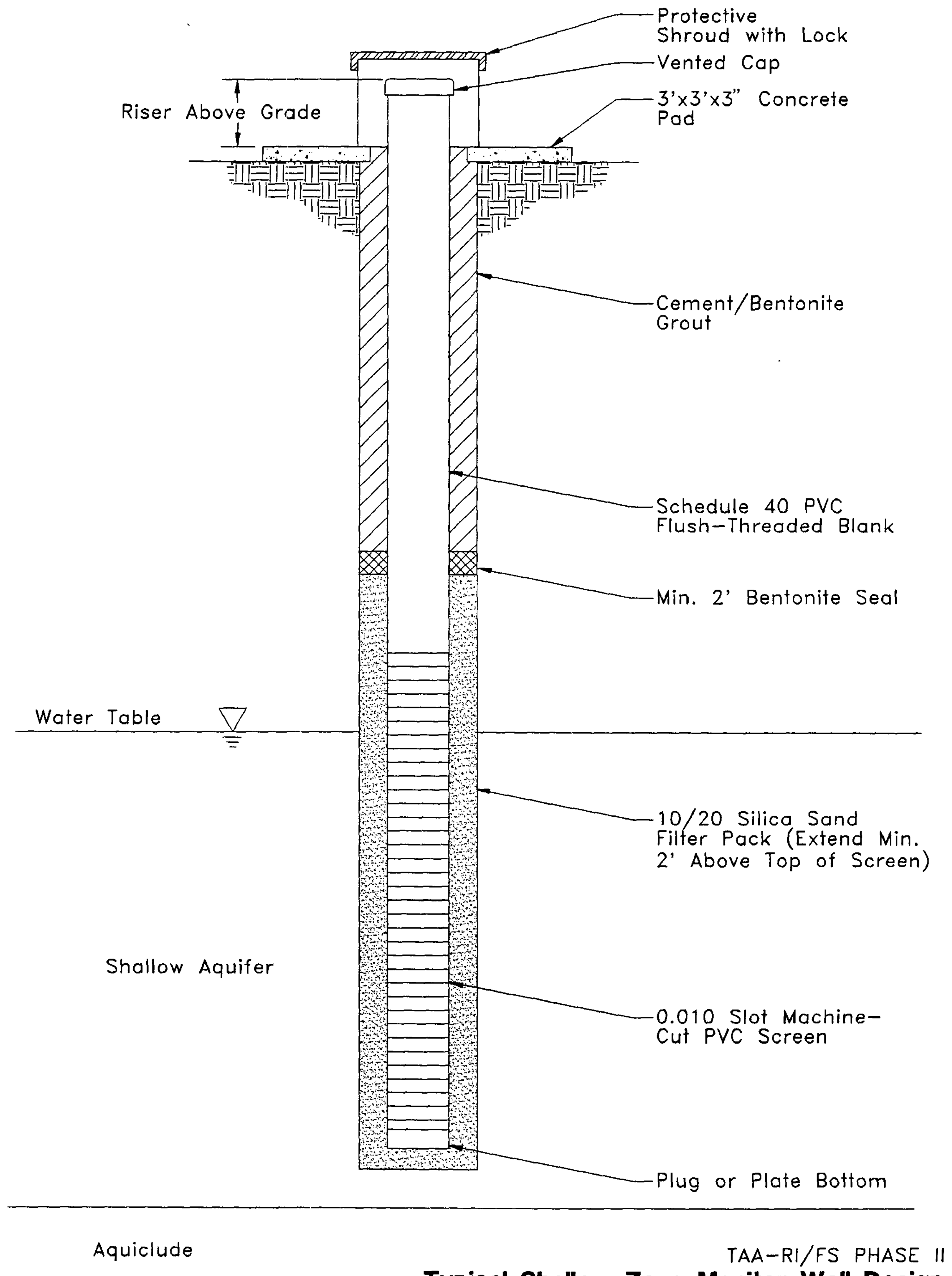
Type	Advantages	Disadvantages
Polypropylene	• Lightweight • Excellent chemical resistance to mineral acids • Good to excellent chemical resistance to alkalies, alcohols, ketones, and esters • Fair chemical resistance to concentrated oxidizing acids, aliphatic hydrocarbons, and aromatic hydrocarbons • Low priced compared to stainless steel and Teflon	• Weaker, less rigid, and more temperature sensitive than metallic materials • May react with and leach some constituents into ground water • Poor machinability--it cannot be slotted because it melts rather than cuts
Kynar	• Greater strength and water resistance than Teflon • Resistant to most chemicals and solvents • Lower priced than Teflon	• Not readily available • Poor chemical resistance to ketones, acetone

(After Driscoll, 1986)

Table 13.4.1-2. Grouting Materials for Monitoring Wells

Type	Advantages	Disadvantages
Bentonite	• Readily available • Inexpensive	• May produce chemical interference with water-quality analysis • May not provide a complete seal because: --There is a limit (14 percent) to the amount of solids that can be pumped in a slurry. Thus, there are few solids in the seal; should wait for liquid to bleed off so solids will settle --During installation, bentonite pellets may hydrate before reaching proper depth, thereby sticking to formation or casing and causing bridging --Cannot determine how effectively material has been placed --Cannot assure complete bond to casing
Cement	• Readily available • Inexpensive • Can use sand/or gravel filter • Possible to determine how well the cement has been placed by temperature logs or acoustic bond logs	• May cause chemical interferences with water-quality analysis • Requires mixer, pump, and tremie line; generally more cleanup than with bentonite • Shrinks when it sets; complete bond to formation and casing not assured

(After Driscoll, 1986)



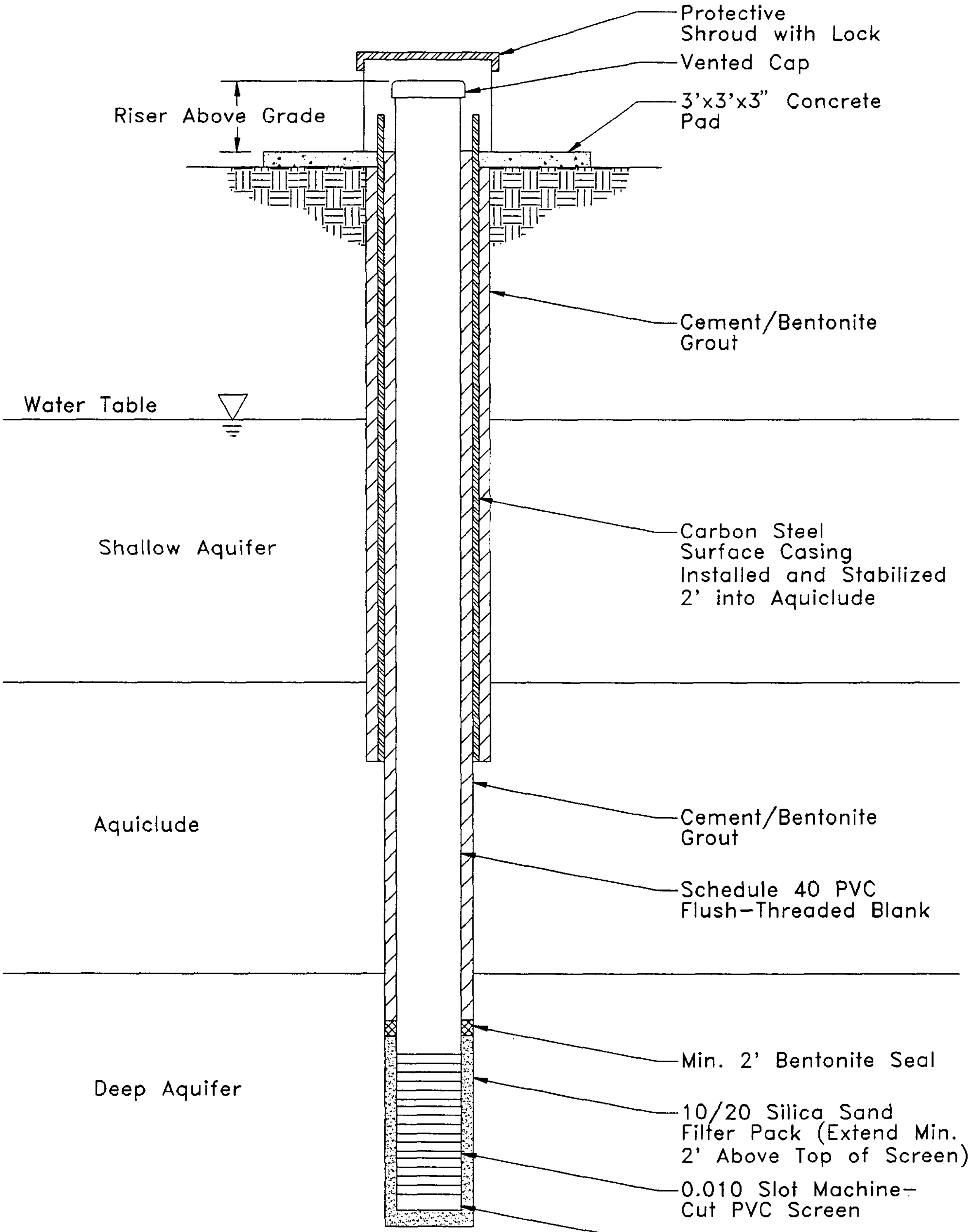
TAA-RI/FS PHASE II

Typical Shallow Zone Monitor Well Design
Single-Cased Well

DANIEL B. STEPHENS & ASSOCIATES, INC.

10-93 3230

Figure 13.4.1-1



TAA-RI/FS PHASE II

Typical Deep Zone Monitor Well Design
Multi-Cased Well

Not to Scale

DANIEL B. STEPHENS & ASSOCIATES, INC.

10-93 3230

Figure 13.4.1-2

DANIEL B. STEPHENS & ASSOCIATES, INC.

Monitor Well Installation Supply List

Project No. ______________________ DBS&A Project Manager ______________________

DBS&A Technical Representative ______________________ DBS&A Field Representative(s) ______________________

Drilling Company ______________________

Drilling Company Contact ______________________ Phone No. ______________________

Date and Time for Work to Begin ______________________

Material	Size	Quantity	Equipment Supplier*
Sand			
Sand			
Pea Gravel			
Bentonite Powder			
Bentonite Pellets			
Bentonite Chips (Ca-montmorill. Slow, NA-montmorill. Fast Hydration)			
PVC (Flush-Threaded Schedule 40)			
PVC (Flush-Threaded Schedule 40)			
PVC (Flush-Threaded Schedule 40)			
PCV Screen Schedule 40 with Slot__________			
PCV Screen Schedule 40 with Slot__________			
PCV Screen Schedule 40 with Slot__________			
Stainless Steel Channel Pack			
Steel Conductor Casing			
Slip Caps			
Slip Caps			
Threaded Endcaps			
Threaded Endcaps			
Locking Caps			
Concrete			
Portland Cement			
Locking Well Vault			

DBS&A Form No. 118 6/93

*DBS&A or Other (specify)

DANIEL B. STEPHENS & ASSOCIATES, INC.

ENVIRONMENTAL SCIENTISTS AND ENGINEERS

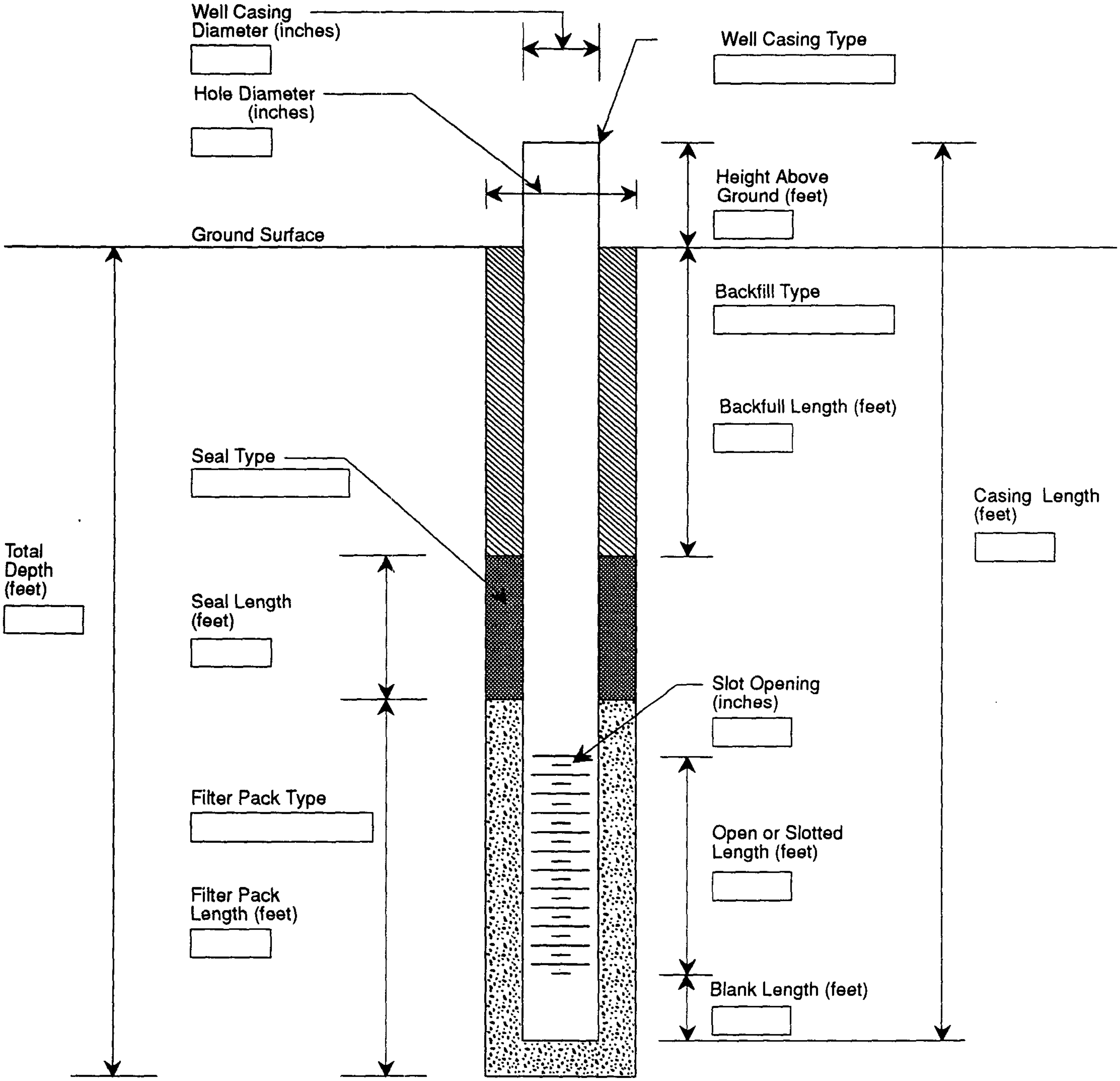
WELL COMPLETION RECORD

Client ______________________ Project No. ______________

Well No. ____________ Site ______________________ Date Installed ______________

Formation of Completion ______________________________________

DBS&A Personnel ______________________ Driller ______________________



Comments ______________________________________

Section 13.4.3

Well Development

1. PURPOSE

This section provides standard operating guidelines (SOGs) for well development.

2. SCOPE

This procedure is applicable to all DBS&A employees and subcontractors who are engaged in well development activities. Table 13.4.3-1 summarizes disadvantages and advantages for different well development methods. The scope of the procedures described in this section includes the following:

- Development Methods
- Duration of Well Development
- Well Recovery Test

Standards for well development are described in ASTM D 5092-90 ("Standard Practice for Design and Installation of Ground Water Monitoring Wells in Aquifers"). Refer to Driscoll (1986), EPA (September 1986) or Aller et al. (1989) for more detailed guidelines about well development.

3. GUIDELINES

Proper well development serves to 1) remove some finer grained material from the well screen and filter pack that may otherwise interfere with water quality analyses, 2) restore the ground-water properties disturbed during the drilling process, and 3) improve the hydraulic characteristics of the filter pack and hydraulic communication between the well and the hydrologic unit adjacent to the screened interval.

3.1 Development Methods (ASTM D 5092-90)

Methods of development most often used include mechanical surging and bailing or pumping, over-pumping, air-lift pumping, and well jetting. An important factor in any method is that the development work be started slowly and gently and be increased in vigor as the well is developed. most methods of well development require the application of sufficient energy to disturb the filter pack, thereby freeing the fines and allowing them to be drawn into the well. The coarser fractions then settle around and stabilize the screen. The well development method chosen should be documented in the field notebook. Table 13.4.3-1 summarizes the opinions of several references on well development methods and can be helpful in selecting an approximate method for development wells screened in varying hydrologic units.

3.1.1 Mechanical Surging

In this method, water is forced to flow into an out of the well screen by operating a plunger (or surge bock) or bailer up and down in the riser. A pump or bailer should then be used to remove the dislodged sediments following surging.

3.1.2 Over Pumping and Backwashing

The easiest, least expensive and most commonly employed technique of well deelopment is some form of pumping. With over pumping, the well is pumped at a rate considerably higher than it would be during normal operation. The fine-grain materials would be dislodged from the filter pack and surrounding strata influenced by the higher pumping rate. This method is usually conducted in conjunction with mechanical surging.

In the case where there is no backflow prevention valve installed, the pump can be alternately started and stopped. This is called backwashing. This starting and stopping allows the column of water that is intially picked up by the pump to be alternately dropped and raised up in a surging action. Each time the water column falls back into the well, an outward surge of water flows into the formation. This surge tends to loosen the bridging of the fine particles into and out of the well.

3.1.3 Air Lift Pumping

In this method, an air lift pump is operated by cycling the air pressure on and off for short periods of time. This operation will provide a surging action that will dislodge fine-grained particles. Applying a steady, low pressure will remove the fines that have been drawn into the well by the surging action. Efforts should be made (that is, through the use of a foot valve) to avoid pumping air into the filter pack and adjacent hydrologic unit because the air may lodge there and inhibit future sampling efforts and may alter ambient water chemistry. Furthermore, application of high air pressures should be avoided to prevent damage to small diameter PVC risers, screens, and filter packs.

3.1.4 Well Jetting

Another method of development involves jetting the well screen area with water while simultaneously air-lift pumping the well. However, the water added during this development procedure will alter the natural, ambient water quality and may be difficult to remove. Therefore, the water added should be obtained from a source with known chemistry. Water from the monitor well being developed may also be used if the suspended sediments are first removed.

3.2 Duration of Well Development (ASTM D 5092-90)

Well development should begin no sooner than 48 hours after the monitor well is completely installed and prior to water sampling. Development should be continued until representative water, free of the drilling fluids, cuttings, or other materials introduced during well construction is obtained. Representative water is assumed to have been obtained when pH, temperature, and specific conductivity readings stabilize and the water is visually clear of suspended solids. The minumum duration of well development will vary according to the method used to develop the well. The duration of well development and the pH, temperature, and specific conductivity readings should be recorded in the field notebook.

3.3 Well Recovery Test (ASTM D 5092-90)

A well recovery test can be performed immediately after and in conjunction with well development. The well recovery test not only provides an indication of well performnce but it may also provide data for determining the transmissivity of the screened hydrologic unit. Estimates of the hydraulic conductivity of the unit can then be determined. Readings should be taken at intervals suggested in Table 13.4.3-2 until the well has recovered to 90 percent of its static water level and recorded in the field notebook. Section 13.6 of the DBS&A Operations Manual describes methods for aquifer hydraulic testing specifically for establishing aquifer hydraulic parameters in greater detail.

Table 13.4.3-2 Suggested Recording Intervals for Well Recovery Tests

TIME SINCE STARTING TEST	TIME INTERVAL
0 to 15 min	1 min
15 to 50 min	5 min
50 to 100 min	10 min
100 to 300 min (5 hours)	30 min
300 to 1,440 min (24 hours)	60 min

4. ATTACHMENTS

- Table 13.4.3-1

5. REFERENCES

Aller, L., T.W. Bennett, G. Hackett, R.J. Petty, J.H. Lehr, H. Sedoris, D.M. Nielson, and J.E. Denne. 1989. Handbook of Suggested Practices for the Design and Installation of Ground-Water Monitoring Well Design and Installation. National Well Water Association. Dublin, OH. 398 p.

ASTM. 1990. Standard Practice for Design and Installation of Ground Water Monitoring Wells in Aquifers. Standard D 5092-90. Philadelphia, PA.

Driscoll, F.G. 1986. Groundwater and Wells. Johnson Division. St. Paul, MN. 1089 p.

EPA. 1986. RCRA Ground-Water Monitoring Technical Enforcement Guidance Document. U.S. EPA. Washington, D.C. September. 208 p. and 3 Appendices.

Prepared by: Natalyn K. Ala

Reviewed by: Larry M. Conn
Quality Assurance Manager

Approved by: DBStephens
Daniel B. Stephens

Reviewed by: Larry M. Conn
Systems Operations Manager

Table 13.4.3-1. Summary of Well Development Methods

Reference	Over-pumping	Backwashing	Mechanical Surging		Well Jetting	Air-lift Pumping
			Surge Block	Bailer		
Gass (1986)	Works best in clean coarse formations and some consolidated rock; problems of water disposal and bridging	Breaks up bridging, low cost & simple; preferentially develops	Can be effective; size made for ≥ 2" well; preferential development where screen >5'; surge inside screen		Consolidated and unconsolidated application; opens fractures, develops discrete zones; disadvantage is external water needed	Replaces air surging; filter air
United States Environmental Protection Agency (1986)	Effective development requires flow reversal or surges to avoid bridges	Indirectly indicates method applicable; formation water should be used	Applicable; formation water should be used; in low-yield formation, outside water source can be used if analyzed to evaluate impact	Applicable		Air should not be used
Barcelona et al.** (1983)	Productive wells; surging by alternating pumping and allowing to equilibrate; hard to create sufficient entrance velocities; often used with airlift		Productive wells; use care to avoid casing and screen damage	Productive wells; more common than surge blocks but not as effective		
Scalf et al. (1981)		Suitable; periodic removal of lines	Suitable; common with cable-tool; not easily used on other rigs	Suitable; use sufficiently heavy bailer; advantage of removing fines; may be custom made for small diameters		Suitable

Table 13.4.3-1. Summary of Well Development Methods (Continued)

Reference	Over-pumping	Backwashing	Mechanical Surging		Well Jetting	Air-lift Pumping
			Surge Block	Bailer		
National Council of the Paper Industry for Air and Stream Improvement (1981)	Applicable; drawback of flow in one direction; smaller wells hard to pump if water level below suction		Applicable; caution against collapse of intake or plugging screen with clay		Methods introducing foreign materials should be avoided (i.e., compressed air or water jets)	
Everett (1980)	Development operation must cause flow reversal to avoid bridging; can alternate pump off and on		Suitable; periodic bailing to remove fines		High velocity jets of water generally most effective; discrete zones of development	
Keely and Boateng (1987 a and b)	Probably most desirable when surged; second series of evacuation/recovery cycles is recommended after resting the well for 24 hours; settlement and loosening of fines occurs after the first development attempt; not as vigorous as backwashing	Vigorous surging action may not be desirable due to disturbance of gravel pack	Method quite effective in loosening fines but may be inadvisable in that filter pack and fluids may be displaced to degree that damages value as a filtering media		Popular but less desirable; method different from water wells; water displaced by short downward bursts of high pressure injection; important not to jet air or water across screen because fines driven into screen cause irreversible blockage; may substantially displace native fluids	Air can become entrained behind screen and reduce permeability

* Schalia and Landick (1986) report on special 2' valved block
** For low hydraulic conductivity wells, flush water up annulus prior to sealing; afterwards pump
(Compiled by Aller et al, 1989)

Section 13.4.4

Well and Boring Abandonment

1. PURPOSE

This section provides standard operating guidelines (SOGs) for well and boring abandonment.

2. SCOPE

This procedure is applicable to all DBS&A employees and subcontractors who are engaged in well and boring abandonment activities. The scope of the procedures described in this section includes the following:

- Need for Sealing Wells and Restoration of Geological Conditions
- Sealing Requirements
- Records of Abandonment Procedures

Abandonment activities conducted by DBS&A personnel will follow all applicable state regulations pertaining to well and boring abandonment.

3. GUIDELINES

Abandoned wells need to be sealed carefully to prevent pollution of the ground water source, eliminate any physical hazard, conserve aquifer yield, maintain confined head conditions, and prevent poor-quality water of one aquifer from entering another. The purpose of sealing an abandoned well is to prevent any further disturbance to the pre-existing hydrogeologic conditions that exist within the subsurface. The plug should prevent vertical movement within the borehole and confine the water to the original zone of occurrence. Driscoll (1986), EPA (September 1986) or Aller et al. (1989) provide more detailed procedures and guidelines for abandonment of wells. The following subsections outline general procedures and guidelines for abandonment of test holes, partially completed wells, and completed wells.

3.1 Need for Sealing Wells and Restoration of Geological Conditions

Abandoned test holes, including test wells, uncompleted wells, and completed wells shall be sealed for the following reasons:

1. Eliminate physical hazard.
2. Prevent contamination of ground water.
3. Conserve yield and hydrostatic head of aquifers.
4. Prevent intermingling of desirable and undesirable waters.

The guiding principle to be followed by the contractor in the sealing of abandoned wells is the restoration, as far as feasible, of the controlling geological conditions that existed before the well was drilled or constructed.

3.2 Sealing Requirements

Sealing requirements are as follows:

1. A well shall be measured for depth before it is sealed to ensure freedom from obstructions that may interfere with effective sealing operations.

2. Removal of liner pipe from some wells may be necessary to ensure placement of an effective seal.

3. If the liner pipe cannot be readily removed, it shall be perforated to ensure the proper sealing required.

4. Concrete, cement grout, or neat cement shall be used as primary sealing materials and shall be placed from the bottom upward by methods that will avoid segregation or dilution of material.

3.3 Records of Abandonment Procedures

Complete, accurate information shall be recorded in the field notebook of the entire abandonment procedure to provide detailed records for possible future reference and to demonstrate to the government state or local agency that the hole was properly sealed. Particularly, the following should be recorded accurately:

1. The depth of each layer of all sealing and backfilling materials shall be recorded.

2. The quantity of sealing materials used shall be recorded. Measurements of static water levels and depths shall be recorded.

3. Any changes in the well made during the plugging, such as perforating casing, shall be recorded in detail.

The owner or well permit holder should notify the appropriate state or local agency of the abandonment.

4. REFERENCES

Aller, L., T.W. Bennett, G. Hackett, R.J. Petty, J.H. Lehr, H. Sedoris, D.M. Nielson, and J.E. Denne. 1989. Handbook of Suggested Practices for the Design and Installation of Ground-Water Monitoring Well Design and Installation. National Well Water Association. Dublin, OH. 398 p.

ASTM. 1990. Standard Practice for Design and Installation of Ground Water Monitoring Wells in Aquifers. Standard D 5092-90. Philadelphia, PA.

Driscoll, F.G. 1986. Groundwater and Wells. Johnson Division. St. Paul, MN. 1089 p.

Prepared by: Natalyn K. Ala

Reviewed by: Larry M. Cu
Quality Assurance Manager

Approved by: DB Stephens
Daniel B. Stephens

Reviewed by: Larry M. Cu
Systems Operations Manager

Section 13.5

Water Sampling

1. PURPOSE

The purpose of this standard operating procedure (SOP) is to present guidelines and procedures for collection, preservation, and shipment of water samples for laboratory chemical analysis. This SOP also outlines procedures for measurement of field water quality parameters during sample collection activities.

2. SCOPE

The SOPs included in this section are applicable to all DBS&A employees, and its contractors and subcontractors, for the conduct of all activities listed in this section. **All SOPs described in this section are proprietary in nature and shall not be copied or reproduced, or distributed to any person or organization not employed by DBS&A, without the expressed written approval of the Systems Operations Manager (SOM) or President of DBS&A.** The scope of the procedure described in this section includes the following:

- 13.5.1 Preparation for Water Sampling
- 13.5.2 Decontamination of Field Equipment
- 13.5.3 Measurement of Field Parameters
- 13.5.4 Collection of Ground-Water Samples
- 13.5.5 Collection of Surface Water Samples
- 13.5.6 Sample Preservation
- 13.5.7 Sample Filtration
- 13.5.8 Quality Assurance/Quality Control (QA/QC) Samples

This SOP includes guidelines for preparation for water sampling, collection of surface- and ground-water samples, sample preservation, chain of custody procedures, and quality assurance/quality control procedures. This SOP is applicable to the collection of surface- and ground-water samples to be analyzed for organic, inorganic and radionuclide constituents and for measurement of field parameters including temperature, conductivity, pH, alkalinity, oxidation/reduction potential (Eh), and dissolved oxygen.

3. PROCEDURES

These SOPs shall be reviewed and updated at least once annually by the Systems Operations Manager (SOM), or person(s) designated by the SOM. Revisions and additions to these SOPs shall be made as needed to assure consistency with industry standards and the collection of high quality data in the field. Requests for revisions shall be made on Form No. 127 in accordance with the procedure described in Section 0.2 of the DBS&A Operations Manual. The Proprietary Copy Request and Authorization Form (DBS&A Form No. 043) shall be used in requesting, authorizing, and documenting any SOP, or part of any SOP, copied or distributed for uses described in Section 13.5 of the Operations Manual. All or parts of the SOPs described in this section may be reproduced and used in DBS&A reports, proposals, and work plans with the verbal consent of either the SOM or President of DBS&A. The SOM shall be responsible for filing and maintaining requests made on Form Nos. 127 and 043.

DANIEL B. STEPHENS & ASSOCIATES, INC.

ENVIRONMENTAL SCIENTISTS AND ENGINEERS

Prepared by: Larry M. Cur

Reviewed by: Larry M. Cur
Quality Assurance Manager

Approved by: Daniel B. Stephens
Daniel B. Stephens

Reviewed by: Larry M. Cur
Systems Operations Manager

Section 13.5.1

Preparation for Water Sampling

1. PURPOSE

The following SOP defines activities to be completed prior to each sampling event. A checklist/summary of water sampling preparation activities is included as Attachment 1 to this SOP.

2. SCOPE

This procedure is applicable to all DBS&A employees and its contractors and subcontractors when preparing to sample water.

3. PROCEDURES

3.1 DBS&A Warehouse

Prior to any water sampling event, the water sampler shall requisition all necessary equipment and supplies by completing a DBS&A Field Equipment and Materials Load-Up Sheet (see Section 13.1.1 of the DBS&A Operations Manual) and giving it to the warehouse manager. The load-up sheet should be provided to the warehouse manager as much in advance as is possible, so that equipment and supply requisitions can be made.

All equipment to be used, with the exception of rental equipment, shall be calibrated and tested in the DBS&A warehouse by the warehouse manager prior to being sent to the field per the guidance prescribed in Section 13.1.1 of the DBS&A Operations Manual. Meter calibration shall be conducted in accordance with standard manufacturer recommended procedures using clean, fresh reagents. The warehouse manager shall ensure that all equipment is clean and in working order prior to leaving the DBS&A warehouse.

3.2 Analytical Laboratory

Prior to a water sampling event, the number and type of samples to be collected (field and quality assurance samples) shall be determined by the Project Manager (PM) or designated project Technical Representative (TR). The PM or project TR shall order appropriate sample containers (Section 13.1.1) from the analytical laboratory and shall inform the analytical laboratory of the expected arrival date of the samples, the analytes to be determined for each sample, and the required turnaround time. It is the water sampler's (Field Representative; FR) responsibility to confirm that all sample bottles have been received and are loaded for sampling. The duties and responsibilities of TRs and FRs are described in Section 13.2 of the DBS&A Operations Manual.

3.3 Site-Specific Instructions

The first time that a site is sampled, or the first time that any new location is sampled, the designated sample identification number shall be determined by the PM or TR prior to field sampling.

Prior to each water sampling event, the PM or TR shall compile a list of samples (including quality assurance samples) to be collected. The order in which the samples should be collected shall also be listed. In general, locations with the lowest concentrations of select analytes shall be sampled before wells with higher concentrations, so the potential for cross-contamination can be minimized. The PM or TR will also list any special procedures that are unique to the site or to the sampling event.

Before each sampling round, the PM or TR shall make all access arrangements with the client and/or property owners. The FR(s) will confirm that access arrangements have been made and should determine if additional on-site access procedures are required.

Prior to leaving for the field, FR(s) shall assemble and be familiar with materials that describe the general conditions of the site, the hydrogeology, well completion information, and objectives of the sampling program. The project health and safety plan shall also be consulted before initiation of the field program.

Prepared by: Joanne Hilton

Reviewed by: [signature]
Quality Assurance Manager

Approved by: DB Stephens
Daniel B. Stephens

Reviewed by: [signature]
Systems Operations Manager

Section 13.5.2

Decontamination of Field Equipment

1. PURPOSE

The following SOP defines activities required to decontaminate water sampling equipment in order to prevent cross-contamination of samples from different sampling locations.

2. SCOPE

This procedure is applicable to all DBS&A employees and its contractors and subcontractors involved in water sampling activities.

3. PROCEDURES

All non-disposable field equipment that may potentially come in contact with any water sample shall be decontaminated in order to minimize the potential for cross-contamination between sampling locations. Thorough decontamination of all sampling equipment shall be conducted in the warehouse before each sampling event. In addition, the FR shall decontaminate all equipment in the field as required to prevent cross-contamination of water samples (see Section 13.1.1 of the DBS&A Operations Manual). The procedures described in this section are specifically for field decontamination of sampling equipment.

For wells or surface waters to be sampled for inorganics and/or metals, or for locations outside of the area of known contamination, the following procedures shall be used:

1. Wash the equipment in a solution of non-phosphate detergent (Liquinox) and distilled/deionized water. All surfaces that may come in direct contact with the samples shall be washed. Use a clean Nalgene tub to contain the wash solution and a scrub brush to mechanically remove loose particles. Wear clean latex or plastic gloves during all washing and rinsing operations.

2. Rinse twice with distilled/deionized water.

3. Dry the equipment before use, to the extent practical.

If the sample is collected from a highly contaminated area or is to be analyzed for organics, follow steps 1 and 2, then rinse once more with organic-free water obtained from the laboratory or other supplier. Contain all wash solutions for proper disposal.

4. REFERENCES

- American Petroleum Institute. 1987. Manual of Sampling and Analytical Methods for Petroleum Hydrocarbons in Groundwater and Soil. API Publication No. 4449. American Petroleum Institute, Washington. DBS&A #3600/API.

Prepared by: Joanne Hilton

Reviewed by: Larry M. C.
Quality Assurance Manager

Approved by: DB Stephens
Daniel B. Stephens

Reviewed by: Larry M. C.
Systems Operations Manager

Section 13.5.3

Measurement of Field Parameters

1. PURPOSE

This section outlines procedures for field measurement of electrical conductivity, temperature, pH, alkalinity, oxidation/reduction potential (Eh), and dissolved oxygen (DO).

2. SCOPE

This procedure is applicable to all DBS&A employees and its contractors and subcontractors involved in water sampling activities. These parameters should be measured during monitor well purging prior to sampling. Surface water samples should also be characterized when they are collected.

3. PROCEDURES

3.1 Conductivity and Temperature

This SOP describes the procedure for determining the specific conductance (conductivity) and temperature of a water sample using the YSI Model 33 SCT Meter. Conductance, or conductivity, is a measure of the ease of flow of electric current, and is the inverse (reciprocal) of resistivity. The term specific conductance (SpC), sometimes referred to simply as "conductivity," is defined as the electrical conductance that would occur through the water between the faces of a 1-cm cube of the water. SpC is usually reported in units of µmhos/cm, which has recently been renamed microsiemens per centimeter (µS/cm). By measuring the specific conductance of a water sample in the field, one can estimate the total dissolved solids (TDS) concentration of the water using the approximate conversion TDS = 0.6 x SpC. Because the SpC of a water allows rapid determination of TDS (salinity), SpC is probably the single most useful water quality parameter.

The conductance of water containing dissolved ions increases with increasing temperature of the water. The temperature dependence varies for different waters and is dependent on the type and concentrations of dissolved ions, but an approximate rule of thumb is that SpC increases 2% per °C temperature increase. For quantitative comparison of SpC values measured on different water samples at different field temperatures, it is necessary to correct all values to the SpC at 25°C. For most qualitative work, however, this is unnecessary. Whether or not temperature corrections are to be applied, <u>the SpC value as measured at field temperature should always be recorded</u> in the field logbook (see Section 13.2.6 of the DBS&A Operations Manual), along with the temperature of the water sample at the time the measurement was made.

The following equipment is needed to measure SpC in the field:

- YSI Model 33 SCT Meter & probe
- Spare D-cell batteries
- Beaker for water sample
- Deionized water in squirt bottle
- KCl conductivity standard solution

The following procedure shall be used to measure SpC in the field:

1. Verify that the meter needle rests on zero prior to turning on the meter. If not, adjust it to zero using the set screw on the face of the meter movement.

2. Calibrate the meter by turning the *MODE* switch to *REDLINE* and adjusting the *REDLINE* control knob until the needle lines up with the small red line on the meter scale. (If unable to calibrate meter, replace the batteries.)

3. Plug in probe cable, and insert gray plastic probe into water sample. Allow at least one minute for temperature equilibration of probe.

4. Set *MODE* control to *TEMPERATURE* and record the temperature of the water sample in the field logbook. (Note that the temperature scale is at the bottom of the meter face and that the values decrease to the right)

5. Switch the *MODE* control to the conductivity setting that gives the maximum needle deflection without going offscale (X100, X10, or X1). Do not allow the probe to touch the sides or bottom of the beaker when making a measurement because this can result in a low reading.

6. Record the SpC value, remembering to multiply the meter reading by the appropriate factor if using the X10 or X100 settings.

7. Rinse the probe with deionized water prior to making another measurement or putting the instrument away.

Other information about the YSI Model 33 SCT Meter may be needed occasionally:

- The probe preferably should be stored in deionized water between uses during each day of field work. If the probe has been stored dry, it is recommended that it be soaked in deionized water at the start of the day prior to making any measurements. This is not absolutely essential, however.

- The *SALINITY* mode will not ordinarily be used unless dealing with brines or other samples with salinity of seawater or above. The *TEMPERATURE* potentiometer only functions in *SALINITY* mode; it does nothing when operating in SpC mode and cannot be used to correct SpC values to 25°C.

- To test probe operation, press the *CELL TEST* button while measuring the SpC of a water sample on the X10 or X100 scales. If the probe is functioning properly, the meter reading should not fall more than 2% when depressed. If the meter reading falls more than 2%, notify the equipment technician that the probe needs attention.

- The meter and probe should be periodically checked against a standard potassium chloride (KCl) solution to verify proper internal calibration. To do so, immerse the (clean) probe in the KCl standard, and record the temperature and SpC values as described above. Check that the SpC value is within

± 5% of the nominal SpC value for that particular KCl solution at that temperature. Record the observed value and the nominal value (from label on bottle) in the field logbook.

3.2 pH

This section describes the procedure for determining the pH of a water sample using the Orion Model 250A pH/mV meter with automatic temperature compensation. Calibration of the meter is performed at least daily using two buffer solutions that bracket the sample pH. A temperature sensor is included on the pH probe to make the minor correction from the sample temperature to 25°C. For information on manual temperature correction, refer to meter instruction manual. The Orion 250A can also be used in millivolt mode with a variety of ion selective electrodes (refer to ISE SOPs).

The following equipment is needed to measure pH in the field:

- Orion Model 250A pH meter
- Buffer solutions (pH 4.01, 7.00, 10.00)
- Spare 9-volt battery
- Beaker for water sample
- Deionized water in squirt bottle

The following procedure shall be used to measure pH in the field:

1. Plug the pH probe and thermistor (ATC) into the appropriate jacks of the meter.

2. Insert battery (if necessary), and press the power button to turn on the meter.

3. If the meter is not already in pH mode as indicated by the caret at the bottom of the display, press the mode button to select pH mode.

4. Rinse the probe with deionized water to remove any dried KCl salts, and slide the silicone rubber sleeve down to expose the electrolyte fill hole. Leave the hole uncovered during measurement, but do not allow the hole to be submerged in the sample.

5. Remove the plastic end cap on the probe, rinse the tip of the probe in deionized water, and insert the probe in the pH 7.0 buffer.

6. Press "2nd," then "Cal" to put the meter in calibration mode. The word "calibrate" should appear on the display, and the designation "P1" indicates that the meter is ready for the first buffer calibration.

7. Stir the probe gently in the pH 7.0 buffer solution. When the reading has stabilized, the meter will beep and the word "ready" will appear. Press "yes" to accept the reading and set the pH 7.0 calibration. "P2" will be displayed, indicating that the meter is ready for the second buffer solution.

8. Rinse the probe with deionized water, and insert it in the pH 4.0 buffer. (If the pH of the water sample is anticipated to be >7, then substitute the pH 10.0 buffer.)

9. When the meter indicates "ready," press "measure" to accept the pH 4.0 calibration. The slope of the calibration curve will be displayed briefly. Record the slope in the field logbook. The slope value should be within the range of 90 to 110. If not, repeat the calibration procedure. The meter will automatically exit the calibration mode, and the word "measure" will be displayed.

10. Rinse the probe and insert it into the water sample to be measured. Stir gently while waiting for the word "ready" to appear. Record the pH value in the field logbook.

11. If more measurements are to be made, rinse the probe and store temporarily in a beaker of deionized water. If finished for the day, turn the meter off, rinse the probe, disconnect the plugs, and store the probe with a few milliliters of the KCl electrode storage solution inside the black plastic end cap.

3.3 Alkalinity

This section describes the procedures for determining the total alkalinity in near-neutral pH, high-alkalinity water samples (most ground waters) using the Hach Test Kit. For information on the procedure for low-alkalinity samples or high pH samples (pH>8), refer to the Hach instruction sheet.

The following equipment is needed to determine total alkalinity in the field:

- Hach Alkalinity Test Kit

The following procedure shall be used to determine total alkalinity in the field:

1. Fill the small plastic test tube with the water to be tested.

2. Pour the contents of the test tube into the square glass bottle.

3. Add the contents of one foil packet containing the *Bromcresol Green/Methyl Red* color indicator. The water will turn a dark green.

4. Carefully begin adding the standard sulfuric acid titrant dropwise using the eye dropper, counting the number of drops added and swirling to mix the solution. Keep the eye dropper nearly vertical to maintain a constant drop volume.

5. When the solution begins to change from green to red, slow down. The titration is complete when the solution is a bright pink color.

6. Record the total number of drops added. Multiply the number of drops by 20 to obtain the total alkalinity, reported as mg/L of $CaCO_3$.

3.4 Oxidation-Reduction Potential (Eh)

This section describes the procedure for determining oxidation reduction potential of water in the field using an electrode.

The following equipment is needed to measure Eh in the field:

- Yellow Oxidation-Reduction Potential (ORP) Electrode
- Orion Model 250A pH/mV meter or YSI Model 3500 flow-thru cell meter
- Standard Zobell solution

The following procedure should be used to measure Eh in the field:

1. Plug the BNC connector into an Orion 250A pH/mV meter (or YSI 3500 meter).

2. Turn on the meter. If using the Orion 250A, use *MODE* key to set meter to "mV" mode (**not** *rel mV*). If using the YSI 3500, turn the black knob to "mV".

3. Check probe operation by immersing it in a disposable beaker with Zobell Solution. The reading should be ± 10 mV of that listed on the table with the Zobell Solution at the temperature of the solution (e.g., 231 mV at 25° C).

4. Rinse the probe and immerse it in the ground-water sample. Following stabilization, record the mV value, along with a ± estimate to indicate the stability of the meter. Also record the sample temperature.

3.5 Dissolved Oxygen (DO)

This section describes the procedure for determining the dissolved oxygen (DO) concentration using the YSI Model 57 DO meter. The meter is calibrated using the air calibration procedure, with corrections for ambient temperature and altitude/barometric pressure. Refer to the instruction manual for details of meter operation and replacement of the probe membrane.

The following equipment is needed to measure dissolved oxygen in the field:

- YSI Model 57 Dissolved Oxygen Meter
- Beaker for water sample
- Deionized water in squirt bottle
- Means of determining the approximate altitude of the site (topo map, altimeter, etc.)

The following procedure shall be used to measure dissolved oxygen in the field:

1. Turn the meter on approximately 15 minutes before measuring samples to allow the probe to polarize. The probe shall be kept in the clear plastic cover. Add a few drops of deionized water

to the small sponge inside the cover to maintain 100% relative humidity around the tip of the probe during storage.

2. Set the salinity knob to "fresh" for normal ground waters, or adjust to the appropriate salinity if brackish or saline waters are to be measured (as determined by specific conductance or previous laboratory analysis).

3. Set the zero on the meter by turning the switch to *ZERO* and adjusting the zero potentiometer until the needle falls on zero.

4. Set the red line on the meter by turning the switch to *RED LINE* and adjusting the appropriate potentiometer.

5. With the probe still in its cover, set the switch to *TEMPERATURE* and note the ambient air temperature displayed on the meter.

6. Determine the maximum (sea level) dissolved oxygen concentration (mg/L) possible for that temperature by referring to the table on the back of the DO meter (also in the instruction manual). Note this value in the field logbook.

7. Determine the approximate altitude of the site, and find the appropriate altitude correction factor on the table on the back of the meter (also in the instruction manual).

8. Multiply the saturated DO concentration determined in Step 5 by the altitude correction factor determined in Step 6. Note the value in the field logbook. This is the corrected saturated DO concentration (corrected for both temperature and altitude). Calibration should be periodically checked during the day as the temperature changes, and adjusted if necessary.

9. Switch the meter to the appropriate measurement scale for the corrected DO concentration determined in Step 7 (e.g., 0-10 mg/L scale), and use the *CALIBRATE* knob to air calibrate the meter by adjusting until the needle falls on the value determined in step 8. The meter is now ready to measure water samples.

10. Rinse the probe with deionized water, and insert it in the water sample and stir gently. Set the switch to *TEMPERATURE*, and record the reading in the field logbook.

11. Set the switch to the appropriate DO scale (e.g., 0-5 mg/L) to keep the needle on scale, and stir gently until a stable reading is obtained. It is important to be stirring the sample when the actual reading is taken. Record the value in the field logbook.

12. The probe may be stored temporarily in deionized water between measurements. When finished for the day, rinse the probe, and store with the dampened sponge in the plastic cap.

Prepared by: Jeffrey Forbes

Reviewed by: Larry M. Cann
Quality Assurance Manager

Approved by: Daniel B. Stephens
Daniel B. Stephens

Reviewed by: Larry M. Cann
Systems Operations Manager

Section 13.5.4

Collection of Ground-Water Samples

1. PURPOSE

The following SOP defines activities to be completed for the collection of ground-water samples.

2. SCOPE

This procedure is applicable to all DBS&A employees, its contractors and subcontractors, when collecting ground-water samples.

3. PROCEDURES

3.1 Wellhead Preparation

Prior to ground-water sample collection, the following wellhead protection activities shall be conducted:

1. Inspect the area around the well for wellhead integrity, cleanliness, and signs of possible contamination.

2. Spread a clean plastic sheet over the ground around the wellhead, where required.

3. Remove the cap on the wellhead. Note any obvious odors within the wellbore in the field logbook.

4. If possible, measure the static water level (see Section 13.6.1 of the DBS&A Operations Manual) prior to initiation of water sampling. Clean the steel tape or electrical sounder used for water level measurement after each use, as described in Section 13.5.2 of the Operations Manual, to avoid cross contamination.

5. If floating product (e.g., gasoline) is suspected at the site, conduct the following procedures:

   - Use a bailer to extract a sample from the surface of the water within the well, if possible.

   - After an initial visual inspection, slowly pour the fluid from the bailer into a small tub or container in order to check for a sheen or any other sign of free product. Note any obvious odors in the field logbook.

   - If free product is detected, use the bailer to remove as much free product as is possible from the wellbore. Lower the bailer into the water slowly in order to prevent mixing and volatilization. Contain all recovered product for proper disposal and note the quantity of product removed in the field logbook.

   - If the site has not been previously sampled, a sample of the free product may be desired. Consequently, place some of the product in an unpreserved 40-mL glass VOA vial, and store it away from the other samples. Confirm sample analysis with the project manager.

- After any free product has been removed from the wellbore, spread a fresh plastic sheet around the wellhead, and clean all contaminated equipment, or segregate it from the other equipment.

3.2 Well Purging

The purpose of purging the well prior to sampling is to remove stagnant water from the well bore so that a representative ground-water sample can be collected. The method of purging can have a pronounced effect on the quality of the ground-water sample. For example, rapid purging may increase sample turbidity and is, therefore, not recommended.

In general, positive displacement (bladder) pumps are preferred for most sampling situations. However, depending on the hydraulic conductivity of the aquifer to be sampled and the project objectives, wells may either be equipped with dedicated pumps or may need to be purged with bailers. Consequently, purging techniques may vary depending on the aquifer conditions, the presence or absence of a dedicated pump, and the proposed sample analytes.

The optimum amount of water to be purged from each well also varies between sites. According to Barcelona et al., 1985, pg. 47, "The number of well volumes to be pumped from a monitoring well prior to the collection of a water sample must be tailored to the hydraulic properties of the geologic materials being monitored, the well construction parameters, the desired pumping rate, and the sampling methodology to be employed."

Site-specific purging procedures shall be prepared for each site. The following purging procedure can be used as a general guideline:

1. Calculate the volume of water standing in the casing by using the formula:

   $$V = \pi r^2 L$$

   where
   r = the radius of the casing (remember to convert inches to feet)
   L = the length of the water column (total depth of well minus the static water level)

2. Purge the well at a rate equal to or greater than the sampling rate.

3. Measure applicable field parameters (see Section 13.5.3 of the Operations Manual) at the pump outlet at a minimum after each 0.5 casing volume is pumped. Purging is generally considered complete when the above parameters are approximately stable over at least one casing volume. Wherever possible, purge a minimum of three (3) casing volumes from each well.

4. In low permeability formations, it may not be possible to purge three casing volumes before the well goes dry. When the formation permeability is too low to allow for continuous purging, remove all of the standing water in the well by pumping or bailing. As soon as the well has recharged sufficiently, collect a sample so as to minimize volatilization in the wellbore.

5. Contain all fluid from obviously contaminated or potentially contaminated wells for later disposal. Anomalous values for the above field parameters, odor, visible sheen, or the presence of free product may be taken as signs of contamination. Results of previous water sampling events will be consulted when available.

6. Take careful notes in order to document all purging procedures. The notes shall include: date, time, name(s) of sampler(s), weather, purge rate, purge method, field parameters (at each time measured, with corresponding purge volume), visual observations, odor, and any other relevant information.

The following guidelines as outlined in pertinent references on water sampling can be used when developing site-specific purging procedures:

- Pg. 103 of the EPA RCRA Technical Enforcement Guidance Document (TEGD) states, "in low yield formations, water should be purged so that it is removed from the bottom of the well." (NWWA, 1986).

- Pg. 103 of the TEGD also states "Whenever a well is purged to dryness, a sample for field parameters should be collected as soon as the well has recovered sufficiently. A second measurement of field parameters should be made immediately after sampling. Do not pump a well to dryness if it causes formation water to cascade down the well." (Ibid).

- The inlet line of the sampling pump or the submersible pump should be placed near the bottom of the screen section, and pump approximately one well volume of water at the well's recovery rate, and then collect the sample from the discharge line (EPA 1977, pg. 211).

- According to Wehrmann (1984), "For high yielding monitoring wells which cannot be pumped to dryness, bailing without pre-pumping the well is not recommended; there is no absolute safeguard against contaminating the sample with stagnant water." The following procedures should be used:

  Place the inlet line of the sampling pump just below the surface of the well water, and pump three to five volumes of water at a rate equal to the well's recovery rate. This provides reasonable assurance that all stagnant water has been evacuated and that the sample will be representative of the groundwater body at that time.

- Wehrmann (1984) further states, "The rate at which wells are purged should be kept to a minimum. Purging rates should be lower than development rates so that well damage does not occur. Pumping at very low rates in effect, isolates the column of stagnant water in the well bore and negates the need for its removal, if the pump intake is placed at the top of, or in, the well screen. This approach can be very useful when disposal of purge water is a problem."

- If a well completed in a highly permeable formation is being purged, it may be useful to periodically move the intake of the purge pump during purging so that stagnant water does not remain in the well bore while fresh water comes in at only one level (Scalf et al., 1981, pg. 44).

3.3 Ground Water Sample Collection

The following procedure shall be used to collect ground-water samples:

1. If the well is not equipped with a sampling pump, use only teflon or stainless steel bailers for sampling. In order to minimize agitation and volatilization, bailers shall be equipped with bottom emptying devices when VOA samples are collected.

2. Whenever possible, collect ground-water samples first from wells that have the lowest potential concentrations of analytes of interest, and last from the wells with the highest suspected concentrations (i.e., clean → dirty). The specific sampling order will be detailed in the site-specific sampling plan.

3. Pumps equipped with Teflon tubing or disposable teflon bailers are generally recommended for collection of samples to be analyzed for volatile organics.

4. Select the appropriate sample container and preservative as described in Section 13.5.6.

5. After the well has been purged, collect water samples as soon as possible in order to reduce the possibility of volatilization within the wellbore. If a pump has been used for purging, lower the pump rate so that the sampling rate is lower than the purge rate. If volatile organic samples are to be collected, set the pump at the lowest possible setting. If possible, the sampling rate should be less than 100 ml per minute, or the minimum setting on the pump.

6. Collect samples in decreasing order of volatility, i.e. collect samples to be analyzed for volatile organic compounds (VOCs) first, followed by semi-volatile organic compounds, PCBs and pesticides, and inorganics. The preferred order of sampling according to the TEGD is VOCs, SVOCs, purgeable organic halogens (POX), total organic halogens (TOX), total organic carbon (TOC), extractable organics, total metals, dissolved metals, phenols, cyanide, sulfate and chloride, turbidity, nitrate and ammonia, and radionuclides.

7. Do not allow the outlet of the sampling pump discharge tubing to come into direct contact with the sample vial or the water within the vial.

8. Make sure that no air is entrapped in the sample vials to be analyzed for volatile organics. Take the sample by holding the vial at an angle so that aeration is minimized. Avoid touching the lip of the vial or the Teflon liner. If the sample cannot be transferred directly to the vial, (i.e. high production well) use a clean stainless steel cup to pour the water into the vial. Direct the water stream against the inside surface of the vial. Allow a convex meniscus to form across the mouth of the filled vial. Carefully cap the vial, then invert and tap the vial to insure that no entrapped air is present. If entrapped air is present, recollect the sample.

9. If filtering of any samples is required by the site specific sampling plan, use the filtering procedure described in Section 13.5.7.

10. Preserve the sample as indicated in Section 13.5.6. Whenever possible, use pre-preserved containers supplied by the analytical laboratory rather than adding preservatives in the field.

11. Measure field parameters as described in Section 13.5.3. Temperature, electrical conductivity, and pH generally will be measured at all locations. Alkalinity, dissolved oxygen, and Eh will be measured only as required by the site specific sampling plan.

12. If the sample is to be collected from a domestic well or location other than a monitoring well, it may be necessary to clean the sampling port prior to sample collection (e.g., an outside hose bib or an inside water facet). Flush the faucet/line by allowing it to run for a minimum of five minutes.

13. Collect samples from domestic wells downstream of water softeners or chlorinators or in-home filters that modify water quality. However, if the objective of the domestic sampling is to evaluate the ground water prior to treatment, the samples may be taken upstream of such devices.

14. Record all pertinent information in the field notebook. Data to be recorded include the date and time of sample collection, climatic conditions at the time of sampling, well sampling sequence, types of sample containers used, sample identification numbers, field parameter data, name(s) of collector(s), deviations from established sampling protocol (e.g., equipment malfunctions), purpose of sampling (e.g., surveillance, compliance), and collection of quality control samples.

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Prepared by: Joanne Hilton

Approved by: Daniel B. Stephens
Daniel B. Stephens

Reviewed by:
Quality Assurance Manager

Reviewed by:
Systems Operations Manager

Section 13.5.5

Collection of Surface Water Samples

1. PURPOSE

The following SOP defines activities to be completed for the collection of surface water samples.

2. SCOPE

This procedure is applicable to all DBS&A employees and its contractors and subcontractors when collecting surface water samples.

3. PROCEDURES

A site-specific water sampling plan shall be prepared to define surface water sampling locations and procedures that are unique to each site. The following general procedure shall be followed for collection of surface water samples:

1. Select the water sampling location. Collect spring samples as close to the source as possible. Do not collect spring or stream samples from stagnant pools; collect these samples from free running locations if possible. The selection of the optimum sampling locations should be based on the objectives of the site-specific sampling plan.

2. Whenever possible, make a discharge measurement at the time of water sampling. If it is not possible to gauge the surface water discharge (see Section 13.9 of the DBS&A Operations Manual), make an estimate, and describe the procedure used to estimate the discharge in the field logbook.

3. Collect surface water samples as "grab" samples unless a depth integrated sampler or other procedure is required in the site specific sampling plan.

4. If the surface water is frozen, ice samples should not be taken in lieu of water samples.

5. Select the appropriate container as described in Section 13.5.6 of the Operations Manual.

6. For non-volatile analytes, dip a clean unpreserved container directly into the surface water, and partially fill the container. Swirl and rinse the container, and then discard the water.

7. Rinse the container two more times.

8. Fill the container with surface water.

9. Collect samples in decreasing order of volatility, i.e. collect samples to be analyzed for volatile organic compounds (VOCs) first, followed by semi-volatile organic compounds (SVOC), PCBs and pesticides, and inorganics. The preferred order of sampling according to the TEGD is VOCs, SVOCs, purgeable organic halogens (POX), total organic halogens (TOX), total organic carbon (TOC), extractable organics, total metals, dissolved metals, phenols, cyanide, sulfate and chloride, turbidity, nitrate and ammonia, and radionuclides.

10. Make sure that no air is entrapped in the sample vials to be analyzed for volatile organics. Take the sample by holding the vial at an angle so that aeration is minimized. Avoid touching the lip of the vial or the Teflon liner. If the sample cannot be collected directly from the water source, use a clean stainless steel cup. Direct the water stream against the inside surface of the vial. Allow a convex meniscus to form across the mouth of the filled vial. Carefully cap the vial, then invert and tap the vial to insure that no entrapped air is present. If entrapped air is present, recollect the sample.

11. If filtering of any samples is required by the site specific sampling plan, use the filtering procedure described in Section 13.5.7 of the Operations Manual.

12. Either add preservatives directly to the container as described in Section 13.5.6 of the Operations Manual, or transfer the sample to a pre-preserved container. If transferring the sample between containers, pour the water slowly from the glass bottle or cubitainer to the sample container.

13. Fill a clean beaker or other appropriate container with surface water for field parameter measurement as discussed in Section 13.5.3 of the Operations Manual. Temperature, electrical conductivity, and pH generally will be measured at all locations. Alkalinity, dissolved oxygen, and Eh will be measured only as required by the site-specific sampling plan.

14. Carefully document the surface water sampling location. Photographs of the sampling location should be taken from several locations if possible. Describe each photograph along with the photo number in the log book (e.g., photo #5-Upstream (south) view of location # SPG-014, taken from the west bank). Also include the time, date, and the name of the photographer in the log book, and transfer this information to the back of photograph when it is received. In addition, provide a detailed written description of the sample location in the log book.

15. Record all pertinent information in the field notebook. Data to be recorded include the date and time of collection, climatic conditions at the time of sampling, well sampling sequence, types of sample containers used, sample identification numbers, field parameter data, name(s) of collector(s), deviations from established sampling protocol (e.g., equipment malfunctions), purpose of sampling (e.g., surveillance, compliance), and collection of quality control samples. Also note any obvious stress to vegetation, which may be a result of contamination.

Prepared by: Joanne Hilton

Reviewed by: Larry M. Cum
Quality Assurance Manager

Approved by: Daniel B. Stephens
Daniel B. Stephens

Reviewed by: Larry M. Cum
Systems Operations Manager

Section 13.5.6

Sample Preservation

1. PURPOSE

The following SOP defines activities to be completed to properly preserve a water sample for shipment to an analytical laboratory for analysis.

2. SCOPE

This procedure is applicable to all DBS&A employees and its contractors and subcontractors when preserving water samples in the field.

3. PROCEDURES

Table 13.5.6-1 of this SOP lists recommended containers, preservatives, and holding times for individual analytes or analytical methods. The suggestions for sample storage and preservation presented are intended to serve as general guidelines. The analytical laboratories shall be consulted for the proper preservation and storage procedure for the analytical methods that will be used (e.g., this guideline recommends preservation of volatile organic samples with hydrochloric acid (HCl), but some laboratories require preservation with mercuric chloride).

Samples for volatile organics analysis (EPA 602, 624 or 8020) shall be collected in pre-cooled, pre-acidified, certified-clean 40 ml borosilicate vials with teflon septum caps supplied by the analytical laboratory. Samples to be analyzed for other constituents should be collected in appropriate containers as listed in Attachment 1 to this SOP.

4 ATTACHMENTS

- Table 13.5.6-1, Container/Preservative Reference Chart (5 sheets)

Prepared by: Joanne Hilton

Approved by: DBStephens
Daniel B. Stephens

Reviewed by: Larry McCann
Quality Assurance Manager

Reviewed by: Larry McCann
Systems Operations Manager

TABLE 13.5.6-1. CONTAINER/PRESERVATIVE REFERENCE CHART
General/Inorganic Chemistry

Analysis	***Container***	***Preservative (Chill to 40°C)***	***Container***	***Holding Time (From Sampling Date)***	
	Water	Water	Soil	Water	Soil
Alkalinity	4 oz. Plastic	Unpreserved	N/A	14 days	N/A
Ammonia (NH_3)	4 oz. Plastic	.25 ml H_2SO_4[A]	4 oz. jar	28 days	28 days
BOD	16 oz. Plastic[B]	Unpreserved	N/A	48 hr.	N/A
Boron	4 oz. Plastic	Unpreserved	4 oz. jar	28 days	28 days
Bromide	16 oz. Plastic	Unpreserved	8 oz. jar	28 days	28 days
Chloride	4 oz. Plastic	Unpreserved	8 oz. jar	28 days	28 days
COD	4 oz. Plastic	.25 ml H_2SO_4[A]	4 oz. jar	28 days	28 days
Color	4 oz. Plastic	Unpreserved	N/A	48 hr.	N/A
Cyanide (total and/ or amenable)	4 oz. Plastic	2 ml 1.5N NaOH[B]	4 oz. jar	14 days	No Specified Time
Electrical Conductivity	4 oz. Plastic	Unpreserved	4 oz. jar	28 days	28 days
Flashpoint	8 oz. Amber Glass w/Septum[B]	Unpreserved	8 oz. jar	28 days	28 days
Fluoride	4 oz. Plastic	Unpreserved	4 oz. jar	28 days	28 days
Formaldehyde	1 L Glass	1% Methanol	4 oz. jar	28 days-Pres. 7 days-Unp.	28 days
General Minerals • General Minerals • NO_3 • Metals	 1 L Plastic 4 oz. Plastic 16 oz. Plastic	 Unpreserved .25 ml H_2SO_4[A] 1 ml HNO_3[A]	 16 oz. jar	 28 days	 28 days
Gross Alpha/Beta	1 L Plastic	2 ml HNO_3[A]	4 oz. jar	6 mo.	6 mo.
Hardness	4 oz. Plastic	Unpreserved	N/A	28 days	N/A
Hexavalent Chromium (CR^{+6})	16 oz. Plastic	Unpreserved	4 oz. jar	24 hr.	28 days

A - Typical volume needed to bring the pH to <2
B - Headspace free
C - Typical volume needed to bring the pH to >12
D - Typical volume needed to bring the pH to >9

TABLE 13.5.6-1. CONTAINER/PRESERVATIVE REFERENCE CHART (CONTINUED)
General/Inorganic Chemistry

Analysis	***Container***	***Preservative (Chill to 40°C)***	***Container***	***Holding Time (From Sampling Date)***	
	Water	Water	Soil	Water	Soil
Iodide	4 oz. Plastic	Unpreserved	4 oz. jar	24 hr.	28 days
Nitrate/Nitrite (NO_3/NO_2) • NO_3	4 oz. Plastic 4 oz. Plastic	.25 ml H_2SO_4 [A] Unpreserved	4 oz. jar 4 oz. jar	28 days 48 hr.	28 days 28 days
Odor	4 oz. Glass	Unpreserved	N/A	48 hr.	N/A
Oil & Grease	1 L Glass	2 ml H_2SO_4 [A]	4 oz. jar	28 days	28 days
418.1 (TPH by IR)	1 L Glass	2 ml H_2SO_4 [A]	4 oz. jar	28 days	28 days
pH	4 oz. Plastic	Unpreserved	4 oz. jar	immediately	14 days
Phenolics	4 oz. Amber Glass	.25 ml H_2SO_4 [A]	4 oz. jar	28 days	28 days
Phosphorus • Total (P)	4 oz./8 oz. Plastic	.25 ml/.5 ml H_2SO_4 [A]	4 oz. jar	28 days	28 days
Phosphorus • Ortho (PO_4)	4 oz./8 oz. Plastic (Filtered)	Unpreserved	4 oz. jar	48 hr.	28 days
Silica	4 oz. Plastic	Unpreserved	4 oz. jar	28 days	28 days
Solids (Residue) • Total dissolved • Total suspended • Total settleable • Total solids	 16 oz. Plastic 16 oz. Plastic 1 L Plastic 16 oz. Plastic	 Unpreserved Unpreserved Unpreserved Unpreserved	 N/A N/A N/A N/A	 7 days 7 days 48 hr. 7 days	 N/A N/A N/A N/A
Specific Gravity	4 oz. Plastic	Unpreserved	4 oz. jar	28 days	28 days
Sulfate	4 oz. Plastic	Unpreserved	4 oz. jar	28 days	28 days
Sulfide	4 oz. Plastic	6 drops-2N Zn acetate & 8 drops 6N NaOH [D]	N/A	7 days	N/A
Sulfite	4 oz. Plastic	1 ml EDTA	N/A	28 days-Pres. 6 hr.-Unp.	N/A

A - Typical volume needed to bring the pH to <2
B - Headspace free
C - Typical volume needed to bring the pH to >12
D - Typical volume needed to bring the pH to >9

TABLE 13.5.6-1. CONTAINER/PRESERVATIVE REFERENCE CHART (CONTINUED)
General/Inorganic Chemistry

Analysis	***Container***	***Preservative (Chill to 40°C)***	***Container***	***Holding Time (From Sampling Date)***	
	Water	**Water**	**Soil**	**Water**	**Soil**
Surfactants (MBAS)	1 L Plastic	Unpreserved	N/A	48 hr.	N/A
Total Coliform	8 oz. Glass or Polypropylene (Sterilized)	0.008% $Na_2S_2O_3$	N/A	6-8 hr.	N/A
TKN (Kjeldahl Nitrogen)	4 oz. Plastic	.25 ml H_2SO_4[A]	4 oz. jar	28 days	28 days
Total Organic Carbon (TOC)	4 oz. Amber Glass w/Septum[B]	.25 ml H_2SO_4[A]	4 oz. jar	28 days	28 days
Total Organic Halide (TOX)	8 oz. Amber Glass w/Septum[B]	.5 ml H_2SO_4[A]	4 oz. jar	7 days	No Specified Time
Total Radium	1 L Plastic	2 ml HNO_3[A,C]	4 oz. jar	6 mo.	6 mo.
Turbidity	4 oz. Plastic	Unpreserved	N/A	48 hr.	N/A

A - Typical volume needed to bring the pH to <2
B - Headspace free
C - Typical volume needed to bring the pH to >12
D - Typical volume needed to bring the pH to >9

TABLE 13.5.6-1. CONTAINER/PRESERVATIVE REFERENCE CHART (CONTINUED)
Organic Chemistry

Analysis	***Container*** *(Glass- and Teflon-lined caps only)*	***Preservative*** *(Chill to 4°C)*	***Container*** *(Glass- and Teflon-lined caps only - Chill to 4°C)*	***Holding Time*** *(From sampling date)*	
	Water	Water	Soil	Water	Soil
8010/8020 • 8010 • 8020 • BTXE	3X VOA[A] 3X VOA[A] 3X VOA[A] 3X VOA[A]	3 drops HCl[B] 3 drops HCl[B] 3 drops HCl[B] 3 drops HCl[B]	4 oz. jar 4 oz. jar 4 oz. jar 4 oz. jar	14 days-Pres., 7 days-Unp. 14 days 14 days-Pres., 7 days-Unp. 14 days-Pres., 7 days-Unp.	14 days until Analysis 14 days until Analysis 14 days until Analysis 14 days until Analysis
Modified 8015 (TPH) • Gasoline Range • Diesel Range	4 oz. Amber Glass w/Septum[A] 2X VOA 4 oz. Amber Glass w/Septum[A]	.25 ml HCl[B] 3 drops HCl[B] .25 ml HCl[B]	4 oz. jar 4 oz. jar 4 oz. jar	14 days until Analysis 14 days until Analysis 14 days until Extraction 40 days after Extraction until Analysis	14 days until Analysis 14 days until Analysis 14 days until Extraction 40 days after Extraction until Analysis
8240	2X VOA	3 drops HCl[B]	4 oz. jar	14 days-Pres., 7 days-Unp.	14 days until Analysis
EDB	1 L Glass	Unp.	8 oz. jar	28 days until Analysis	28 days until Analysis
8040	1 L Glass	Unp.	4 oz. jar	7 days until Extraction 40 days after Extraction until Analysis	14 days until Extraction 40 days after Extraction until Analysis
8080	2 x 1 L Glass	Unp.	4 oz. jar	7 days until Extraction 40 days after Extraction until Analysis	14 days until Extraction 40 days after Extraction until Analysis
8100/8310	1 L Amber Glass	Unp.	4 oz. jar	7 days until Extraction 40 days after Extraction until Analysis	14 days until Extraction 40 days after Extraction until Analysis
8140	1 L Glass	Unp.	4 oz. jar	7 days until Extraction 40 days after Extraction until Analysis	14 days until Extraction 40 days after Extraction until Analysis
8150	1 L Glass	Unp.	4 oz. jar	7 days until Extraction 40 days after Extraction until Analysis	14 days until Extraction 40 days after Extraction until Analysis
Modified 619	1 L Glass	Unp.	4 oz. jar	7 days until Extraction 40 days after Extraction until Analysis	14 days until Extraction 40 days after Extraction until Analysis
8270	2 x 1 L Glass	Unp.	4 oz. jar	7 days until Extraction 40 days after Extraction until Analysis	14 days until Extraction 40 days after Extraction until Analysis
Modified 632	1 L Glass	Unp.	4 oz. jar	7 days until Extraction 40 days after Extraction until Analysis	14 days until Extraction 40 days after Extraction until Analysis
TCLP • Volatiles (zero headspace extraction) • Non-Volatiles	N/A N/A	N/A N/A	4 oz. jar 16 oz. jar	N/A N/A	14 days until Extraction 14 days after Extraction until Analysis 14 days until TCLP Leaching

A - Headspace free
B - Typical amount to bring the pH to <2

TABLE 13.5.6-1. CONTAINER/PRESERVATIVE REFERENCE CHART (CONTINUED)
Metals

Analysis	***Container***	***Preservative***	***Holding Time*** ***(From Sampling Date)***
WATER			
Metals (1 or more metals)			
• Total	16 oz. Plastic	l-ml HNO_3[A]	6 mo. (28 days-Hg)
• Dissolved • Filtered in Field	16 oz. Plastic	l-ml HNO_3[A]	6 mo. (28 days-Hg)
• Not Filtered	16 oz. Plastic (Specify "To be lab filtered")	Unpreserved	6 mo. (28 days-Hg)
• Organic Lead	8 oz. Amber Glass (Glass Only) w/Septum (Headspace Free)	Unpreserved Chill to 4°C	14 days until Analysis (laboratory recommended)
• Hexavalent Chromium (Cr^{+6})	16 oz. Plastic	Unpreserved	24 hr.
SOIL			
Metals (1 or more metals)			
• Total	4 oz. jar		6 mo.
• Soluble			
• EP Toxicity	8 oz. jar		6 mo.
• WET	8 oz. jar		6 mo.
• TCLP (see also Organic Chemistry)	8 oz. jar		6 mo.
• Hexavalent Chromium (Cr^{+6})	4 oz. jar		28 days
• Organic Lead	4 oz. jar	Chill to 4°C	14 days until Analysis (laboratory recommended)

A - Typical amount to bring the pH to <2.

Section 13.5.7

Sample Filtration

1. PURPOSE

The following SOP defines activities to be completed to properly filter water samples in preparation for analysis by an analytical laboratory.

2. SCOPE

This procedure is applicable to all DBS&A employees and its contractors and subcontractors when filtering water samples.

3. PROCEDURES

Recent research indicates that if samples are obtained correctly, field filtration for metals may not be necessary (Puls and Powell, 1992). However, filtration of samples to be analyzed for dissolved metals may be required in some cases. If filtration is required, it shall be outlined in the site specific sampling plan.

If filtration is required, filter the samples in the field if possible. If field filtering is not possible, preserve the sample by chilling to 4°C (i.e. do not add acid), and immediately ship the sample via overnight delivery to the laboratory. Indicate on the chain of custody that laboratory filtration and preservation are required.

Vacuum filtration of ground water samples is not recommended (Barcelona et al., 1985, pg. 65). Samples to be analyzed for TOC, VOCs or other organic compounds should not be filtered. Filtration may be performed on samples collected for analysis of dissolved metals, however.

The following procedure shall be followed to filter samples in the field with the GeoPump:

1. Connect the GeoPump to an automobile cigarette lighter or outlet if electricity is available.

2. Replace the tubing for the GeoPump at the beginning of each sampling round. If the samples are collected in any order other than most contaminated to least contaminated, or if very high levels of contamination are suspected or observed, then replace the tubing between each sample or as necessary.

3. If the tubing is not replaced between each sample, flush the lines with Liquinox followed by at least three flushes with distilled water.

4. Collect an unfiltered water sample as discussed in Sections 13.5.4 and 13.5.5 of the DBS&A Operations Manual.

5. Place the intake line in the unfiltered sample.

6. Pump at least a few hundred milliliters of the sample through the GeoPump prior to sample collection in order to flush the line. Set the GeoPump at the lowest rate possible in order to minimize aeration. Dispose of this water appropriately.

7. Place a disposable 45 micron filter on the output line. Direct the output stream below the filter into the pre-acidified sample container, as outlined in Section 13.5.6 of the DBS&A Operations Manual

4. REFERENCES

- Barcelona, Michael J., James P. Gibb, John A. Helfrich and Edward E. Garske. 1985. Practical Guide for Ground-Water Sampling. Prepared in cooperation with RSKERL, Ada, Oklahoma. SWS Contract Report 374. DBS&A #560/BAR/1985.

- Puls, Robert W. and Robert M. Powell, R.S. Kerr Environmental Research Laboratory (RSKERL). 1992. Acquisition of Representative Ground Water Quality Samples for Metals. *Ground Water Monitoring Review, Summer 1992.*

Prepared by: Joaned Hill

Approved by: DBStephens
Daniel B. Stephens

Reviewed by: Larry M. Crum
Quality Assurance Manager

Reviewed by: Larry M. Crum
Systems Operations Manager

Section 13.5.8

Quality Assurance/ Quality Control (QA/QC)

1. PURPOSE

The following SOP defines activities to be completed to assure quality assurance and quality control for water samples collected in the field.

2. SCOPE

This procedure is applicable to all DBS&A employees and its contractors and subcontractors when collecting water samples in the field.

3. PROCEDURES

QA/QC samples include split samples, duplicates, blind duplicates, blind check standards, trip blanks, and equipment blanks. The specific QA/QC samples that will be collected during each sampling event shall be designated in the site sampling plan.

3.1 General QA/QC Guidelines

The following general guidelines shall be followed for collection of QA/QC samples:

1. Include a trip blank with each cooler that contains samples to be analyzed for volatile organic compounds (VOCs). Ideally, trip blanks will be prepared at the lab in advance and will be shipped with the sample bottle order. If trip blanks are prepared in the DBS&A warehouse or in the field, prepare well away from any areas of known or suspected contamination. Prepare the trip blanks by filling a pre-acidified 40-ml VOA vials with organic-free water.

2. Collect an equipment (rinsate) blank from any non-disposable equipment that comes in contact with the water to be sampled, such as non-dedicated pumps or bailers or field filtration devices. Collect the equipment blank by running or pouring deionized water through any portion of the device that normally comes in contact with the water sample or presents a potential for cross-contamination, including hoses, valves, etc. Equipment blanks generally are not required for disposable equipment which is certified clean by the manufacturer (e.g., disposable teflon bailers). The exact number and type of equipment blanks to be collected will be determined on a site-specific basis. Describe the process used to collect the equipment blank in the field log book (see Section 13.2.6 of the DBS&A Operations Manual).

3. Replicate samples consist of two aliquots of the same sample analyzed independently. Replicate samples are used to evaluate laboratory precision.

4. A duplicate consists of two separate samples from the same source, analyzed independently. Duplicates are used to evaluate laboratory precision, heterogeneity of the material, and precision of field sampling techniques.

5. Split samples are replicate samples divided into two portions, sent to different laboratories, and analyzed for the same parameters.

6. In some cases, blind check standards may be submitted to the analytical laboratory. These may be obtained commercially or prepared in advance in the DBS&A laboratory. Alternatively, a duplicate sample may be spiked in the field with a known quantity of the analyte(s) of concern.

3.2 Well Security

All monitor wells shall be securely locked following the completion of sampling.

3.3 Chain-of-Custody Procedures

Chain-of-custody (COC) documents shall be kept for all samples collected by DBS&A. The COC program includes proper labeling of the samples to prevent misidentification. The following general guidelines for sample handling and custody procedures will be followed:

1. As few people as possible should handle the samples.

2. Samples must be within a locked/secure area at all times when not within view of DBS&A personnel.

3. Use the COC form provided by the analytical laboratory that will be performing the analyses. A representative form is included as Attachment 1 to this SOP (DBS&A Form No. 095).

4. The FR is responsible for the custody of the samples until they are transferred to the analytical laboratory or until custody is transferred to another designated individual. If the sample is transferred to another DBS&A employee, both people should sign and date the "relinquished" and "received" sections of the form, respectively.

5. Include the following information on the COC form:

   - The date and time of sample collection
   - The exact identification of the sample
   - The type of sample (e.g., water, soil, fuel)
   - Any preservatives used
   - The number of containers for each sample
   - The job number and name
   - Whether or not the sample was filtered
   - The analytical methods to be used (e.g., EPA 8240)

6. Have a second member of the water sampling team check the chain of custody document to ensure that all data is correct and exactly matches the information on the sample bottle labels. Place the appropriate copies of the COC form(s) in a sealed plastic bag taped to the inside lid of the cooler containing the samples. If more than one cooler is being shipped, each cooler should have a separate COC form listing all samples in that cooler.

7. Whenever the sample leaves control of the sampling team (e.g., when shipped by common carrier) place a COC seal on the shipping container or individual sample bottles. Sign and date the COC seal. The purpose to the seal is to ensure that the samples have not been tampered with prior to receipt at the lab.

8. If samples are shipped to arrive on Friday afternoon, weekends, or holidays, special arrangements need to be made with the analytical laboratory to ensure that someone will be available for sample receipt, and that the holding times will be met.

4. ATTACHMENTS

1. Chain-of-Custody Form (DBS&A Form No. 095)

Prepared by: Joanne Hilton

Reviewed by: Larry M. Cox
Quality Assurance Manager

Approved by: Daniel B. Stephens
Daniel B. Stephens

Reviewed by: Larry M. Cox
Systems Operations Manager

DANIEL B. STEPHENS & ASSOCIATES, INC.

Chain of Custody

To:

Date ________ Project No. ________

Client ________

Relinquished by ________

Sent by: ☐ Fed Ex ☐ DHL ☐ Other ________

Purpose of Shipment ________

Possible Contaminants ________

Item No.	Sample No.	Analysis to be Done	Sample Container	Comments

Date Received ________ by ________
Company Representative

Received the above articles in good condition

Except as noted ________

Section 13.6.1

Ground-Water Level Measurement

1. PURPOSE

The purpose of this procedure is to provide DBS&A personnel with the information necessary to collect accurate water-level data from ground-water wells. Water level measurements provide the fundamental data needed to determine aquifer characteristics; therefore, it is crucial that the appropriate methods are used to meet the data requirements of an aquifer investigation.

2. SCOPE

The following procedures are applicable to all DBS&A employees and subcontractors engaged in the measurement of ground-water levels in wells. Several methods are available for determining the depth to water (DTW); this SOP briefly describes methods used to measure water levels manually, and automatically with the help of data recorders. This information is intended to help DBS&A personnel determine the appropriate equipment to collect water levels for background trend analysis and aquifer tests.

3. PROCEDURES

Immediately following well construction (see Section 13.4.1 of the DBS&A Operations Manual), a measuring point shall be clearly labeled "MP" with a permanent marker at the top of the casing. The designated MP shall be located at a point which is unlikely to change in elevation during the life of the well. This will prevent repeated surveys to determine the reference elevation of the measuring point. If the MP does change, it shall be clearly re-marked and referenced to the original elevation or a new survey will be necessary. Water levels will be measured in accordance with ASTM D 4750, Standard Test Method for Determining Subsurface Liquid Levels in a Borehole or Monitoring Well (Observation Well).

The water level measurement (depth to water; DTW) shall be recorded on the Water Level Measurement Form included as Attachment 1 to this SOP (DBS&A Form No. 120). In addition, the following information shall be recorded on the form: the person making the measurement, the measuring device, the surveyed point from which the measurement is made, the time of day (military time), the date, the wellhead condition, and any measuring point (MP) changes.

Ground-water level data may also be recorded in the field log and on other applicable DBS&A forms including but not limited to those used for water sampling and drilling/soils logging.

The following subsections will describe the most commonly used techniques for obtaining water-level data in the field.

3.1 Steel Tape

Graduated steel tapes provide accurate measurements to within approximately 0.01 foot of the actual DTW for depths of 100 feet or less. The rigidity of the tape allows it to hang straight in the well. Steel tapes should generally not be used when many measurements must be made in rapid succession, such as during an aquifer test. Measurements with a steel tape are relatively time consuming.

When using a steel tape the lower 2 to 3 feet is wiped dry and coated with carpenters chalk or water finding paste before being lowered down the well. The tape is then lowered into the well to the estimated DTW. The tape should be held on a foot marker at the well-head measuring or reference point (MP). After removing the tape, the wetted end is read and subtracted from the previous reading; the difference is the actual DTW. If tape graduations are greater than 0.1 foot apart, a separate engineering tape or scale shall be used to accurately determine the wetted end measurement.

The steel tape should not stretch more than 0.05% under normal use and should not cause more than an 0.05-foot perceived rise in water level during measurement. If more than a 0.05-foot rise in water level occurs during measurement, a correction shall be made for the displacement. Steel tapes shall be calibrated against a surveyor's reference tape annually by the DBS&A Environmental Equipment Coordinator. Information from these calibrations shall be kept on hand at the DBS&A equipment supply facility.

The main disadvantage of the steel tape method is that the approximate depth to water must be known prior to the measurement. In addition, interferences such as cascading water, smearing, and/or evaporation may compromise the accuracy of the wetted-end measurement. However, steel tapes are relatively inexpensive and generally more durable than electrical instruments for measuring water levels.

3.2 Electrical Sounders

Electrical sounders operate by completing a circuit when the probe contacts the water level. Upon completion of the circuit a light, buzzer, or ammeter needle indicates that the probe is in contact with the water table. The probe is connected to a graduated tape, usually made from plastic and fiberglass. Batteries supply the necessary current through electrical wires contained in the graduated tape. Measurements are commonly made to within 0.01 foot with electrical sounders.

Electrical sounders are the most commonly used ground-water level measuring device on DBS&A projects. The major advantage of electrical sounders is that many measurements can be made rapidly and accurately without removing the probe from the well. Field personnel should position themselves near the MP so the DTW can be read at eye level. A second check reading should be taken before withdrawing the electric tape from the well. Most DBS&A sounders are marked every 0.02 foot.

The length of the electric line shall be calibrated annually with an engineers tape by the DBS&A Environmental Equipment Coordinator. Information from these calibrations shall be kept on hand at the DBS&A equipment supply facility.

Potential disadvantages of the electrical sounder devices include: the expense of an accurate sounder; inaccurate measurements that may be made due to stretching or kinking of the tape; electrical shorts that may be caused by broken or corroded wires; false readings due to cascading water; snagging of the sounder tip on pump columns and cables; or incomplete circuits due to low concentrations of total dissolved solids in the water.

3.3 Automated Water Level Measurements

To determine background water level trends, the most economic approach is to set up a continuous data recorder capable of making many measurements automatically. Driscoll (1986) discusses the application and installation of such systems in detail. The most common recorders produce a graphical chart or store the data electronically for future retrieval. Continuous water level records are quite useful for determining daily and seasonal fluctuations resulting from recharge and discharge periods, evapotranspiration and tidal stress, and during aquifer tests when there are not enough field personnel to collect all the necessary data. The following paragraphs briefly review equipment used with continuous recorders to measure water levels.

Automated pressure transducers are useful for collecting large quantities of water-level data rapidly during labor intensive aquifer tests. DBS&A owns an electronic data logging system consisting of a Campbell Scientific 21X data logger and DRUK pressure transducers which can be calibrated to output feet of water above the transducer. Refer to Section 13.6.4 of the Operations Manual for detailed information on using the system. The system can be programmed to collect data on arithmetic and logarithmic time scales. Measurements are accurate to approximately 0.01 foot providing there is no turbulence in the well.

Airline bubblers are commonly used by the U.S. Geological Survey for measuring stream stage and water levels in wells over periods of several years. Airline bubblers usually operate on nitrogen gas. The device works on the principal that the gas pressure required to push all the water out of the submerged portion of the tube equals the water pressure of a column of water equal to that height. Measurements are accurate to within 0.01 foot.

Float sensors can also be used to determine long term variation in background water levels. Float sensors consist of a tape or cable passing over a pulley with a float attached to one end and a counterweight attached to the other. The float follows the rise and fall of the water level. A graphic or electronic recorder is attached to the calibrated pulley to store the water level data. Float sensors work best in large diameter wells (4 inches or greater). The greatest disadvantage of this method is the potential for the float to stick on the side of the casing or jump the pulley resulting in a "stair stepping" record or no record at all. Measurements are accurate to 0.1 foot or greater depending on the precision of the recorder and pulley calibration.

4. ATTACHMENTS

1. Water Level Measurements (DBS&A Form No. 120)

5. REFERENCES

ASTM. 1990. Standard Practice for Design and Installation of Ground Water Monitoring Wells in Aquifers. Standard D 5092-90. Philadelphia, PA.

Driscoll, F.G. 1986. Groundwater and Wells. Johnson Division. St. Paul, MN. 1089 p.

Prepared by: Bob Marley

Approved by: Daniel B. Stephens

Reviewed by: Quality Assurance Manager

Reviewed by: Systems Operations Manager

DANIEL B. STEPHENS & ASSOCIATES, INC.

Water Level Measurements

Project Name ______________________ Measurement Date ______________

Project Number ______________ Field Staff ______________________

Measuring Points and Datum Used ______________________

Observations ______________________

Well Number	Time	Elevation of Measuring Point (feet, mean sea level)	Depth Below Measuring Point (feet)	Water Level Elevation (feet, mean sea level)

Signature ______________________ Date ______________

DBS&A Form No. 120 5/93

Section 13.6.2

Slug Testing

1. PURPOSE

The following SOP describes procedures for performing various types of aquifer slug tests in the field.

2. SCOPE

The procedures listed below are applicable to all DBS&A employees, its contractors and subcontractors, for performing aquifer slug tests. The procedures for obtaining the necessary data in the field are described herein; the procedures for analyzing the data to calculate aquifer hydraulic properties are described in Section 14 of the DBS&A Operations Manual.

3. PROCEDURES

The procedures described below for performing slug tests are applicable to all aquifer types. Where a variation in methodology occurs with a particular aquifer type, it will be noted. These procedures are in accordance with ASTM D 4044-91, Standard Test Method (Field Procedure) for Instantaneous Change in Head (Slug Tests) for Determining Hydraulic Properties of Aquifers. Additional references which may be helpful in planning and performing slug tests are Groundwater and Wells (Driscoll, 1986), and Analysis and Evaluation of Pumping Test Data (Kruseman and de Ridder, 1992).

3.1 Slug Testing

The slug test method involves creating a sudden change in head in a well and measuring the resulting water level response. Head changes are induced by suddenly removing or adding a known quantity of water in the well. This can be accomplished by removing a bailer full of water from the water column, placing a mechanical slug into the water column, or increasing/decreasing the air pressure in the well casing. From these measurements, the aquifer's transmissivity or hydraulic conductivity can be determined. Various analytical techniques allow for the estimation of coefficient of storage but should be considered less reliable than the estimate of transmissivity.

Slug tests are an inexpensive and rapid method of obtaining estimates of aquifer properties. No pumping is required in the slug test and no piezometers are required to be monitored. The main limitation of this test is that this method is only capable of determining the characteristics of a small volume of aquifer material surrounding the well. This material may have been disturbed during well drilling and construction and, as a result, may have a large impact on the results of the test. Additionally, only slug withdrawal test methods should be used for unconfined aquifers.

3.1.1 Required Preliminary Hydrogeologic Information

All available information pertinent to the slug test should be reviewed prior to the start of the test. This information will aid in preparing design specifications for the test. This information includes aquifer properties, such as aquifer type (confined, unconfined, etc.), aquifer thickness, aquifer boundaries, and any previous estimates of hydraulic properties, if available. Information on well construction details are also needed prior to the test. This includes geologic logs, well construction logs, screen interval and size, sand pack interval and size, borehole diameter, and casing diameter.

3.1.2 Water Level Measurements

Water levels should be measured immediately prior to the test, and throughout the test until water levels in the test well reach approximately 95% of the pre-test level. Water level response during the slug test will be measured as described in Section 13.6.1 of the DBS&A Operations Manual. Because water levels are dropping fast immediately after slug emplacement, measurements should be taken at brief intervals during this time. As recovery continues, the intervals can be gradually lengthened. Readings collected during the slug test should be recorded on Form No. 124, Slug Test Measurements.

3.1.3 Slug Test by Water Withdrawal

Water can be rapidly removed from a test well with the use of a bailer. In this method, a bailer of known volume is lowered below the water level in the test well. After it has been determined that the water level in the control well has recovered to within 95% of static, the bailer is rapidly removed from the water column. Water level recovery within the well is then measured and recorded until the water level has recovered to 95% of the background level. The bailer should be of sufficient size to ensure a proper water level response during removal from the water column.

A submersible pump can also be used to rapidly withdraw water from the test well. The pump will need to remove a sufficient volume of water from the test well in a matter of seconds. Care should be taken to ensure that water does not backflow into the well when the pump is shut off.

3.1.4 Slug Test by Mechanical Slug Injection

A mechanical slug constructed of nonporous material with a density greater than water can be rapidly lowered into the water column of the test well creating a nearly instantaneous rise in water level. The resulting water level recovery is then measured and recorded in the test well until the water level reaches approximately 95% of the background level.

3.1.5 Slug Test by Air Injection

Slug withdrawal can be simulated by injecting air into a well which has an airtight cap. This is accomplished with the use of an air pressure pump and regulator. In this method, the well is pressurized by the injection of air into the airtight test well. The injection of air into the well causes the water level in the test well to drop. Once the water level has stabilized, the pressure is released creating a sudden change in head. Water level recovery will need to be measured with the use of a pressure transducer connected to a data logger. This method requires that the test well be screened in the saturated portion of the aquifer.

3.1.6 Slug Test by Vacuum Withdrawal

The injection of a slug can be simulated by applying a vacuum to an airtight test well. This method requires the use of a vacuum pump and regulator. In this method, a steady vacuum is applied to the test well which creates a rise in water level. After the water level in the test well has stabilized, the vacuum is released which creates a sudden change in head. The water level recovery is then measured with the use of a pressure transducer connected to a data logger. This method requires that the test well be screened entirely in the saturated portion of the aquifer.

4. ATTACHMENTS

1. Slug Test Measurements (DBS&A Form No. 124)

5. REFERENCES

Driscoll, F.G. 1986. Groundwater and Wells, Second Edition. Johnson Filtration Systems, Inc., St. Paul, Minnesota.

Kruseman, G.P. and N.A. de Ridder. 1992. Analysis and Evaluation of Pumping Test Data, Second Edition. International Institute of Land Reclamation and Improvement.

Prepared by: ______________________

Reviewed by: ______________________
Quality Assurance Manager

Approved by: ______________________
Daniel B. Stephens

Reviewed by: ______________________
Systems Operations Manager

DANIEL B. STEPHENS & ASSOCIATES, INC.

Slug Test Measurements

Project Name ______________________ Test Date ______________

Project Number ______________ Field Staff ______________________

Well Number and Datum Used ______________________________

Slug Type (material, volume, etc.) ______________________________

Observations ______________________________

Time	Depth Below Measuring Point (feet)	Change in Water Level (feet)

Signature ______________________________ Date ______________

DBS&A Form No. 124 8/93

APPENDIX G

BORING LOGS AND DRILLING LOGS

Boring Logs
On-Site Monitor Wells and Recovery Wells

HALLIBURTON NUS
Environmental Corporation

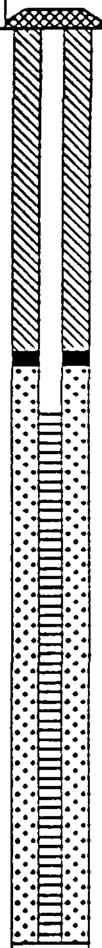
BORING/WELL NUMBER MW-1 SHEET 1 OF 1
PROJECT Transwestern Pipeline Company
LOCATION Roswell, New Mexico
PROJECT NUMBER 6250
LOGGED BY L. Basilio
DATE DRILLED 7/21/92

COORDINATES
SURFACE ELEVATION DATUM

ELEVATION FEET	SOIL DESCRIPTION	STRATA	SAMPLE INFORMATION: Depth Feet	Sample Type	Sample ID	Inches Adv. / Inches Rec.	Penetr-ometer / Blow Counts	PID/FID (ppm)
	GROUND SURFACE							
	Auger to 60 feet BLS prior to sampling							
			5					
			10					
			15					
			20					
			25					
			30					
			35					
			40					
			45					
			50					
			55					
	CLAY - red, sandy, firm, occasional gravel less than 1/4-inch, saturated red sand in top 6 inches, most likely hole slough, sanitary sewer odor	▨	60	SPT		18/18		
	CLAY - red, sandy to silty, moderately firm, moist, hole slough at top is saturated, sanitary sewer odor	▨		SPT		18/18		
	CLAY - brick red to brownish, firm to occasionally hard, silty to sandy, gypsum at base	▨		SPT		18/ 0		
	CLAY - red with hard gypsum nodules	▨	65	SPT		18/ 0		
				SPT		12/12		
				SPT		12 12		

WELL CONSTRUCTION DETAIL & REMARKS

T.O.C. Elev.



DRILLING CONTRACTOR: SH & B
DRILLER: Ed Adams
DRILLING METHOD: Hollow Stem Auger
DRILLING EQUIPMENT: CME-55

DIAMETER, TYPE & INTERVAL OF CASING: 4-inch Schedule 40 PVC
WELL SCREEN/INTERVAL: 0.010 slot/28-68 ft BLS
FILTER PACK-INTERVAL/QUANTITY: 25.2-68 ft BLS/22 sacks
WELL SEAL-INTERVAL/QUANTITY: 24.4-25.2 ft BLS

HALLIBURTON NUS
Environmental Corporation

BORING/WELL NUMBER **MW-1B** SHEET **1** OF **2**

PROJECT **Transwestern Pipeline Company**

LOCATION **Roswell Compressor Station No. 9**

COORDINATES

PROJECT NUMBER **5T72**

SURFACE ELEVATION **95.2** DATUM **GRADE**

LOGGED BY **S. Richard** DATE DRILLED **4/21/93**

ELEVATION FEET	SOIL DESCRIPTION	STRATA	SAMPLE INFORMATION						WELL CONSTRUCTION DETAIL & REMARKS
			Depth Feet	Sample Type	Sample ID	Inches Adv. / Inches Rec.	Penetrometer Blow Counts	PID/FID (ppm)	
	GROUND SURFACE								T.O.C. Elev. 95.18
	Silts and Clays with Gravel								
90			5						
	Hitting rock - No recovery			SPT		3 / 0	50		
85	Hitting rock - No recovery. Will try sampling with split spoon sampler.		10						
	Hit large rock			SPT		3 / 0	50		
80			15						
	Silts and Clays with Gravels			SPT		6 / 2	50		
75			20						
				SPT		2 / 0	50		
70			25	SPT		2 / 0			
				SPT		3 / 0			
	Very Silty								
65	Silts and Clays, little gravel		30					0	
				SPT		2 / 1		40	
	SILT - brown, organic odor								
	Black gravel and coarse sand			SPT		24/24	9 14 21 36 9	>1000	

DRILLING CONTRACTOR: Layne Environmental

DRILLER: Russ Deike

DRILLING METHOD: Hollow Stem Auger

DRILLING EQUIPMENT: Failing F-10

DIAMETER, TYPE & INTERVAL OF CASING: 2" PVC

WELL SCREEN/INTERVAL: 0.020" slot, 55' to 65'

FILTER PACK-INTERVAL/QUANTITY: 10/20 silica sand, 53' to 65.5'

WELL SEAL-INTERVAL/QUANTITY: 50' to 53', bentonite pellets

HALLIBURTON NUS
Environmental Corporation

BORING/WELL NUMBER **MW-1B** SHEET **2** OF **2**

PROJECT **Transwestern Pipeline Company**

LOCATION **Roswell Compressor Station No. 9**

COORDINATES

PROJECT NUMBER **5T72**

SURFACE ELEVATION **95.2** DATUM **GRADE**

LOGGED BY **S. Richard** DATE DRILLED **4/21/93**

ELEVATION FEET	SOIL DESCRIPTION	Depth Feet
	CONTINUED FROM PREVIOUS PAGE	
	CLAY - organic odor	
	No odor	
55		40
50		45
	Interbedded Sands and Clays	
45		50
	CLAY - stiff	
	CLAY - stiff	
40		55
	SAND - organic odor	
	CLAY	
	SAND with PSH	
35	Fine sand - wet	60
	6 inches of black sand	
	CLAY	
30		65
	Total depth = 65.5 feet BLS	

SAMPLE INFORMATION

Sample Type	Sample ID	Inches Adv. / Inches Rec.	PID/FID (ppm)
SPT		24/24	>1000
SPT		24/24	50
SPT		24/24	>1000
SPT		24/24	>1000
SPT		24/24	>1000
SPT		24/24	>1000
SPT		24/24	>1000
SPT		24/20	>1000
SPT		24/18	>1000
SPT		24/18	>1000
SPT		24/18	>1000

Penetrometer Blow Counts (in order as printed): 13, 23, 27, 13, 18, 25, 37, 10, 21, 35, 18, 9, 18, 19, 27, 6, 12, 12, 27, 5, 7, 11, 19, 12, 13, 14, 41, 31, 11, 18, 33, 6, 15, 18, 50+, 12, 21, 39, 19, 9, 11, 19, 21

WELL CONSTRUCTION DETAIL & REMARKS

Water level at 58.8 feet BLS at 0900 hr on 4/23/93

Water level at 62.1 feet BLS at 1700 hr on 4/22/93

HALLIBURTON NUS
Environmental Corporation

BORING/WELL NUMBER MW-2 SHEET 1 OF 2

PROJECT Transwestern Pipeline Company

LOCATION Roswell Compressor Station No. 9

PROJECT NUMBER 5T72

COORDINATES

SURFACE ELEVATION 97.0 DATUM GRADE

LOGGED BY S. Richard DATE DRILLED 4/21/93

ELEVATION FEET	SOIL DESCRIPTION	STRATA	SAMPLE INFORMATION: Depth Feet	Sample Type	Sample ID	Inches Adv. / Inches Rec.	Penetrometer Blow Counts	PID/FID (ppm)	WELL CONSTRUCTION DETAIL & REMARKS
	GROUND SURFACE								T.O.C. Elev. 96.98
	Silt and Clay with Gravel and Pebbles								
95									
			5	SPT		18/18	37 34 29	1	
90									
			10	SPT		6 / 3	50	2	
85									
			15	SPT		6 / 0	50	2	
80	More Gravel								
			20	SPT		6 / 2	50	1	
75									
	3-inch dark brown sandy clay layer, sand is well sorted and medium grained		25	SPT		4 / 2	50	2	
70									
	Small layer (1 foot) of black coarse gravel, organic odor		30	SPT		18/15	14 14 14	>1000	
	CLAY								
65				SPT		18/18	5 9 10	700	

DRILLING CONTRACTOR: Layne Environmental

DRILLER: Russ Deike

DRILLING METHOD: Hollow Stem Auger

DRILLING EQUIPMENT: Failing F-10

DIAMETER, TYPE & INTERVAL OF CASING: 2" PVC

WELL SCREEN/INTERVAL: 0.020" slot PVC, 55' to 65'

FILTER PACK-INTERVAL/QUANTITY: 10/20 silica sand, 53' to 65'

WELL SEAL-INTERVAL/QUANTITY: 50' to 53', bentonite pellets

HALLIBURTON NUS
Environmental Corporation

BORING/WELL NUMBER MW-2 SHEET 2 OF 2

PROJECT Transwestern Pipeline Company

LOCATION Roswell Compressor Station No. 9

COORDINATES

PROJECT NUMBER 5T72

SURFACE ELEVATION 97.0 DATUM GRADE

LOGGED BY S. Richard DATE DRILLED 4/21/93

ELEVATION FEET	SOIL DESCRIPTION (CONTINUED FROM PREVIOUS PAGE)	STRATA	SAMPLE INFORMATION: Depth Feet	Sample Type	Sample ID	Inches Adv. / Inches Rec.	Penetrometer Blow Counts	PID/FID (ppm)	WELL CONSTRUCTION DETAIL & REMARKS
				SPT		18/18	5 9 10	50	
60				SPT		18/18	5 4 4	45	
			40	SPT		18/18	4 4 3	20	
55	CLAY with Silt and Gravel layers								
	CLAY with Gravel layers		45	SPT		18/18	4 5 6	1	
50				SPT		18/14	3 5 6	2	
	Clay only		50	SPT		18/18	10 12 21	2	
45	Clay			SPT		18/18	2 3 6	3	
	Clay - hard		55	SPT		18/18	4 7 10		
40									
	SAND - fine grained, well sorted, with clay, organic odor			SPT		18/8	4 6 14	>1000	
			60	SPT		18/17	7 17 50	>1000	
				AUGER		42/0			
	Total depth = 65.0 feet BLS								

HALLIBURTON NUS
Environmental Corporation

BORING/WELL NUMBER MW-3 SHEET 1 OF 2
PROJECT Transwestern Pipeline Company
LOCATION Roswell Compressor Station No. 9
COORDINATES
PROJECT NUMBER 5T72
SURFACE ELEVATION 100.1 DATUM GRADE
LOGGED BY S. Richard
DATE DRILLED 4/26/93

ELEVATION FEET	SOIL DESCRIPTION	Depth Feet	Sample Type	Sample ID	Inches Adv. / Inches Rec.	Penetrometer Blow Counts	PID/FID (ppm)	WELL CONSTRUCTION DETAIL & REMARKS
	GROUND SURFACE							T.O.C. Elev. 100.10
	Silt and Clay with Gravel							
95	Silt and Clay with Gravel	5	SH		6 / 4			
90	Silt and Clay with Gravel	10	SH		6 / 3			
85	Silt and Clay with Gravel	15	SH		6 / 4			
80	Silt and Clay with Gravel	20	SH		6 / 4			
75	Sand, Clay, Gravel	25						
	Gravel							
70	Gravel, no recovery	30	SPT		5 / 4	50/5		
	CLAY - stiff, moist		SPT		24 / 24	13 14 15 16 26		

DRILLING CONTRACTOR: Layne Environmental
DRILLER: Russ Deike
DRILLING METHOD: Hollow Stem Auger
DRILLING EQUIPMENT: Failing F-10

DIAMETER, TYPE & INTERVAL OF CASING: 2" PVC
WELL SCREEN/INTERVAL: 0.020" slot PVC, 60' to 70'
FILTER PACK-INTERVAL/QUANTITY: 10/20 silica sand, 58' to 72.5'
WELL SEAL-INTERVAL/QUANTITY: 55' to 58', bentonite pellets

HALLIBURTON NUS
Environmental Corporation

BORING/WELL NUMBER MW-3 SHEET 2 OF 2

PROJECT Transwestern Pipeline Company

LOCATION Roswell Compressor Station No. 9

COORDINATES

PROJECT NUMBER 5T72

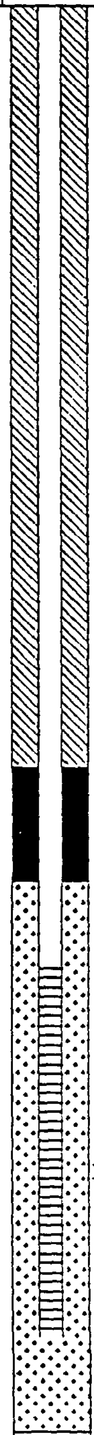
SURFACE ELEVATION 100.1 DATUM GRADE

LOGGED BY S. Richard

DATE DRILLED 4/26/93

CONTINUED FROM PREVIOUS PAGE

ELEVATION FEET	SOIL DESCRIPTION	Depth Feet	Sample Type	Sample ID	Inches Adv. / Inches Rec.	Penetrometer Blow Counts	PID/FID (ppm)	WELL CONSTRUCTION DETAIL & REMARKS
			SPT		24/24	8, 10, 12		
			SPT		24/24	6, 9, 18, 20		
	CLAY - stiff, moist							
60		40						
55		45	CORE		60/60		9	
	Sandy Silt - brown, fine sand							
50		50	CORE		60/50			
45	2-inch fine sand and gravel layer .M = MLS CLAY - stiff, stringer of silt	55	CORE		60/48			
40		60	CORE		60/48			
	Silty Sand							
	Layers of Clay							
35		65	CORE		60/36			Water level 65.75 feet BLS at 1109 hrs on 4/27/93
	Wet Sand							
30	CLAY - stiff	70	CORE		60/60			
	SAND							
	Total depth = 72.5 feet BLS							



HALLIBURTON NUS Environmental Corporation

BORING/WELL NUMBER MW-5 SHEET 1 OF 2

PROJECT Transwestern Pipeline Company

LOCATION Roswell Compressor Station No. 9

COORDINATES

PROJECT NUMBER 5T72

SURFACE ELEVATION 98.0 DATUM GRADE

LOGGED BY S. Richard

DATE DRILLED 4/28/93

ELEVATION FEET	SOIL DESCRIPTION	Depth Feet	Sample Type	Sample ID	Inches Adv. / Inches Rec.	Penetrometer Blow Counts	PID/FID (ppm)	WELL CONSTRUCTION DETAIL & REMARKS
	GROUND SURFACE							T.O.C. Elev. 97.98
95								
	Sand, Clay, Gravel	5	SPT		24/20	22 40 18 19		
90								
	Sand, Clay, Gravel	10	SPT		24/18	24 14 19 22		
85								
		15	SPT		24/20	11 37 41 27		
	GRAVEL - moist							
80								
	CLAY	20	SPT		24/20	8 11 27 23		
	CLAY with gravel		SPT		24/24	16 8 10 16		
75								
	CLAY with gravel and pebbles, stiff	25						
	Pebbles		CORE		60/56			
	CLAY - stiff							
70	SILT							
	SILTY CLAY							
	CLAY	30						
	SILTY SAND - light brown		CORE		60/30			
65								

DRILLING CONTRACTOR: Layne Environmental

DRILLER: Russ Deike

DRILLING METHOD: Hollow Stem Auger

DRILLING EQUIPMENT: Failing F-10

DIAMETER, TYPE & INTERVAL OF CASING: 2" PVC

WELL SCREEN/INTERVAL: 0.020"slot, 60' to 70'

FILTER PACK-INTERVAL/QUANTITY: 10/20 silica sand, 58' to 75'

WELL SEAL-INTERVAL/QUANTITY: 55' to 58', bentonite pellets

HALLIBURTON NUS
Environmental Corporation

BORING/WELL NUMBER **MW-5** SHEET **2** OF **2**

PROJECT **Transwestern Pipeline Company**

LOCATION **Roswell Compressor Station No. 9**

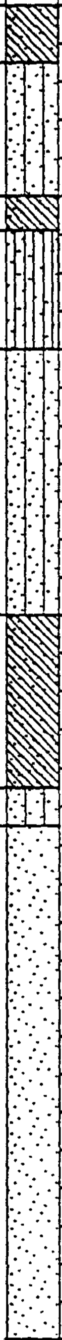
COORDINATES

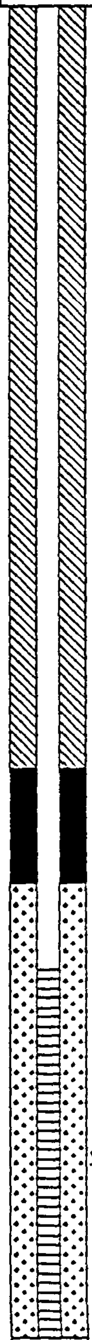
PROJECT NUMBER **5T72**

SURFACE ELEVATION **98.0** DATUM **GRADE**

LOGGED BY **S. Richard** DATE DRILLED **4/28/93**

ELEVATION FEET	SOIL DESCRIPTION (CONTINUED FROM PREVIOUS PAGE)	Depth Feet	Sample Type	Sample ID	Inches Adv. / Inches Rec.	Penetrometer Blow Counts	PID/FID (ppm)	WELL CONSTRUCTION DETAIL & REMARKS
	SILTY SAND - light brown, fine grained CLAY - brown, stiff SILTY SAND - light brown with gravel Silt and Clay		CORE		60/30			
-60	SAND SAND - tan							
	SILTY CLAY - brown, moist CLAY - moist SILT - slightly sandy SANDY SILT	40	CORE		60/42			
-55	Interbedded Silt, Clay							
	SILTY SAND - fine grained	45	CORE		60/24			
-50	SAND - fine grained	50						
	CLAY SILTY CLAY		CORE		60/30			
-45	SILTY CLAY SILTY SAND	55	CORE		36/24			
	SAND - well sorted with gravel							
-40			SPT		6 / 5	50/5"		
		60						
-35	Wet	65	SPT		24/12	7 11 33 33		Water level
	SAND - wet							
-30			AUGER		48/0			
	Total depth = 70 feet BLS	70						



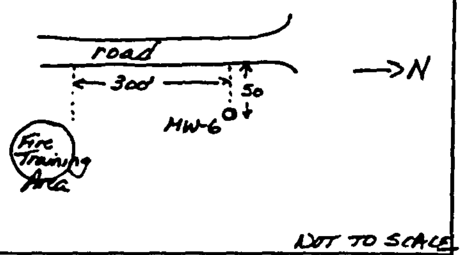


DANIEL B. STEPHENS & ASSOCIATES, INC.

Boring Log

Site	ENRON - ROSWELL COMPRESSOR STATION		
Logged by	B. CASADEVALL	Client/Project #	4115.2
Boring Number	MW-6	Drilling Co.	POOL ENV. DRILLING
Drilling Method	HSA 8¼" O.D.	Drill Rig	CME-75
Date Started	11/30/94 0945	Date Completed	12/1/94

Location Map



Time	PID/FID Reading	Blow Counts	Sampling Device	Sample Recovery	Sample Interval	Sample Number	USCS Symbol	Depth (feet)	Soil Description/Remarks (Soil type, color, texture, grain size, sorting, roundness, plasticity, consistency, moisture content)	HEADSP Reading (ppm)
			Split-Spoon with brass sleeves					2		
							GW	4	4-5.5: Sandy Gravel (GW): v. pale brown (10YR 8/4); v. fine- to v. crse.-grained w/ fragments of limestone & granite up to 1"; loose; dry; no odor.	0.2
1000	0.4	12/23/24		1.5/1.5				6		
								8		
1015	0.0	42/50		10"/10"			GW	10	9-10.5: Sandy Gravel (GW): mostly limestone fragments, w/ little sand, little silt, & trace clay. Matrix is lt. reddish brown (5YR 6/4) & fragments are grayish brown (2.5Y 5/2); loose; dry; no odor.	0.1
								12		
1035	0.0	43/50		9/9"			GW	14	14-15.5: Sandy Gravel (GW): as above.	0.15
								16		
								18		
1045	0.0	39/50		9/11"			GW	20	19-20.5: Sandy Gravel (GW): as above.	—
								22		
1100	—	50		3"			GW	24	24-25.5: Sandy Gravel (GW): as above. v. poor recovery; v. rocky & v. hard.	0.6
								26		
								28		
[illegible]6	—	50		3"			GW	30	29-30.5: Sandy Gravel (GW): as above.	—
									---Driller indicates formation change at 31'.	
								32		
[illegible]30	0.0	17/25/26		15/18"			SP/CL	34	34-35.5: Sand (SP): light red (10R 6/8); v. fine-fine-grained; mostly sand w/ tr. silt; med. consistency; calcareous; dry.	0.6
								36	35.5: CLAY (CL): reddish brown (2.5YR 5/4); medium plasticity; stiff; damp; no odor.	
								38		

DANIEL B. STEPHENS & ASSOCIATES, INC.

Boring Log

Site	ENRON-ROSWELL		
Logged by	B. CASADEVALL	Client/Project #	4115.2
Boring Number	MW-6	Drilling Co.	POOL
Drilling Method	HSA	Drill Rig	CME-75
Date Started	11/30/94	Date Completed	12/1/94

Location Map

Time	PID/FID Reading	Blow Counts	Sampling Device	Sample Recovery	Sample Interval	Sample Number	USCS Symbol	Depth (feet)	Soil Description/Remarks (Soil type, color, texture, grain size, sorting, roundness, plasticity, consistency, moisture content)	Headspace PID
1145	0.2	8-20-25	SS w/BS	18"/18"			SP/CH	42	39-41: Sand (SP), red (2.5 YR 5/6) to reddish yllw (5 YR 7/8), v. fine-fine w/ tr. silt, calcareous. Interbedded w/ Clay and silty clay (CH); reddish brown (5 YR 5/4); damp tr. silt, v. plastic; v. stiff	(0.6)
1240	0.0	8-36-50	SS/BS	15"/15"			SP/CH	44, 46, 48	44-45.5: Sand (SP); red to reddish yllw, v. fine-fine w/ tr. silt, calc. cement. Interbedded with clay and sandy clay (CH), reddish brown, damp, v. plastic; v. stiff.	(0.2)
58	0.0	50	SS/BS	4"/4"			GW	50, 52	49-49.5: Sandy Gravel (GW): pinkish white (7.5 YR 8/2) v. fine-coarse grain; tr. clay, some sand, some gravel; subrounded gravel (ls./granitics); calc. cement; dry. * cuttings becoming damp @ 53'	(0.1)
1315	0.0	9/23/25	SS/BS	20"/18"			SP/SC	54, 56, 58	54-55.5: Sand (SP) and Silty Sand (SC): reddish yllw. (5YR 7/8) → to pink (7.5 YR 8/3). Some plastic fines in v. fine grained sands — v. few fines in fine sand. Sands are damp.	(0.0)
00	0.0	4/12/15	SS/BS	20"/18"			MH to CH	60, 62	59-60.5: Clayey ~~Sand~~ Silt (MH) — reddish yellow (5YR 6/6); some clay, mostly silt and v. fine sand; damp to moist; very plastic; stiff	(0.1)
26	0.0	10/25/35	SS/BS	20"/18"			CH/SC or SC	64, 66, 68	64-65.5: Silty clay (CH) and clayey/silty sand (SC). red (2.5 YR 4/6); clay is v. plastic; sands are v. poorly sorted; v. fine to v. coarse (some small pebbles). moist to wet at 65.5'.	(0.1)
45	0.0	8/11/20		20"/18"			CH/SC	70, 72	69-70.5: Silty clay (CH) and clayey sand. Saturated, esp. the sand layers.	
1535	0.0	8/15/16		18/18			SC/CH	74, 76, 78	74-75.5: Clayey sand & silty clay - v. fine grained sand; v. plastic fines; damp-moist, but not wet. Pale yllw. areas appear more calcareous.	

DBS&A Form No. 080 3/92

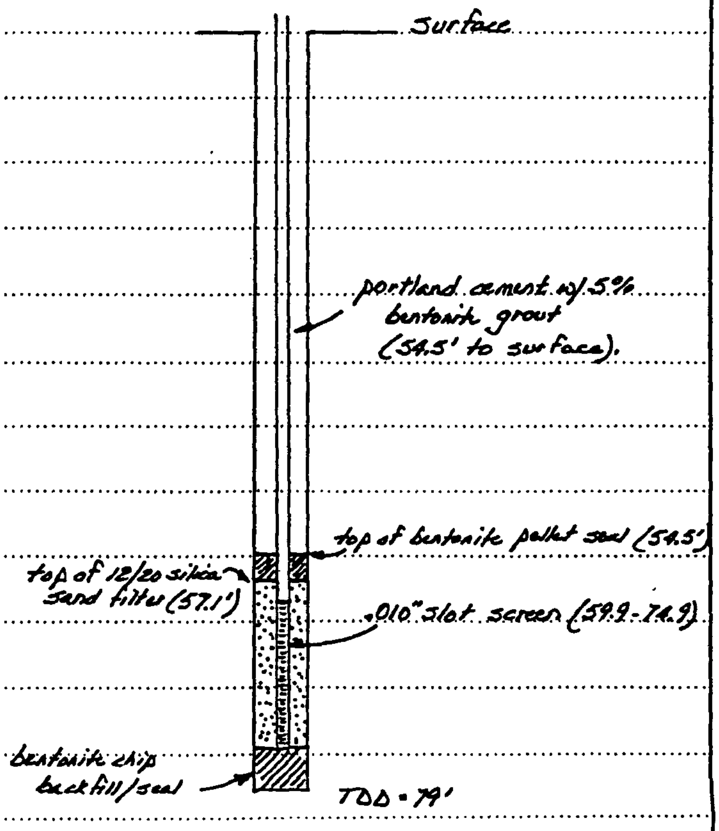
No brass sleeves used after

DANIEL B. STEPHENS & ASSOCIATES, INC.

Boring Log

Site: ROSWELL (ENRON).	Location Map
Logged by: B. CASADEVALL	Client/Project #: 4115.2
Boring Number: MW-6	Drilling Co. Pool
Drilling Method: HSA	Drill Rig: CME-75
Date Started: 11-30-94	Date Completed: 12/1/94

PID/FID Reading	Blow Counts	Sampling Device	Sample Recovery	Sample Interval	Sample Number	USCS Symbol	Depth (feet)	Soil Description/Remarks Soil type, color, texture, grain size, sorting, roundness, plasticity, consistency, moisture content
0.0	17/12/18	SS	20"/18"	//////		GC/SC		79-80.5: Sandy gravel & gravelly sand. – red brown, as above; damp to saturated; sands are v. fine to fine grained with few clay, but fines are v. plastic.
							82	
							84	
							86	
								TDD = 79' (sampled to 80.5)



HALLIBURTON NUS
Environmental Corporation
16360 Park Ten Place
Suite 300
Houston, Texas 77084
(713) 492-1888

FIELD LOG OF BORING

Boring No. RW-1
Sheet 1 of

Project Name: Roswell CS
Project Number:
Client: TW

Drilling Method: HSA
Sampling Method: SS
Driller: Cousee
Logged By: Gibson

Water Level					Drilling Start	Drilling Finish
Time					Time 145	Time 0908
Date					Date 6/11/93	Date 6/13/93
Casing Depth		Boring Depth	42.5			

Location of Boring
Note: 0-30 drilled - no samples
log will start at 30'

Datum
Elevation

Sample No. / Sample Depth	Sampler Type	Inches Driven Pushed / Inches Recovered	Blows Sampler	HNU/OVA Reading	Pocket Penetrometer	Depth in Feet	Soil Graph	Surface Conditions:
						1		
						2		
						3		
						4		
						5		
		2 / 2	50/2	35		36		Sandy gravel brown
						7		
		3 / 1	50/3	>1000		8		Sand gravel, product coated brownish
						9		
		5 / 5	50/5	>1000		40		Sandy gravel, with clayey seams gray to black, wet
						1		
						2		Clay ~~40~~ 41.5' red brown several small gravel, somewhat calc. product
								TD 42.5
						3		
						4		
						5		
						6		
						7		
						8		
						9		

Drilling Logs
Off-Site Wells

FIELD ENGR. LOG Transwestern Well TW-1
(Well #2 on DBS&A Fig. 2-5)

Form WR-23

STATE ENGINEER OFFICE

WELL RECORD

INSTRUCTIONS: This form should be executed in triplicate, preferably typewritten, and submitted to the nearest district office of the State Engineer. All sections, except Section 5, shall be answered as completely and accurately as possible when any well is drilled, repaired or deepened. When this form is used as a plugging record, only Section 1A and Section 5 need be completed.

Section 1

(Plat of 640 acres)

(A) Owner of well Pecos Valley Artesian Conservancy Dist.

Street and Number P. O. Box 1346

City Roswell. State New Mexico

Well was drilled under Permit No. RA-5540 and is located in the NW ¼ NW ¼ NW ¼ of Section 28 Twp. 9 S Rge. 24 E

(B) Drilling Contractor P.V.A.C.D. License No. WD 190

Street and Number same as above

City ______ State ______

Drilling was commenced September 17, 1969

Drilling was completed October 23, 1969

Elevation at top of casing in feet above sea level ______ Total depth of well 352 feet

State whether well is shallow or artesian artesian Depth to water upon completion ______ May 24, 1979 WL 90'

Section 2 PRINCIPAL WATER-BEARING STRATA

No.	Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation
1	92	240	148	Rough Rock
2	249	352	103	Water Rock (rough)
3				
4				
5				

Section 3 RECORD OF CASING

Dia in.	Pounds ft.	Threads in	Depth Top	Depth Bottom	Feet	Type Shoe	Perforations From	Perforations To
9-5/8	32		0	240	240	Halliburton	None	

Section 4 RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Diameter Hole in in.	Tons Clay	No. Sacks of Cement	Methods Used
0	240	12¼	220	150	Denton Well Cementing Co.

Section 5 PLUGGING RECORD

Name of Plugging Contractor ______ License No. ______

Street and Number ______ City ______ State ______

Tons of Clay used ______ Tons of Roughage used ______ Type of roughage ______

Plugging method used ______ Date Plugged ______ 19__

Plugging approved by:

______ Basin Supervisor

Cement Plugs were placed as follows:

No.	Depth of Plug From	Depth of Plug To	No. of Sacks Used

FOR USE OF STATE ENGINEER ONLY

Date Received OCT 1969

File No. RA-5540 Use Recorder Location No. 9.24.28.1113

113172

Section 6

LOG OF WELL

Depth in Feet		Thickness in Feet	Color	Type of Material Encountered
From	To			
0	8	8		Soil
8	18	10		Sand-Gravel
18	43	25		Clay
43	52	9		Clay & Gravel
52	68	16		Clay & Gyp Rock
68	92	24		Redbed - Gyp Rock
92	150	58		Rough Rock (lost circulation)
150	235	85		1 and 2 foot Drops
235	249	14		Lime (set casing 240')
249	282	33		Lime (water rock)
282	288	6		Hard Lime
288	315	27		Lime (water rock)
315	319	4		Hard Lime
319	352			Lime Rock (water rock)

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above described well.

Charles R. Wyche

Well Driller

Charles R. Wyche, Supt.

Well #5
on DBS&A Fig. 2-5

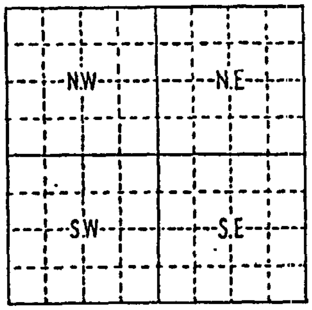
RA-3423

WELL RECORD

File No. ____________

INSTRUCTIONS: This form should be typewritten, and filed in the office of the State Engineer, (P.O. Box 1079) Santa Fe, New Mexico, unless the well is situated in the Roswell Artesian Basin, in which case it should be filed in the office of the Artesian Well Supervisor, Roswell, New Mexico. Section 5 should be answered only if an old artesian well has been plugged. All other sections should be answered in full in every case, regardless of whether the well drilled is shallow or artesian in character. This report must be subscribed and sworn to before a Notary Public.

Sec. 1



(Plat of 640 acres)
Locate Well Accurately

Owner of well Oscar White

Street and Number 400 N. Kentucky.

Post Office Roswell, New Mexico

Well was drilled under Permit No. .... and

is located in the NW ¼ SE ¼ .... ¼ of Section 20

Township 9, Range 24.

Drilling Contractor Conrad Keyes

Street and Number ....

Post Office ....

Drilling was commenced .... 19...... Drilling was completed .... 19......

Elevation at top of casing in feet above sea level ....

State whether well is shallow or artesian ....

Total depth of well .... feet.

Sec. 2

PRINCIPAL WATER-BEARING STRATA

No. 1, from .... to ...., Thickness in feet ...., Formation ....

No. 2, from .... to ...., Thickness in feet ...., Formation ....

No. 3, from .... to ...., Thickness in feet ...., Formation ....

No. 4, from .... to ...., Thickness in feet ...., Formation ....

No. 5, from .... to ...., Thickness in feet ...., Formation ....

Sec. 3

RECORD OF CASING

DIAMETER IN INCHES	POUNDS PER FOOT	THREADS PER INCH	NAME OF MANUFACTURER	FEET OF CASING	TYPE OF SHOE	PERFORATED		PURPOSE
						FROM	TO	

Sec. 4

RECORD OF MUDDING AND CEMENTING

DIAMETER OF HOLE IN INCHES	NUMBER OF SACKS OF CEMENT	METHODS USED	SPECIFIC GRAVITY OF MUD	TONS OF CLAY USED

Sec. 5

PLUGGING RECORD OF OLD WELL

Well is located in the .... ¼ .... ¼ .... ¼ of Section ...., Township ....,

Range .... Name of plugging contractor ....

Street and Number .... Post Office ....

Tons of clay used .... Tons of roughage used .... Type of roughage ....

.... Was plugging approved by Artesian Well Supervisor ....

Cement plugs were placed as follows:

No. 1 was placed at .... feet Number of sacks of cement used ....

No. 2 was placed at .... feet Number of sacks of cement used ....

No. 3 was placed at .... feet Number of sacks of cement used ....

No. 4 was placed at .... feet Number of sacks of cement used ....

No. 5 was placed at .... feet Number of sacks of cement used ....

(OVER)

RA-3423

9.24.20.410

Sec. 8

LOG OF WELL

FROM (depth in feet)	TO (depth in feet)	THICKNESS IN FEET	CLASSIFICATION OF FORMATION
0 - 12			Soil
12 - 45			Red Sandy clay
45 - 85			Red Sandy Clay
85 -115			Gyp (water)
115 - 130			Anhydrite
130 - 142			Gyp & shale
142 - 165			Anhydrite
165 - 175			Lime
175 - 180			Shale & Lime
180 - 220			Broken Lime (water)
220 - 226			Clay & Shale
226 - 254			Sand Lime (water)
254 - 263			Yellow clay
263 - 285			Broken Lime
285 - 288			Sandy Lime (water
288 - 300			Broken Lime
300 - 335			Sandy Lime
335-340			Broken Lime(water)
340-~~367~~ 360			~~Broken Lime~~ Gray lime
360 - 367			Broken Lime (water)
367 - 370			Gray Lime
	Set 156 ' 9"	10" casing	
	Set 170' 6"	8½"casing perforated	
	37		

I, ...do solemnly swear that, to the best of my knowledge and belief, the foregoing information is a true and correct record of the well for which report is hereby made, insofar as can be determined from all available records.

SUBSCRIBED AND SWORN TO BEFORE ME this .... Signed ....

day of ...., A. D., 19...... Position ....

....
Notary Public

Street and Number ....

My Commission Expires .... Post Office ....

Form WR-23 FIELD . GR. LOG STATE ENGINEER OFFICE Well #8 on DBS&A Fig. 2-5

WELL RECORD

INSTRUCTIONS: This form should be executed in triplicate, preferably typewritten, and submitted to the nearest district office of the State Engineer. All sections, except Section 5, shall be answered as completely and accurately as possible when any well is drilled, repaired or deepened. When this form is used as a plugging record, only Section 1A and Section 5 need be completed.

Well # 5

Section 1

(A) Owner of well J. P. Mc Lonn

Street and Number Clovis Star Route

City Roswell State New Mexico

Well was drilled under Permit No. R A 3123 and is located in the S E ¼ ¼ ¼ of Section 15 Twp. 9 Rge. 24 E

(B) Drilling Contractor J. D. Smith License No. W D 278

Street and Number 413 East 23rd. St.

City Roswell State New Mexico

Drilling was commenced Mar. 18 19 [illegible]

Drilling was completed Apr. 25 19 [illegible]

(Plat of 640 acres)

Elevation at top of casing in feet above sea level ________ Total depth of well 425

State whether well is shallow or artesian Artesian Depth to water upon completion [illegible]

Section 2

PRINCIPAL WATER-BEARING STRATA

No.	Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation
1				Porous Limestone in Broken Stratified Layers
2				
3				
4				
5				

Section 3

RECORD OF CASING

Dia in.	Pounds ft.	Threads in	Depth Top	Depth Bottom	Feet	Type Shoe	Perforations From	Perforations To
16	50	8	0	120	120	reg.		
10 3/4	42	8	112	300	263	reg.		
8 5/8	32	8	355	415	60		380	415

Section 4

RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Diameter Hole in in.	Tons Clay	No. Sacks of Cement	Methods Used

Section 5

PLUGGING RECORD

Name of Plugging Contractor ________ License No. ________

Street and Number ________ City ________ State ________

Tons of Clay used ________ Tons of Roughage used ________ Type of roughage ________

Plugging method used ________ Date Plugged ________ 19

Plugging approved by:

________ Basin Supervisor

Cement Plugs were placed as follows:

No.	Depth of Plug From	Depth of Plug To	No. of Sacks Used

FOR USE OF STATE ENGINEER ONLY

Date Received FILED MAY 23 [illegible] OFFICE GROUND WATER SUPERVISOR ROSWELL, NEW MEXICO

File No. RA-3123 Use Irr Location No. 9.24.15.413

Section 6

LOG OF WELL

Depth in Feet		Thickness in Feet	Color	Type of Material Encountered
From	To			

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above described well.

Well Driller
J. D. Smith

This Well was filled in below the casing seat @ 300 W/ broken porous Lime. I Cleaned out cavings & set 60 ft. of 8 5/8 perforated liner in bottom, also I set a Carrigan tapered wedge type lead seal & had leakage test run on Well. Test proved O.K., no leakage. Installed Pump & tested Well Water quality O.K. & quantity [illegible] G.P.M. @ 70 ft. Head.

Well #15(?) on DBS&A Fig 2-5

Form WR-WELD ENG. LOG STATE ENGINEER OFFICE

WELL RECORD

INSTRUCTIONS: This form should be executed in triplicate, preferably typewritten, and submitted to the nearest district office of the State Engineer. All sections, except Section 5, shall be answered as completely and accurately as possible when any well is drilled, repaired or deepened. When this form is used as a plugging record, only Section 1A and Section 5 need be completed.

Section 1

(Plat of 640 acres)

(A) Owner of well ~~XXXXX~~. Joe P. McLean

Street and Number

City Roswell, N. M. State

Well was drilled under Permit No. RA 3957 and is located in the

¼ ¼ ¼ of Section 15 Twp. 9S Rge. 23E 24E

(B) Drilling Contractor Murray Drill. Co. License No. WD100

Street and Number Auto Route West

City Roswell, N. M. State

Drilling was commenced ~~X/XX/XX~~ 12/15/58 19

Drilling was completed 1/16/59 19

Elevation at top of casing in feet above sea level Total depth of well 375

State whether well is shallow or artesian Artesion Depth to water upon completion 55

Section 2 PRINCIPAL WATER-BEARING STRATA

No.	Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation
1	40	55	15	sand and water
2	368	375	7	lime and water
3				
4				
5				

Section 3 RECORD OF CASING

Dia in.	Pounds ft.	Threads in	Depth Top	Depth Bottom	Feet	Type Shoe	Perforations From	Perforations To
70d	24		0	370	370	Cemented by Denton, Artesia, N. M.		
		45 sacks How Earley Cement Insp. by State Engineer						
		Samples picked up y Jim White on location.						

Section 4 RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Diameter Hole in in.	Tons Clay	No. Sacks of Cement	Methods Used

Section 5 PLUGGING RECORD

Name of Plugging Contractor License No.

Street and Number City State

Tons of Clay used Tons of Roughage used Type of roughage

Plugging method used Date Plugged 19

Plugging approved by:

Basin Supervisor

Cement Plugs were placed as follows:

No.	Depth of Plug From	Depth of Plug To	No. of Sacks Used

FOR USE OF STATE ENGINEER ONLY

Date Received JUL 20 1959

File No. RA-3957 Use Dom. Location No. 9.24.15.424

Section 6

LOG OF WELL

Depth in Feet From	Depth in Feet To	Thickness in Feet	Color	Type of Material Encountered
0	40	40	Red	Sandy Clay
40	55	15		Sand and water
55	360	305	Red	Sandy Clay
360	368	8	Gray	Shale
368	375	8		Lime and water

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above described well.

C H Murray
Well Driller

Form WR-23

STATE ENGINEER OFFICE

Well #15 (?) on DBS+A Fig. 2-5 (record of well deepening)

WELL RECORD

INSTRUCTIONS: This form should be executed in triplicate, preferably typewritten, and submitted to the nearest district office of the State Engineer. All sections, except Section 5, shall be answered as completely and accurately as possible when any well is drilled, repaired or deepened. When this form is used as a plugging record, only Section 1A and Section 5 need be completed.

Section 1

(Plat of 640 acres)

(A) Owner of well Joe P. McLean

Street and Number Clovis Star Route

City Roswell State N. Mex.

Well was drilled under Permit No. RA 3957 and is located in the Center on east Line of Section 15 Twp. 9-S Rge. 24 E

(B) Drilling Contractor J. D. Smith License No. WD 278

Street and Number 413 E. 23rd

City Roswell State N. Mex.

Drilling was commenced Feb. 20. 1960

Drilling was completed May 20. 1960

Elevation at top of casing in feet above sea level ______ Total depth of well 415

State whether well is shallow or artesian Artesian Depth to water upon completion 47 ft.

Section 2 PRINCIPAL WATER-BEARING STRATA

No.	Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation
1	410	415	5	Porous Lime
2				
3				
4				
5				

Section 3 RECORD OF CASING

Dia in.	Pounds ft.	Threads in	Depth Top	Depth Bottom	Feet	Type Shoe	Perforations From	Perforations To
1/2	15	8	287	410	123	ACE	none	

Section 4 RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Diameter Hole in in.	Tons Clay	No. Sacks of Cement	Methods Used
390	405	6½	3	15	Dump Bailer [illegible] Plug

Section 5 PLUGGING RECORD

Name of Plugging Contractor ______ License No. ______

Street and Number ______ City ______ State ______

Tons of Clay used ______ Tons of Roughage used ______ Type of roughage ______

Plugging method used ______ Date Plugged ______ 19

Plugging approved by:

______
Basin Supervisor

Cement Plugs were placed as follows:

No.	Depth of Plug From	Depth of Plug To	No. of Sacks Used

FOR USE OF STATE ENGINEER ONLY

Date Received STATE ENGINEER OFFICE 1960 JUL 19 AM 10:18

File No. RA-3957 Use Dom Location No. 9.24.15

Section 6 **LOG OF WELL**

Depth in Feet From	Depth in Feet To	Thickness in Feet	Color	Type of Material Encountered
390	400	10	Gray	Lime Porous Lime High Salt & mineral Content unusable
400	410	10	Gray	Lime Solid
410	415	5	Gray	Lime Porous with Salt Content Less mineral

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above described well.

J. L. Smith
Well Driller

This well had very bad water the quality is [illegible] unusable. I first tried plugging off Bad Water but was unable to get sufficient seal.

I then deepened to 410 & cemented in a well 5½ in liner. Let cement set 72 hrs. I drilled out plug & deepened to 415. Mineral Content was Lowered and also salt content was Lowered from 8500 PPM to 1500 PPM.

Form WR-23

FIELD ENGR. LOG

STATE ENGINEER OFFICE

Well #16 on DBS&A Fig. 2-5

WELL RECORD

INSTRUCTIONS: This form should be executed in triplicate, preferably typewritten, and submitted to the nearest district office of the State Engineer. All sections, except Section 5, shall be answered as completely and accurately as possible when any well is drilled, repaired or deepened. When this form is used as a plugging record, only Section 1A and Section 5 need be completed.

Section 1

(Plat of 640 acres)

(A) Owner of well Joe R. McClain
Street and Number Clovis Star Route
City Roswell State New Mexico
Well was drilled under Permit No. RA 3120 and is located in the NW ¼ ~~SE~~ SE ¼ ~~SE~~ NE ¼ of Section 15 Twp. 9S Rge. 24E
(B) Drilling Contractor J. D. Smith License No. WD 278
Street and Number Route 1, Box 507
City Roswell State New Mexico
Drilling was commenced Nov. 15 1965
Drilling was completed Mar. 12 1966

Elevation at top of casing in feet above sea level ______ Total depth of well 365
State whether well is shallow or artesian Artesian Depth to water upon completion 66

Section 2 PRINCIPAL WATER-BEARING STRATA

No.	Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation
1	50	80	30	L. Tan Conglomerate Gravel & Sand
2	192	195	5	Loose " "
3	204	210	6	Red sand w/water
4	265	275	10	Conglomerate Gravel w/water 130ft level
5	330	365	35	Porous Fissured Gray Limestone w/water

Section 3 RECORD OF CASING

Dia in.	Pounds ft.	Threads in	Depth Top	Depth Bottom	Feet	Type Shoe	Perforations From	Perforations To
13¾	48	8	0	292	292	Howco Guide		
16.00	¼ in	Welded	0	120	120	Belled	None	
10¾	40	10	276	365	89	Reg.	325	365

Section 4 RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Diameter Hole in in.	Tons Clay	No. Sacks of Cement	Methods Used
0	293	15 in		150 sks neat	Pumped placed in casing under Press.
					by Denton Oilwell Cementing Co.
					Artesia

Section 5 PLUGGING RECORD

Name of Plugging Contractor ______ License No. ______
Street and Number ______ City ______ State ______
Tons of Clay used ______ Tons of Roughage used ______ Type of roughage ______
Plugging method used ______ Date Plugged ______ 19__
Plugging approved by:

______ Basin Supervisor

Cement Plugs were placed as follows:

No.	Depth of Plug From	Depth of Plug To	No. of Sacks Used

FOR USE OF STATE ENGINEER ONLY

Date Received 1966 MAR 23 AM 8:32 STATE ENGINEER OFFICE

File No. RA-3120 Use Irr Location No. 9.24.15.241

Section 6

LOG OF WELL

Depth in Feet From	Depth in Feet To	Thickness in Feet	Color	Type of Material Encountered
0	10	10	L. Gray	Topsoil & Gypsum
10	25	15	L. Gray	Gypsum
25	50	25	L. Tan	Clay & Sand
50	80	30	L. Tan	Conglomerate Gravel w/water
80	120	40	Blue Gray	Blue Shale & Clay Solidified
120	172	52	Blue Gray	Blue Shale & Gyp Shells
172	192	20	L. Pink	Hard Sandstone w/Conglomerate
192	195	3	L. Pink	Loose Conglomerate w/water
195	204	9	Red	Clay
204	210	6	Red	Sand w/water
210	265	55	Red	Shale & Gyp. Shells
265	275	10	L. Pink	Conglomerate w/water & Eroded Lime
275	286	11	L. Gray	Shale & Dolomic Lime Shells
286	293	7	Gray	Limestone
(Set 292 ft	13 3/8	& Cemented w/ 150 sks Cement)		
Drilled plug		& Tested Casing		Bailed Test 30 min O.K. after 70 hr Cement time
293	330	37	Gray	Lime
330	365	35	Gray	Fissured Porous Lime w/water

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above described well. RA-3120

J. D. Smith
Well Driller

'Set 89 ft 10 3/4 Perforated liner below 276'
'Well Tested. Sufficient quanity & quality.'

Form WR-23

STATE ENGINEER OFFICE

Well #16 on DBS&A Fig. 2-5 (record of "salt water shutoff")

FIELD ENGR. LOG

WELL RECORD

INSTRUCTIONS: This form should be executed in triplicate, preferably typewritten, and submitted to the nearest district office of the State Engineer. All sections, except Section 5, shall be answered as completely and accurately as possible when any well is drilled, repaired or deepened. When this form is used as a plugging record, only Section 1A and Section 5 need be completed.

Well # 4

Section 1

(Plat of 640 acres)

(A) Owner of well J. P. Mc Lean

Street and Number Clovis Star Route

City Roswell State New Mexico

Well was drilled under Permit No. R A 3120 and is located in the 5 E. ¼ ¼ ¼ of Section 15 Twp. 9 S. Rge. 24 E.

(B) Drilling Contractor J. D. Smith License No. WD 278

Street and Number 413 East 23rd.

City Roswell State New Mexico

Drilling was commenced Feb. 14 1959

Drilling was completed Mar 18 1959

Elevation at top of casing in feet above sea level ______ Total depth of well ______

State whether well is shallow or artesian ______ Depth to water upon completion ______

Section 2

PRINCIPAL WATER-BEARING STRATA

No.	Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation
1				Not obtainable Due to nature of repair performed.
2				
3				
4				
5				

Section 3

RECORD OF CASING

Dia in.	Pounds ft.	Threads in	Depth Top	Depth Bottom	Feet	Type Shoe	Perforations From	Perforations To
~~13 3/8~~	~~48~~	~~8~~	~~0~~	~~106~~	~~106~~	~~Reg.~~	~~None~~	
10 3/4	32.75	8	100	360	260	"	"	
8 5/8	32	8	245	365	120	"	"	
7	22	8	170	380	210	"	"	

Section 4

RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Diameter Hole in in.	Tons Clay	No. Sacks of Cement	Methods Used

Section 5

PLUGGING RECORD

Name of Plugging Contractor ______ License No. ______

Street and Number ______ City ______ State ______

Tons of Clay used ______ Tons of Roughage used ______ Type of roughage ______

Plugging method used ______ Date Plugged ______ 19___

Plugging approved by:

______
Basin Supervisor

Cement Plugs were placed as follows:

No.	Depth of Plug From	Depth of Plug To	No. of Sacks Used

FOR USE OF STATE ENGINEER ONLY

Date Received FILED MAY 26 1959 OFFICE GROUND WATER ... ROSWELL, NEW MEX.

File No. RA-3120 Use Oil Location No. 9.24.15.424

Section 6

LOG OF WELL

Depth in Feet		Thickness in Feet	Color	Type of Material Encountered
From	To			

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above described well.

J. D. Smith
Well Driller
J.D. Smith

On this well I set & Cemented 210 ft. 7 in. o.o. liner @ 380 suspended by gravel & Calseal plug w/ 25 sks. Neat Cement. Waited 72 hrs. then cleaned out hole below liner, to depth of 425 also set Carrigan Wedge type Lead seals @ 100 ft. & @ 170 ft., Well checked for leakage via Bailer test. Test O.K.

This was a salt water shut off.