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Additional Investigation and Closure Activities at the Transwestern Pipeline Company Atoka 1 Compressor Station Artesia, New Mexico

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at the
Transwestern Pipeline Company

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This report was prepared in accordance with the standards of the environmental consulting industry at the time it was prepared. It should not be relied upon by parties other than those for whom it was prepared, and then only to the extent of the scope of work which was authorized. This report does not guarantee that no additional environmental contamination beyond that described in this report exists at the site.

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CHAPTER 1

INTRODUCTION

The following section presents a brief discussion of the project objectives and scope of work. In addition, a brief description of the site is given along with a description of a previous investigation.

Project Objectives

In the "Work Plan/Closure Plan for Atoka 1 Compressor Station," dated August 29, 1994, Brown and Caldwell defined the project objectives as follows:

1) determine the vertical and horizontal extent of impacted soil and ground water at and adjacent to the Atoka 1 facility,
2) close the former concrete-lined surface impoundment, and
3) collect soil and ground water information necessary to evaluate remediation/closure alternatives for potentially impacted soil and groundwater at the facility.

Scope of Work

On September 28, 1994, the New Mexico Oil Conservation Division (NMOCD) approved the above referenced work plan, with some exceptions. In accordance with the approved work plan, Brown and Caldwell completed the removal, overexcavation, and sampling of the former concrete-lined surface impoundment and the installation and sampling of five soil borings, with two of the borings being completed as permanent monitoring wells. In addition to the approved work plan, Brown and Caldwell installed and collected samples from six more soil borings, of which two were completed as permanent monitoring wells. A description of the field activities conducted during the performance of this work plan is discussed in the subsequent sections of this report.

Site Description

The Transwestern Pipeline Company's (Transwestern) Atoka 1 Compressor Station (facility) is located approximately 10 miles southeast of Artesia, New Mexico. The site occupies approximately 1.5 acres in the NE/4, NE/4 of Section 1, Township 18 South, Range 27 East. The parcel on which the facility lies is leased from the US Department of the Interior Bureau of Land Management (BLM). A topographic map showing the location of the facility is presented as Figure 1.

In general, the facility consists of five compressor units and their associated piping, a control building, a dehydrator unit, and various aboveground storage tanks (ASTs). Prior to recent closure activities, a concrete-lined surface impoundment was also present at the facility. A site plan which illustrates the layout of various structures at the facility is presented as Figure 2.

Previous Investigation

During June and July of 1993, a preliminary subsurface investigation was conducted to assess potential impact from the concrete-lined surface impoundment at the facility. Brown & Root Environmental drilled twelve soil borings, subsequently, four were completed as monitoring wells. A site map displaying the boring and well locations is included as Figure 3. The following sections describe the results of that investigation.

Site Hydrogeology. Ground water levels and recharge rates in the wells varied. Ground water was encountered during drilling at depths ranging from 47 to 63 feet below ground surface (bgs). After well stabilization, the levels varied significantly, ranging from 36 to 60 feet bgs or from 31.56 to 58.45 feet in elevation.

Ground water recharge also varied considerably. Three of the four monitoring wells were bailed dry. Monitoring wells MW-1 and MW-4 recharged very slowly, on the order of days, and monitoring well MW-3 required several hours to recharge. Monitoring well MW-2 could not be bailed dry.

Soil Impact. Soil samples sent to the laboratory were analyzed for total petroleum hydrocarbons (TPH) using EPA Method 418.1. Soil samples collected from Borings AT1-1 though AT1-6 were analyzed for volatile organics using EPA Method 8240 and semivolatile organics using EPA Method 8270. Soil samples collected from borings AT1-7 though AT1-10 were analyzed for benzene, toluene, ethylbenzene, and xylene (BTEX) using EPA Method 8020.

The near surface (less than 20 feet bgs) soils near the historical bermed pipeline petroleum hydrocarbon liquids tank area appear to be impacted. Subsurface soil samples collected from boring AT1-4 detected volatile organic constituents ethylbenzene, toluene, and xylene at concentrations of 6.2 mg/kg, 1 mg/kg, and 40 mg/kg, respectively. The detection limits on the other volatile organic constituents analyzed for, in that sample, were elevated due to matrix interference. TPH was detected at 410 mg/kg and bis(2-Ethylhexyl)phthalate, a semivolatile compound, was detected at 1.5 mg/kg.

Deeper subsurface soil (greater than 20 feet bgs) impact is indicated from laboratory analytical and field screening results from soil samples collected from borings AT1-2 and AT1-7, located west of the concrete-lined surface impoundment. The sample collected from the 32 to 34 foot interval bgs in boring AT1-2 detected ethylbenzene, toluene, and xylenes at concentrations of 0.97 mg/kg, 30 mg/kg, and 40 mg/kg, respectively. The detection limits on the other volatile organic constituents analyzed for, in that sample, were elevated due to matrix interference. The sample collected from the 47 to 48.5 foot bgs interval in boring AT1-7 detected benzene, toluene, ethylbenzene, and xylene at concentrations of 2 mg/kg, 1.7 mg/kg, 6.7 mg/kg, and 12.3 mg/kg, respectively. TPH was detected at concentrations of 4,400 mg/kg and 150 mg/kg, respectively.

Ground Water Impact. Ground water samples were analyzed for TPH by EPA Method 418.1 and total dissolved solids (TDS) using EPA Method 160.1. Ground water from monitor well MW-1 (AT1-2W) was sampled for volatile organics using EPA Method 8240 and semivolatile organics using EPA Method 8270. The other three wells were analyzed for BTEX constituents only using EPA Method 8020.

Phase separated hydrocarbons (PSH) were observed in MW-1. Because of the PSH, TPH and BTEX concentrations in ground water collected from that well were elevated. The ground water sample collected from monitor well MW-2 (boring AT1-7) detected TPH and benzene, toluene, ethylbenzene and xylene at concentrations of 12 mg/L, 3.6 mg/L, 0.4 mg/L, 9.8 mg/L, and 3.17 mg/L, respectively. Monitor well MW-4 (boring AT1-3), located west of the concrete-lined surface impoundment, detected TPH and benzene, toluene, ethylbenzene and xylene at concentrations of 0.6 mg/L, 0.061 mg/L, 0.004 mg/L, 0.020 mg/L, and 0.068 mg/L, respectively. Monitor well MW-3 detected TPH, benzene, and toluene at concentrations of 1.1 mg/L, 0.007 mg/L, and 0.006 mg/L, respectively.

TDS concentrations ranged from 4,600 mg/L in monitor well MW-4 to 7,700 mg/L in the monitor well containing PSH (MW-1).

CHAPTER 2

CONCRETE-LINED SURFACE IMPOUNDMENT CLOSURE

The following is a discussion of the removal of the concrete-lined surface impoundment, the initial excavation of hydrocarbon-affected soils from the surface impoundment, the expanded excavation of the surface impoundment, and excavation of soils in the area of the previous soil boring AT1-4. Verification sampling and disposition of the materials related to the closure of the surface impoundment will also be discussed.

Removal of the Surface Impoundment

On October 12, 1994, the surface impoundment was removed. Approximately two feet of residual material (solids, liquids, and sludge) had remained in the surface impoundment. The solids and sludge were removed with shovels and a backhoe. A bermed area was constructed and lined with heavy-gauge plastic for the storage of the solid and sludge material. This material was placed in the bermed area and covered with plastic.

Following the removal of the residual material, a backhoe and dozer were used to remove the concrete lining of the surface impoundment. The waste concrete was placed on plastic to await disposal.

Initial Excavation and Sampling of Surface Impoundment Soils

During the removal of concrete, stained soils were observed behind each wall and beneath the floor of the surface impoundment. An initial excavation using a track hoe, was conducted to remove the stained soil from each wall and the floor of the surface impoundment area. After stained soils were removed, soil samples from the floor and each wall of the excavation were collected for field screening and laboratory analysis to determine if the overexcavation of soils should be continued.

The soil samples were screened using the ambient temperature headspace (ATH) method to measure total volatile organic compounds (VOCs), the PETRO RISc® immunoassay test kits from ENSYS, Inc. for measuring total petroleum hydrocarbons (TPH), General Analysis Corporation (GAC) TPH test kits, or a combination of these methods.

The ATH method of field screening is accomplished by placing a portion of a soil sample in a resealable plastic bag. The soil sample in the bag is allowed to remain undisturbed for approximately five minutes at temperatures of at least 60 degrees Fahrenheit, which allows for

the accumulation of volatile organic compounds (VOCs). After five minutes, the sample is shaken vigorously for approximately one minute, the probe of a photoionization detector (PID) or a flame ionization detector (FID) is inserted into the bag and a measurement of the concentration of VOCs is taken.

Immunoassay test kits use antibodies to detect the presence of hydrocarbon compounds in a methanol extraction solution obtained from soil samples. The extraction solution is placed in a test tube, coated with a particular antibody, producing a color change in the presence of hydrocarbon compounds. The relative concentration of hydrocarbons is measured by comparing the color of the sample with a calibrated color chart or using a portable photometer. The PETRO RISc® test kit for soil conforms to EPA Method 4030.

The GAC test kit for the analysis of TPH uses a process similar to EPA Method 418.1. Freon is used to extract hydrocarbons from a soil sample. The extraction solution is then analyzed by IR spectrophotometry to determine the concentration of TPH in the soil sample.

Following the initial excavation of stained soils from the surface impoundment, a total of seven confirmation soil samples were collected from the floor and walls of the excavation. The soil samples were collected using a trackhoe to obtain soil from the excavation and a clean stainless steel trowel to transfer soil from the trackhoe into a laboratory-supplied container. The soil samples collected from the surface impoundment excavation on October 13, 1994 were labelled, packed on ice, and delivered to Environmental Lab of Texas in Odessa, Texas using chain-of-custody procedures. The confirmation soil samples were analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX) by EPA Method 8020 and TPH by EPA Method 418.1.

Laboratory analytical results of the confirmation soil samples indicated that TPH concentrations ranged from 55 milligrams per kilogram (mg/kg) in SINW-1-9, collected at a depth of approximately 9 feet from the north wall of the excavation, to 5,284 mg/kg in sample SISW-1-9, collected at a depth of approximately 9 feet from the south wall of the excavation. The locations and analytical results of these initial confirmation samples are shown on Figure 4. In addition, total BTEX concentrations were reported to range from below the laboratory detection limits (0.60 mg/kg for total BTEX) in samples SIEW-1-6, SIEW-1-9, SINW-1-6, and SINW-1-9 to as much as 284 mg/kg in sample SIWW-1-9. Benzene was reported to be below the laboratory detection limit of 0.10 mg/kg in each sample. A summary of the analytical results for these confirmation soil samples is presented in Table 1. The laboratory analytical results and chain of custody forms are included in Appendix B.

Based on the laboratory analytical results of these confirmation samples, three small trenches were excavated to assist in determining the vertical and horizontal extent of hydrocarbon impacted soils in the vicinity of the surface impoundment excavation. One trench was located to the northwest, one to the southwest, and one to the southeast of the surface impoundment excavation. Trench locations are shown on Figure 5. Soil samples were field screened during trenching to determine the possible horizontal extent of the hydrocarbon impacted soils to determine the collection of confirmation samples. One confirmation soil sample for laboratory analysis was collected from each of the three trenches on October 15, 1994. The soil samples were labelled, packed on ice, and shipped by overnight delivery to Terra Laboratories, Inc. using chain-of-custody procedures. The confirmation soil samples were analyzed for BTEX using EPA Method 8020 and TPH using EPA Method 418.1.

Laboratory analytical results of trench confirmation samples, shown on Figure 5, indicated that TPH concentrations ranged from 28 mg/kg in sample SWT-1-10, collected from the wall of the southwest trench, to 33 mg/kg, in samples SET-1-10 and MT-2-10, collected from the wall of the southeast and northwest trench; respectively. In addition, each BTEX constituent was reported to be below the respective laboratory detection limits. A summary of the analytical results for these confirmation soil samples is presented in Table 2. The laboratory analytical results and chain of custody forms are included in Appendix B.

Expanded Excavation of Surface Impoundment Soils

Based on the laboratory analytical results for the confirmation samples, the surface impoundment excavation was expanded horizontally and vertically.

On November 20, 1995, at the conclusion of overexcavation activities, an additional seven confirmation samples were collected from the walls and floor of the excavation. The soil samples were collected and packed in the same manner as the previous soil samples, and shipped by overnight delivery to Terra Laboratories, Ltd. using chain-of-custody procedures. The soil samples were analyzed for BTEX using EPA Method 8020 and TPH using EPA Method 418.1.

Based on the laboratory analytical results TPH and BTEX constituents were detected in samples I-3 (west floor), I-4 (east wall), I-5 (east floor), and I-6 (south wall) only. Concentrations of TPH ranged from 270 mg/kg in sample I-6 to 3,900 mg/kg in sample I-3. Concentrations of total BTEX ranged from 81.6 mg/kg in sample I-3 to 0.013 mg/kg in sample I-6. Benzene concentrations were reported to be below the laboratory detection limit in each sample. The expanded excavation is shown on Figure 6. An enlarged view of the final excavation area along with the confirmation sample locations are shown on Figure 7. A

summary of the analytical results for these confirmation samples is presented in Table 3. The laboratory analytical results and chain of custody forms are included in Appendix D.

The final excavation of the surface impoundment covered an area of approximately 2,300 square feet and 12 to 14 feet in depth. A total of approximately 1,100 cubic yards of soil was excavated.

Overexcavation and Sampling of Soils in the Area of the Previous Boring AT1-4

In addition to the overexcavation of soils at the concrete-lined surface impoundment, soils were excavated from an area near the previous soil boring AT1-4. The excavation of soils, field screening methods, and the collection of confirmation soil samples were conducted the same as the overexcavation activities at the surface impoundment. The soil samples were labelled, packed, and shipped to Terra Laboratories, Ltd., in the same manner as the confirmation samples collected from the surface impoundment excavation. The confirmation samples were analyzed for BTEX by EPA Method 8020 and TPH by EPA Method 418.1.

Laboratory analytical results for the confirmation samples collected on October 15, 1994 indicated that TPH concentrations ranged from below the laboratory detection limit of 25 mg/kg in samples AT4-WT1-9 (western edge of excavation) and AT4-SW-9 (south wall of excavation) to 25,000 mg/kg in sample AT4-EW-9 (east wall of excavation). Concentrations of total BTEX ranged from below the laboratory detection limits in samples AT4-WT1-9 and AT4-SW-9 to 165 mg/kg in sample AT4-EW-9. Laboratory analytical results for these confirmation samples are presented in Table 4. The location and approximate size of the final excavated area is shown on Figure 6. Figure 8 displays the locations of the samples collected and the analytical results. The laboratory analytical reports and chain-of-custody documents are included in Appendix E.

Based on the laboratory analytical results of the confirmation samples, the excavation was expanded to the east and additional soil was removed from the floor. On November 20, 1995, following the overexcavation conducted on the basis of field screening results, an additional five confirmation samples were collected from the east wall, near the corners of the east wall, and from the floor of the excavation. The soil samples were collected, screened, labelled, packed, and shipped to Terra Laboratories, Ltd. in the same manner as previously described. The soil samples were analyzed for BTEX by EPA Method 8020 and TPH by EPA Method 418.1.

Figure 8 also shows the confirmation samples and analytical results of the expanded excavation confirmation samples. Laboratory analytical results indicated that TPH was detected in samples B-4 (east wall) and B-6 (east floor) only at concentrations of 25 mg/kg in B-6 and

870 mg/kg in sample B-4. BTEX constituents were detected in sample B-4 only. Toluene was the only constituent detected and was reported at a concentration of 0.019 mg/kg. Laboratory analytical results for these confirmation samples are presented in Table 5. The laboratory analytical reports and chain of custody documents are included in Appendix F.

The final excavation covered an aerial extent of approximately 1,800 square feet and varied in depth from approximately 10 feet on the west end to approximately 18 feet on the east end. A total of approximately 900 cubic yards of soil was excavated.

Disposition of Soils and Concrete

The waste concrete from the demolition of the surface impoundment was stockpiled on plastic to await the conclusion of excavation activities. Soils generated from the excavations at the impoundment and AT1-4 areas were also stockpiled on plastic. At the conclusion of excavation activities, the waste concrete was placed in the bottom of the two excavated areas.

During the excavation of the surface impoundment and AT1-4 areas, one composite sample was collected from the stockpiled soils. The composite sample was collected by obtaining soil from each stockpile. In addition, after approval was obtained from the New Mexico Oil Conservation Division (NMOCD), the stockpiled soils (approximately 2,000 cubic yards) were shredded, mixed with water and fertilizer, and used as backfill for the two excavated areas.

CHAPTER 3

SOIL INVESTIGATION

This section presents results of the soil investigation conducted at the facility.

Regional Geology and Hydrogeology

The Atoka 1 Compressor Station is located in the Pecos Valley section of the Southern High Plains physiographic province. The area is characterized by broad plains and rolling hills with transecting bluffs and shallow river valleys. The site is situated atop Quaternary sedimentary deposits overlying formations of the Artesia Group of Permian age.

The Artesia Group is positioned stratigraphically above the San Andres limestone and is composed of carbonate, sandstone and evaporite strata. The units comprising the Artesia Group, from youngest to oldest, are the Tansil Formation, Yates Sandstone, Seven Rivers Formation, Queen Formation, and the Grayburg Formation. Both the Artesia Group and the underlying San Andres Limestone were deposited along the shelves associated with the Delaware Basin. Evaporite sequences were generally deposited along the distal portions of the shelves during the early Guadalupian and encroached toward the reefs associated with the basins during the late Guadalupian, denoting the impending end of the inland sea in the region.

Information regarding major and/or minor aquifers in the area was not available for this report.

Site Geology and Hydrogeology

Based on the eleven soil borings drilled for this investigation and a previous investigation, native soils beneath the facility consist of a predominantly tan cover of mixed sand, silt, clay, and gravel from ground surface to as much as two feet below grade. This mixed cover is underlain by a tan to sometimes pink, unconsolidated to semiconsolidated silt to as much as 29 feet below grade. This silt contains abundant gravel. Underlying the silt, a discontinuous, reddish-brown, semiconsolidated to consolidated sand and sandstone was encountered in some of the soil borings. Below the sand and sandstone, a reddish brown clay interbedded with gypsum and anhydrite was encountered to total depth.

During this assessment, water was only encountered in borings drilled near the south fenceline and to the southwest of the facility. However, when present, water was typically encountered at depths of 29 to 46 feet. The water-bearing zone encountered during this

investigation was typically a reddish-brown sand which contains large amounts of silt and clay. Figure 9 shows the locations of the eleven newly drilled soil borings. Figure 10 shows the locations of three cross-sections, two north-south cross-sections and one west-east cross-section, which are shown as Figures 11-13. Water levels and OVM results are also shown on the cross-sections.

Water at and surrounding the facility appears to be in discontinuous perched zones. Water was encountered and measured at various elevations in the previously installed and newly installed monitoring wells. In addition, water was not encountered in several of the soil borings drilled during this investigation. A hydraulic gradient was therefore not calculated. However, due to the presence of hydrocarbons in monitoring wells located southwest of the site, it is assumed that water beneath the facility flows in a southwesterly direction.

Drilling and Sampling of Soil Borings

During November 15 through December 8, Brown and Caldwell drilled and sampled eleven soil borings. The soil borings were drilled using air rotary drilling techniques and were sampled using a 2-foot split spoon sampler or a 10-foot NX-sized core barrel. In soil boring AT1-11, soil samples were first collected with the split-spoon sampler at 10-foot intervals from ground surface to 28 feet. Then the boring was continuously sampled with the core barrel to 65 feet. The core barrel was then used to collect samples at 10-foot intervals to total depth. Each of the other ten soil borings were typically sampled on 10-foot intervals from ground surface to total depth. Borings AT1-12 and AT1-13 were sampled with a split-spoon sampler until refusal was encountered. At that point the borings were sampled using the core barrel to total depth. The remaining soil borings were sampled with the core barrel from ground surface to total depth. The locations of the soil borings are shown on Figure 9. Collected soil samples and visually inspected drill cuttings were used to construct boring logs. Boring logs for each soil boring are presented in Appendix A.

Each soil sample collected was split into two portions. The first portion was placed into a sealed plastic bag and placed on ice. The other half of the sample was placed in a sealed plastic bag and set aside for approximately five minutes to allow for the accumulation of any volatile organic compounds (VOCs) in the headspace of the bag. The soil sample in the plastic bag was then screened using the probe of a flame ionization detector (FID) to pierce the bag and obtain a headspace measurement of VOCs. The headspace readings are shown on the soil boring logs located in Appendix A.

Soil samples were selected for laboratory analysis based on field screening and visual inspection. In the soil borings where water was not encountered, the sample with the highest FID reading and the sample from the bottom of the boring were submitted for laboratory analysis. In the soil borings where water was encountered, the sample from the capillary fringe and the sample with the highest FID reading were submitted for laboratory analysis.

Following the completion of soil sampling activities, the samples selected for laboratory analysis, accompanied by trip blanks, were shipped to Terra Laboratories, Ltd. in League City by overnight delivery using chain of custody protocol. The soil samples were analyzed for BTEX using EPA Method 8020 and TPH using EPA Method 418.1.

Downhole equipment was steam cleaned prior to drilling and between each soil boring. Sampling equipment used by Brown and Caldwell was cleaned prior to the collection of each sample by washing with a mixture of tap water and a laboratory-grade detergent, rinsing with tap water, and a final rinse with distilled water.

Analytical Results For Soil Samples

As shown on Table 6, benzene was detected in several of the soil samples collected from the newly drilled soil borings. Concentrations of benzene ranged from 0.008 milligrams per kilogram (mg/kg) in sample AT1-13-9, collected from boring AT1-13 at a depth interval of 99 to 101 feet below ground surface to 0.088 mg/kg in sample AT1-11-10, collected from soil boring AT1-11 at a depth interval of 61 to 65 feet below ground surface. Benzene was reported to be below laboratory detection limits in samples AT1-11-14, AT1-14-7, AT1-16-2, AT1-16-4, AT1-17-3, AT1-17-4 AT1-18-9, and AT1-18-11.

Total BTEX concentrations ranged from below the laboratory detection limits for each constituent in samples AT1-11-14, AT1-16-2, AT1-16-4, and AT1-17-3 to 10.39 mg/kg in sample AT1-18-9 collected from a depth interval of 79 to 81 feet below ground surface.

Concentrations of (TPH), above the laboratory detection limit, were reported in samples AT1-11-10, AT1-11-14, AT1-17-4, and AT1-18-9 only. Concentrations ranged from 41 mg/kg in sample AT1-11-14 to 170 mg/kg in sample AT1-18-9.

A summary of the laboratory analytical results for soil samples, including the sampling depth intervals, is presented in Table 6. The laboratory analytical results for the trip blanks are also included in Table 6. The laboratory analytical reports for soil samples and associated trip blanks are presented in Appendix G.

CHAPTER 4

WATER INVESTIGATION

The following section describes the procedures and results of the water investigation conducted at the facility.

Installation and Development of Monitoring Wells

After completion of soil sampling activities, soil borings AT1-14, AT1-15, AT1-16, and AT1-17 were completed as permanent monitoring wells. Each monitoring well was completed by placing 2-inch-diameter PVC well screen (0.010 slot) into the boring followed by 2-inch-diameter PVC casing to the surface. The length of the screened interval varied with each monitoring well. A filter pack composed of clean No. 2 blasting sand was added to the annulus to approximately 2 feet above the top of the well screen. Above the top of the filter pack, approximately 2 feet of bentonite pellets were added to the annulus and hydrated to form a seal. A cement/bentonite grout slurry was then added to the annulus to near ground surface. A flush-mounted surface completion was constructed for each of the monitoring wells. The location of the newly installed monitoring wells, as well as the previously existing monitoring wells, and the measured water elevations are shown on Figure 14. Water was not encountered in borings ATI-11, ATI-12, ATI-13, ATI-18, ATI-19, ATI-20, and ATI-21. The locations of these "dry" borings are also shown as Figure 9 and Figure 14. Well construction details for the newly installed monitoring wells are shown on the boring logs presented in Appendix F.

The depth to water in each of the newly installed monitoring wells was measured with an oil/water interface probe to the nearest 0.01 foot and recorded. It should be noted that no water was observed in MW-8 after its installation. However, water had accumulated in the well by January 4, 1995. Cumulative water elevation data is presented in Table 7.

The depth to water measurements were used to calculate approximate well volumes for each monitoring well. Each of the newly installed monitoring wells, with the exception of MW-8, was developed with a dedicated, disposable bailer to remove fine sediments. Water was removed from each well until the fine sediments were removed, it was determined that further development would not improve the clarity of the water, or the well bailed dry. MW-8 was not developed.

Purging and Sampling of Monitoring Wells

Prior to purging, depth to water measurements were obtained from the previously existing monitoring wells and the newly installed monitoring wells. Phase-separated hydrocarbons (PSH) were observed in monitoring wells MW-1 and MW-2 at thicknesses of 0.7 feet and 0.04 feet,

respectively. The depth to water measurements were used to determine well volumes for monitoring wells MW-3, MW-4, MW-5, MW-6, and MW-7.

Purging was accomplished by manual bailing with dedicated, disposable bailers. Water was removed from each well until stability was achieved, or the well bailed dry. Stability was determined by field testing the pH, temperature, and specific conductance of the water during purging. After approximately one well volume was removed, a measurement was taken of the pH, temperature, and specific conductance. Subsequent measurements of each parameter were made until the measurement for each parameter was within 5% of the previous measurement. Purging was terminated and water samples were collected.

Water samples were obtained by lowering a dedicated, disposable bailer into each well. The water samples were immediately placed in laboratory-supplied containers and placed on ice. Following the completion of water sampling activities, the samples, accompanied by trip blanks, were shipped to Terra Laboratories, Ltd. in League City by overnight delivery using chain of custody protocol.

On January 4, 1995, water was observed in monitoring well MW-8. Due to the well initially being dry after installation and not recharging for over a week, the well was not purged. However, on January 7, 1995, a sample was collected for laboratory analysis. A water sample was collected from MW-8 using the procedures described above.

In addition to the water samples collected, a sample of the PSH observed in monitoring well MW-1 was collected for laboratory analysis. MW-1 was first purged of the existing PSH, and allowed to remain undisturbed until enough PSH was present in the well to obtain a sample. Removal of the PSH and sampling was conducted by lowering a dedicated, disposable bailer into the well. The PSH sample was immediately placed into laboratory-supplied containers and placed on ice. The sample was packed and shipped using appropriate procedures for the shipment of hazardous materials, and delivered by overnight delivery to Core Laboratories, Inc. in Houston, Texas.

Water samples collected for laboratory analysis were analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX) by EPA Method 8020, polynuclear aromatic hydrocarbons (PAHs) by EPA Method 8270, total metals (RCRA list) by EPA Methods 6010 and 7470, and major cations and ions. The water sample obtained from MW-8 was also analyzed for total dissolved solids (TDS) using EPA Method 160.1.

Analytical Results For Water Samples

As shown in Table 8 and on Figure 15, concentrations of benzene above the laboratory detection limits were reported in the samples from each of the monitoring wells except MW-8 which was reported to be below detection limits for each BTEX constituent. Concentrations ranged from 0.014 milligrams per liter (mg/L) in the sample from MW-3 to 6.2 mg/L in the sample from MW-5. Total BTEX concentrations ranged from 0.014 mg/L in MW-3 to 27.7 mg/L in MW-5.

No PAHs were reported to be above the laboratory detection limit of 0.010 mg/L in any of the water samples collected. Barium was the only metal reported to be above laboratory detection limits. It was reported in each water sample collected. Concentrations ranged from 0.04 mg/L in samples MW-3 and MW-4 to 1.2 mg/L in sample MW-7.

As shown in Table 8, concentrations of calcium ranged from 210 mg/L in MW-6 to 740 mg/L in MW-4. Concentrations of magnesium ranged from 100 mg/L in MW-6 to 550 mg/L in MW-5. Concentrations of potassium ranged from 1.7 mg/L in MW-7 to 8.5 mg/L in MW-3. Concentrations of sodium ranged from 200 mg/L in MW-7 to 580 mg/L in MW-8. Concentrations of chloride ranged from 170 mg/L in MW-4 to 610 mg/L in MW-8, and concentrations of sulfate ranged from 940 mg/L in MW-6 to 4,900 mg/L in MW-3.

As shown in Table 8, TDS was reported in the sample from MW-8 at a concentration of 4,800 mg/L.

A summary of the laboratory analysis for groundwater samples reported above, including associated trip blanks, is presented in Table 8. A summary of the laboratory analysis of major cations and ions is also included in Table 8. The laboratory analytical reports and chain of custody documents are presented in Appendix H.

A capillary analysis of PSH collected from MW-1 was also performed. The following is a breakdown of composition based on percentage of the liquid volume (LV%):

paraffins	=	16.89 LV%
naphthenes	=	38.11 LV%
aromatics	=	8.01 LV%
isoparaffins	=	33.70 LV%
olefins	=	0.00 LV%
unidentified	=	3.29 LV%
total	=	100.0 LV%

Based on laboratory analysis, the PSH was identified by Core Laboratories as being characteristic of natural gas condensate. The laboratory analytical report and chain of custody document for the PSH sample are included in Appendix I.

CHAPTER 5

CONCLUSIONS

Based on the information collected during the performance of the concrete-lined surface impoundment closure activities, and the soil and water investigation, Brown and Caldwell presents the following conclusions:

1) Shallow soils at the site consist of light brown to white caliche, silts and sandstone while deeper soils consist mainly of a reddish brown, dense clay interbedded with gypsum and anhydride.

2) Benzene was below 10 mg/kg, total BTEX was below 50 mg/kg, and TPH was below 1,000 mg/kg as indicated by laboratory analysis of final confirmation samples collected from the former surface impoundment excavation.

3) Benzene was below 10 mg/kg, total BTEX was below 50 mg/kg, and TPH was below 1,000 mg/kg in samples collected from the west wall, south wall, and east wall from the area near the previous boring AT1-4 excavation.

4) Benzene was reported to be below 10 mg/kg in the sample collected from the north wall of the excavation in the area of previous boring AT1-4; however, total BTEX was reported to be 165 mg/kg, and TPH was reported at a concentration of 25,000 mg/kg. The excavation of the north wall was halted to prevent undermining an existing containment wall.

5) Detectable concentrations of hydrocarbons were present in deeper soils on the adjacent property to the south of the site and to the west of the AST containment area and north of the Compressor Buildings No. 3 and No. 4 on-site as indicated by laboratory analysis of soil samples collected from the soil drilled during this investigation.

6) There are discontinuous, perched water-bearing zones located beneath the facility based on water elevations observed in the monitoring wells located on-site and on the adjacent property.

7) PSH was observed in monitoring wells MW-1 and MW-2 at thicknesses of 0.7 feet and 0.04 feet, respectively.

8) Hydrocarbon constituents are present in each of the monitoring wells located on-site and on the adjacent property to the south of the facility as indicated by laboratory analysis of water samples, except well MW-8. Monitoring well MW-5, located on site near the southwest corner of the facility, reported the highest concentrations of BTEX constituents.

9) No PAHs above laboratory detection limits were reported in any of the water samples collected for analysis.

10) The PSH sample collected from monitoring well MW-1 indicated that the liquid composition is typical of natural gas condensate as indicated by laboratory analysis.

TABLES

TABLE 1

Laboratory Analytical Results for Initial Confirmation Soil Samples-Surface Impoundment Excavation

Transwestern Pipeline Company
Atoka 1 Compressor Station
Artesia, New Mexico

Sample ID	Description	Date	TPH - 418.1 (mg/kg)	BTEX - 8020 (mg/kg)			
				Benzene	Toluene	Ethylbenzene	Xylenes
SIEW-1-6	Surface impoundment; approximately 6 feet down on the east wall.	10/13/94	209	<0.1	<0.1	<0.1	<0.3
SIEW-1-9	Surface impoundment, approximately 9 feet down on the east wall.	10/13/94	932	<0.1	<0.1	<0.1	<0.3
SINW-1-6	Surface impoundment; approximately 6 feet down on the north wall.	10/13/94	73	<0.1	<0.1	<0.1	<0.3
SINW-1-9	Surface impoundment; approximately 9 feet down on the north wall.	10/13/94	55	<0.1	<0.1	<0.1	<0.3
SISW-1-9	Surface impoundment; approximately 9 feet down on the south wall.	10/13/94	5,284	<0.1	<0.1	12.2	132.4
SIWW-1-9	Surface impoundment; approximately 9 feet down on the west wall.	10/13/94	3,894	<0.1	81.8	20.5	181.7
SIFM-1-10	Surface impoundment; from near the southeast corner of the excavation floor.	10/13/94	4,118	<0.1	<0.1	9.6	103.4

TABLE 2

Laboratory Analytical Results for Trench Samples

Transwestern Pipeline Company
Atoka 1 Compressor Station
Artesia, New Mexico

Sample ID	Description	Date	TPH - 418.1 (mg/kg)	BTEX - 8020 (mg/kg)			
				Benzene	Toluene	Ethylbenzene	Xylenes
MT-2-10	Surface impoundment; approximately 10 feet down Trench MT	10/15/94	33	<0.1	<0.1	<0.1	<0.3
SET-3-10	Surface impoundment; approximately 10 feet down in Trench SET	10/15/94	33	<0.1	<0.1	<0.1	<0.3
SWT-1-10	AT1-4 area; approx. 10 feet down in Trench SWT	10/15/94	28	<0.1	<0.1	<0.1	<0.3

TABLE 3

Laboratory Analytical Results for Final Confirmation Soil Samples-Surface Impoundment Excavation

Transwestern Pipeline Company
Atoka 1 Compressor Station
Artesia, New Mexico

Sample ID	Description	Date	TPH - 418.1 mg/kg	BTEX - 8020 (mg/kg)			
				Benzene	Toluene	Ethylbenzene	Xylenes
I-1	Surface impoundment; approximately 10-12 feet down on west wall	11/20/94	<25	<0.005	<0.005	<0.005	<0.010
I-2	Surface impoundment; approximately 10-12 feet down on north wall	11/20/94	<25	<0.005	<0.005	<0.005	<0.010
I-3	Surface impoundment; from floor, near west side	11/20/94	3900	<2.0	3.6	7	71
I-4	Surface impoundment; approximately 10-12 down on east wall	11/20/94	370	<0.005	0.01	0.017	0.23
I-5	Surface impoundment; from floor near east side	11/20/94	2,100	<0.10	0.45	0.33	4.1
I-6	Surface impoundment; approximately 10-12 feet down on south wall	11/20/94	270	<0.005	<0.005	<0.005	0.013
I-8	Surface impoundment; approximately 10-12 feet down SE corner	11/20/94	<25	<0.005	<0.005	<0.005	<0.01

TABLE 4

Laboratory Analytical Results for Initial Confirmation Soil Samples-AT1-4 Excavation

Transwestern Pipeline Company
Atoka 1 Compressor Station
Artesia, New Mexico

Sample ID	Description	Date	TPH - 418.1 (mg/kg)	BTEX - 8020 (mg/kg)			
				Benzene	Toluene	Ethylbenzene	Xylenes
AT4-WT1-9	AT1-4 area; approximately 9 feet down in the west trench of the excavation	10/15/94	<25	<0.01	<0.01	<0.01	<0.03
AT4-SW-9	AT1-4 area; approximately 9 feet down on south wall	10/15/94	<25	<0.02	<0.02	<0.02	<0.06
AT4-FM-11	AT1-4 area; approximately 11 feet down near center of floor	10/15/94	2,700	<4.0	18	8	69
AT4-EW-9	AT1-4 area; approximately 9 feet down on the east wall	10/15/94	25,000	<4.0	41	14	110
AT4-NW-9	AT1-4 area; approximately 9 feet down on the north wall	10/15/94	3,100	<4.0	26	11	93

TABLE 5

Laboratory Analytical Results for Final Confirmation Soil Samples-AT1-4 Excavation

Transwestern Pipeline Company
Atoka 1 Compressor Station
Artesia, New Mexico

Sample ID	Description	Date	TPH - 418.1 (mg/kg)	BTEX - 8020 (mg/kg)			
				Benzene	Toluene	Ethylbenzene	Xylenes
B-2	AT1-4 area; approximately 10-12 feet down in north corner	11/20/94	<25	<0.005	<0.005	<0.005	<0.01
B-3	AT1-4 area; approximately 10-12 feet down on east wall	11/20/94	<25	<0.005	<0.005	<0.005	<0.01
B-4	AT1-4 area; approximately 10-12 feet down on east wall	11/20/94	830	<0.005	<0.005	<0.005	0.019
B-5	AT1-4 area; approx. 10-12 feet down on south wall	11/20/94	<25	<0.005	<0.005	<0.005	<0.01
B-6	AT1-4 area; from floor near the east wall	11/20/94	25	<0.005	<0.005	<0.005	<0.01
TB-2	Trip Blank	11/20/94	NA	<0.002	<0.002	<0.002	<0.004

TABLE 6

Laboratory Analytical Results for Soil Boring Samples

Transwestern Pipeline Company
Atoka 1 Compressor Station
Artesia, New Mexico

Sample ID	Depth (ft)	Date	TPH - 418.1 mg/kg	BTEX - 8020 mg/kg			
				Benzene	Ethylbenzene	Toluene	Xylenes
AT1-11-10	61-65	11/16/94	130	0.088	<0.005	0.04	<0.021
AT1-11-14	99-101	11/19/94	41	<0.005	<0.005	<0.010	<0.030
AT1-12-9	69-71	11/17/94	<25	0.007	<0.005	<0.005	<0.010
AT1-12-12	99-101	11/17/94	<25	0.055	<0.005	<0.005	<0.010
AT1-13-6	69-71	11/18/94	<25	0.012	<0.005	<0.005	<0.010
AT1-13-9	99-101	11/19/94	<25	0.008	<0.005	<0.005	<0.010
AT1-14-5	49-51	11/20/94	<25	0.015	<0.005	<0.005	<0.010
AT1-14-7	69-71	11/20/94	<25	<0.005	<0.005	0.005	<0.010
AT1-15-4	39-41	11/20/94	<25	0.018	0.009	0.11	0.091
AT1-15-5	49-51	11/21/94	<25	0.032	0.02	0.21	0.23
TB-1	Trip Blank	11/21/94	NA	<0.002	<0.002	<0.002	<0.004
AT1-16-2	19-21	11/29/94	<25	<0.005	<0.005	<0.005	<0.010
AT1-16-4	39-41	11/30/94	<25	<0.005	<0.005	<0.005	<0.011
AT1-17-3	29-31	11/30/94	<25	<0.005	<0.005	<0.005	<0.010
AT1-17-4	39-41	11/30/94	86	<0.020	0.36	0.21	3.1
AT1-18-9	79-81	12/1/94	170	<0.020	1	0.59	8.8
AT1-18-11	99-101	12/2/94	<25	<0.005	0.007	0.003	0.075
TB-3	Trip Blank	12/2/94	NA	<0.002	<0.002	<0.002	<0.004
AT1-19	81-86	1/7/95	140	0.053	0.61	0.071	0.63
AT1-19	110-115	1/7/95	16	<0.010	0.01	<0.010	<0.020
AT1-20	81-86	1/6/95	960	0.052	0.6	0.24	2
AT1-20	96-101	1/6/95	<15	<0.005	0.014	<0.005	<0.010
AT1-21	29-34	1/7/95	18	<0.005	<0.005	<0.005	<0.010
AT1-21	44-49	1/7/95	<15	0.005	0.018	<0.014	<0.042

TABLE 7

Water Elevation Data

Transwestern Pipeline Company
Atoka 1 Compressor Station
Artesia, New Mexico

Monitoring Well ID	Surveyed Top of Casing (ft)	Date Measured	Depth to PSH from TOC (ft)	Depth to Water from TOC (ft)	Water Elevation (ft)	Adjusted Water Elevation (ft)
MW-1	94.68	7/21/93	Unknown	Unknown	Unknown	31.56
	94.65	12/2/94	56.12	56.82	37.83	38.39
MW-2	96.45	7/21/93	---	42.38	54.07	54.07
	96.45	12/2/94	42.31	42.35	54.10	54.13
MW-3	95.00	7/21/93	---	36.55	58.45	58.45
	95.00	12/2/94	---	32.23	62.77	62.77
MW-4	94.02	7/21/93	---	49.92	44.10	44.10
	94.02	12/2/94	---	46.38	47.64	47.64
MW-5	NA	7/21/93	NA	NA	NA	---
	98.22	12/2/94	---	34.40	63.82	63.82
MW-6	NA	7/21/93	NA	NA	NA	---
	99.62	12/2/94	---	36.00	63.62	63.62
MW-7	NA	7/21/93	NA	NA	NA	---
	99.14	12/2/94	---	45.58	53.56	53.56
MW-8	NA	7/21/93	NA	NA	NA	---
	95.98	1/4/95	---	28.70	67.28	67.28

PSH = Phase-separated hydrocarbons.

NA = Not applicable. The indicated monitoring wells were not installed at the time of the July 1993 monitoring event.

Unknown = The previous investigation report indicated the presence of PSH in well MW-2; however, no measurements were given.

Note 1: A correction factor of 0.8 was used in calculating the Adjusted Water Elevations for wells containing PSH.

Note 2: The top of casing elevation for the previously existing monitoring wells were resurveyed along with the newly installed wells.

TABLE 8

Laboratory Analytical Results for Water Samples

Transwestern Pipeline Company
Atoka 1 Compressor Station
Artesia, New Mexico

ANALYTE	Sample Identification							
	MW-3 12/2/94	MW-4 12/2/94	TB-1 12/2/94	MW-5 12/2/94	MW-6 12/2/94	MW-7 12/2/94	TB-2 12/2/94	MW-8 1/3/95
BTEX by EPA Method 8020 (mg/L)								
Benzene	0.014	0.23	<0.002	6.2	0.36	0.62	<0.002	<0.002
Ethylbenzene	<0.002	<0.002	<0.002	1.1	0.05	0.17	<0.002	<0.002
Toluene	<0.002	0.06	<0.002	13	<0.01	1.1	<0.002	<0.002
Xylenes	<0.004	0.13	<0.004	7.4	<0.02	1.1	<0.004	<0.004
Polynuclear Aromatic Hydrocarbons by EPA Method 8270 (mg/L)								
Acenaphthene	<0.010	<0.010	NA	<0.010	<0.010	<0.010	NA	<0.010
Acenaphthylene	<0.010	<0.010	NA	<0.010	<0.010	<0.010	NA	<0.010
Anthracene	<0.010	<0.010	NA	<0.010	<0.010	<0.010	NA	<0.010
Benzo (a) anthracene	<0.010	<0.010	NA	<0.010	<0.010	<0.010	NA	<0.010
Benzo (a) pyrene	<0.010	<0.010	NA	<0.010	<0.010	<0.010	NA	<0.010
Benzo (b) fluoroanthene	<0.010	<0.010	NA	<0.010	<0.010	<0.010	NA	<0.010
Benzo (g,h,i) perylene	<0.010	<0.010	NA	<0.010	<0.010	<0.010	NA	<0.010
Benzo (k) fluoroanthene	<0.010	<0.010	NA	<0.010	<0.010	<0.010	NA	<0.010
Chrysene	<0.010	0.010	NA	<0.010	<0.010	<0.010	NA	<0.010
Dibenz (a,h) anthracene	<0.010	<0.010	NA	<0.010	<0.010	<0.010	NA	<0.010
Fluoroanthene	<0.010	<0.010	NA	<0.010	<0.010	<0.010	NA	<0.010
Fluorene	<0.010	<0.010	NA	<0.010	<0.010	<0.010	NA	<0.010
Indeno (1,2,3-cd) pyrene	<0.010	<0.010	NA	<0.010	<0.010	<0.010	NA	<0.010
Naphthalene	<0.010	<0.010	NA	<0.010	<0.010	<0.010	NA	<0.010
Phenanthrene	<0.010	<0.010	NA	<0.010	<0.010	<0.010	NA	<0.010
Pyrene	<0.010	<0.010	NA	<0.010	<0.010	<0.010	NA	<0.010

mg/L = milligrams per liter

NA = Not analyzed for the indicated parameter.

Note: EPA Method 8270 was used in place of EPA Method 8100 for the analysis of polycyclic aromatic hydrocarbons.

TABLE 8 (cont.)

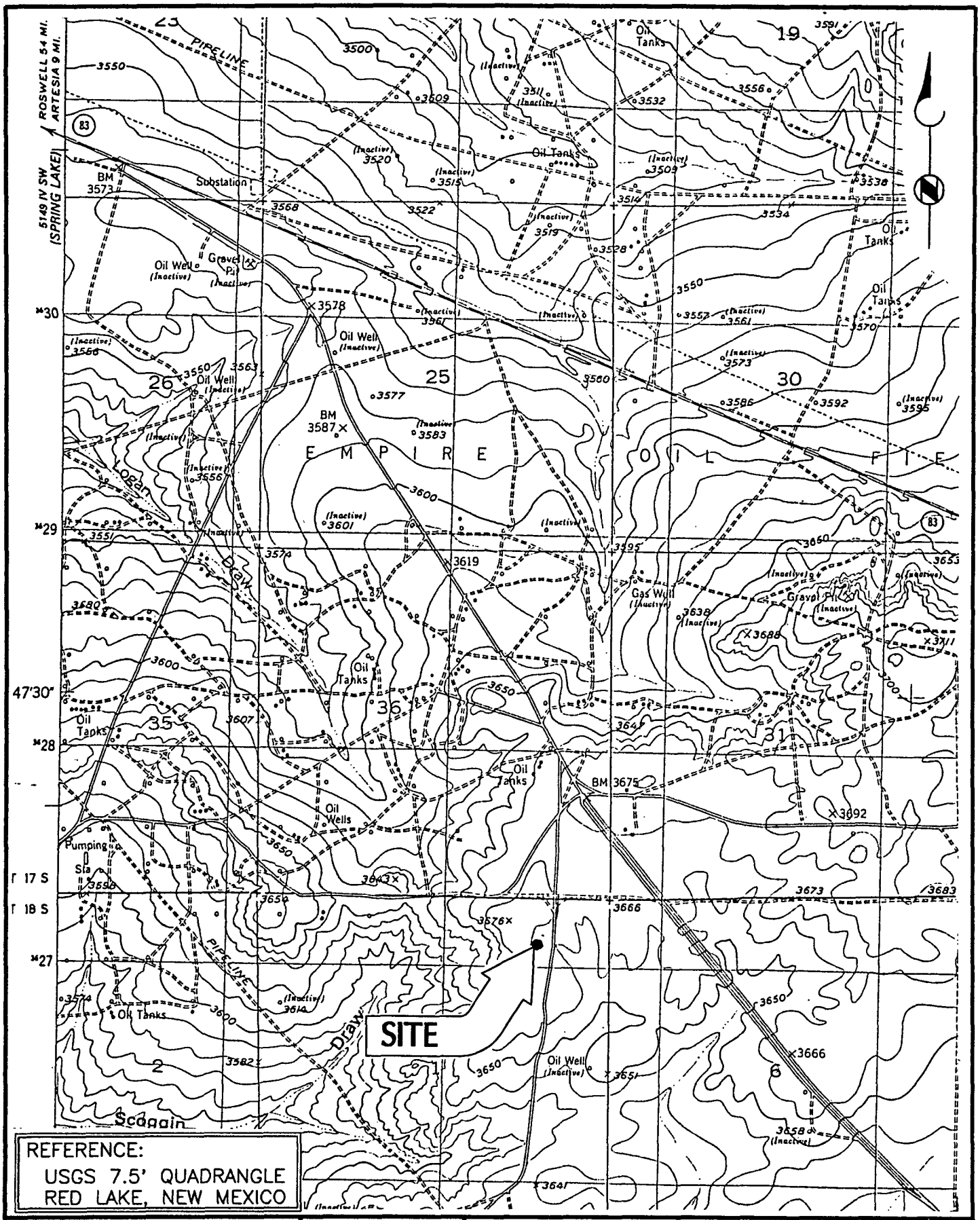
Laboratory Analytical Results for Water Samples

Transwestern Pipeline Company
Atoka 1 Compressor Station
Artesia, New Mexico

ANALYTE	Sample Identification							
	MW-3 12/2/94	MW-4 12/2/94	TB-1 12/2/94	MW-5 12/2/94	MW-6 12/2/94	MW-7 12/2/94	TB-2 12/2/94	MW-8 1/3/95
Total Metals by EPA Methods 6010 and 7470 (mg/L)								
Arsenic	<0.6	<0.6	NA	<0.6	<0.6	<0.6	NA	<0.6
Barium	0.04	0.04	NA	0.24	0.48	1.2	NA	0.05
Cadmium	<0.03	<0.03	NA	<0.03	<0.03	<0.03	NA	<0.03
Chromium	<0.03	<0.03	NA	<0.03	<0.03	<0.03	NA	<003
Lead	<0.1	<0.1	NA	<0.1	<0.1	<0.1	NA	<0.1
Mercury	<0.0002	<0.0002	NA	<0.0002	<0.0002	<0.0002	NA	<0.0002
Selenium	<0.6	<0.6	NA	<0.6	<0.6	<0.6	NA	<0.6
Silver	<0.03	<0.03	NA	<0.03	<0.03	<0.03	NA	<0.03
Total Dissolved Solids by EPA Method 160.1 (mg/L)	NA	NA	NA	NA	NA	NA	NA	4,800
Major Cations and Anions by EPA Methods 6010, 325.3, and 375.4 (mg/L)								
Calcium	600	740	NA	560	210	340	NA	690
Magnesium	550	270	NA	150	100	170	NA	260
Potassium	8.5	1.9	NA	3.3	3.5	1.7	NA	3.3
Sodium	460	240	NA	370	210	200	NA	580
Chloride, Titrimetric	470	170	NA	530	420	350	NA	610
Sulfate	4,900	1,900	NA	1,400	940	1,100	NA	2,100
Alkalinity Analysis by EPA Method 310.1 (mg/L)								
Carbonate Alkalinity	<2	<2	NA	<2	<2	<2	NA	<1
Bicarbonate Alkalinity	200	420	NA	570	230	620	NA	290

mg/L = milligrams per liter

NA = Not analyzed for the indicated parameter



REFERENCE:
USGS 7.5' QUADRANGLE
RED LAKE, NEW MEXICO

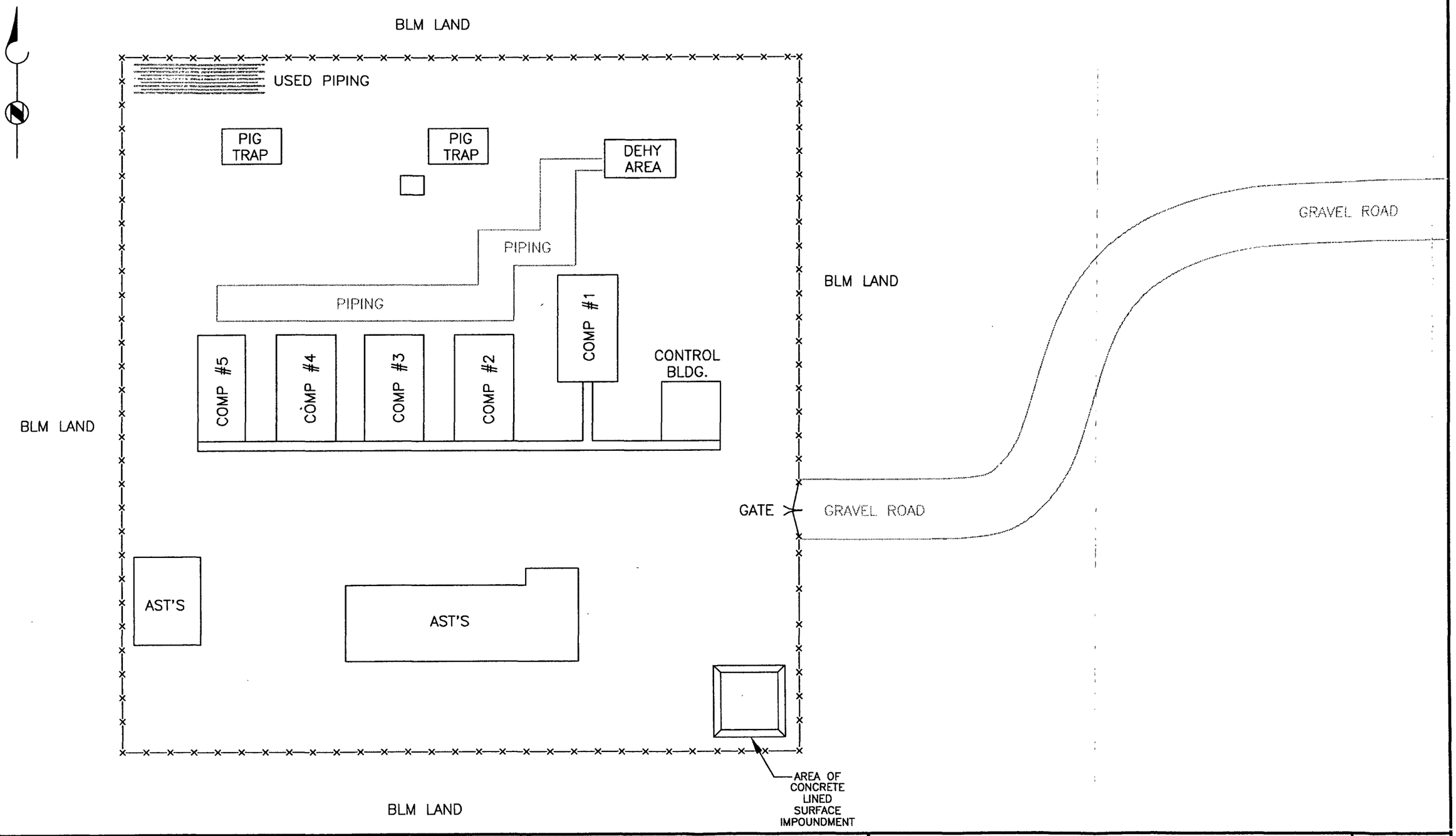
T:\1618\FINAL\001 3/21/95 DHD

BROWN AND CALDWELL
HOUSTON, TEXAS
SUBMITTED: SUSANNE RICHARD DATE:
PROJECT MANAGER
APPROVED: ROBERT JENNINGS, P.E. DATE:
BROWN AND CALDWELL

0 1000 2000
SCALE: 1" = 2000'
DRAWN BY: DHD DATE 8/23
CHK'D BY: DG DATE 8/23
APPROVED: SR DATE

TITLE: SITE LOCATION MAP
CLIENT: TRANSWESTERN PIPELINE COMPANY
SITE LOCATION: ATOKA 1 COMPRESSOR STATION
ATOKA, NEW MEXICO

DATE: 3/22/95
PROJECT NUMBER: 1618
FIGURE NUMBER: 1



T:\1618\FINAL\002 3/21/95 DHD

BROWN AND CALDWELL
HOUSTON, TEXAS

SUBMITTED: SUSANNE RICHARD (PROJECT MANAGER) DATE: _____

APPROVED: ROBERT JENNINGS, P.E. (BROWN AND CALDWELL) DATE: _____

0 20 40

SCALE: 1" = 40'

DRAWN BY: DHD DATE 1/5

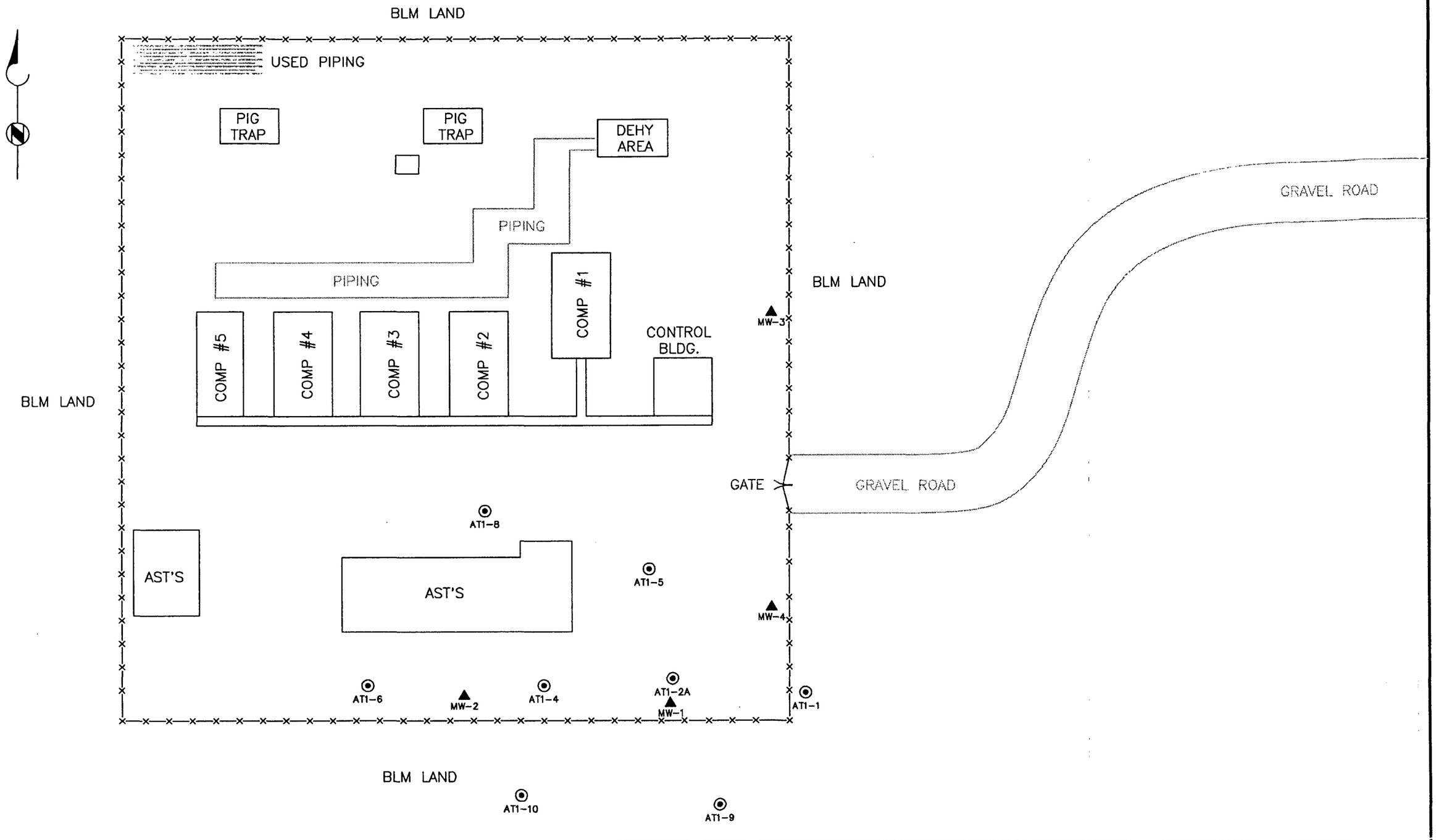
CHK'D BY: JLC DATE 1/5

APPROVED: -- DATE --

LEGEND

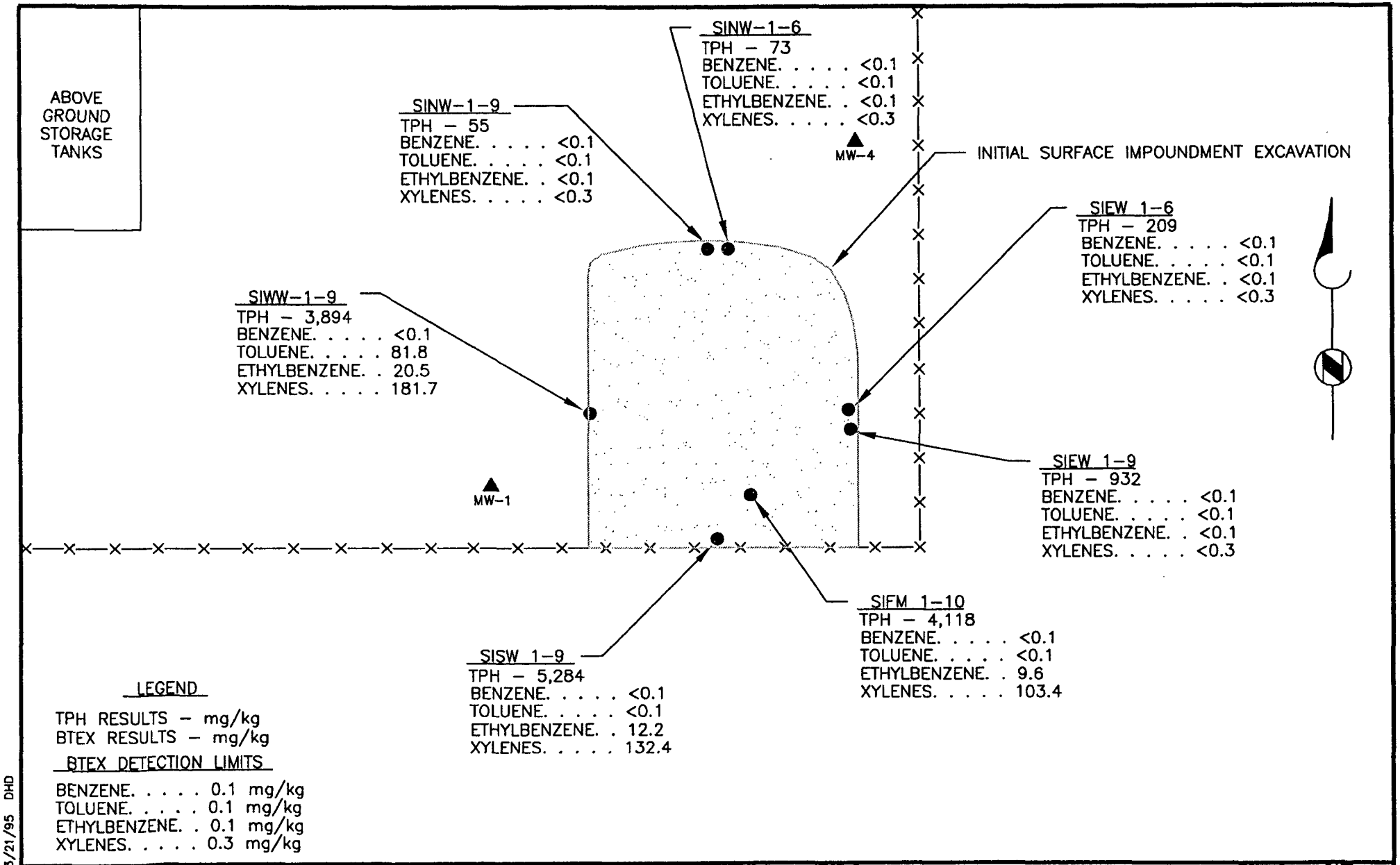
x—x—x FENCE LINE

TITLE: SITE MAP	DATE: 3/22/95
CLIENT: TRANSWESTERN PIPELINE COMPANY	PROJECT NUMBER: 1618-02
SITE: ATOKA 1 COMPRESSOR STATION	FIGURE NUMBER: 2



BROWN AND CALDWELL HOUSTON, TEXAS SUBMITTED: SUSANNE RICHARD DATE: ____ PROJECT MANAGER APPROVED: ROBERT JENNINGS, P.E. DATE: ____ BROWN AND CALDWELL	0 20 40 SCALE: 1" = 40' DRAWN BY: DHD DATE 1/5 CHK'D BY: JLC DATE 1/5 APPROVED: – DATE –	LEGEND FENCE LINE MW-2 EXISTING MONITORING WELL LOCATION (BROWN AND ROOT) AT1-6 EXISTING SOIL BORING LOCATION (BROWN AND ROOT)	TITLE: BORING/WELL LOCATION MAP (BROWN AND ROOT INVESTIGATION) CLIENT: TRANSWESTERN PIPELINE COMPANY SITE: ATOKA 1 COMPRESSOR STATION	DATE: 3/22/95 PROJECT NUMBER: 1618-02 FIGURE NUMBER: 3

T:\1618\FINAL\003 3/21/95 DHD



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BROWN AND CALDWELL
HOUSTON, TEXAS
SUBMITTED: SUSANNE RICHARD DATE:
PROJECT MANAGER
APPROVED: ROBERT JENNINGS, P.E. DATE:
BROWN AND CALDWELL

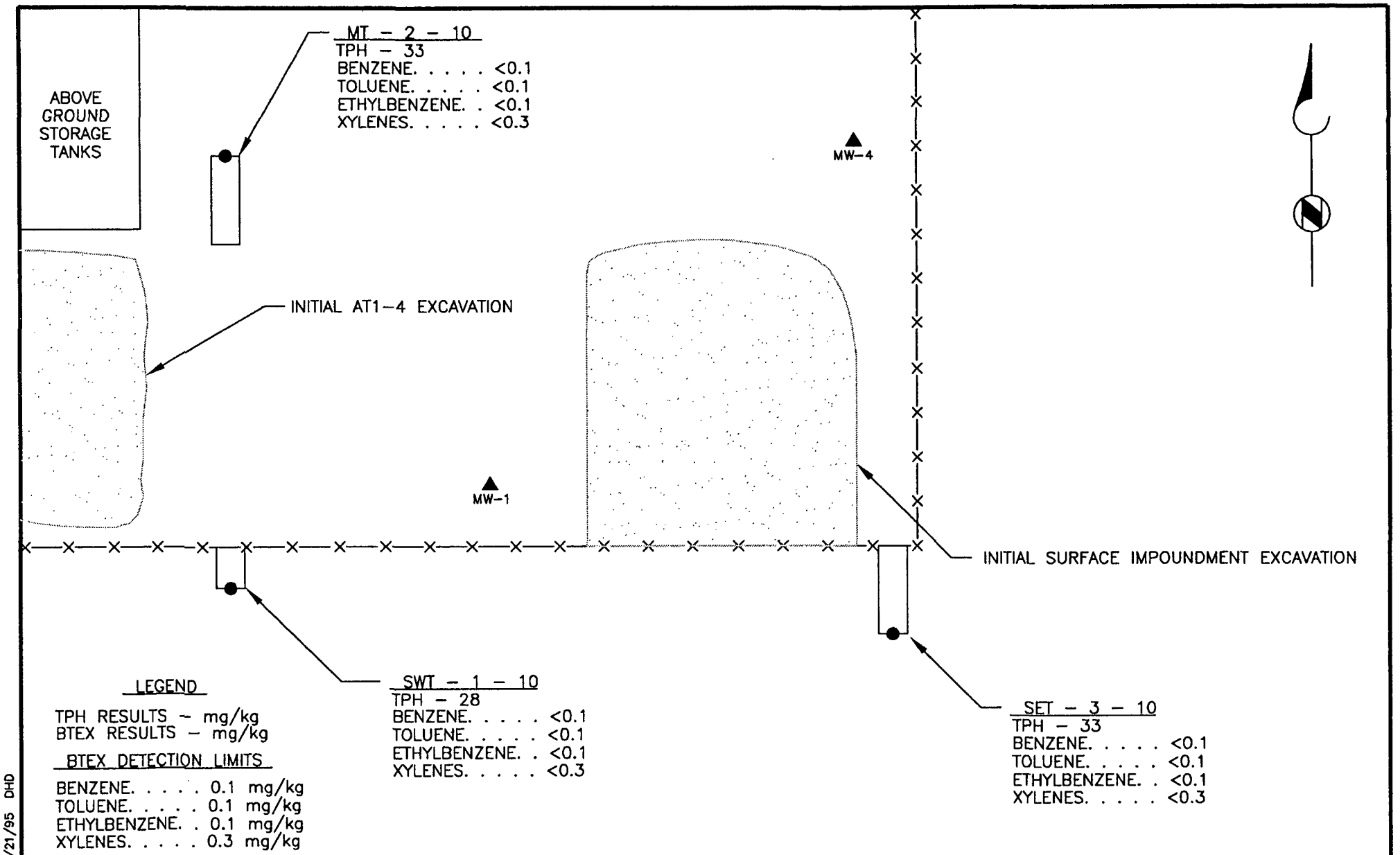
SYMBOL LEGEND

×——×	FENCE LINE
▲ MW-2	EXISTING MONITORING WELL LOCATION
● I-6	CONFIRMATION SOIL SAMPLES

0 8 16
SCALE: 1/16"=1'-0"
DRAWN BY: DHD DATE 3/9
CHK'D BY: AH DATE 3/9
APPROVED: DATE

TITLE: INITIAL EXCAVATION AND CONFIRMATION SOIL SAMPLES
CLIENT: TRANSWESTERN PIPELINE CO.
SITE LOCATION: ATOKA 1 COMPRESSOR STATION

DATE: 3/22/95
PROJECT NUMBER: 1618
FIGURE NUMBER: 4



T:\1618\FINAL\005 3/21/95 DHD

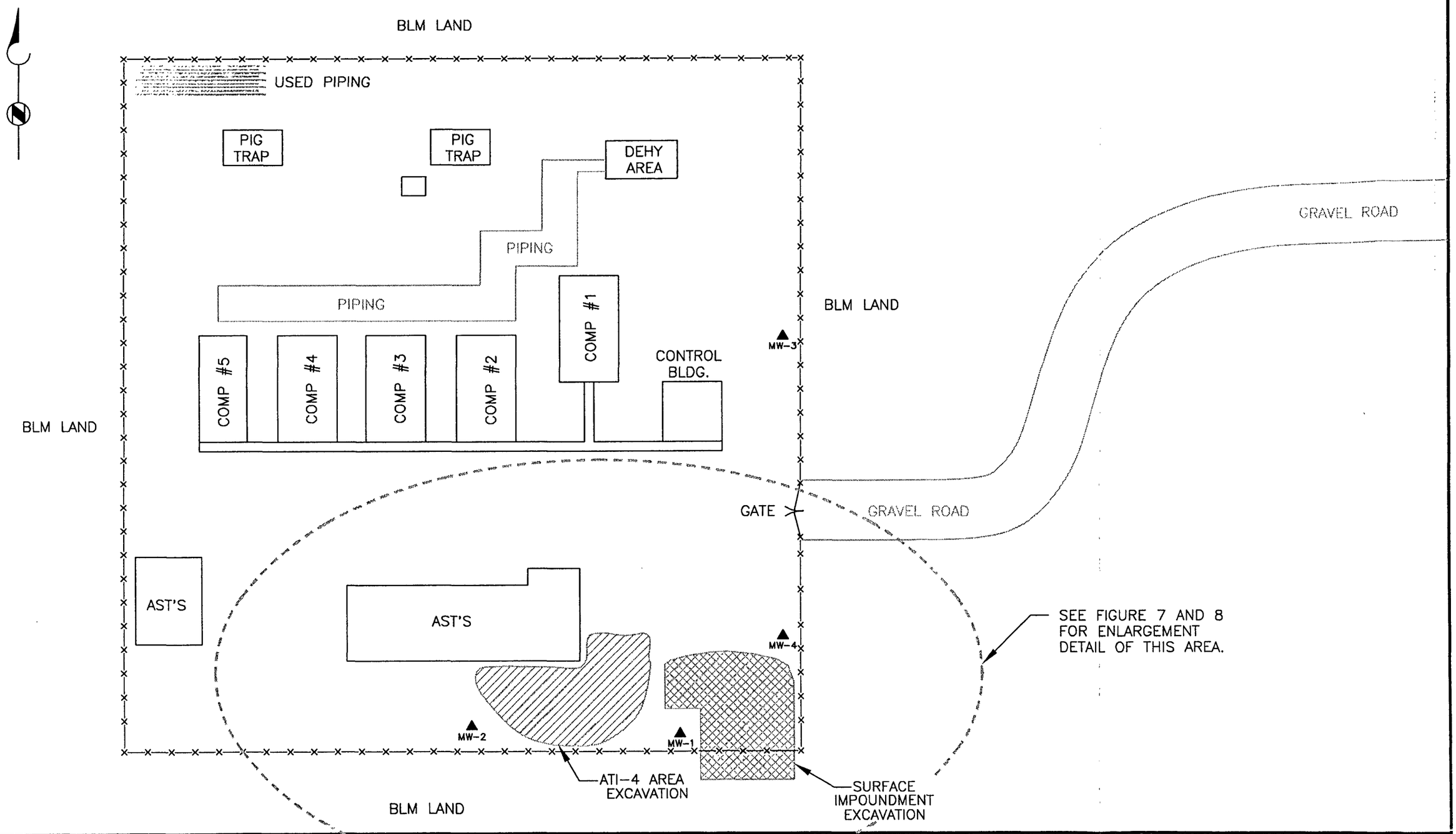
BROWN AND CALDWELL
HOUSTON, TEXAS
SUBMITTED: SUSANNE RICHARD DATE:
PROJECT MANAGER
APPROVED: ROBERT JENNINGS, P.E. DATE:
BROWN AND CALDWELL

SYMBOL LEGEND

×——×	FENCE LINE
▲ MW-2	EXISTING MONITORING WELL LOCATION
● I-6	CONFIRMATION SOIL SAMPLES

0 8 16
SCALE: 1/16"=1'-0"
DRAWN BY: DHD DATE 3/9
CHK'D BY: AH DATE 3/9
APPROVED: DATE

TITLE	TRENCH SAMPLE RESULTS
CLIENT	TRANSWESTERN PIPELINE CO.
SITE LOCATION	ATOKA 1 COMPRESSOR STATION
DATE	3/22/95
PROJECT NUMBER	1618
FIGURE NUMBER	5



T:\1618\FINAL\006 3/21/95 DHD

BROWN AND CALDWELL
HOUSTON, TEXAS

SUBMITTED: SUSANNE RICHARD PROJECT MANAGER DATE:

APPROVED: ROBERT JENNINGS, P.E. BROWN AND CALDWELL DATE:

0 20 40

SCALE: 1" = 40'

DRAWN BY: DHD DATE 1/5

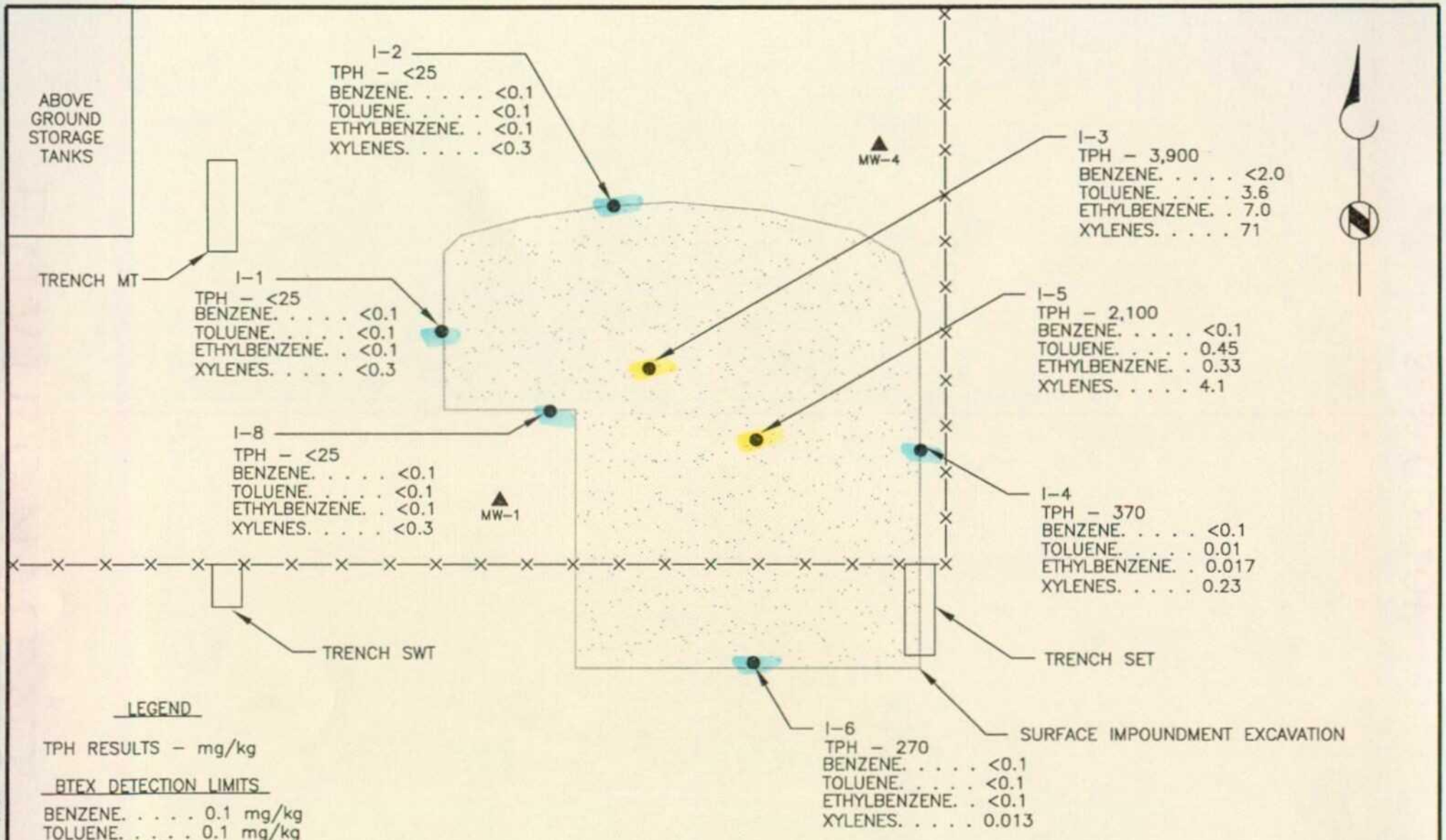
CHK'D BY: JLC DATE 1/5

APPROVED: – DATE –

LEGEND

- FENCE LINE
- ATI-4 BORING LOCATION
- MW-2 EXISTING MONITORING WELL LOCATION

TITLE: SITE MAP WITH LOCATIONS OF FINAL EXCAVATIONS	DATE: 3/22/95
CLIENT: TRANSWESTERN PIPELINE COMPANY	PROJECT NUMBER: 1618-02
SITE: ATOKA 1 COMPRESSOR STATION	FIGURE NUMBER: 6



T:\1618\FINAL\007 3/22/95 DHD

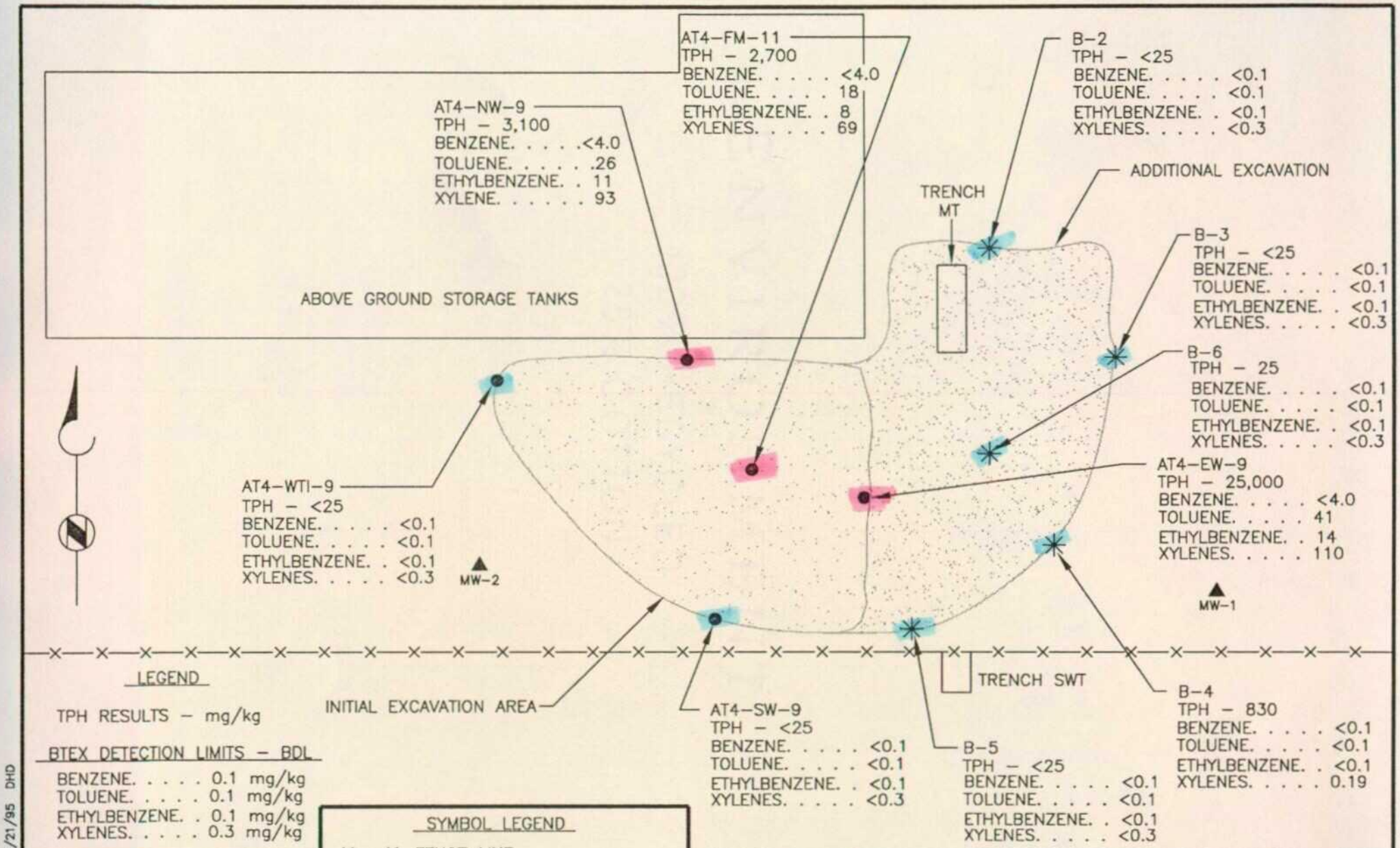
BROWN AND CALDWELL
HOUSTON, TEXAS
SUBMITTED: SUSANNE RICHARD DATE:
PROJECT MANAGER
APPROVED: ROBERT JENNINGS, P.E. DATE:
BROWN AND CALDWELL

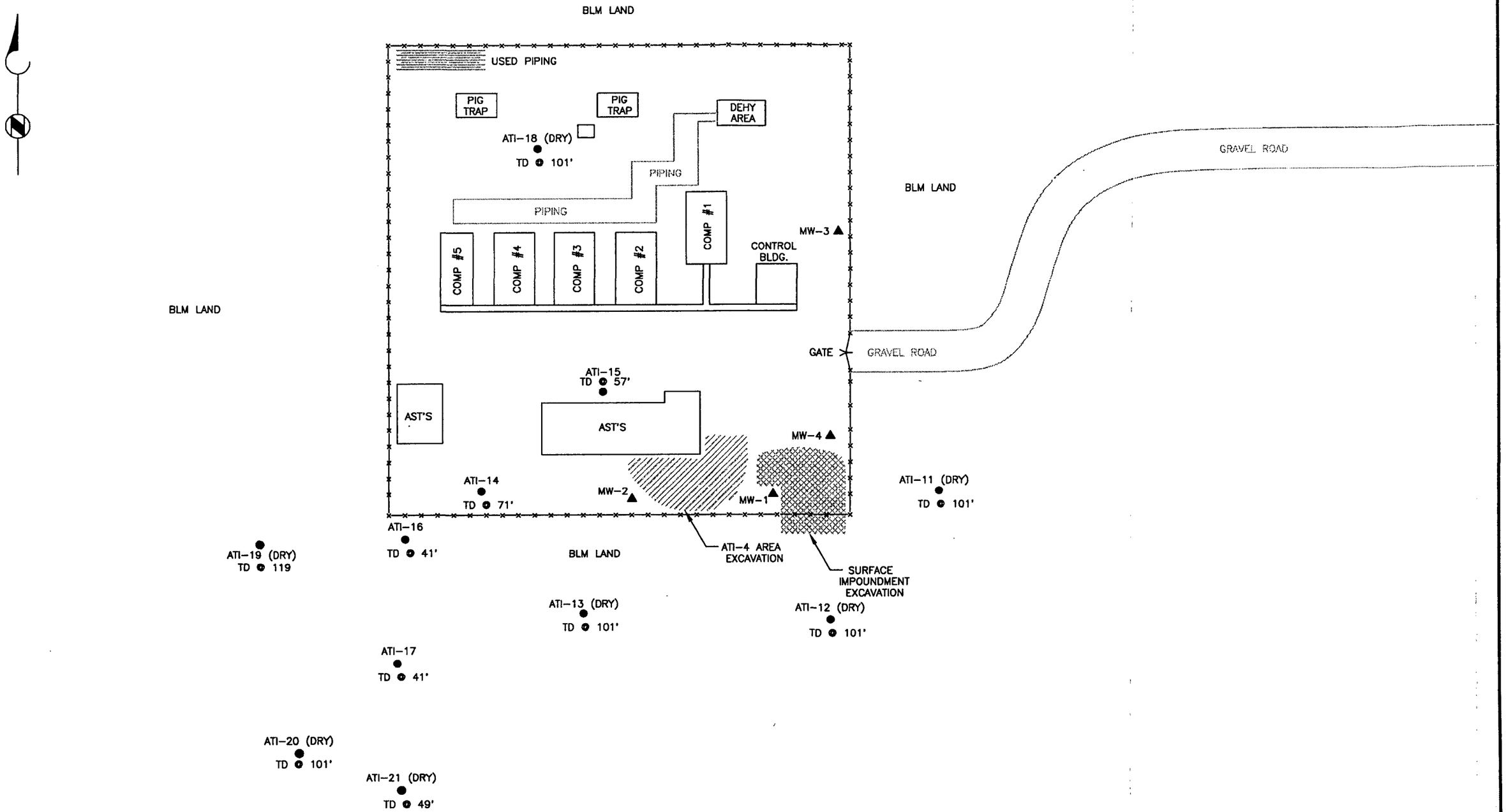
SYMBOL LEGEND
FENCE LINE
MW-2 EXISTING MONITORING WELL LOCATION
I-6 CONFIRMATION SOIL SAMPLES

0 8 16
SCALE: 1/16"=1'-0"
DRAWN BY: DHD DATE 3/9
CHK'D BY: AH DATE 3/9
APPROVED: DATE

TITLE: FINAL CONFIRMATION SAMPLES SURFACE IMPOUNDMENT EXCAVATION
CLIENT: TRANSWESTERN PIPELINE CO.
SITE LOCATION: ATOKA 1 COMPRESSOR STATION

DATE: 3/22/95
PROJECT NUMBER: 1618
FIGURE NUMBER: 7


AT4-FM-11
TPH – 2,700
BENZENE. . . . . <4.0
TOLUENE. 18
ETHYLBENZENE. . 8
XYLENES. 69
B-2
TPH – <25
BENZENE. . . . . <0.1
TOLUENE. . . . . <0.1
ETHYLBENZENE. . <0.1
XYLENES. . . . . <0.3
AT4-NW-9
TPH – 3,100
BENZENE. . . . .<4.0
TOLUENE. 26
ETHYLBENZENE. . 11
XYLENE. 93
ADDITIONAL EXCAVATION
TRENCH MT
ABOVE GROUND STORAGE TANKS
B-3
TPH – <25
BENZENE. . . . . <0.1
TOLUENE. . . . . <0.1
ETHYLBENZENE. . <0.1
XYLENES. . . . . <0.3
B-6
TPH – 25
BENZENE. . . . . <0.1
TOLUENE. . . . . <0.1
ETHYLBENZENE. . <0.1
XYLENES. . . . . <0.3
AT4-WTI-9
TPH – <25
BENZENE. . . . . <0.1
TOLUENE. . . . . <0.1
ETHYLBENZENE. . <0.1
XYLENES. . . . . <0.3
MW-2
AT4-EW-9
TPH – 25,000
BENZENE. . . . . <4.0
TOLUENE. 41
ETHYLBENZENE. . 14
XYLENES. 110
MW-1
INITIAL EXCAVATION AREA
AT4-SW-9
TPH – <25
BENZENE. . . . . <0.1
TOLUENE. . . . . <0.1
ETHYLBENZENE. . <0.1
XYLENES. . . . . <0.3
TRENCH SWT
B-5
TPH – <25
BENZENE. . . . . <0.1
TOLUENE. . . . . <0.1
ETHYLBENZENE. . <0.1
XYLENES. . . . . <0.3
B-4
TPH – 830
BENZENE. . . . . <0.1
TOLUENE. . . . . <0.1
ETHYLBENZENE. . <0.1
XYLENES. 0.19
LEGEND
TPH RESULTS – mg/kg
BTEX DETECTION LIMITS – BDL
BENZENE. . . . . 0.1 mg/kg
TOLUENE. . . . . 0.1 mg/kg
ETHYLBENZENE. . 0.1 mg/kg
XYLENES. . . . . 0.3 mg/kg
SYMBOL LEGEND
FENCE LINE
INITIAL CONFIRMATION SAMPLES
EXPANDED CONFIRMATION SAMPLES
MW-2
EXISTING MONITORING WELL LOCATION
0 8 16
SCALE: 1/16"=1'-0"
DRAWN BY: DHD DATE 3/9
CHK'D BY: AH DATE 3/9
APPROVED: DATE
BROWN AND CALDWELL
HOUSTON, TEXAS
SUBMITTED: SUSANNE RICHARD DATE:
PROJECT MANAGER
APPROVED: ROBERT JENNINGS, P.E. DATE:
BROWN AND CALDWELL
TITLE
CONFIRMATION SAMPLES
ATI-4 EXCAVATION
CLIENT
TRANSWESTERN PIPELINE CO.
SITE LOCATION
ATOKA 1 COMPRESSOR STATION
DATE
3/22/95
PROJECT NUMBER
1618
FIGURE NUMBER
8
T:\1618\FINAL\008 3/21/95 DHD



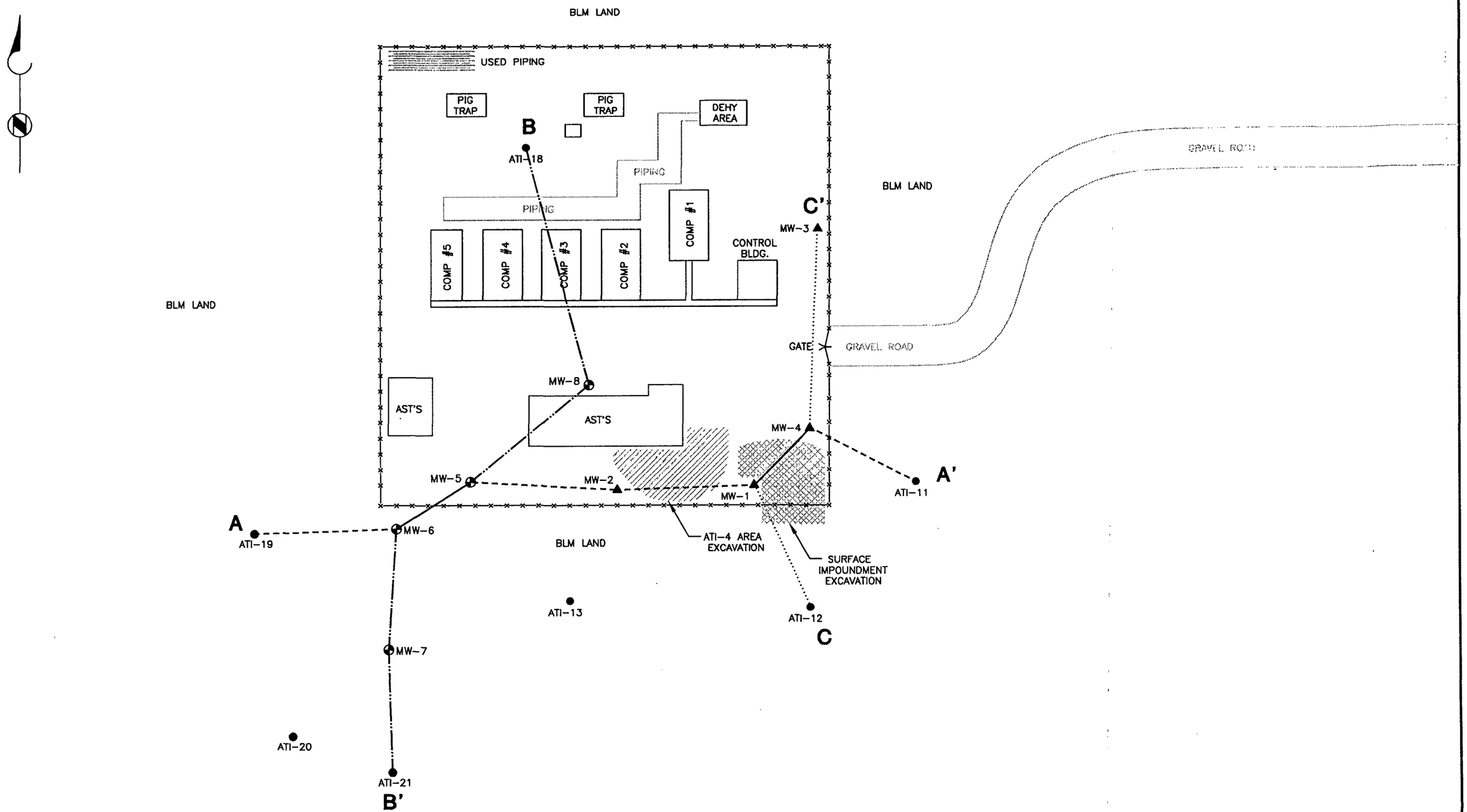
T:\1618\FINAL\009 3/21/95 DHD

BROWN AND CALDWELL
HOUSTON, TEXAS
SUBMITTED: SUSANNE RICHARD DATE: ____
PROJECT MANAGER
APPROVED: ROBERT JENNINGS, P.E. DATE: ____
BROWN AND CALDWELL

0 30 60
SCALE: 1" = 60'
DRAWN BY: DHD DATE 3/9
CHK'D BY: AH DATE 3/9
APPROVED: -- DATE --

LEGEND
FENCE LINE
MW-3 EXISTING MONITORING WELL INSTALLED BY BROWN AND ROOT
ATI-12 SOIL BORING LOCATION AND IDENTIFICATION

TITLE: SITE PLAN WITH SOIL BORING LOCATIONS	DATE: 3/22/95
CLIENT: TRANSWESTERN PIPELINE COMPANY	PROJECT NUMBER: 1618-02
SITE: ATOKA 1 COMPRESSOR STATION	FIGURE NUMBER: 9



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BROWN AND CALDWELL
HOUSTON, TEXAS

SUBMITTED: SUSANNE RICHARD PROJECT MANAGER DATE: _____

APPROVED: ROBERT JENNINGS, P.E. BROWN AND CALDWELL DATE: _____

0 30 60

SCALE: 1" = 60'

DRAWN BY: DHD DATE 3/9

CHK'D BY: AH DATE 3/9

APPROVED: - DATE -

LEGEND

A------A' B——B' C·····C' CROSS SECTION LINES

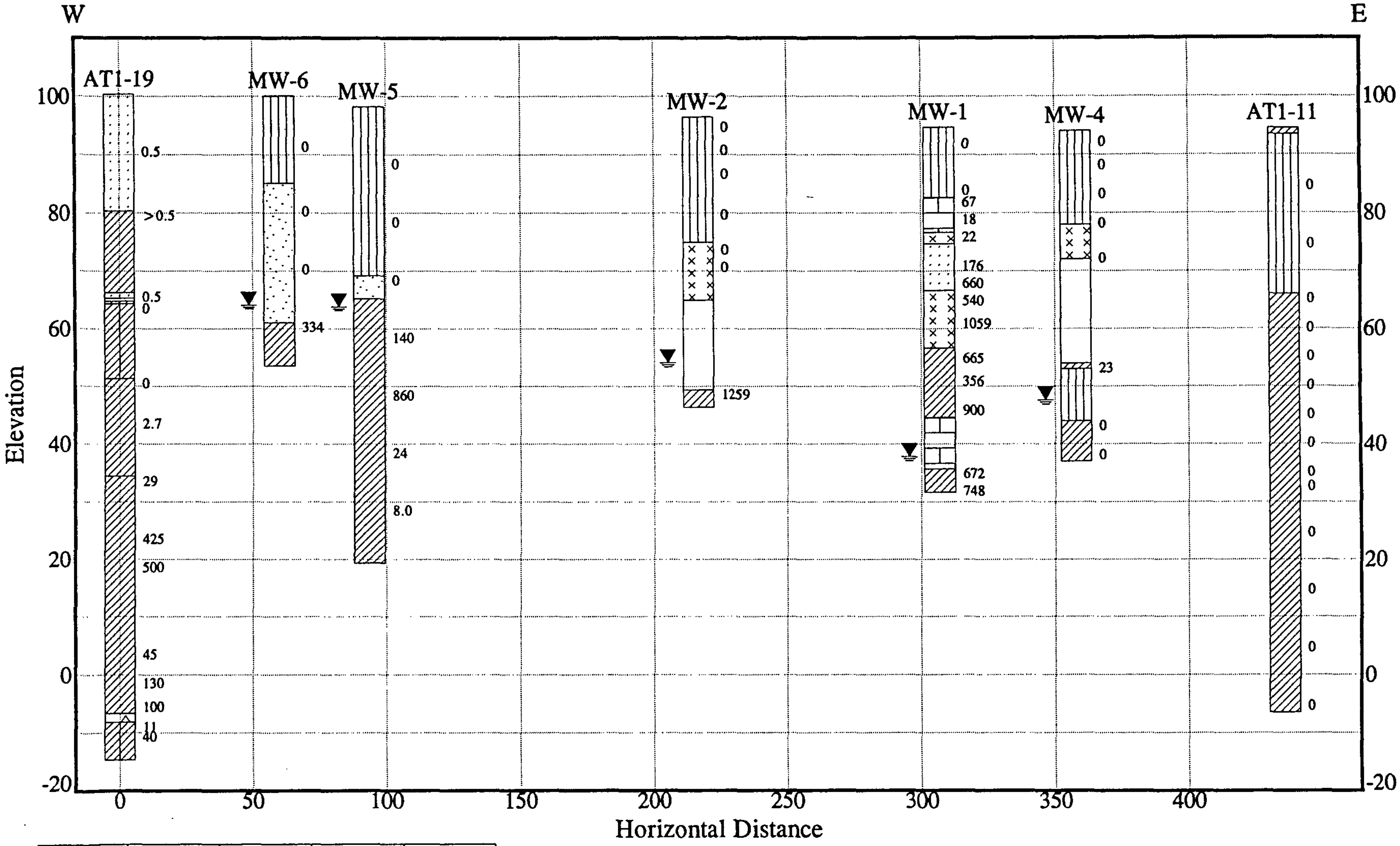
FENCE LINE

MW-7 EXISTING MONITORING WELL INSTALLED BY BROWN AND CALDWELL

MW-3 EXISTING MONITORING WELL INSTALLED BY BROWN AND ROOT

ATI-12 SOIL BORING LOCATION AND IDENTIFICATION

TITLE: CROSS SECTIONS	DATE: 3/22/95
CLIENT: TRANSWESTERN PIPELINE COMPANY	PROJECT NUMBER: 1618-02
SITE: ATOKA 1 COMPRESSOR STATION	FIGURE NUMBER: 10



Boring	North	East	Elev.	Depth
AT1-11	234	612	94.5	101.0
AT1-19	201	222	100.3	115.0
MW-1	231	510	94.7	63.0
MW-2	228	420	96.5	50.0
MW-4	270	543	94.0	57.0
MW-5	234	297	98.2	79.0
MW-6	204	282	100.1	46.5

LEGEND

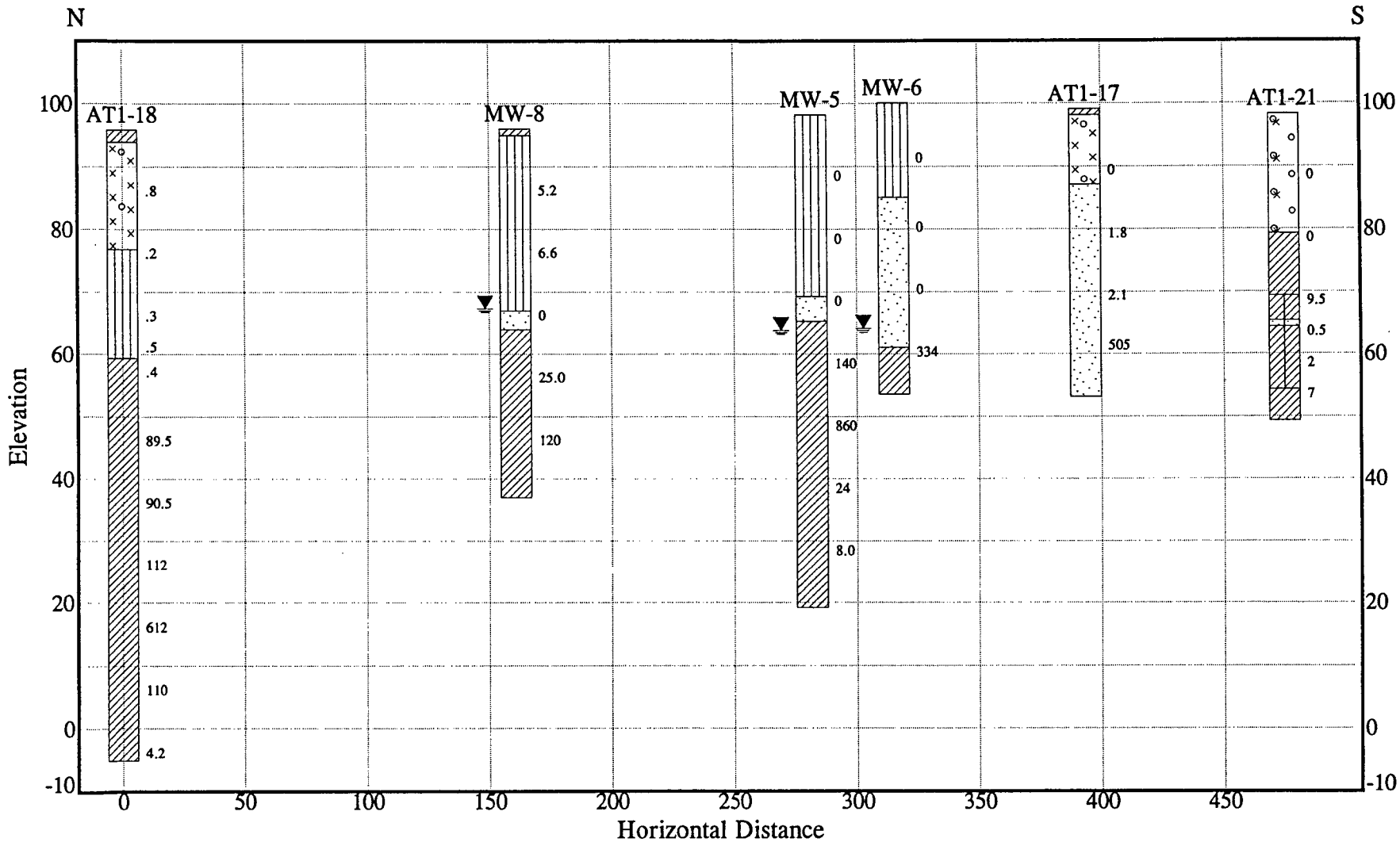
Numbers on the right of the column are OVM results.

▼ - Static water level on December 2, 1994.

If there is no water level symbol, water was not encountered in the boring.

BROWN AND CALDWELL

CROSS-SECTION A-A' SUBSURFACE FENCE DIAGRAM		
Transwestern-Atoka 1 Artesia, New Mexico		
PROJECT NO.: 1618.02	DATE: March 22nd, 1995	FIGURE: 11



Boring	North	East	Elev.	Depth
AT1-17	126	276	99.1	46.0
AT1-18	450	363	95.9	101.0
AT1-21	45	279	98.3	49.0
MW-5	234	297	98.2	79.0
MW-6	204	282	100.1	46.5
MW-8	294	402	96.0	59.0

LEGEND

Numbers on the right of the column are OVM results.

▼ - Static water level on December 2, 1994.

If there is no water level symbol, water was not encountered in the boring.

BROWN AND CALDWELL

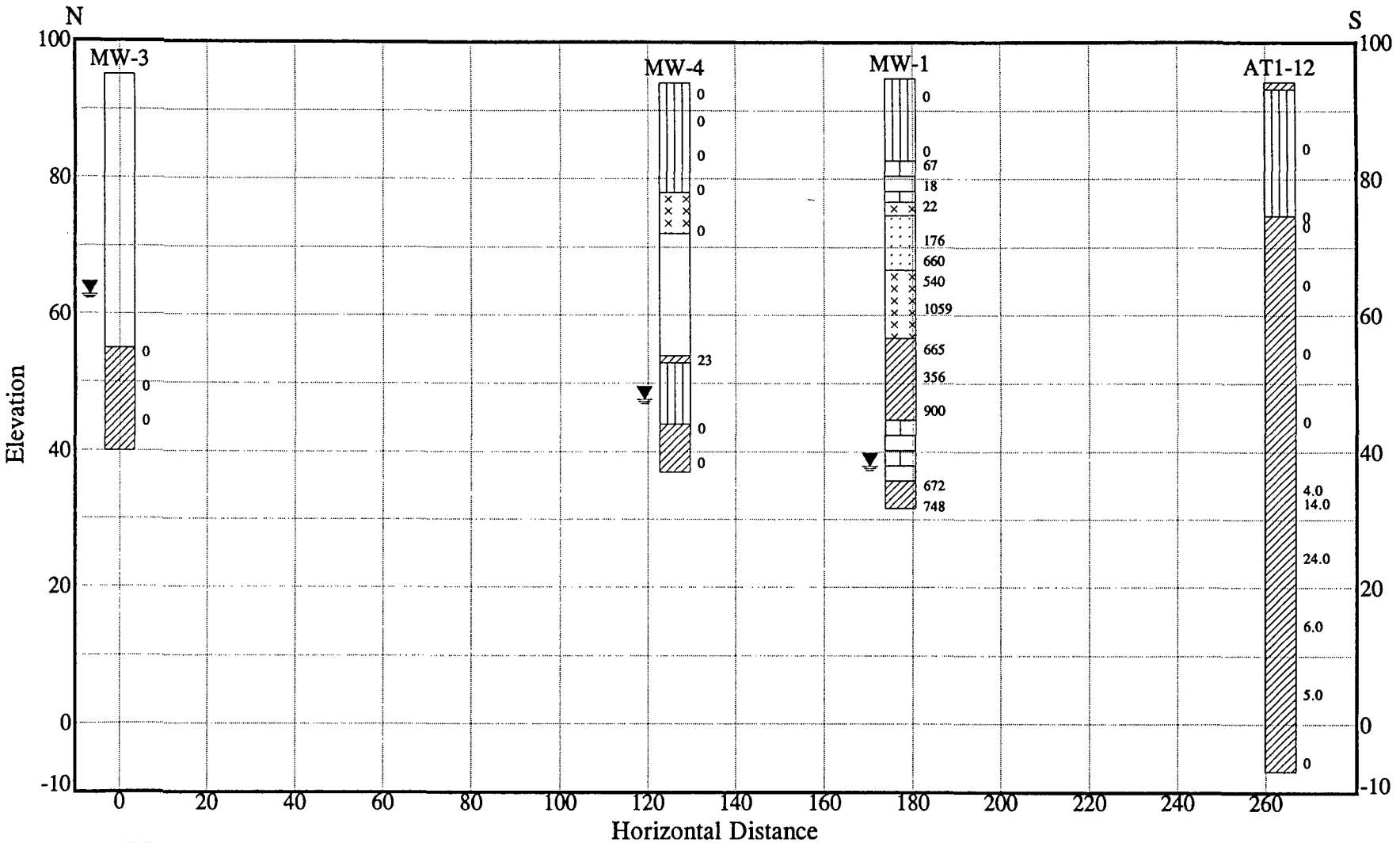
CROSS-SECTION B-B'

SUBSURFACE FENCE DIAGRAM

Transwestern-Atoka 1

Artesia, New Mexico

PROJECT NO.:	DATE:	FIGURE:
1618.02	March 22nd, 1995	12



Boring	North	East	Elev.	Depth
AT1-12	153	546	94.1	101.0
MW-1	231	510	94.7	63.0
MW-3	396	549	95.0	55.0
MW-4	270	543	94.0	57.0

LEGEND

Numbers on the right of the column are OVM results.

▼ - Static water level on December 2, 1994.

If there is no water level symbol, water was not encountered in the boring.

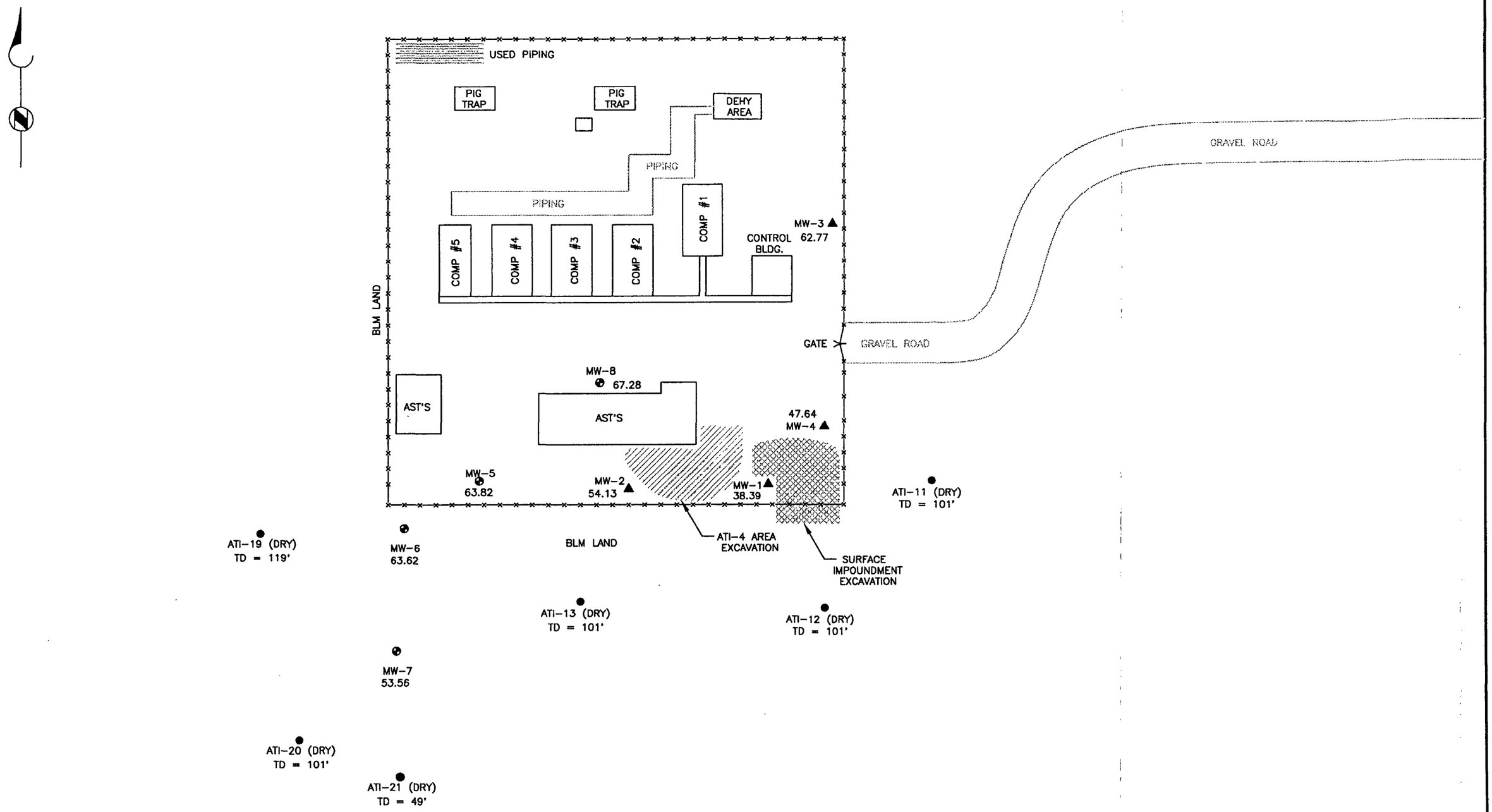
BROWN AND CALDWELL

CROSS-SECTION C-C'

SUBSURFACE FENCE DIAGRAM

Transwestern-Atoka 1
Artesia, New Mexico

PROJECT NO.:	DATE:	FIGURE:
1618.02	March 22nd, 1995	13



T:\1618\FINAL\0014 3/22/95 DHD

BROWN AND CALDWELL
HOUSTON, TEXAS

SUBMITTED: SUSANNE RICHARD DATE: _____
PROJECT MANAGER

APPROVED: ROBERT JENNINGS, P.E. DATE: _____
BROWN AND CALDWELL

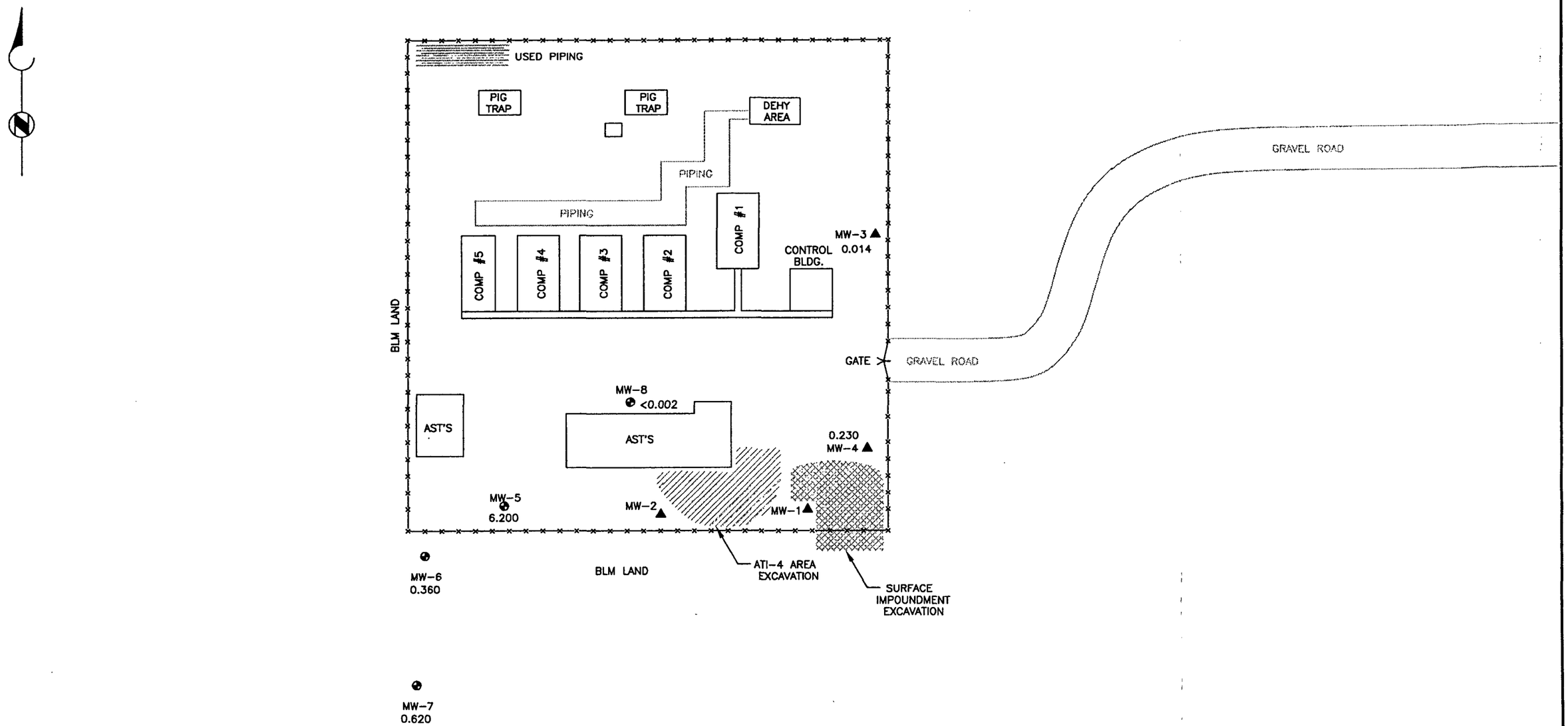
0 30 60
SCALE: 1" = 60'

DRAWN BY: DHD DATE 3/9
CHK'D BY: AH DATE 3/9
APPROVED: - DATE -

LEGEND

- FENCE LINE
- MW-3 EXISTING MONITORING WELL INSTALLED BY BROWN AND ROOT
- ATI-21 (DRY) SOIL BORINGS WHERE WATER WAS NOT ENCOUNTERED (DRY)
- MW-5 53.56 NEW MONITORING WELL LOCATION AND IDENTIFICATION / WATER LEVEL

TITLE: SITE PLAN WITH MONITORING WELL LOCATIONS AND WATER ELEVATIONS	DATE: 3/22/95
CLIENT: TRANSWESTERN PIPELINE COMPANY	PROJECT NUMBER: 1618-02
SITE: ATOKA 1 COMPRESSOR STATION	FIGURE NUMBER: 14



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BROWN AND CALDWELL
HOUSTON, TEXAS
SUBMITTED: SUSANNE RICHARD (PROJECT MANAGER) DATE:
APPROVED: ROBERT JENNINGS, P.E. (BROWN AND CALDWELL) DATE:

0 30 60
SCALE: 1" = 60'
DRAWN BY: DHD DATE 3/9
CHK'D BY: AH DATE 3/9
APPROVED: — DATE —

LEGEND
- FENCE LINE
- MW-3 ▲ EXISTING MONITORING WELL INSTALLED BY BROWN AND ROOT
- MW-4 ● 0.230 NEW MONITORING WELL LOCATION AND IDENTIFICATION; BENZENE CONCENTRATIONS IN GROUNDWATER MEASURED IN mg/L

TITLE: SITE PLAN WITH MONITORING WELL LOCATIONS AND BENZENE CONCENTRATIONS IN GROUNDWATER
DATE: 3/22/95
CLIENT: TRANSWESTERN PIPELINE COMPANY
PROJECT NUMBER: 1618-02
SITE: ATOKA 1 COMPRESSOR STATION
FIGURE NUMBER: 15

APPENDIX A

Soil Boring/Monitor Wells

BROWN AND CALDWELL

BORING LOG

Project Name: Transwestern - Atoka 1 Project Number: 1618.02

Soil Boring [X] Monitoring Well [ ] Boring/Well Number: AT1-11 Sheet 1 of 3

Boring Location: Artesia, NM		Elevation and Datum:	
Drilling Contractor: GPI	Driller: W. Cowser	Date Started: 11/15/94	Date Finished: 11/19/94
Drilling Equipment: Mobil B-61	Borehole Diameter: 3.88"	Completed Depth: (feet) 101.0	Water Depth: (feet)
Sampling Method: CME Sampler/NX Core		WELL CONSTRUCTION	
Drilling Method: HSA/Air Rotary	Drilling Fluid:	Type and Diameter of Well Casing:	
Backfill Material:		Slot Size:	Filter Material:
Logged By: Jack Cooper	Checked By:	Development Method:	

Depth (feet)	USC Soil Type	Description	Recovery %	Blow Counts	Sample No.	Graphic Log: Sample	Graphic Log: Lithology	Graphic Log: Backfill	Readings: OVA PPM	Remarks	Elevation (feet)
		CLAY and GRAVEL; brown, dry to slightly moist.									
	ML	SILT; tan to brown; some caliche and gravel present up to 1/2" diameter, dry									
5											
		Becoming pink.			1				0	Sample AT1-11-1 from 9' - 11'	
10											
15											
		Pink to light reddish brown, sandy, semiconsolidated, dry; black inclusions with some caliche present.			2				0	Sample AT1-11-2 from 19' - 21'	
20											
25											
					3				0		
	CL	CLAY; dense, reddish brown, interbedded GYPSUM and ANHYDRITE, slickensides, caliche is present in varying amounts									
30										Sample AT1-11-3 from 28.5' - 33.5'	

BROWN AND CALDWELL

BORING LOG

Project Name: Transwestern - Atoka 1 Project Number: 1618.02

Soil Boring [X] Monitoring Well [ ] Boring/Well Number: AT1-11 Sheet 3 of 3

Depth (feet)	USC Soil Type	Description	Recovery %	Blow Counts	Sample No.	Graphic Log: Sample	Graphic Log: Lithology	Graphic Log: Backfill	Readings: OVA PPM	Remarks	Elevation (feet)
80		**CLAY**, dense, reddish brown with interbedded **GYPSUM and ANHYDRITE**			12				0	Sample AT1-11-12 from 79.0' - 81.0'	
85											
90					13				0	Sample AT1-11-13 from 89.0' - 91.0'	
95											
100					14				0	Sample AT1-11-14 from 99.0' - 101.0'	
		T.D. Boring at 101.0 feet.									

BROWN AND CALDWELL

BORING LOG

Project Name: Transwestern - Atoka 1 Project Number: 1618.02

Soil Boring [X] Monitoring Well [ ] Boring/Well Number: AT1-12 Sheet 1 of 3

Boring Location: Artesia, NM		Elevation and Datum:	
Drilling Contractor: GPI	Driller: W. Cowser	Date Started: 11/16/94	Date Finished: 11/16/94
Drilling Equipment: Mobil B-61	Borehole Diameter: 3.88"	Completed Depth: (feet) 101.0	Water Depth: (feet)
Sampling Method: CME Sampler/NX Core		WELL CONSTRUCTION	
Drilling Method: HSA/Air Rotary	Drilling Fluid:	Type and Diameter of Well Casing:	
Backfill Material:		Slot Size:	Filter Material:
Logged By: Jack Cooper	Checked By:	Development Method:	

Depth (feet)	USC Soil Type	Description	Recovery %	Blow Counts	Sample No.	Graphic Log: Sample	Graphic Log: Lithology	Graphic Log: Backfill	Readings OVA PPM	Remarks	Elevation (feet)
		CLAY, SILT, and GRAVEL.									
	ML	SILT; tan with abundant caliche, dry.									
10					1				0	Sample AT1-12-1 from 9.0' - 11.0'	
20	CL	CLAY; dense, reddish brown with interbedded GYPSUM and ANHYDRITE, some black and gray inclusions in the clay, slickensides			2				0	Sample AT1-12-2 from 19.0' 19.5'	
					3				0	Sample AT1-12-3 from 19.5' - 21.0'	
30					4				0	Sample AT1-12-4 from 29.0' - 31.0'	

BROWN AND CALDWELL

BORING LOG

Project Name: Transwestern - Atoka 1 Project Number: 1618.02

Soil Boring [X] Monitoring Well [ ] Boring/Well Number: AT1-12 Sheet 2 of 3

Depth (feet)	USC Soil Type	Description	Recovery %	Blow Counts	Sample No.	Graphic Log: Sample	Graphic Log: Lithology	Graphic Log: Backfill	Readings OVA PPM	Remarks	Elevation (feet)
35		**CLAY**; dense, reddish brown with interbedded **GYPSUM and ANHYDRITE**, slickensides									
					5				0	Sample AT1-12-5 from 39.0' - 41.0'	
40											
45											
		Siltstone lenses 49'-51'; reddish brown			6				0	Sample AT1-12-6 from 49.0' - 51.0'	
50											
55											
					7				4		
60					8				14	Sample AT1-12-7 from 59.0' - 61.0'	
										Sample AT1-12-8 from 61.0' - 64.0'	
65											
					9				24		
70										Sample At1-12-9 from 69.0' - 71.0'	

BROWN AND CALDWELL

BORING LOG

Project Name: Transwestern - Atoka 1 Project Number: 1618.02

Soil Boring [X] Monitoring Well [ ] Boring/Well Number: AT1-12 Sheet 3 of 3

Depth (feet)	USC Soil Type	Description	Recovery %	Blow Counts	Sample No.	Graphic Log: Sample	Graphic Log: Lithology	Graphic Log: Backfill	Readings: OVA PPM	Remarks	Elevation (feet)
80		**CLAY**; dense, reddish brown, with interbedded **GYPSUM and ANHYDRITE**			10				6	Sample AT1-12-10 from 79.0' - 81.0'	
85											
90		Some Siltstone and Sandstone gravel present			11				5	Sample AT1-12-11 from 89.0' - 91.0'	
95											
100					12				0	Sample AT1-12-12 from 99.0' - 101.0'	
		T.D. Boring at 101.0 feet.									

BROWN AND CALDWELL

BORING LOG

Project Name: Transwestern - Atoka 1 Project Number: 1618.02

Soil Boring [X] Monitoring Well [ ] Boring/Well Number: AT1-13 Sheet 1 of 3

Boring Location: Artesia, NM		Elevation and Datum:	
Drilling Contractor: GPI	Driller: W. Cowser	Date Started: 11/18/94	Date Finished: 11/18/94
Drilling Equipment: Mobil B-61	Borehole Diameter: 3.88"	Completed Depth: (feet) 101.0	Water Depth: (feet)
Sampling Method: CME Sampler/NX Core		WELL CONSTRUCTION	
Drilling Method: HSA/Air Rotary	Drilling Fluid:	Type and Diameter of Well Casing:	
Backfill Material:		Slot Size:	Filter Material:
Logged By: Jack Cooper	Checked By:	Development Method:	

Depth (feet)	USC Soil Type	Description	Recovery %	Blow Counts	Sample No.	Graphic Log: Sample	Graphic Log: Lithology	Graphic Log: Backfill	Readings: OVA PPM	Remarks	Elevation (feet)
0	ML	SILT; tan with abundant caliche; dry.									
10					1				0	Sample AT1-13-1 from 9.0' - 11.0'	
20		SILT; reddish brown, indurated, sandy								Sampler refusal at 19 feet; switch to air rotary drilling	
30		Black inclusions.			2				0	Sample AT1-13-2 from 29.0' - 31.0'	

BROWN AND CALDWELL

BORING LOG

Project Name: Transwestern - Atoka 1 Project Number: 1618.02

Soil Boring [X] Monitoring Well [ ] Boring/Well Number: AT1-13 Sheet 2 of 3

Depth (feet)	USC Soil Type	Description	Recovery %	Blow Counts	Sample No.	Graphic Log: Sample	Graphic Log: Lithology	Graphic Log: Backfill	Readings OVA PPM	Remarks	Elevation (feet)
35	CL	**CLAY**; dense, reddish brown, with interbedded **GYPSUM and ANHYDRITE**, slickensides									
		Black inclusions.			3				0	Sample AT1-13-3 from 39.0' - 41.0'	
40											
45											
50					4				12	Sample AT1-13-4 from 49.0' - 51.0'	
55											
60		**SILTSTONE**; reddish brown to pink; disseminated **GYPSUM** present			5				22	Sample AT1-13-5 from 59.0' - 61.0'	
	CL	**CLAY**; dense, reddish brown, with interbedded **GYPSUM and ANHYDRITE**, slickensides									
65											
70					6				44	Sample AT1-13-6 from 69.0' - 71.0'	

BROWN AND CALDWELL

BORING LOG

Project Name: Transwestern - Atoka 1 Project Number: 1618.02

Soil Boring [X] Monitoring Well [ ] Boring/Well Number: AT1-13 Sheet 3 of 3

Depth (feet)	USC Soil Type	Description	Recovery %	Blow Counts	Sample No.	Graphic Log: Sample	Graphic Log: Lithology	Graphic Log: Backfill	Readings: OVA PPM	Remarks	Elevation (feet)
80		**CLAY**; dense, reddish brown, with interbedded **GYPSUM and ANHYDRITE**, slickensides			7				20	Sample AT1-13-7 from 79.0' - 81.0'	
85											
90					8				6	Sample AT1-13-8 from 89.0' - 91.0'	
95											
100					9				0	Sample AT1-13-9 from 99.0' - 101.0'	
		T.D. Boring at 101.0 feet.									

BROWN AND CALDWELL

BORING LOG

Project Name: Transwestern - Atoka 1 Project Number: 1618.02

Soil Boring ☐ Monitoring Well ☒ Boring/Well Number: AT1-14* Sheet 1 of 3

Boring Location: Artesia, NM		Elevation and Datum:	
Drilling Contractor: GPI	Driller: W. Cowser	Date Started: 11/20/94	Date Finished: 11/20/94
Drilling Equipment: Mobil B-61	Borehole Diameter: 3.88"	Completed Depth: (feet) 79.0	Water Depth: (feet)
Sampling Method: NX Core		WELL CONSTRUCTION	
Drilling Method: Air Rotary	Drilling Fluid:	Type and Diameter of Well Casing:	
Backfill Material:		Slot Size:	Filter Material:
Logged By: Jack Cooper	Checked By:	Development Method:	

Depth (feet)	USC Soil Type	Description	Recovery %	Blow Counts	Sample No.	Graphic Log: Sample	Graphic Log: Lithology	Graphic Log: Well	Readings: OVA PPM	Remarks	Elevation (feet)
0	ML	**SILT**; tan; sandy and unconsolidated; abundant caliche								* AT1-14 was converted to monitoring well MW-5.	
10					1				0	Sample AT1-14-1 from 9.0' - 11.0'	
20					2				0	Sample AT1-14-2 from 19.0' - 21.0'	
30	SP	**SAND**, reddish-brown; very fine grained with silt and clay present; slightly moist; consolidated to loose			3				0	Sample AT1-14-3 from 29.0' - 31.0'	

BROWN AND CALDWELL

BORING LOG

Project Name: Transwestern - Atoka 1 Project Number: 1618.02

Soil Boring ☐ Monitoring Well ☒ Boring/Well Number: AT1-14* Sheet 2 of 3

Depth (feet)	USC Soil Type	Description	Recovery %	Blow Counts	Sample No.	Graphic Log: Sample	Graphic Log: Lithology	Graphic Log: Well	Readings OVA PPM	Remarks	Elevation (feet)
35	CL	**CLAY**; dense, reddish-brown, with interbedded **GYPSUM and ANHYDRITE**, slickensides									
40					4				140	Sample AT1-14-4 from 39.0' - 41.0'	
45											
50					5				860	Sample AT1-14-5 from 49.0' - 51.0'	
55											
60					6				24	Sample AT1-14-6 from 59.0' - 61.0'	
65											
70					7				8	Sample AT1-14-7 from 69.0' - 71.0' Driller reports water blown out of hole at 71.0', open hole had remained undisturbed for approx. 1.5 hours.	

BROWN AND CALDWELL

BORING LOG

Project Name: Transwestern - Atoka 1 Project Number: 1618.02

Soil Boring ☐ Monitoring Well ☒ Boring/Well Number: AT1-14* Sheet 3 of 3

Depth (feet)	USC Soil Type	Description	Recovery %	Blow Counts	Sample No.	Graphic Log: Sample	Graphic Log: Lithology	Graphic Log: Well	Readings OVA PPM	Remarks	Elevation (feet)
		CLAY; dense, reddish brown, with interbedded **GYPSUM and ANHYDRITE**, slickensides									
		T.D. Boring at 79.0 feet.									

BROWN AND CALDWELL

BORING LOG

Project Name: Transwestern - Atoka 1 Project Number: 1618.02

Soil Boring ☐ Monitoring Well ☒ Boring/Well Number: AT1-15* Sheet 1 of 2

Boring Location: Artesia, NM		Elevation and Datum:	
Drilling Contractor: GPI	Driller: W. Cowser	Date Started: 11/20/94	Date Finished: 11/29/94
Drilling Equipment: Mobil B-61	Borehole Diameter: 3.88"	Completed Depth: (feet) 59.0	Water Depth: (feet)
Sampling Method: NX Core		WELL CONSTRUCTION	
Drilling Method: Air Rotary	Drilling Fluid:	Type and Diameter of Well Casing:	
Backfill Material:		Slot Size:	Filter Material:
Logged By: Jack Cooper	Checked By:	Development Method:	

Depth (feet)	USC Soil Type	Description	Recovery %	Blow Counts	Sample No.	Graphic Log: Sample	Graphic Log: Lithology	Graphic Log: Well	Readings OVA PPM	Remarks	Elevation (feet)
0	CL	**CLAY**; brown, gravel abundant.									
	ML	**SILT**; tan with abundant caliche, slightly moist, unconsolidated								* AT1-15 was converted to monitoring well MW-8	
5											
10					1				5	Sample AT1-15-1 from 9.0' - 11.0'	
15											
20		Reddish brown to pink, slightly indurated, sandy with black inclusions			2				7	Sample AT1-15-2 from 19.0' - 21.0'	
25											
30	SP	**SAND**; reddish brown, silty, clayey, slightly indurated, slightly moist			3				0	Sample AT1-15-3 from 29.0' - 31.0'	

BROWN AND CALDWELL

BORING LOG

Project Name: Transwestern - Atoka 1 Project Number: 1618.02

Soil Boring ☐ Monitoring Well ☒ Boring/Well Number: AT1-15* Sheet 2 of 2

Depth (feet)	USC Soil Type	Description	Recovery %	Blow Counts	Sample No.	Graphic Log: Sample	Graphic Log: Lithology	Graphic Log: Well	Readings OVA PPM	Remarks	Elevation (feet)
35	CL	**CLAY**; dense, reddish brown, with interbedded **GYPSUM and ANHYDRITE**, slickensides									
40					4				25	Sample AT1-15-4 from 39.0' - 41.0'	
45											
50					5				120	Small amount of water noted in bottom of boring. Sample AT1-15-5 from 49.0' - 51.0'	
55											
		T.D. Boring at 59.0 feet.									

BROWN AND CALDWELL

BORING LOG

Project Name: Transwestern - Atoka 1 Project Number: 1618.02

Soil Boring ☐ Monitoring Well ☒ Boring/Well Number: AT1-16* Sheet 1 of 2

Boring Location: Artesia, NM	Elevation and Datum:
Drilling Contractor: GPI / Driller: W. Cowser	Date Started: 11/29/94 / Date Finished: 11/30/94
Drilling Equipment: Mobil B-61 / Borehole Diameter: 3.88"	Completed Depth: (feet) 46.5 / Water Depth: (feet)
Sampling Method: NX Core	WELL CONSTRUCTION
Drilling Method: Air Rotary / Drilling Fluid:	Type and Diameter of Well Casing:
Backfill Material:	Slot Size: / Filter Material:
Logged By: Jack Cooper / Checked By:	Development Method:

Depth (feet)	USC Soil Type	Description	Recovery %	Blow Counts	Sample No.	Graphic Log: Sample	Graphic Log: Lithology	Graphic Log: Well	Readings: OVA PPM	Remarks	Elevation (feet)
0	ML	SILT; weathered limestone and caliche, tan to white, friable to unconsolidated, dry								*AT1-16 was converted to monitoring well MW-6	
5											
10					1				0	Sample AT1-16-1 from 9.0' - 11.0'	
15	SP	SAND; pink to tan, very fine grained, moderately indurated, caliche, gravel abundant; dry									
20					2				0	Sample AT1-16-2 from 19.0' - 21.0'	
25											
30		Less indurated; less caliche gravel.			3				0	Sample AT1-16-3 from 29.0' - 31.0'	

BROWN AND CALDWELL

BORING LOG

Project Name: Transwestern - Atoka 1 Project Number: 1618.02

Soil Boring ☐ Monitoring Well ☒ Boring/Well Number: AT1-16* Sheet 2 of 2

Depth (feet)	USC Soil Type	Description	Recovery %	Blow Counts	Sample No.	Graphic Log: Sample	Graphic Log: Lithology	Graphic Log: Well	Readings OVA PPM	Remarks	Elevation (feet)
35		**SAND**; pink to tan, very fine-grained, moderately indurated, caliche gravel abundant; dry								Water measured in open borehole at 36.13' below TOG after open hole to 39.0' left overnight	
40	CL	**CLAY**; dense, reddish brown, sandy, firm, black staining from 39.5' to 40'; **GYPSUM and ANHYDRITE** stringers present.			4				334	Sample AT1-16-4 from 39.0' to 41.0'\	
45		T.D. Boring at 46.5 feet.									

BROWN AND CALDWELL

BORING LOG

Project Name: Transwestern - Atoka 1 Project Number: 1618.02

Soil Boring ☐ Monitoring Well ☒ Boring/Well Number: AT1-17* Sheet 1 of 2

Boring Location: Artesia, NM		Elevation and Datum:	
Drilling Contractor: GPI	Driller: W. Cowser	Date Started: 11/30/94	Date Finished: 11/30/94
Drilling Equipment: Mobil B-61	Borehole Diameter: 3.88"	Completed Depth: (feet) 46.0	Water Depth: (feet)
Sampling Method: NX Core		WELL CONSTRUCTION	
Drilling Method: Air Rotary	Drilling Fluid:	Type and Diameter of Well Casing:	
Backfill Material:		Slot Size:	Filter Material:
Logged By: Jack Cooper	Checked By:	Development Method:	

Depth (feet)	USC Soil Type	Description	Recovery %	Blow Counts	Sample No.	Graphic Log: Sample	Graphic Log: Lithology	Graphic Log: Well	Readings: OVA PPM	Remarks	Elevation (feet)
0	CL	**CLAY**; brown, dry.									
		CALICHE; silty, tan to white, consolidated to unconsolidated, gravel abundant								* AT1-17 was converted to monitoring well MW-7	
5											
10					1				0	Sample AT1-17-1 from 9.0' - 11.0'	
	SP	**SAND**; pink and tan to reddish brown, abundant caliche gravel, moderately indurated.									
15											
20					2				2	Sample AT1-17-2 from 19.0' - 21.0'	
25											
		Very clayey with black inclusions at 29'.			3				2	Sample AT1-17-3 from 29.0' - 31.0'	
30											

BROWN AND CALDWELL

BORING LOG

Project Name: Transwestern - Atoka 1 Project Number: 1618.02

Soil Boring ☐ Monitoring Well ☒ Boring/Well Number: AT1-17* Sheet 2 of 2

Depth (feet)	USC Soil Type	Description	Recovery %	Blow Counts	Sample No.	Graphic Log: Sample	Graphic Log: Lithology	Graphic Log: Well	Readings OVA PPM	Remarks	Elevation (feet)
35		**SAND**; pink and tan to reddish brown, abundant caliche gravel, moderately indurated			4				505	Driller reports soft zone at 36.5' Water in open borehole to 35.7 feet after left left undisturbed for approx. 1 hour Sample AT1-17-4 from 39.0' - 41.0'	
40											
45		T.D. Boring 46.0 feet.									

BROWN AND CALDWELL

BORING LOG

Project Name: Transwestern - Atoka 1 Project Number: 1618.02

Soil Boring [X] Monitoring Well [ ] Boring/Well Number: AT1-18 Sheet 1 of 3

Boring Location: Artesia, NM		Elevation and Datum:	
Drilling Contractor: GPI	Driller: W. Cowser	Date Started: 12/1/94	Date Finished: 12/2/94
Drilling Equipment: Mobil B-61	Borehole Diameter: 3.88"	Completed Depth: (feet) 101.0	Water Depth: (feet)
Sampling Method: NX Core		WELL CONSTRUCTION	
Drilling Method: Air Rotary	Drilling Fluid:	Type and Diameter of Well Casing:	
Backfill Material:		Slot Size:	Filter Material:
Logged By: Jack Cooper	Checked By:	Development Method:	

Depth (feet)	USC Soil Type	Description	Recovery %	Blow Counts	Sample No.	Graphic Log: Sample	Graphic Log: Lithology	Graphic Log: Backfill	Readings OVA PPM	Remarks	Elevation (feet)
0	CL	**CLAY**; brown, moist to dry									
		CALICHE, tan to white, extremely weathered, dry, silty.									
10					1				1	Sample AT1-18-1 from 9.0' - 11.0'	
20	ML	**SILT**; tan, sandy, caliche gravel abundant, slightly moist			2				0	Sample AT1-18-2 from 19.0' - 21.0'	
30		Tan to pink; some clay			3				0	Sample AT1-18-3 from 29.0' - 31.0'	

BROWN AND CALDWELL

BORING LOG

Project Name: Transwestern - Atoka 1 Project Number: 1618.02

Soil Boring [X] Monitoring Well [ ] Boring/Well Number: AT1-18 Sheet 2 of 3

Depth (feet)	USC Soil Type	Description	Recovery %	Blow Counts	Sample No.	Graphic Log: Sample	Graphic Log: Lithology	Graphic Log: Backfill	Readings OVA PPM	Remarks	Elevation (feet)
35		**SILT**; tan, sandy, caliche gravel abundant, slightly moist Very clayey, reddish brown, moist			4				1	Driller reports soft zone at 34.0' Sample AT1-18-4 from 34.0' - 36.0'	
	CL	**CLAY**; dense, reddish-brown, with some **GYPSUM and ANHYDRITE** present			5				0	No water in hole after left undisturbed to 39.0' for approx. 2.5 hours Sample AT1-18-5 from 39.0' - 41.0'	
40											
45											
50		Thin Silt lenses at 49.5'			6				90	Sample AT1-18-6 from 49.0' - 51.0'	
55											
60					7				91	Sample AT1-18-7 from 59.0' - 61.0'	
65											
70					8				112	Sample AT1-18-8 from 69.0' - 71.0'	

BROWN AND CALDWELL

BORING LOG

Project Name: Transwestern - Atoka 1 Project Number: 1618.02

Soil Boring [X] Monitoring Well [ ] Boring/Well Number: AT1-18 Sheet 3 of 3

Depth (feet)	USC Soil Type	Description	Recovery %	Blow Counts	Sample No.	Graphic Log: Sample	Graphic Log: Lithology	Graphic Log: Backfill	Readings OVA PPM	Remarks	Elevation (feet)
		CLAY; dense, reddish brown, with some **GYPSUM** and **ANHYDRITE** present									
		Thin Clay lenses, gray, strong odor			9				612	Sample AT1-18-9 from 79.0' - 81.0'	
80											
85											
					10				110	Sample AT1-18-10 from 89.0' - 91.0'	
90											
95											
					11				4	Sample AT1-18-11 from 99.0' - 101.0'	
100		T.D. Boring at 101.0 feet.									

BROWN AND CALDWELL

BORING LOG

Project Name: Transwestern-Atoka 1 Project Number: 1618.02

Soil Boring [X] Monitoring Well [ ] Boring/Well Number: AT1-19 Sheet 1 of 3

Boring Location: Artesia, NM		Elevation and Datum:	
Drilling Contractor: GPI	Driller: Wes Cowser	Date Started: 1/4/95	Date Finished: 1/7/95
Drilling Equipment: Mobile B-61	Borehole Diameter: 3.88"	Completed Depth: (feet) 115.0	Water Depth: (feet)
Sampling Method: NX Core		WELL CONSTRUCTION	
Drilling Method: Air Rotary	Drilling Fluid:	Type and Diameter of Well Casing:	
Backfill Material: Grout		Slot Size:	Filter Material:
Logged By: Al Fear	Checked By: Al Fear	Development Method:	

Depth (feet)	USC Soil Type	Description	Recovery %	Blow Counts	Sample No.	Graphic Log: Sample	Graphic Log: Lithology	Graphic Log: Backfill	Readings OVA PPM	Remarks	Elevation (feet)
5		**SANDSTONE**; consolidated, fine-grained, interbedded with stringers of **GYPSUM and ANHYDRITE**									
10			100		1				1	Sample AT1-19-1 from 9.0' - 11.0'	
15											
20	CL	**CLAY**; dense, rediish-brown, interbedded with **ANHYDRITE and GYPSUM**	100		2				>0.5	Sample AT1-19-2 from 20.0' - 22.0'	
25											
30											

BROWN AND CALDWELL

BORING LOG

Project Name: Transwestern-Atoka 1 Project Number: 1618.02

Soil Boring [X] Monitoring Well [ ] Boring/Well Number: AT1-19 Sheet 2 of 3

Depth (feet)	USC Soil Type	Description	Recovery %	Blow Counts	Sample No.	Graphic Log: Sample	Graphic Log: Lithology	Graphic Log: Backfill	Readings OVA PPM	Remarks	Elevation (feet)
35		**SANDSTONE**; consolidated, whitish tan	100								
		ANHYDRITE			3				1	Sample AT1-19-3 from 34.0' - 36.0'	
	CL	**CLAY**; dense, reddish brown	100								
	CL ML	**SILTY CLAY, ANHYDRITE, and GYPSUM**; interbedded, with black and gray mottling in the clay.									
40					14				0	Sample AT1-19-14 from 36.0' - 42.0'	
45											
50	CL	**CLAY**; dense, reddish brown, interbedded with **ANHYDRITE**	100		4				0	Sample AT1-19-4 from 49.0' - 51.0' Discontinued boring on 1-4-95 Continued boring on 1-6-95	
55											
			100		5				3	Sample AT1-19-5 from 56.0' - 61.0'	
60											
65											
	CL	**CLAY**; dense, reddish brown, interbedded with **GYPSUM and ANHYDRITE**	100		6				29	Sample AT1-19-6 from 66.0' - 71.0'	
70											

BROWN AND CALDWELL

BORING LOG

Project Name: Transwestern-Atoka 1 Project Number: 1618.02

Soil Boring ☒ Monitoring Well ☐ Boring/Well Number: AT1-19 Sheet 3 of 3

Depth (feet)	USC Soil Type	Description	Recovery %	Blow Counts	Sample No.	Graphic Log: Sample	Graphic Log: Lithology	Graphic Log: Backfill	Readings OVA PPM	Remarks	Elevation (feet)
		CLAY; dense, reddish brown, interbedded with **GYPSUM and ANHYDRITE**	100								
					7				425	Sample AT1-19-7 from 76.0' - 81.0'	
80			100								
					8				500	Sample AT1-19-8 from 81.0' - 86.0'	
85											
90											
95											
			100								
					9				45	Sample AT1-19-9 from 96.0' - 101.0'	
100			100								
					10				130	Sample AT1-19-10 from 101.0' - 105.0'	
105		**CLAY**; dense, reddish brown	100		11				100	Sample AT1-19-11 from 105.0' - 107.0'	
		ANHYDRITE, dense								No Sample	
	CL ML	**CLAY**; dense, reddish brown, with interbedded **ANHYDRITE**	100		12				11	Sample AT1-19-12 from 108.5' - 110.0'	
110		**SILTY CLAY, CLAY, and ANHYDRITE**, interbedded	100								
					13				40	Sample AT1-19-13 from 110.0' - 113.0'	
115		T.D. Boring at 115.0 feet.									

BROWN AND CALDWELL

BORING LOG

Project Name: Transwestern-Atoka 1 Project Number: 1618.02

Soil Boring ☒ Monitoring Well ☐ Boring/Well Number: AT1-20 Sheet 1 of 3

Boring Location: Artesia, NM		Elevation and Datum:	
Drilling Contractor: GPI	Driller: Wes Cowser	Date Started: 1/4/95	Date Finished: 1/5/95
Drilling Equipment: Mobile B-61	Borehole Diameter: 3.88"	Completed Depth: (feet) 101.0	Water Depth: (feet)
Sampling Method: NX Core		WELL CONSTRUCTION	
Drilling Method: Air Rotary	Drilling Fluid:	Type and Diameter of Well Casing:	
Backfill Material: Grout		Slot Size:	Filter Material:
Logged By: Al Fear	Checked By: Al Fear	Development Method:	

Depth (feet)	USC Soil Type	Description	Recovery %	Blow Counts	Sample No.	Graphic Log: Sample	Graphic Log: Lithology	Graphic Log: Backfill	Readings OVA PPM	Remarks	Elevation (feet)
5		SANDSTONE; light brown, consolidated, fine-grained									
10			100		1				0	Sample AT1-20-1 from 9.0' - 11.0'	
15											
20	CL	CLAY; dense, reddish brown, interbedded with ANHYDRITE	100		2				0	Sample AT1-20-2 from 19.0' - 21.0'	
25											
30		SANDSTONE; dense, reddish brown, consolidated, with black mottling throughout, some ANHYDRITE									

BROWN AND CALDWELL

BORING LOG

Project Name: Transwestern-Atoka 1 Project Number: 1618.02

Soil Boring ☒ Monitoring Well ☐ Boring/Well Number: AT1-20 Sheet 2 of 3

Depth (feet)	USC Soil Type	Description	Recovery %	Blow Counts	Sample No.	Graphic Log: Sample	Graphic Log: Lithology	Graphic Log: Backfill	Readings OVA PPM	Remarks	Elevation (feet)
	CL ML	**SILTY CLAY**; dense, reddish brown with black mottling throughout	100		3				1	Sample AT1-20-3 from 32.0' - 33.0'	
		SANDSTONE; dense, reddish brown with **ANHYDRITE** inclusions	100								
35					4				0	Sample AT1-20-4 from 34.0' - 39.0'	
40											
		ANHYDRITE									
45											
		ANHYDRITE; dense, crystalline	100								
50					5				0	Sample AT1-20-5 from 49.0' - 51.0'	
		ANHYDRITE; crystalline, interbedded with **SILTY CLAY**, reddish brown	100								
					6				0	Sample AT1-20-6 from 51.0' - 56.0'	
55											
		ANHYDRITE; dense, crystalline									
	CL ML	**SILTY CLAY**; reddish brown with **GYPSUM** inclusions	100		7				6	Sample AT1-20-7 from 59.0' - 61.0'	
60		**ANHYDRITE**; interbedded with reddish brown **SILTY CLAY and GYPSUM**	100								
					8				4	Sample AT1-20-8 from 61.0' - 66.0'	
65											
			100								
					9				14	Sample AT1-20-9 from 66.0' - 71.0'	
70											
	CL	**CLAY**; dense, reddish brown with disseminated **GYPSUM**	100								
					10				60	Sample AT1-20-10 from 71.0' -	

BROWN AND CALDWELL

BORING LOG

Project Name: Transwestern-Atoka 1 Project Number: 1618.02

Soil Boring [X] Monitoring Well [ ] Boring/Well Number: AT1-20 Sheet 3 of 3

Depth (feet)	USC Soil Type	Description	Recovery %	Blow Counts	Sample No.	Graphic Log: Sample	Graphic Log: Lithology	Graphic Log: Backfill	Readings OVA PPM	Remarks	Elevation (feet)
										76.0'	
		CLAY; dense, reddish brown with **ANHYDRITE**									
80											
		CLAY; dense, reddish brown with white mottling and interbedded **GYPSUM and ANHYDRITE**	100		11				450	Sample AT1-20-11 from 81.0' - 84.0'	
			100		12				500	Sample AT1-20-12 from 84.0' - 86.0'	
85			100		13				60		
			100		14				50	Sample AT1-20-13 from 86.0' - 88.0'	
		ANHYDRITE; dense									
90										Sample AT1-20-14 from 88.0' - 91.0'	
95											
	CL	**CLAY**; dense, reddish brown, interbedded with **ANHYDRITE** with laminae of **SELENITE and GYPSUM** nodules	100		15				2	Sample AT1-20-15 from 96.0' - 101.0'	
100											
		T.D. Boring at 101.0 feet.									

BROWN AND CALDWELL

BORING LOG

Project Name: Transwestern-Atoka 1 Project Number: 1618.02

Soil Boring [X] Monitoring Well [ ] Boring/Well Number: AT1-21 Sheet 1 of 2

Boring Location: Artesia, NM		Elevation and Datum:	
Drilling Contractor: GPI	Driller: Wes Cowser	Date Started: 1/5/95	Date Finished: 1/5/95
Drilling Equipment: Mobile B-61	Borehole Diameter: 3.88"	Completed Depth: (feet) 49.0	Water Depth: (feet)
Sampling Method: NX Core		WELL CONSTRUCTION	
Drilling Method: Air Rotary	Drilling Fluid:	Type and Diameter of Well Casing:	
Backfill Material: Grout		Slot Size:	Filter Material:
Logged By: Al Fear	Checked By: Al Fear	Development Method:	

Depth (feet)	USC Soil Type	Description	Recovery %	Blow Counts	Sample No.	Graphic Log: Sample	Graphic Log: Lithology	Graphic Log: Backfill	Readings OVA PPM	Remarks	Elevation (feet)
5		**CALICHE**; dense, consolidated, white-tan with interbedded tan **SANDSTONE**									
10			100		1				0	Sample AT1-21-1 from 9.0' - 11.0'	
15											
20	CL	**CLAY**; dense, reddish brown with some **SILT**, interbedded with ANHYDRITE stringers	100		2				0	Sample AT1-21-2 from 19.0' - 24.0'	
25											
30	CL ML	**SILTY CLAY**; lithified	100		3				10	Sample AT1-21-3 from 29.0' -	

BROWN AND CALDWELL

BORING LOG

Project Name: Transwestern-Atoka 1 Project Number: 1618.02

Soil Boring [X] Monitoring Well [ ] Boring/Well Number: AT1-21 Sheet 2 of 2

Depth (feet)	USC Soil Type	Description	Recovery %	Blow Counts	Sample No.	Graphic Log: Sample	Graphic Log: Lithology	Graphic Log: Backfill	Readings: OVA PPM	Remarks	Elevation (feet)
	SP SM	**SILTY SAND**; interbedded with consolidated **SILTY SANDSTONE**								33.0'	
35	CL ML	**SILTY CLAY**; reddish brown, interbedded with stiff **CLAY**	100		4				1	Sample AT1-21-4 from 34.0' - 39.0'	
40		As above; interbedded with dense **ANHYDRITE**	100		5				2	Sample AT1-21-5 from 39.0' - 44.0'	
45	CL	**CLAY**; dense, reddish brown, interbedded with **ANHYDRITE**	100		6				7	Sample AT1-21-6 from 44.0' - 49.0'	
		T.D. Boring at 49.0 feet.									

APPENDIX B

Laboratory Analytical Reports and Chain-of-Custody for Initial Confirmation Soil Samples-Surface Impoundment

ENVIRONMENTAL LAB OF , INC.

"Don't Treat Your Soil Like Dirt!"

October 14, 1994

Client: Brown & Caldwell
Mr. Lynn Wright
1415 Louisiana, Suite 2500
Houston, Texas 77002

Sample Matrix: Soil

Job ID: Atoka 1
Date Received: 10/14/94
Analysis Date: 10/14/94

CHEMICAL ANALYSIS REPORT

Parameter	Value	Units	EPA SW-846 Test Method
Sample ID: S1EW-1-9			418.1/3550
Total Petroleum Hydrocarbons	932	ppm	
Sample ID: S1EW-1-6			
Total Petroleum Hydrocarbons	209	ppm	
Sample ID: S1NW-1-9			
Total Petroleum Hydrocarbons	55	ppm	
Sample ID: S1NW-1-6			
Total Petroleum Hydrocarbons	73	ppm	
Sample ID: S1SW-1-9			
Total Petroleum Hydrocarbons	5,284	ppm	
Sample ID: S1WW-1-9			
Total Petroleum Hydrocarbons	3,894	ppm	
Sample ID: S1FW-1-10			
Total Petroleum Hydrocarbons	4,118	ppm	

QC (Quality Control)

Total Petroleum Hydrocarbons QC: 100 ppm
Detection Limit 10 ppm

	Result	% IA
TPH	104 ppm	104

Kirk Robinson

ENVIRONMENTAL LAB OF , INC.

"Don't Treat Your Soil Like Dirt!"

October 14, 1994

Client: Brown & Caldwell
Mr. Lynn Wright
1415 Louisiana, Suite 2500
Houston, Texas 77002

Sample Matrix: Soil

Job ID: Atoka 1
Date Received: 10/14/94
Analysis Date: 10/14/94

Compounds	Actual (ppm)	Detection Limit (ppm)	QC	%IA
Sample ID: S1EW-1-9				
Benzene	ND	0.1	0.100	100
Toluene	ND	0.1	0.100	100
Ethylbenzene	ND	0.1	0.103	103
Xylene (m,p)	ND	0.2	0.206	103
Xylene (o)	ND	0.1	0.102	102
Surrogate Spike	%Recovery			
a,a,a Trifluorotoluene	92			
Sample ID: S1EW-1-6				
Benzene	ND	0.1	0.100	100
Toluene	ND	0.1	0.100	100
Ethylbenzene	ND	0.1	0.103	103
Xylene (m,p)	ND	0.2	0.206	103
Xylene (o)	ND	0.1	0.102	102
Surrogate Spike	%Recovery			
a,a,a Trifluorotoluene	113			
Sample ID: S1NW-1-9				
Benzene	ND	0.1	0.100	100
Toluene	ND	0.1	0.100	100
Ethylbenzene	ND	0.1	0.103	103
Xylene (m,p)	ND	0.2	0.206	103
Xylene (o)	ND	0.1	0.102	102
Surrogate Spike	%Recovery			
a,a,a Trifluorotoluene	114			

page 2 Atoka 1 Cont.

Compounds	Actual (ppm)	Detection Limit (ppm)	QC	%IA
Sample ID: S1NW-1-6				
Benzene	ND	0.1	0.100	100
Toluene	ND	0.1	0.100	100
Ethylbenzene	ND	0.1	0.103	103
Xylene (m,p)	ND	0.2	0.206	103
Xylene (o)	ND	0.1	0.102	102
Surrogate Spike	%Recovery			
a,a,a Trifluorotoluene	115			
Sample ID: S1SW-1-9				
Benzene	ND	0.1	0.100	100
Toluene	ND	0.1	0.100	100
Ethylbenzene	12.2	0.1	0.103	103
Xylene (m,p)	85.1	0.2	0.206	103
Xylene (o)	47.3	0.1	0.102	102
Surrogate Spike	%Recovery			
a,a,a Trifluorotoluene	--			
Sample ID: S1WW-1-9				
Benzene	ND	0.1	0.100	100
Toluene	81.8	0.1	0.100	100
Ethylbenzene	20.5	0.1	0.103	103
Xylene (m,p)	135.5	0.2	0.206	103
Xylene (o)	46.2	0.1	0.102	102
Surrogate Spike	%Recovery			
a,a,a Trifluorotoluene	--			
Sample ID: S1FW-1-10				
Benzene	ND	0.1	0.100	100
Toluene	ND	0.1	0.100	100
Ethylbenzene	9.6	0.1	0.103	103
Xylene (m,p)	73.5	0.2	0.206	103
Xylene (o)	29.9	0.1	0.102	102
Surrogate Spike	%Recovery			
a,a,a Trifluorotoluene	--			

QC= 100 ppb BTE (o)X & 200 ppb (m,p) X. Surrogate Spike=120 ppb a,a,a Trifluorotoluene
Methods: EPA SW 846-8020/5030

ND = Not Detected

Kirk Robinson

[redacted]

[redacted]

CHAIN OF CUSTODY

REPORT TO:			REMIT TO:		
COMPANY Brown & Caldwell			COMPANY Same		
ADDRESS 1415 Louisiana Ste 2500			ADDRESS		
CITY Houston	STATE TX	ZIP 770[illegible]	CITY	STATE	ZIP
ATTN Mr. [illegible]	PHONE 713/759-0999	FAX 713/759-0952	ATTN	PHONE	FAX
Client Comments: [illegible]			Project Name:	P.O. #	
			Turnaround Time	Release #	

ANALYSES REQUESTED

DATE	24HR TIME	MATRIX	COMPOSITE	GRAB	SAMPLE DESCRIPTION	NUMBER CONTAINERS	ANALYSES REQUESTED	ELOT # [redacted]
					SIEW-1-9			ELT 2787
					SIEW-1-6			2788
					SINW-1-9			2789
					SINW-1-6			2790
					SISW-1-9			2791
					SIWW-1-9			2792
					SIFW-1-10			2793

Collected by:	Date:	Time:	Received by Terra:	Date:	Time:	Remarks
[illegible]	10/13/94	1800	Steve Taylor	10-13-94	5:55 pm	
Relinquished by: Steve Taylor	Date: 10-13-94	Time: 7:10 pm	Received by: Benny Benge	Date: 10-13-94	Time: 7:10 P.M.	
Relinquished by: Benny Benge	Date: 10-14-94	Time: 9:14 Am	Received by: [illegible]	Date: 10/14/94	Time: 9:14 Am	

APPENDIX C

Laboratory Analytical Reports and Chain-of-Custody for Trench Samples

TERRA LABORATORIES, LTD.
2525 SOUTH SHORE BLVD, SUITE 100
LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: OCT. 21 1994 Page # 1

Enron Oil & Gas Company
P.O. Box 1188
Houston , TX 77251-1188

Reviewed by:JMH
Customer#: 169
Job Number:

Attn: GEORGE ROBINSON

Date Collected:10/15/94

Sample Number: 94007201
Project Name: ATOKAL
Sample ID: MT-2-10

Time Collected:1115

Date Received: 10/18/94

Test Code	Analyte	Result	Units	Method	Analyst
BTEXS'D	BTEX Analysis Prep(Date/Time)	10/20 1251	init.	6-5030	NSH
BZ8020S	Benzene	< 0.010	ppm	6-8020	NSH
TOL8020S	Toluene	< 0.010	ppm	6-8020	NSH
EBZ8020S	Ethylbenzene	< 0.010	ppm	6-8020	NSH
XYLSTLs	Total Xylenes	< 0.030	ppm	6-8020	NSH
BTEXTLs	Total BTEX	< 0.060	ppm	6-8020	NSH
aaaTFTs	aaa-TFT (surr)	102.	%	6-8020	NSH
4BFBs	4-BFB (surr)	95.	%	6-8020	NSH
418_1S'D	TPH Analysis Prep(Date/Time)	10/20 2015	init.	6-3550	CJT
TPH'S	TPH(Total Petroleum Hydrocarbon	33	ppm	2-418.1	CJT

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
5. SM: Standard Methods for the Examination of Water and Wastewater, 18th edition.
6. SW: SW-846, Test Methods for Evaluation of Solid Waste, Third edition. Update I, July 1992.

RW 10/21/94

TERRA LABORATORIES, LTD.
2525 SOUTH SHORE BLVD, SUITE 100
LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: OCT. 21 1994 Page # 1

Enron Oil & Gas Company
P.O. Box 1188
Houston , TX 77251-1188

Reviewed by:JMH
Customer#: 169
Job Number:

Attn: GEORGE ROBINSON

Date Collected:10/15/94

Sample Number: 94007202
Project Name: ATOKAL
Sample ID: SET-3-10

Time Collected:1150

Date Received: 10/18/94

Test Code	Analyte	Result	Units	Method	Analyst
BTEXS'D	BTEX Analysis Prep(Date/Time)	10/19 1813	init.	6-5030	NSH
BZ8020S	Benzene	< 0.010	ppm	6-8020	NSH
TOL8020S	Toluene	< 0.010	ppm	6-8020	NSH
EBZ8020S	Ethylbenzene	< 0.010	ppm	6-8020	NSH
XYLSTLs	Total Xylenes	< 0.030	ppm	6-8020	NSH
BTEXTLs	Total BTEX	< 0.060	ppm	6-8020	NSH
aaaTFTs	aaa-TFT (surr)	77.	%	6-8020	NSH
4BFBs	4-BFB (surr)	76.	%	6-8020	NSH
418_1S'D	TPH Analysis Prep(Date/Time)	10/20 2015	init.	6-3550	CJT
TPH'S	TPH(Total Petroleum Hydrocarbon	33	ppm	2-418.1	CJT

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
5. SM: Standard Methods for the Examination of Water and Wastewater, 18th edition.
6. SW: SW-846, Test Methods for Evaluation of Solid Waste, Third edition. Update I, July 1992.

10/21/94

TERRA LABORATORIES, LTD.
2525 SOUTH SHORE BLVD, SUITE 100
LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: OCT. 21 1994 Page # 1

Enron Oil & Gas Company
P.O. Box 1188
Houston , TX 77251-1188

Reviewed by:JMH
Customer#: 169
Job Number:

Attn: GEORGE ROBINSON

Date Collected:10/15/94

Sample Number: 94007203
Project Name: ATOKAL
Sample ID: SWT-1-10

Time Collected:1230

Date Received: 10/18/94

Test Code	Analyte	Result	Units	Method	Analyst
BTEXS'D	BTEX Analysis Prep(Date/Time)	10/19 1832	init.	6-5030	NSH
BZ8020S	Benzene	< 0.010	ppm	6-8020	NSH
TOL8020S	Toluene	< 0.010	ppm	6-8020	NSH
EBZ8020S	Ethylbenzene	< 0.010	ppm	6-8020	NSH
XYLSTLs	Total Xylenes	< 0.030	ppm	6-8020	NSH
BTEXTLs	Total BTEX	< 0.060	ppm	6-8020	NSH
aaaTFTs	aaa-TFT (surr)	74.	%	6-8020	NSH
4BFBs	4-BFB (surr)	MI	%	6-8020	NSH
418_1S'D	TPH Analysis Prep(Date/Time)	10/20 2015	init.	6-3550	CJT
TPH'S	TPH(Total Petroleum Hydrocarbon	28	ppm	2-418.1	CJT

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
5. SM: Standard Methods for the Examination of Water and Wastewater, 18th edition.
6. SW: SW-846, Test Methods for Evaluation of Solid Waste, Third edition. Update I, July 1992.

RW 10/21/94
Gary Adkins

TERRA LABORATORIES LTD.

2525 South Shore Blvd. League City, Texas 77573 (713) 334-5052 Fax: (713) 334-3116

CHAIN OF CUSTODY

REPORT TO:				REMIT TO:			
COMPANY	BROWN & CALDWELL			COMPANY	SAME		
ADDRESS	415 LOUISIANA			ADDRESS			
CITY	HOUSTON	STATE TX	ZIP 77002	CITY		STATE	ZIP
ATTN	Ms. LYNN WRIGHT	PHONE 713/759-0999	FAX 713/759-0935	ATTN		PHONE	FAX
Client Comments:				Project Name:	ATOKA 1	P.O. #	
				Turnaround Time	STANDARD	Release #	

ANALYSES REQUESTED

DATE	24HR TIME	MATRIX	COMPOSITE	GRAB	SAMPLE DESCRIPTION	CONTAINERS NUMBER	BTEX 8020	TPH 418.1	TERRA SAMPLE NO.
10/15/94	1030	Soil		X	AT4-WT1-9	1	X	X	94-7196
	1040				AT4-SW-9	1			7197
	1045				AT4-EM-11	1			7198
	1050				AT4-EW-9	1			7199
	1055				AT4-NW-9	1			7200
	1115				NT-2-10	1			7201
	1150				SET-3-10	1			7202
	1230				SWT-1-10	1			7203

Collected by:	Date:	Time:	Received by Terra:	Date:	Time:	Remarks
[signature]	10/15/94	1530	Benny Benge	10-15-94	6:30	3°C Temp AC 10-18-94
Relinquished by: Benny Benge	Date: 10-17-94	Time: 9:00 AM	Received by: Terra [signature]	Date: 10-18-94	Time: 1030	
Relinquished by:	Date:	Time:	Received by:	Date:	Time:	

APPENDIX D

Laboratory Analytical Reports and Chain-of-Custody for Final Confirmation Soil Samples-Expanded Surface Impoundment Excavation

Terra Laboratories, Ltd.
Quality Analytical Services

December 7, 1994

Lynn Wright
Brown and Caldwell
1415 Louisiana, Suite 2500
Houston, TX 77002

Re: Twelve (12) solid samples, and one (1) trip blank (Project Name: Atoka 1) received on 11/22/94

Dear Mr. Wright:

Attached are the final reports of analysis of the samples referenced above as per your analysis and/or method requests.

The samples were received in good condition and at 0 & 2^{o} Centigrade.

We appreciate this opportunity to serve Brown and Caldwell. Please let me, or Linda McKee, know if there is any other way we can help you.

Sincerely,

Larry D. Wallace
Laboratory Director

2525 South Shore Blvd. ♦ League City, Texas 77573 ♦ (713) 334-5052 Fax: (713) 334-3116

TERRA LABORATORIES, LTD.
2525 SOUTH SHORE BLVD, SUITE 100
LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: DEC. 1 1994 Page # 1

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Reviewed by:TMG
Customer#: 309
Job Number:

Attn: Wright, Lynn

Date Collected:11/20/94

Sample Number: 94008255
Project Name: ATOKA 1
Sample ID: I-1 GRAB

Time Collected:0944

Date Received: 11/22/94

Test Code	Analyte	Result	Units	Method	Analyst
BTEXS'D	BTEX Analysis Prep(Date/Time)	11/26 1235	init.	6-5030	NSH
BZ8020S	Benzene	< 0.005	ppm	6-8020	NSH
TOL8020S	Toluene	< 0.005	ppm	6-8020	NSH
EBZ8020S	Ethylbenzene	< 0.005	ppm	6-8020	NSH
XYLSTLs	Total Xylenes	< 0.010	ppm	6-8020	NSH
BTEXTLs	Total BTEX	< 0.025	ppm	6-8020	NSH
aaaTFTs	aaa-TFT (surr)	100.	%	74-121	NSH
4BFBs	4-BFB (surr)	108.	%	75-125	NSH
418_1S'D	TPH Analysis Prep(Date/Time)	11/30 0800	init.	6-3550	AM
TPH'S	TPH(Total Petroleum Hydrocarbon	< 25	ppm	2-418.1	TMG

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
5. SM: Standard Methods for the Examination of Water and Wastewater, 18th edition.
6. SW: SW-846, Test Methods for Evaluation of Solid Waste, Third edition. Update I, July 1992.

12/1/94

TERRA LABORATORIES, LTD.
2525 SOUTH SHORE BLVD, SUITE 100
LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: DEC. 1 1994 Page # 1

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Reviewed by:TMG
Customer#: 309
Job Number:

Attn: Wright, Lynn

Date Collected:11/20/94

Sample Number: 94008256
Project Name: ATOKA 1
Sample ID: I-2 GRAB

Time Collected:0946

Date Received: 11/22/94

Test Code	Analyte	Result	Units	Method	Analyst
BTEXS'D	BTEX Analysis Prep(Date/Time)	11/26 1256	init.	6-5030	NSH
BZ8020S	Benzene	< 0.005	ppm	6-8020	NSH
TOL8020S	Toluene	< 0.005	ppm	6-8020	NSH
EBZ8020S	Ethylbenzene	< 0.005	ppm	6-8020	NSH
XYLSTLs	Total Xylenes	< 0.010	ppm	6-8020	NSH
BTEXTLs	Total BTEX	< 0.025	ppm	6-8020	NSH
aaaTFTs	aaa-TFT (surr)	103.	%	74-121	NSH
4BFBs	4-BFB (surr)	117.	%	75-125	NSH
418_1S'D	TPH Analysis Prep(Date/Time)	11/30 0800	init.	6-3550	AM
TPH'S	TPH(Total Petroleum Hydrocarbon	< 25	ppm	2-418.1	TMG

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
5. SM: Standard Methods for the Examination of Water and Wastewater, 18th edition.
6. SW: SW-846, Test Methods for Evaluation of Solid Waste, Third edition. Update I, July 1992.

12/1/94

TERRA LABORATORIES, LTD.
2525 SOUTH SHORE BLVD, SUITE 100
LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: DEC. 1 1994 Page # 1

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Attn: Wright, Lynn

Reviewed by:TMG
Customer#: 309
Job Number:

Date Collected:11/20/94

Sample Number: 94008257
Project Name: ATOKA 1
Sample ID: I-3 GRAB

Time Collected:0948

Date Received: 11/22/94

Test Code	Analyte	Result	Units	Method	Analyst
BTEXS'D	BTEX Analysis Prep(Date/Time)	11/30 1042	init.	6-5030	NSH
BZ8020S	Benzene	< 2.0	ppm	6-8020	NSH
TOL8020S	Toluene	3.6	ppm	6-8020	NSH
EBZ8020S	Ethylbenzene	7.0	ppm	6-8020	NSH
XYLSTLs	Total Xylenes	71	ppm	6-8020	NSH
BTEXTLs	Total BTEX	< 83.6	ppm	6-8020	NSH
aaaTFTs	aaa-TFT (surr)	MI	%	74-121	NSH
4BFBs	4-BFB (surr)	116.	%	75-125	NSH
418_1S'D	TPH Analysis Prep(Date/Time)	11/30 0800	init.	6-3550	AM
TPH'S	TPH(Total Petroleum Hydrocarbon	3900	ppm	2-418.1	AM

COMMENTS: BTEX Dil.Fx. X 1000

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
5. SM: Standard Methods for the Examination of Water and Wastewater, 18th edition.
6. SW: SW-846, Test Methods for Evaluation of Solid Waste, Third edition. Update I, July 1992.

12/1/94

TERRA LABORATORIES, LTD.
2525 SOUTH SHORE BLVD, SUITE 100
LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: DEC. 1 1994 Page # 1

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Reviewed by:TMG
Customer#: 309
Job Number:

Attn: Wright, Lynn

Date Collected:11/20/94

Sample Number: 94008258
Project Name: ATOKA 1
Sample ID: I-4 GRAB

Time Collected:0950

Date Received: 11/22/94

Test Code	Analyte	Result	Units	Method	Analyst
BTEXS'D	BTEX Analysis Prep(Date/Time)	11/26 1336	init.	6-5030	NSH
BZ8020S	Benzene	< 0.005	ppm	6-8020	NSH
TOL8020S	Toluene	.0100	ppm	6-8020	NSH
EBZ8020S	Ethylbenzene	.017	ppm	6-8020	NSH
XYLSTLs	Total Xylenes	.23	ppm	6-8020	NSH
BTEXTLs	Total BTEX	< 0.262	ppm	6-8020	NSH
aaaTFTs	aaa-TFT (surr)	109.	%	74-121	NSH
4BFBs	4-BFB (surr)	94.	%	75-125	NSH
418_1S'D	TPH Analysis Prep(Date/Time)	11/30 0800	init.	6-3550	AM
TPH'S	TPH(Total Petroleum Hydrocarbon	370	ppm	2-418.1	AM

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
5. SM: Standard Methods for the Examination of Water and Wastewater, 18th edition.
6. SW: SW-846, Test Methods for Evaluation of Solid Waste, Third edition. Update I, July 1992.

Rec 12/1/94

TERRA LABORATORIES, LTD.
2525 SOUTH SHORE BLVD, SUITE 100
LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: DEC. 1 1994 Page # 1

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Reviewed by:TMG
Customer#: 309
Job Number:

Attn: Wright, Lynn

Date Collected:11/20/94

Sample Number: 94008259
Project Name: ATOKA 1
Sample ID: I-5 GRAB

Time Collected:0952

Date Received: 11/22/94

Test Code	Analyte	Result	Units	Method	Analyst
BTEXS'D	BTEX Analysis Prep(Date/Time)	11/30 1356	init.	6-5030	NSH
BZ8020S	Benzene	< 0.10	ppm	6-8020	NSH
TOL8020S	Toluene	.45	ppm	6-8020	NSH
EBZ8020S	Ethylbenzene	.33	ppm	6-8020	NSH
XYLSTLs	Total Xylenes	4.1	ppm	6-8020	NSH
BTEXTLs	Total BTEX	< 4.98	ppm	6-8020	NSH
aaaTFTs	aaa-TFT (surr)	MI	%	74-121	NSH
4BFBs	4-BFB (surr)	101.	%	75-125	NSH
418_1S'D	TPH Analysis Prep(Date/Time)	11/30 0800	init.	6-3550	AM
TPH'S	TPH(Total Petroleum Hydrocarbon	2100	ppm	2-418.1	AM

COMMENTS: BTEX Dil.Fx. X 50

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
5. SM: Standard Methods for the Examination of Water and Wastewater, 18th edition.
6. SW: SW-846, Test Methods for Evaluation of Solid Waste, Third edition. Update I, July 1992.

RW 12/1/94
Larry D. Miller

TERRA LABORATORIES, LTD.
2525 SOUTH SHORE BLVD, SUITE 100
LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: DEC. 1 1994 Page # 1

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Attn: Wright, Lynn

Reviewed by:TMG
Customer#: 309
Job Number:

Date Collected:11/20/94

Sample Number: 94008260
Project Name: ATOKA 1
Sample ID: I-6 GRAB

Time Collected:0954

Date Received: 11/22/94

Test Code	Analyte	Result	Units	Method	Analyst
BTEXS'D	BTEX Analysis Prep(Date/Time)	11/26 1416	init.	6-5030	NSH
BZ8020S	Benzene	< 0.005	ppm	6-8020	NSH
TOL8020S	Toluene	< 0.005	ppm	6-8020	NSH
EBZ8020S	Ethylbenzene	< 0.005	ppm	6-8020	NSH
XYLSTLs	Total Xylenes	.013	ppm	6-8020	NSH
BTEXTLs	Total BTEX	< 0.028	ppm	6-8020	NSH
aaaTFTs	aaa-TFT (surr)	74.	%	74-121	NSH
4BFBs	4-BFB (surr)	80.	%	75-125	NSH
418_1S'D	TPH Analysis Prep(Date/Time)	11/30 0800	init.	6-3550	AM
TPH'S	TPH(Total Petroleum Hydrocarbon	270	ppm	2-418.1	AM

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
5. SM: Standard Methods for the Examination of Water and Wastewater, 18th edition.
6. SW: SW-846, Test Methods for Evaluation of Solid Waste, Third edition. Update I, July 1992.

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LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: DEC. 1 1994 Page # 1

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Reviewed by:TMG
Customer#: 309
Job Number:

Attn: Wright, Lynn

Date Collected:11/20/94

Sample Number: 94008261
Project Name: ATOKA 1
Sample ID: I-8 GRAB

Time Collected:0958

Date Received: 11/22/94

Test Code	Analyte	Result	Units	Method	Analyst
BTEXS'D	BTEX Analysis Prep(Date/Time)	11/26 1436	init.	6-5030	NSH
BZ8020S	Benzene	< 0.005	ppm	6-8020	NSH
TOL8020S	Toluene	< 0.005	ppm	6-8020	NSH
EBZ8020S	Ethylbenzene	< 0.005	ppm	6-8020	NSH
XYLSTLs	Total Xylenes	< 0.010	ppm	6-8020	NSH
BTEXTLs	Total BTEX	< 0.025	ppm	6-8020	NSH
aaaTFTs	aaa-TFT (surr)	95.	%	74-121	NSH
4BFBs	4-BFB (surr)	108.	%	75-125	NSH
418_1S'D	TPH Analysis Prep(Date/Time)	11/30 0800	init.	6-3550	AM
TPH'S	TPH(Total Petroleum Hydrocarbon	< 25	ppm	2-418.1	TMG

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
5. SM: Standard Methods for the Examination of Water and Wastewater, 18th edition.
6. SW: SW-846, Test Methods for Evaluation of Solid Waste, Third edition. Update I, July 1992.

Rev 12/1/94

APPENDIX E

Laboratory Analytical Results and Chain-of-Custody for Initial Confirmation Soil Samples-AT1-4 Excavation

TERRA LABORATORIES, LTD.
2525 SOUTH SHORE BLVD, SUITE 100
LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: OCT. 21 1994 Page # 1

Enron Oil & Gas Company
P.O. Box 1188
Houston , TX 77251-1188

Reviewed by:JMH
Customer#: 169
Job Number:

Attn: GEORGE ROBINSON

Date Collected:10/15/94

Sample Number: 94007196
Project Name: ATOKAL
Sample ID: AT4-WT1-9

Time Collected:1030

Date Received: 10/18/94

Test Code	Analyte	Result	Units	Method	Analyst
BTEXS'D	BTEX Analysis Prep(Date/Time)	10/19 1733	init.	6-5030	NSH
BZ8020S	Benzene	< 0.010	ppm	6-8020	NSH
TOL8020S	Toluene	< 0.010	ppm	6-8020	NSH
EBZ8020S	Ethylbenzene	< 0.010	ppm	6-8020	NSH
XYLSTLs	Total Xylenes	< 0.030	ppm	6-8020	NSH
BTEXTLs	Total BTEX	< 0.060	ppm	6-8020	NSH
aaaTFTs	aaa-TFT (surr)	92.	%	6-8020	NSH
4BFBs	4-BFB (surr)	91.	%	6-8020	NSH
418_1S'D	TPH Analysis Prep(Date/Time)	10/20 2015	init.	6-3550	CJT
TPH'S	TPH(Total Petroleum Hydrocarbon	< 25	ppm	2-418.1	CJT

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
5. SM: Standard Methods for the Examination of Water and Wastewater, 18th edition.
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RW 10/21/94
Barry D. Wilson

TERRA LABORATORIES, LTD.
2525 SOUTH SHORE BLVD, SUITE 100
LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: OCT. 21 1994 Page # 1

Enron Oil & Gas Company
P.O. Box 1188
Houston , TX 77251-1188

Reviewed by:JMH
Customer#: 169
Job Number:

Attn: GEORGE ROBINSON

Date Collected:10/15/94

Sample Number: 94007197
Project Name: ATOKAL
Sample ID: AT4-SW-9

Time Collected:1040

Date Received: 10/18/94

Test Code	Analyte	Result	Units	Method	Analyst
BTEXS'D	BTEX Analysis Prep(Date/Time)	10/19 1535	init.	6-5030	NSH
BZ8020S	Benzene	< 0.020	ppm	6-8020	NSH
TOL8020S	Toluene	< 0.020	ppm	6-8020	NSH
EBZ8020S	Ethylbenzene	< 0.020	ppm	6-8020	NSH
XYLSTLs	Total Xylenes	< 0.060	ppm	6-8020	NSH
BTEXTLs	Total BTEX	< 0.120	ppm	6-8020	NSH
aaaTFTs	aaa-TFT (surr)	96.	%	6-8020	NSH
4BFBs	4-BFB (surr)	95.	%	6-8020	NSH
418_1S'D	TPH Analysis Prep(Date/Time)	10/20 2015	init.	6-3550	CJT
TPH'S	TPH(Total Petroleum Hydrocarbon	< 25	ppm	2-418.1	CJT

COMMENTS: BTEX Dil.Fx. X 5

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
5. SM: Standard Methods for the Examination of Water and Wastewater, 18th edition.
6. SW: SW-846, Test Methods for Evaluation of Solid Waste, Third edition. Update I, July 1992.

10/21/94
Larry D. Miller

TERRA LABORATORIES, LTD.
2525 SOUTH SHORE BLVD, SUITE 100
LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: OCT. 21 1994 Page # 1

Enron Oil & Gas Company
P.O. Box 1188
Houston , TX 77251-1188

Reviewed by:JMH
Customer#: 169
Job Number:

Attn: GEORGE ROBINSON

Date Collected:10/15/94

Sample Number: 94007198
Project Name: ATOKAL
Sample ID: AT4-FM-11

Time Collected:1045

Date Received: 10/18/94

Test Code	Analyte	Result	Units	Method	Analyst
BTEXS'D	BTEX Analysis Prep(Date/Time)	10/19 1614	init.	6-5030	NSH
BZ8020S	Benzene	< 4.0	ppm	6-8020	NSH
TOL8020S	Toluene	18	ppm	6-8020	NSH
EBZ8020S	Ethylbenzene	8.0	ppm	6-8020	NSH
XYLSTLs	Total Xylenes	69	ppm	6-8020	NSH
BTEXTLs	Total BTEX	< 99.0	ppm	6-8020	NSH
aaaTFTs	aaa-TFT (surr)	107.	%	6-8020	NSH
4BFBs	4-BFB (surr)	102.	%	6-8020	NSH
418_1S'D	TPH Analysis Prep(Date/Time)	10/20 2015	init.	6-3550	CJT
TPH'S	TPH(Total Petroleum Hydrocarbon	2700	ppm	2-418.1	CJT

COMMENTS: BTEX Dil.Fx. X 100

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
5. SM: Standard Methods for the Examination of Water and Wastewater, 18th edition.
6. SW: SW-846, Test Methods for Evaluation of Solid Waste, Third edition. Update I, July 1992.

RW 10/21/94

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2525 SOUTH SHORE BLVD, SUITE 100
LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: OCT. 21 1994 Page # 1

Enron Oil & Gas Company
P.O. Box 1188
Houston , TX 77251-1188

Reviewed by:JMH
Customer#: 169
Job Number:

Attn: GEORGE ROBINSON

Date Collected:10/15/94

Sample Number: 94007199
Project Name: ATOKAL
Sample ID: AT4-EW-9

Time Collected:1050

Date Received: 10/18/94

Test Code	Analyte	Result	Units	Method	Analyst
BTEXS'D	BTEX Analysis Prep(Date/Time)	10/19 1634	init.	6-5030	NSH
BZ8020S	Benzene	< 4.0	ppm	6-8020	NSH
TOL8020S	Toluene	41	ppm	6-8020	NSH
EBZ8020S	Ethylbenzene	14	ppm	6-8020	NSH
XYLSTLs	Total Xylenes	110	ppm	6-8020	NSH
BTEXTLs	Total BTEX	< 169	ppm	6-8020	TMG
aaaTFTs	aaa-TFT (surr)	MI	%	6-8020	NSH
4BFBs	4-BFB (surr)	104.	%	6-8020	NSH
418_1S'D	TPH Analysis Prep(Date/Time)	10/20 2015	init.	6-3550	CJT
TPH'S	TPH(Total Petroleum Hydrocarbon	25000	ppm	2-418.1	CJT

COMMENTS: BTEX Dil.Fx. X 1000

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
5. SM: Standard Methods for the Examination of Water and Wastewater, 18th edition.
6. SW: SW-846, Test Methods for Evaluation of Solid Waste, Third edition. Update I, July 1992.

RW 10/21/94
Larry Dillon

TERRA LABORATORIES, LTD.
2525 SOUTH SHORE BLVD, SUITE 100
LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: OCT. 21 1994 Page # 1

Enron Oil & Gas Company
P.O. Box 1188
Houston , TX 77251-1188

Reviewed by:JMH
Customer#: 169
Job Number:

Attn: GEORGE ROBINSON

Date Collected:10/15/94

Sample Number: 94007200
Project Name: ATOKAL
Sample ID: AT4-NW-9

Time Collected:1055

Date Received: 10/18/94

Test Code	Analyte	Result	Units	Method	Analyst
BTEXS'D	BTEX Analysis Prep(Date/Time)	10/19 1654	init.	6-5030	NSH
BZ8020S	Benzene	< 4.0	ppm	6-8020	NSH
TOL8020S	Toluene	26	ppm	6-8020	NSH
EBZ8020S	Ethylbenzene	11	ppm	6-8020	NSH
XYLSTLs	Total Xylenes	93	ppm	6-8020	NSH
BTEXTLs	Total BTEX	< 134.0	ppm	6-8020	NSH
aaaTFTs	aaa-TFT (surr)	109.	%	6-8020	NSH
4BFBs	4-BFB (surr)	102.	%	6-8020	NSH
418_1S'D	TPH Analysis Prep(Date/Time)	10/20 2015	init.	6-3550	CJT
TPH'S	TPH(Total Petroleum Hydrocarbon	3100	ppm	2-418.1	CJT

COMMENTS: BTEX Dil.Fx. X 1000

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
5. SM: Standard Methods for the Examination of Water and Wastewater, 18th edition.
6. SW: SW-846, Test Methods for Evaluation of Solid Waste, Third edition. Update I, July 1992.

RW 10/21/94
Larry Dillman

TERRA LABORATORIES LTD.

2525 South Shore Blvd. League City, Texas 77573 (713) 334-5052 Fax: (713) 334-3116

CHAIN OF CUSTODY

REPORT TO:			REMIT TO:		
COMPANY: Brown & Caldwell			COMPANY: SAME		
ADDRESS: 415 Louisiana			ADDRESS:		
CITY: Houston	STATE: TX	ZIP: 77002	CITY:	STATE:	ZIP:
ATTN: Ms. Lynn Wright	PHONE: 713/759-0999	FAX: 713/759-0952	ATTN:	PHONE:	FAX:
Client Comments:			Project Name: Atoka 1	P.O. #	
			Turnaround Time: STANDARD	Release #	

ANALYSES REQUESTED

DATE	24HR TIME	MATRIX	COMPOSITE	GRAB	SAMPLE DESCRIPTION	CONTAINERS NUMBER	BTEX 8020	TPH 418.1	TERRA SAMPLE NO.
10/5/94	1030	Soil		X	AT4-WT1-9	1	X	X	94-7196
	1040				AT4-SW-9	1			7197
	1045				AT4-EM-11	1			7198
	1050				AT4-EW-9	1			7199
	1055				AT4-NW-9	1			7200
	1115				NT-2-10	1			7201
	1150				SET-3-10	1			7202
	1230				SWT-1-10	1			7203

Collected by:	Date: 10/15/94	Time: 1530	Received by Terra: Benny Benge	Date: 10-15-94	Time: 5:30	Remarks: 3°C Temp AC 10-18-94	
Relinquished by: Benny Benge	Date: 10-17-94	Time: 9:00 AM	Received by: Terra	Date: 10-18-94	Time: 1030		
Relinquished by:	Date:	Time:	Received by:	Date:	Time:		

APPENDIX F

Laboratory Analytical Reports and Chain-of-Custody for Final Confirmation Soil Samples-AT1-4 Excavation

TERRA LABORATORIES, LTD.
2525 SOUTH SHORE BLVD, SUITE 100
LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: DEC. 1 1994 Page # 1

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Attn: Wright, Lynn

Sample Number: 94008267
Project Name: ATOKA-1
Sample ID: TB-2

Reviewed by:TMG
Customer#: 309
Job Number:

Date Collected:11/21/94

Time Collected:1125

Date Received: 11/22/94

Test Code	Analyte	Result	Units	Method	Analyst
BTEXW'D	BTEX Analysis Prep(Date/Time)	11/29 1443	init.	6-5030	NSH
BZ8020W	Benzene	< 0.002	ppm	6-8020	NSH
TOL8020W	Toluene	< 0.002	ppm	6-8020	NSH
EBZ8020W	Ethylbenzene	< 0.002	ppm	6-8020	NSH
XYLSTLw	Total Xylenes	< 0.004	ppm	6-8020	NSH
BTEXTLw	Total BTEX	< 0.010	ppm	6-8020	NSH
aaaTFTw	aaa-TFT (surr)	MI	%	86-115	TMG
4BFBw	4-BFB (surr)	87.	%	86-115	NSH

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
5. SM: Standard Methods for the Examination of Water and Wastewater, 18th edition.
6. SW: SW-846, Test Methods for Evaluation of Solid Waste, Third edition. Update I, July 1992.

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TERRA LABORATORIES, LTD.
2525 SOUTH SHORE BLVD, SUITE 100
LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: DEC. 1 1994 Page # 1

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Reviewed by:TMG
Customer#: 309
Job Number:

Attn: Wright, Lynn

Date Collected:11/20/94

Sample Number: 94008262
Project Name: ATOKA 1
Sample ID: B-2 GRAB

Time Collected:0940

Date Received: 11/22/94

Test Code	Analyte	Result	Units	Method	Analyst
BTEXS'D	BTEX Analysis Prep(Date/Time)	11/27 0956	init.	6-5030	NSH
BZ8020S	Benzene	< 0.005	ppm	6-8020	NSH
TOL8020S	Toluene	< 0.005	ppm	6-8020	NSH
EBZ8020S	Ethylbenzene	< 0.005	ppm	6-8020	NSH
XYLSTLs	Total Xylenes	< 0.010	ppm	6-8020	NSH
BTEXTLs	Total BTEX	< 0.025	ppm	6-8020	NSH
aaaTFTs	aaa-TFT (surr)	107.	%	74-121	NSH
4BFBs	4-BFB (surr)	109.	%	75-125	NSH
418_1S'D	TPH Analysis Prep(Date/Time)	11/30 0800	init.	6-3550	AM
TPH'S	TPH(Total Petroleum Hydrocarbon	< 25	ppm	2-418.1	TMG

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
5. SM: Standard Methods for the Examination of Water and Wastewater, 18th edition.
6. SW: SW-846, Test Methods for Evaluation of Solid Waste, Third edition. Update I, July 1992.

Rw 12/1/94
Larry D. Williams

TERRA LABORATORIES, LTD.
2525 SOUTH SHORE BLVD, SUITE 100
LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: DEC. 1 1994 Page # 1

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Reviewed by:TMG
Customer#: 309
Job Number:

Attn: Wright, Lynn

Date Collected:11/20/94

Sample Number: 94008263
Project Name: ATOKA 1
Sample ID: B-3 GRAB

Time Collected:0942

Date Received: 11/22/94

Test Code	Analyte	Result	Units	Method	Analyst
BTEXS'D	BTEX Analysis Prep(Date/Time)	11/26 1556	init.	6-5030	NSH
BZ8020S	Benzene	< 0.005	ppm	6-8020	NSH
TOL8020S	Toluene	< 0.005	ppm	6-8020	NSH
EBZ8020S	Ethylbenzene	< 0.005	ppm	6-8020	NSH
XYLSTLs	Total Xylenes	< 0.010	ppm	6-8020	NSH
BTEXTLs	Total BTEX	< 0.025	ppm	6-8020	NSH
aaaTFTs	aaa-TFT (surr)	95.	%	74-121	NSH
4BFBs	4-BFB (surr)	112.	%	75-125	NSH
418_1S'D	TPH Analysis Prep(Date/Time)	11/30 0800	init.	6-3550	AM
TPH'S	TPH(Total Petroleum Hydrocarbon	< 25	ppm	2-418.1	TMG

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
5. SM: Standard Methods for the Examination of Water and Wastewater, 18th edition.
6. SW: SW-846, Test Methods for Evaluation of Solid Waste, Third edition. Update I, July 1992.

12/1/94

TERRA LABORATORIES, LTD.
2525 SOUTH SHORE BLVD, SUITE 100
LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: DEC. 1 1994 Page # 1

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Attn: Wright, Lynn

Reviewed by:TMG
Customer#: 309
Job Number:

Date Collected:11/20/94

Time Collected:1002

Date Received: 11/22/94

Sample Number: 94008265
Project Name: ATOKA-1
Sample ID: B-5

Test Code	Analyte	Result	Units	Method	Analyst
BTEXS'D	BTEX Analysis Prep(Date/Time)	11/27 0932	init.	6-5030	NSH
BZ8020S	Benzene	< 0.005	ppm	6-8020	NSH
TOL8020S	Toluene	< 0.005	ppm	6-8020	NSH
EBZ8020S	Ethylbenzene	< 0.005	ppm	6-8020	NSH
XYLSTLs	Total Xylenes	< 0.010	ppm	6-8020	NSH
BTEXTLs	Total BTEX	< 0.025	ppm	6-8020	NSH
aaaTFTs	aaa-TFT (surr)	104.	%	74-121	NSH
4BFBs	4-BFB (surr)	117.	%	75-125	NSH
418_1S'D	TPH Analysis Prep(Date/Time)	11/30 0800	init.	6-3550	AM
TPH'S	TPH(Total Petroleum Hydrocarbon	< 25	ppm	2-418.1	TMG

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
5. SM: Standard Methods for the Examination of Water and Wastewater, 18th edition.
6. SW: SW-846, Test Methods for Evaluation of Solid Waste, Third edition. Update I, July 1992.

Rev 12/1/94
Larry D. Wilson

TERRA LABORATORIES, LTD.
2525 SOUTH SHORE BLVD, SUITE 100
LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: DEC. 1 1994 Page # 1

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Reviewed by:TMG
Customer#: 309
Job Number:

Attn: Wright, Lynn

Date Collected:11/20/94

Sample Number: 94008264
Project Name: ATOKA-1
Sample ID: B-4

Time Collected:1000

Date Received: 11/22/94

Test Code	Analyte	Result	Units	Method	Analyst
BTEXS'D	BTEX Analysis Prep(Date/Time)	11/26 1616	init.	6-5030	NSH
BZ8020S	Benzene	< 0.005	ppm	6-8020	NSH
TOL8020S	Toluene	< 0.005	ppm	6-8020	NSH
EBZ8020S	Ethylbenzene	< 0.005	ppm	6-8020	NSH
XYLSTLs	Total Xylenes	.019	ppm	6-8020	NSH
BTEXTLs	Total BTEX	< 0.034	ppm	6-8020	NSH
aaaTFTs	aaa-TFT (surr)	90.	%	74-121	NSH
4BFBs	4-BFB (surr)	96.	%	75-125	NSH
418_1S'D	TPH Analysis Prep(Date/Time)	11/30 0800	init.	6-3550	AM
TPH'S	TPH(Total Petroleum Hydrocarbon	830	ppm	2-418.1	AM

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
5. SM: Standard Methods for the Examination of Water and Wastewater, 18th edition.
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12/1/94

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LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: DEC. 1 1994 Page # 1

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Reviewed by:TMG
Customer#: 309
Job Number:

Attn: Wright, Lynn

Date Collected:11/20/94

Sample Number: 94008266
Project Name: ATOKA-1
Sample ID: B-6

Time Collected:1004

Date Received: 11/22/94

Test Code	Analyte	Result	Units	Method	Analyst
BTEXS'D	BTEX Analysis Prep(Date/Time)	11/26 1736	init.	6-5030	NSH
BZ8020S	Benzene	< 0.005	ppm	6-8020	NSH
TOL8020S	Toluene	< 0.005	ppm	6-8020	NSH
EBZ8020S	Ethylbenzene	< 0.005	ppm	6-8020	NSH
XYLSTLs	Total Xylenes	< 0.010	ppm	6-8020	NSH
BTEXTLs	Total BTEX	< 0.025	ppm	6-8020	NSH
aaaTFTs	aaa-TFT (surr)	100.	%	74-121	NSH
4BFBs	4-BFB (surr)	113.	%	75-125	NSH
418_1S'D	TPH Analysis Prep(Date/Time)	11/30 0800	init.	6-3550	AM
TPH'S	TPH(Total Petroleum Hydrocarbon	25	ppm	2-418.1	AM

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
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12/1/94

QUALITY CONTROL REPORT

Report To: Brown and Caldwell
Terra Laboratories Sample No(s). 94008255 - 94008267

			Precision			Accuracy	
Analyte	Units	Blank	Orig	Dup	RPD(%)	MSR(%)	LCSR(%)
BTEX (Batch 112694S) Sample No. 94008264 Spike							
MTBE	ppb	< 5	20	15	28.6*	100	
Benzene	ppb	< 5	15	9	50*	75	90
Toluene	ppb	< 5	14	9	43*	70	91
Ethylbenzene	ppb	< 5	14	9	43*	70	85
Xylenes	ppb	< 10	53	33	46*	76	89
*Spike duplicate-had difficulty purging							
TPH (Batch B113094S)							
Sample No. 94008256	mg/kg	< 25	< 25	< 25	-		95
Sample No. 94008265	mg/kg	< 25	< 25	< 25	-		95
BTEX MeOH (Batch 113094S) 94008186 Spike							
Benzene	ppb	< 5	23	24	4	96	90
Toluene	ppb	< 5	27	27	0	80	95
Ethylbenzene	ppb	< 5	32	35	9	92	95
Xylenes	ppb	< 10	111	126	13	99	110
BTEX (Batch 112794S) Sample No. 94008264 Spike							
MTBE	ppb	< 5	22	21	5	105	
Benzene	ppb	< 5	18	18	0	90	98
Toluene	ppb	< 5	17	18	6	90	101
Ethylbenzene	ppb	< 5	16	16	0	80	90
Xylenes	ppb	< 10	49	55	8	75	98
BTEX (Batch 112994W) Sample No. 94008342 Spike							
MTBE	ppb	< 4	19	21	10	105	
Benzene	ppb	< 4	18	19	5	95	100
Toluene	ppb	< 4	20	20	0	100	100
Ethylbenzene	ppb	< 4	18	19	5	95	100
Xylene	ppb	< 12	56	58	4	97	102

12/7/94
Larry D. Sullivan

TERRA LABORATORIES LTD.

2525 South Shore Blvd. League City, Texas 77573 (713) 334-5052 Fax: (713) 334-3116

CHAIN OF CUSTODY

REPORT TO:			REMIT TO:		
COMPANY: Brown & Caldwell			COMPANY: Same		
ADDRESS: 1415 Louisiana, Ste. 2500			ADDRESS:		
CITY: Houston	STATE: TX	ZIP: 77002	CITY:	STATE:	ZIP:
ATTN: Mr. Lynn Wright	PHONE: 713/759-0999	FAX: 713/759-0999	ATTN:	PHONE:	FAX:
Client Comments:			Project Name: Atoka 1	P.O. #	
			Turnaround Time: Std.	Release #	

ANALYSES REQUESTED

DATE	24HR TIME	MATRIX	COMPOSITE	GRAB	SAMPLE DESCRIPTION	CONTAINERS NUMBER	BTEX 8020	TPH 418.1	TERRA SAMPLE NO.
11/20/94	944	Soil		X	I-1	2	X	X	94 - 8255
	946				I-2	1	X	X	- 8256
	948				I-3		X	X	- 8257
	950				I-4		X	X	- 8258
	952				I-5		X	X	- 8259
	954				I-6		X	X	- 8260
	958				I-8		X	X	- 8261
	940				B-2		X	X	- 8262
	942				B-3		X	X	- 8263
↓	1000	↓		↓	B-4	↓	X	X	↓ - 8264

Collected by: [signature]	Date: 11/21/94	Time: 1140	Received by Terra: FED EX	Date:	Time:	Remarks: 0°C, 2°C Temp ok 11-22-94
Relinquished by:	Date:	Time:	Received by: [signature]	Date: 11-22-94	Time: 0945	
Relinquished by:	Date:	Time:	Received by:	Date:	Time:	

TERRA LABORATORIES LTD.

2525 South Shore Blvd. League City, Texas 77573 (713) 334-5052 Fax: (713) 334-3116

PAGE 1 OF 1

CHAIN OF CUSTODY

REPORT TO:			REMIT TO:		
COMPANY: BROWN AND CALDWELL			COMPANY: SAME		
ADDRESS: 1415 LOUISIANA, STE. 2500			ADDRESS:		
CITY: HOUSTON	STATE: TX	ZIP: 77002	CITY:	STATE:	ZIP:
ATTN: Mr. Lynn Wright	PHONE: 713/754-0999	FAX: 713/754-0952	ATTN:	PHONE:	FAX:
Client Comments:			Project Name: TOKAY 1	P.O. #	
			Turnaround Time: Standard	Release #	

ANALYSES REQUESTED

DATE	24HR TIME	MATRIX	COMPOSITE	GRAB	SAMPLE DESCRIPTION	NUMBER OF CONTAINERS	BTEX 8020	TPH 418.1	TERRA SAMPLE NO.
11/20/94	1002	Soil			B-5	2	X	X	94-8265
11/20/94	1004	Soil			B-6	2	X	X	94-8266
11/21/94	1125	W		X	~~TB~~ TB-2	2	X		94-8267

Collected by: Julie Cooper	Date: 11/21/94	Time: 1155	Received by Terra: FED EX	Date:	Time:	Remarks: 0°C, 2°C Temp HC 11-22-94
Relinquished by:	Date:	Time:	Received by:	Date: 11-22-94	Time: 0945	
Relinquished by:	Date:	Time:	Received by:	Date:	Time:	

APPENDIX G

Laboratory Analytical Reports and Chain-of-Custody for Soil Boring Soil Samples

Terra Laboratories, Ltd.
Quality Analytical Services

December 7, 1994

Lynn Wright
Brown and Caldwell
1415 Louisiana, Suite 2500
Houston, TX 77002

Re: Ten (10) solid samples, and one (1) trip blank (Project Name: Atoka 1) received on 11/22/94

Dear Mr. Wright:

Attached are the final reports of analysis of the samples referenced above as per your analysis and/or method requests.

The samples were received in good condition and at 0^{o} Centigrade.

We appreciate this opportunity to serve Brown and Caldwell. Please let me, or Linda McKee, know if there is any other way we can help you.

Sincerely,

Larry D. Wallace
Laboratory Director

2525 South Shore Blvd. ♦ League City, Texas 77573 ♦ (713) 334-5052 Fax: (713) 334-3116

TERRA LABORATORIES, LTD.
2525 SOUTH SHORE BLVD, SUITE 100
LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: DEC. 1 1994 Page # 1

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Reviewed by:TMG
Customer#: 309
Job Number:

Attn: Wright, Lynn

Date Collected:11/16/94

Sample Number: 94008244
Project Name: ATOKA 1
Sample ID: AT1-11-10 (61-65) GRAB

Time Collected:1100

Date Received: 11/22/94

Test Code	Analyte	Result	Units	Method	Analyst
BTEXS'D	BTEX Analysis Prep(Date/Time)	11/24 1715	init.	6-5030	SAK
BZ8020S	Benzene	.088	ppm	6-8020	SAK
TOL8020S	Toluene	.040	ppm	6-8020	SAK
EBZ8020S	Ethylbenzene	< 0.005	ppm	6-8020	SAK
XYLSTLs	Total Xylenes	< 0.021	ppm	6-8020	SAK
BTEXTLs	Total BTEX	< 0.154	ppm	6-8020	TMG
aaaTFTs	aaa-TFT (surr)	91.	%	74-121	SAK
4BFBs	4-BFB (surr)	95.	%	75-125	SAK
418_1S'D	TPH Analysis Prep(Date/Time)	11/29 0745	init.	6-3550	MLC
TPH'S	TPH(Total Petroleum Hydrocarbon	130	ppm	2-418.1	MLC

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
5. SM: Standard Methods for the Examination of Water and Wastewater, 18th edition.
6. SW: SW-846, Test Methods for Evaluation of Solid Waste, Third edition. Update I, July 1992.

12/1/94

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LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: DEC. 1 1994 Page # 1

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Reviewed by:TMG
Customer#: 309
Job Number:

Attn: Wright, Lynn

Date Collected:11/19/94

Sample Number: 94008245
Project Name: ATOKA 1
Sample ID: AT1-11-14 (99-101) GRAB

Time Collected:1635
Date Received: 11/22/94

Test Code	Analyte	Result	Units	Method	Analyst
BTEXS'D	BTEX Analysis Prep(Date/Time)	11/24 1735	init.	6-5030	SAK
BZ8020S	Benzene	.010	ppm	6-8020	TMG
TOL8020S	Toluene	< 0.005	ppm	6-8020	SAK
EBZ8020S	Ethylbenzene	< 0.005	ppm	6-8020	SAK
XYLSTLs	Total Xylenes	< 0.010	ppm	6-8020	SAK
BTEXTLs	Total BTEX	< 0.030	ppm	6-8020	SAK
aaaTFTs	aaa-TFT (surr)	92.	%	74-121	SAK
4BFBs	4-BFB (surr)	106.	%	75-125	SAK
418_1S'D	TPH Analysis Prep(Date/Time)	11/29 0745	init.	6-3550	MLC
TPH'S	TPH(Total Petroleum Hydrocarbon	41	ppm	2-418.1	MLC

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
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Rw 12/1/94
Larry Dillon

TERRA LABORATORIES, LTD.
2525 SOUTH SHORE BLVD, SUITE 100
LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: DEC. 1 1994 Page # 1

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Reviewed by:TMG
Customer#: 309
Job Number:

Attn: Wright, Lynn

Date Collected:11/17/94

Sample Number: 94008246
Project Name: ATOKA 1
Sample ID: AT1-12-9 (69-71) GRAB

Time Collected:1030

Date Received: 11/22/94

Test Code	Analyte	Result	Units	Method	Analyst
BTEXS'D	BTEX Analysis Prep(Date/Time)	11/24 1755	init.	6-5030	SAK
BZ8020S	Benzene	.007	ppm	6-8020	TMG
TOL8020S	Toluene	< 0.005	ppm	6-8020	SAK
EBZ8020S	Ethylbenzene	< 0.005	ppm	6-8020	SAK
XYLSTLs	Total Xylenes	< 0.010	ppm	6-8020	SAK
BTEXTLs	Total BTEX	< 0.027	ppm	6-8020	SAK
aaaTFTs	aaa-TFT (surr)	98.	%	74-121	SAK
4BFBs	4-BFB (surr)	89.	%	75-125	SAK
418_1S'D	TPH Analysis Prep(Date/Time)	11/29 0745	init.	6-3550	MLC
TPH'S	TPH(Total Petroleum Hydrocarbon	<25	ppm	2-418.1	MLC

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
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LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: DEC. 1 1994 Page # 1

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Reviewed by:TMG
Customer#: 309
Job Number:

Attn: Wright, Lynn

Date Collected:11/17/94

Sample Number: 94008247
Project Name: ATOKA 1
Sample ID: AT1-12-12 (99-101) GRAB

Time Collected:1510

Date Received: 11/22/94

Test Code	Analyte	Result	Units	Method	Analyst
BTEXS'D	BTEX Analysis Prep(Date/Time)	11/24 1814	init.	6-5030	SAK
BZ8020S	Benzene	.055	ppm	6-8020	SAK
TOL8020S	Toluene	< 0.005	ppm	6-8020	SAK
EBZ8020S	Ethylbenzene	< 0.005	ppm	6-8020	SAK
XYLSTLs	Total Xylenes	< 0.010	ppm	6-8020	SAK
BTEXTLs	Total BTEX	< 0.075	ppm	6-8020	SAK
aaaTFTs	aaa-TFT (surr)	88.	%	74-121	SAK
4BFBs	4-BFB (surr)	99.	%	75-125	SAK
418_1S'D	TPH Analysis Prep(Date/Time)	11/29 0745	init.	6-3550	MLC
TPH'S	TPH(Total Petroleum Hydrocarbon	<25	ppm	2-418.1	MLC

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
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713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: DEC. 1 1994 Page # 1

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Reviewed by:TMG
Customer#: 309
Job Number:

Attn: Wright, Lynn

Date Collected:11/18/94

Sample Number: 94008248
Project Name: ATOKA 1
Sample ID: AT1-13-6 (69-71) GRAB

Time Collected:1645

Date Received: 11/22/94

Test Code	Analyte	Result	Units	Method	Analyst
BTEXS'D	BTEX Analysis Prep(Date/Time)	11/24 1834	init.	6-5030	SAK
BZ8020S	Benzene	.012	ppm	6-8020	SAK
TOL8020S	Toluene	< 0.005	ppm	6-8020	SAK
EBZ8020S	Ethylbenzene	< 0.005	ppm	6-8020	SAK
XYLSTLs	Total Xylenes	< 0.010	ppm	6-8020	SAK
BTEXTLs	Total BTEX	< 0.025	ppm	6-8020	SAK
aaaTFTs	aaa-TFT (surr)	95.	%	74-121	SAK
4BFBs	4-BFB (surr)	109.	%	75-125	SAK
418_1S'D	TPH Analysis Prep(Date/Time)	11/30 0800	init.	6-3550	AM
TPH'S	TPH(Total Petroleum Hydrocarbon	< 25	ppm	2-418.1	TMG

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
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12/1/94

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713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: DEC. 1 1994 Page # 1

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Reviewed by:TMG
Customer#: 309
Job Number:

Attn: Wright, Lynn

Date Collected:11/19/94

Sample Number: 94008249
Project Name: ATOKA 1
Sample ID: AT1-13-9 (99-101) GRAB

Time Collected:0825
Date Received: 11/22/94

Test Code	Analyte	Result	Units	Method	Analyst
BTEXS'D	BTEX Analysis Prep(Date/Time)	11/24 1854	init.	6-5030	SAK
BZ8020S	Benzene	.008	ppm	6-8020	TMG
TOL8020S	Toluene	< 0.005	ppm	6-8020	SAK
EBZ8020S	Ethylbenzene	< 0.005	ppm	6-8020	SAK
XYLSTLs	Total Xylenes	< 0.010	ppm	6-8020	SAK
BTEXTLs	Total BTEX	< 0.028	ppm	6-8020	SAK
aaaTFTs	aaa-TFT (surr)	87.	%	74-121	SAK
4BFBs	4-BFB (surr)	99.	%	75-125	SAK
418_1S'D	TPH Analysis Prep(Date/Time)	11/30 0800	init.	6-3550	AM
TPH'S	TPH(Total Petroleum Hydrocarbon	< 25	ppm	2-418.1	TMG

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
5. SM: Standard Methods for the Examination of Water and Wastewater, 18th edition.
6. SW: SW-846, Test Methods for Evaluation of Solid Waste, Third edition. Update I, July 1992.

Rw 12/1/94
Larry D Hillhouse

TERRA LABORATORIES, LTD.
2525 SOUTH SHORE BLVD, SUITE 100
LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: DEC. 1 1994 Page # 1

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Reviewed by:TMG
Customer#: 309
Job Number:

Attn: Wright, Lynn

Date Collected:11/20/94

Sample Number: 94008250
Project Name: ATOKA 1
Sample ID: AT1-14-5 (49-51) GRAB

Time Collected:1015
Date Received: 11/22/94

Test Code	Analyte	Result	Units	Method	Analyst
BTEXS'D	BTEX Analysis Prep(Date/Time)	11/24 1913	init.	6-5030	SAK
BZ8020S	Benzene	.015	ppm	6-8020	SAK
TOL8020S	Toluene	< 0.005	ppm	6-8020	SAK
EBZ8020S	Ethylbenzene	< 0.005	ppm	6-8020	SAK
XYLSTLs	Total Xylenes	< 0.010	ppm	6-8020	SAK
BTEXTLs	Total BTEX	< 0.035	ppm	6-8020	SAK
aaaTFTs	aaa-TFT (surr)	96.	%	74-121	SAK
4BFBs	4-BFB (surr)	109.	%	75-125	SAK
418_1S'D	TPH Analysis Prep(Date/Time)	11/30 0800	init.	6-3550	AM
TPH'S	TPH(Total Petroleum Hydrocarbon	< 25	ppm	2-418.1	TMG

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
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RW 12/1/94

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LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: DEC. 1 1994 Page # 1

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Reviewed by:TMG
Customer#: 309
Job Number:

Attn: Wright, Lynn

Date Collected:11/20/94

Sample Number: 94008251
Project Name: ATOKA 1
Sample ID: AT1-14-7 (69-71) GRAB

Time Collected:1150
Date Received: 11/22/94

Test Code	Analyte	Result	Units	Method	Analyst
BTEXS'D	BTEX Analysis Prep(Date/Time)	11/24 1933	init.	6-5030	SAK
BZ8020S	Benzene	< 0.005	ppm	6-8020	SAK
TOL8020S	Toluene	0.005	ppm	6-8020	TMG
EBZ8020S	Ethylbenzene	< 0.005	ppm	6-8020	SAK
XYLSTLs	Total Xylenes	< 0.010	ppm	6-8020	SAK
BTEXTLs	Total BTEX	< 0.025	ppm	6-8020	SAK
aaaTFTs	aaa-TFT (surr)	91.	%	74-121	SAK
4BFBs	4-BFB (surr)	104.	%	75-125	SAK
418_1S'D	TPH Analysis Prep(Date/Time)	11/30 0800	init.	6-3550	AM
TPH'S	TPH(Total Petroleum Hydrocarbon	< 25	ppm	2-418.1	TMG

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
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6. SW: SW-846, Test Methods for Evaluation of Solid Waste, Third edition. Update I, July 1992.

12/1/94

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2525 SOUTH SHORE BLVD, SUITE 100
LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: DEC. 1 1994 Page # 1

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Reviewed by:TMG
Customer#: 309
Job Number:

Attn: Wright, Lynn

Date Collected:11/20/94

Sample Number: 94008252
Project Name: ATOKA 1
Sample ID: AT1-15-4 (39-41) GRAB

Time Collected:1710

Date Received: 11/22/94

Test Code	Analyte	Result	Units	Method	Analyst
BTEXS'D	BTEX Analysis Prep(Date/Time)	11/24 1953	init.	6-5030	SAK
BZ8020S	Benzene	.018	ppm	6-8020	SAK
TOL8020S	Toluene	.11	ppm	6-8020	SAK
EBZ8020S	Ethylbenzene	.009	ppm	6-8020	TMG
XYLSTLs	Total Xylenes	.091	ppm	6-8020	TMG
BTEXTLs	Total BTEX	< 0.228	ppm	6-8020	TMG
aaaTFTs	aaa-TFT (surr)	105.	%	74-121	SAK
4BFBs	4-BFB (surr)	106.	%	75-125	SAK
418_1S'D	TPH Analysis Prep(Date/Time)	11/30 0800	init.	6-3550	AM
TPH'S	TPH(Total Petroleum Hydrocarbon	< 25	ppm	2-418.1	TMG

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
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12/1/94

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2525 SOUTH SHORE BLVD, SUITE 100
LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: DEC. 1 1994 Page # 1

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Reviewed by:TMG
Customer#: 309
Job Number:

Attn: Wright, Lynn

Date Collected:11/21/94

Sample Number: 94008253
Project Name: ATOKA 1
Sample ID: AT1-15-5 (49-51) GRAB

Time Collected:0730
Date Received: 11/22/94

Test Code	Analyte	Result	Units	Method	Analyst
BTEXS'D	BTEX Analysis Prep(Date/Time)	11/24 2051	init.	6-5030	SAK
BZ8020S	Benzene	.032	ppm	6-8020	SAK
TOL8020S	Toluene	.21	ppm	6-8020	SAK
EBZ8020S	Ethylbenzene	.020	ppm	6-8020	SAK
XYLSTLs	Total Xylenes	.23	ppm	6-8020	SAK
BTEXTLs	Total BTEX	0.492	ppm	6-8020	TMG
aaaTFTs	aaa-TFT (surr)	95.	%	74-121	SAK
4BFBs	4-BFB (surr)	103.	%	75-125	SAK
418_1S'D	TPH Analysis Prep(Date/Time)	11/30 0800	init.	6-3550	AM
TPH'S	TPH(Total Petroleum Hydrocarbon	< 25	ppm	2-418.1	TMG

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
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12/1/94

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LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: NOV. 29 1994 Page # 1

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Reviewed by:TMG
Customer#: 309
Job Number:

Attn: Wright, Lynn

Date Collected:

Sample Number: 94008254
Project Name: ATOKA 1
Sample ID: TRIP BLANK(TB-1) GRAB

Time Collected:0000
Date Received: 11/22/94

Test Code	Analyte	Result	Units	Method	Analyst
BTEXW'D	BTEX Analysis Prep(Date/Time)	11/23 1940	init.	6-5030	SAK
BZ8020W	Benzene	< 0.002	ppm	6-8020	SAK
TOL8020W	Toluene	< 0.002	ppm	6-8020	SAK
EBZ8020W	Ethylbenzene	< 0.002	ppm	6-8020	SAK
XYLSTLw	Total Xylenes	< 0.004	ppm	6-8020	SAK
BTEXTLw	Total BTEX	< 0.010	ppm	6-8020	SAK
aaaTFTw	aaa-TFT (surr)	108.	%	86-115	SAK
4BFBw	4-BFB (surr)	MI	%	86-115	TMG

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dilution - Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated BRL = Below Reporting Limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
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12/1/94

QUALITY CONTROL REPORT

Report To: Brown and Caldwell
Terra Laboratories Sample No(s). 94008244 - 94008254

			Precision			Accuracy	
Analyte	Units	Blank	Orig	Dup	RPD(%)	MSR(%)	LCSR(%)
BTEX (Batch 112494S) Sample No. 94008328 Spike							
MTBE	ppb	< 5	26.5	27.8	4.8	133	
Benzene	ppb	< 5	19.7	19.6	0.5	99	92
Toluene	ppb	< 5	19.2	19.4	1.0	96	94
Ethylbenzene	ppb	< 5	18.9	18.4	2.7	95	86
Xylenes	ppb	< 10	57.9	57.7	0.3	97	90
TPH (Batch 112994S)							
Sample No. 94008344	mg/kg	< 25	1206	1206	0		94
TPH (Batch B113094S)							
Sample No. 94008256	mg/kg	< 25	< 25	< 25	-		95
Sample No. 94008265	mg/kg	< 25	< 25	< 25	-		95
BTEX (Batch 112394W) Sample No. 94008138 Spike							
MTBE	ppb	< 4	332	330	0.6	85	
Benzene	ppb	< 4	153	153	0	65	92
Toluene	ppb	< 4	19.1	19.1	0	96	88
Ethylbenzene	ppb	< 4	61.9	62.2	0.5	104	92
Xylene	ppb	< 12	65.1	65	0.2	101	97

12/7/94

TERRA LABORATORIES LTD.

2525 South Shore Blvd. League City, Texas 77573 (713) 334-5052 Fax: (713) 334-3116

CHAIN OF CUSTODY

REPORT TO:			REMIT TO:		
COMPANY	BROWN AND CALDWELL		COMPANY	SAME	
ADDRESS	1415 LOUISIANA, STE. 2500		ADDRESS		
CITY	HOUSTON	STATE TX ZIP	CITY	STATE	ZIP
ATTN	MR. LYNN WRIGHT	PHONE 713/759-0999 FAX 713/759-0952	ATTN	PHONE	FAX
Client Comments:			Project Name: ATOICA 1	P.O. #	
			Turnaround Time Standard	Release #	

ANALYSES REQUESTED

DATE	24HR TIME	MATRIX	COMPOSITE	GRAB	SAMPLE DESCRIPTION	CONTAINERS NUMBER	BTEX - 8020	TPH - 418.1	TERRA SAMPLE NO.
11/16/94	1100	Soil		X	ATI-11-10(61-65)	2	X	X	* 94-8244
11/19/94	1635			X	ATI-11-14 (99-101)	2	X	X	-8245
11/17/94	1030			X	ATI-12-9 (69-71)	2	X	X	-8246
11/17/94	1510			X	ATI-12-12(99-101)	2	X	X	-8247
11/18/94	1645			X	ATI-13-6 (69-71)	2	X	X	-8248
11/19/94	825			X	ATI-13-9 (99-101)	2	X	X	-8249
11/20/94	1015			X	ATI-14-5 (49-51)	2	X	X	-8250
11/20/94	1150			X	ATI-14-7 (69-71)	2	X	X	-8251
11/20/94	1710			X	ATI-15-4 (39-41)	2	X	X	-8252
11/21/94	730			X	ATI-15-5 (49-51	2	X	X	-8253

Collected by: J. L. Cooper	Date: 11/21/94	Time: 1120	Received by Terra: FED EX	Date:	Time:	Remarks: Trip Blank (TB-1) included 94-8254 run for BTEX 8020. J. L. Cooper
Relinquished by:	Date:	Time:	Received by:	Date: 11-22-94	Time: 0945	
Relinquished by:	Date:	Time:	Received by:	Date:	Time:	0°C, ~~NC~~ Temp HC 11-22-94

* Time on both containers have 0920 as time sampled HC 11-22-94

Terra Laboratories, Ltd.
Quality Analytical Services

December 14, 1994

Lynn Wright
Brown and Caldwell
1415 Louisiana, Suite 2500
Houston, TX 77002

Re: Six (6) solid samples and one (1) trip blank (Project Name: Atoka 1) received on 12/06/94

Dear Mr. Wright:

Attached are the final reports of analysis of the samples referenced above as per your analysis and/or method requests.

The samples were received in good condition and at 0^{o} Centigrade.

We appreciate this opportunity to serve Brown and Caldwell. Please let me, or Linda McKee, know if there is any other way we can help you.

Sincerely,

Larry D. Wallace
Laboratory Director

2525 South Shore Blvd. ♦ League City, Texas 77573 ♦ (713) 334-5052 Fax: (713) 334-3116

TERRA LABORATORIES, LTD.
2525 SOUTH SHORE BLVD, SUITE 100
LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: DEC. 8 1994 Page # 1

rcwn and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Reviewed by:TMG
Customer#: 309
Job Number:

Attn: Wright, Lynn

Date Collected:11/29/94

ample Number: 94008432
rcject Name: ATOKA 1
Sample ID: AT 1-16-2 (19-21) GRAB

Time Collected:1608

Date Received: 12/06/94

Test Code	Analyte	Result	Units	Method	Analyst
BTEXS'D	BTEX Analysis Prep(Date/Time)	12/07 1818	init.	6-5030	PRS
Z8020S	Benzene	< 0.005	ppm	6-8020	PRS
OL8020S	Toluene	< 0.005	ppm	6-8020	PRS
EBZ8020S	Ethylbenzene	< 0.005	ppm	6-8020	PRS
YLSTLs	Total Xylenes	< 0.010	ppm	6-8020	PRS
TEXTLs	Total BTEX	< 0.025	ppm	6-8020	PRS
aaaTFTs	aaa-TFT (surr)	94.	%	74-121	PRS
4BFBs	4-BFB (surr)	97.	%	75-115	PRS
18_1S'D	TPH Analysis Prep(Date/Time)	12/06 1410	init.	6-3550	MLC
TPH'S	TPH(Total Petroleum Hydrocarbon	< 25	ppm	2-418.1	MLC

OMMENTS:

FOCTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dil.Fx.- Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated B=found in blank J=>mdl< reporting limit

reparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
5. SM: Standard Methods for the Examination of Water and Wastewater, 18th edition.
6. SW: SW-846, Test Methods for Evaluation of Solid Waste, Third edition. Update I, July 1992.

Rec 12/13/94

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2525 SOUTH SHORE BLVD, SUITE 100
LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: DEC. 8 1994 Page # 1

rown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

ttn: Wright, Lynn

ample Number: 94008433
roject Name: ATOKA 1
Sample ID: AT 1-16-4 (39-41) GRAB

Reviewed by:TMG
Customer#: 309
Job Number:

Date Collected:11/30/94

Time Collected:0715

Date Received: 12/06/94

Test Code	Analyte	Result	Units	Method	Analyst
BTEXS'D	BTEX Analysis Prep(Date/Time)	12/07 1838	init.	6-5030	TMG
Z8020S	Benzene	< 0.005	ppm	6-8020	PRS
OL8020S	Toluene	< 0.005	ppm	6-8020	PRS
EBZ8020S	Ethylbenzene	< 0.005	ppm	6-8020	PRS
YLSTLs	Total Xylenes	< 0.011	ppm	6-8020	PRS
TEXTLs	Total BTEX	< 0.026	ppm	6-8020	PRS
aaaTFTs	aaa-TFT (surr)	98.	%	74-121	PRS
4BFBs	4-BFB (surr)	99.	%	75-115	PRS
18_1S'D	TPH Analysis Prep(Date/Time)	12/06 1410	init.	6-3550	MLC
TPH'S	TPH(Total Petroleum Hydrocarbon	< 25	ppm	2-418.1	MLC

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dil.Fx.- Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated B=found in blank J=>mdl< reporting limit

reparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
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RW 12/12/94

TERRA LABORATORIES, LTD.
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LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: DEC. 8 1994 Page # 1

rown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Reviewed by:TMG
Customer#: 309
Job Number:

ttn: Wright, Lynn

Date Collected:11/30/94

ample Number: 94008434
roject Name: ATOKA 1
Sample ID: AT 1-17-3 (29-31) GRAB

Time Collected:1130
Date Received: 12/06/94

Test Code	Analyte	Result	Units	Method	Analyst
BTEXS'D	BTEX Analysis Prep(Date/Time)	12/07 1857	init.	6-5030	PRS
Z8020S	Benzene	< 0.005	ppm	6-8020	PRS
OL8020S	Toluene	< 0.005	ppm	6-8020	PRS
EBZ8020S	Ethylbenzene	< 0.005	ppm	6-8020	PRS
YLSTLs	Total Xylenes	< 0.010	ppm	6-8020	PRS
TEXTLs	Total BTEX	< 0.025	ppm	6-8020	PRS
aaaTFTs	aaa-TFT (surr)	82.	%	74-121	PRS
4BFBs	4-BFB (surr)	84.	%	75-115	PRS
18_1S'D	TPH Analysis Prep(Date/Time)	12/06 1410	init.	6-3550	MLC
TPH'S	TPH(Total Petroleum Hydrocarbon	< 25	ppm	2-418.1	MLC

OMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dil.Fx.- Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated B=found in blank J=>mdl< reporting limit

reparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
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RW 12/12/94

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LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: DEC. 8 1994 Page # 1

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Reviewed by:JMH
Customer#: 309
Job Number:

Attn: Wright, Lynn

Date Collected:11/30/94

Sample Number: 94008435
Project Name: ATOKA 1
Sample ID: AT 1-17-4 (39-41) GRAB

Time Collected:1400
Date Received: 12/06/94

Test Code	Analyte	Result	Units	Method	Analyst
BTEXS'D	BTEX Analysis Prep(Date/Time)	12/08 1020	init.	6-5030	PRS
BZ8020S	Benzene	< 0.20	ppm	6-8020	PRS
TOL8020S	Toluene	.21	ppm	6-8020	PRS
EBZ8020S	Ethylbenzene	.36	ppm	6-8020	PRS
XYLSTLs	Total Xylenes	3.1	ppm	6-8020	PRS
TEXTLs	Total BTEX	< 3.87	ppm	6-8020	PRS
aaaTFTs	aaa-TFT (surr)	92.	%	74-121	PRS
4BFBs	4-BFB (surr)	MI	%	75-115	PRS
418_1S'D	TPH Analysis Prep(Date/Time)	12/06 1410	init.	6-3550	MLC
TPH'S	TPH(Total Petroleum Hydrocarbon	86	ppm	2-418.1	MLC

COMMENTS: BTEX Dil. Factor X 100

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dil.Fx.- Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated B=found in blank J=>mdl< reporting limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
5. SM: Standard Methods for the Examination of Water and Wastewater, 18th edition.
6. SW: SW-846, Test Methods for Evaluation of Solid Waste, Third edition. Update I, July 1992.

Rw 12/12/94

TERRA LABORATORIES, LTD.
2525 SOUTH SHORE BLVD, SUITE 100
LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: DEC. 8 1994 Page # 1

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Reviewed by:JMH
Customer#: 309
Job Number:

Attn: Wright, Lynn

Date Collected:12/01/94

Sample Number: 94008436
Project Name: ATOKA 1
Sample ID: AT 1-18-9 (79-81) GRAB

Time Collected:1710
Date Received: 12/06/94

Test Code	Analyte	Result	Units	Method	Analyst
BTEXS'D	BTEX Analysis Prep(Date/Time)	12/08 1041	init.	6-5030	PRS
BNZ8020S	Benzene	< 0.20	ppm	6-8020	PRS
TOL8020S	Toluene	.59	ppm	6-8020	PRS
EBZ8020S	Ethylbenzene	1.0	ppm	6-8020	PRS
XYLSTLs	Total Xylenes	8.8	ppm	6-8020	PRS
BTEXTLs	Total BTEX	<10.59	ppm	6-8020	PRS
aaaTFTs	aaa-TFT (surr)	100.	%	74-121	PRS
4BFBs	4-BFB (surr)	109.	%	75-115	PRS
TPH_1S'D	TPH Analysis Prep(Date/Time)	12/06 1410	init.	6-3550	MLC
TPH'S	TPH(Total Petroleum Hydrocarbon	170	ppm	2-418.1	MLC

COMMENTS: BTEX Dil. Factor X 100

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dil.Fx.- Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated B=found in blank J=>mdl< reporting limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
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Rev 12/12/94

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LAB ANALYSIS REPORT

Report Date: DEC. 8 1994 Page # 1

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Attn: Wright, Lynn

Reviewed by:TMG
Customer#: 309
Job Number:

Date Collected:12/02/94

Sample Number: 94008437
Project Name: ATOKA 1
Sample ID: AT 1-18-11(99-101) GRAB

Time Collected:0930

Date Received: 12/06/94

Test Code	Analyte	Result	Units	Method	Analyst
BTEXS'D	BTEX Analysis Prep(Date/Time)	12/07 1919	init.	6-5030	PRS
BZ8020S	Benzene	< 0.005	ppm	6-8020	PRS
TOL8020S	Toluene	.003	ppm	6-8020	TMG
EBZ8020S	Ethylbenzene	.007	ppm	6-8020	TMG
XYLSTLs	Total Xylenes	.075	ppm	6-8020	PRS
BTEXTLs	Total BTEX	< 0.117	ppm	6-8020	PRS
aaaTFTs	aaa-TFT (surr)	90.	%	74-121	PRS
4BFBs	4-BFB (surr)	90.	%	75-115	PRS
418_1S'D	TPH Analysis Prep(Date/Time)	12/06 1410	init.	6-3550	MLC
TPH'S	TPH(Total Petroleum Hydrocarbon	< 25	ppm	2-418.1	MLC

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dil.Fx.- Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated B=found in blank J=>mdl< reporting limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
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RW 12/12/94
Larry Dirkman

TERRA LABORATORIES, LTD.
2525 SOUTH SHORE BLVD, SUITE 100
LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: DEC. 12 1994 Page # 1

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Reviewed by:TMG
Customer#: 309
Job Number:

Attn: Wright, Lynn

Date Collected:12/02/94

Sample Number: 94008438
Project Name: ATOKA 1
Sample ID: TB-3 GRAB

Time Collected:1700
Date Received: 12/06/94

Test Code	Analyte	Result	Units	Method	Analyst
BTEXW'D	BTEX Analysis Prep(Date/Time)	12/08 1900	init.	6-5030	PRS
BZ8020W	Benzene	< 0.002	ppm	6-8020	PRS
TOL8020W	Toluene	< 0.002	ppm	6-8020	PRS
EBZ8020W	Ethylbenzene	< 0.002	ppm	6-8020	PRS
XYLSTLw	Total Xylenes	< 0.004	ppm	6-8020	PRS
BTEXTLw	Total BTEX	< 0.010	ppm	6-8020	PRS
aaaTFTw	aaa-TFT (surr)	99.	%	82-114	PRS
4BFBw	4-BFB (surr)	100.	%	85-115	PRS

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dil.Fx.- Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated B=found in blank J=>mdl< reporting limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
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Rec 12/12/94

QUALITY CONTROL REPORT

Report To: Brown and Caldwell
Terra Laboratories Sample No(s). 94008432 - 94008438

			Precision			Accuracy	
Analyte	Units	Blank	Orig	Dup	RPD(%)	MSR(%)	LCSR(%)
BTEX (Batch 120794S) Sample No. 94008464 Spike							
MTBE	ppb	< 10	24	23	4	115	
Benzene	ppb	< 10	25	25	0	125	95
Toluene	ppb	< 10	24	24	0	120	90
Ethylbenzene	ppb	< 10	24	24	0	120	95
Xylenes	ppb	< 30	74	74	0	124	95
TPH (Batch 120694S)							
Sample No. 94008437	mg/kg	< 25	< 25	< 25	-		94
BTEX MeOH (Batch 120894S) Blank Spike							
Benzene	ppb	< 5	29.3	30.2	3.0		117
Toluene	ppb	< 5	27.2	28.1	3.0		109
Ethylbenzene	ppb	< 5	29.0	29.7	2.0		116
Xylenes	ppb	< 10	86.6	90.5	4.0		115
BTEX (Batch 120894W) Sample No. 94007540 Spike							
Benzene	ppb	< 2	72.6	79.6	9.0	102	113
Ethylbenzene	ppb	< 2	72.0	77.4	7.0	102	108
Toluene	ppb	< 2	62.7	67.4	7	102	115
Xylenes	ppb	< 4	160.6	168.8	5	102	111

RW 12/15/94
Larry Dillman

TERRA LABORATORIES LTD.

2525 South Shore Blvd. League City, Texas 77573 (713) 334-5052 Fax: (713) 334-3116

CHAIN OF CUSTODY

TRANSWESTERN

REPORT TO:			REMIT TO:		
COMPANY Brown & Caldwell			COMPANY SAME		
ADDRESS 1415 Louisiana, Ste. 2500			ADDRESS		
CITY Houston	STATE TX	ZIP 77002	CITY	STATE	ZIP
ATTN Mr. Lynn Wright	PHONE 713/759-0999	FAX 713/759-0952	ATTN	PHONE	FAX
Client Comments:			Project Name: Attica 1	P.O. #	
			Turnaround Time	Release #	

ANALYSES REQUESTED

DATE	24HR TIME	MATRIX	COMPOSITE	GRAB	SAMPLE DESCRIPTION	CONTAINERS NUMBER	BTEX 8020	TPH 418.1	TERRA SAMPLE NO.
11-29-94	1608	Soil		X	ATI-16-2 (19-21)	1	X	X	94-5432
11-30-94	715	"		X	ATI-16-4 (39-41)	2	X	X	5433
11-30-94	1130	"		X	ATI-17-3 (29-31)	2	X	X	5434
11-30-94	1400	"		X	ATI-17-4 (39-41)	2	X	X	5435
12-1-94	1710	"		X	ATI-18-9 (79-81)	2	X	X	5436
12-2-94	930	"		X	ATI-18-11 (99-101)	2	X	X	5437
12-2-94	1700	Water		X	TB-3	2	X		5438

Collected by:	Date:	Time:	Received by Terra:	Date:	Time:	Remarks
J. L. Cooper, Jr.	12/5/94	1730	FED EX			0° C
Relinquished by:	Date:	Time:	Received by:	Date:	Time:	w2
				12-6-94	1018	12-6-94
Relinquished by:	Date:	Time:	Received by:	Date:	Time:	

Terra Laboratories, Ltd.
Quality Analytical Services

January 20, 1995 **Lab No(s). 95000095 - 95000101**

Susanne Richards
Brown and Caldwell
1415 Louisiana, Suite 2500
Houston, TX 77002

Re: Six (6) solid samples and one (1) liquid sample (Project Name: Atoka 1 Artesia, NM) received on 01/10/95

Dear Ms. Richards:

Attached are the final reports of analysis of the samples referenced above as per your analysis and/or method requests.

The samples were received in good condition and at 1^{o} Centigrade.

We appreciate this opportunity to serve Brown and Caldwell. Please let me, or Linda McKee, know if there is any other way we can help you.

Sincerely,

Larry D. Wallace
Laboratory Director

2525 South Shore Blvd. ♦ League City, Texas 77573 ♦ (713) 334-5052 Fax: (713) 334-3116

TERRA LABORATORIES, LTD.
2525 SOUTH SHORE BLVD, SUITE 100
LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: JAN. 12 1995 Page # 1

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Reviewed by:TMG
Customer#: 309
Job Number:

Attn: Richards, Susanne

Date Collected:01/06/95

Sample Number: 95000095
Project Name: ATOKA 1 ARTESIA N.M.
Sample ID: AT 1-20 81-86

Time Collected:1130

Date Received: 01/10/95

Test Code	Analyte	Result	Units	Method	Analyst
BTEXS'D	BTEX Analysis Prep(Date/Time)	01/10 1412	init.	6-5030	NSH
BZ8020S	Benzene	.052	ppm	6-8020	NSH
TOL8020S	Toluene	.60	ppm	6-8020	NSH
EBZ8020S	Ethylbenzene	.24	ppm	6-8020	NSH
XYLSTLs	Total Xylenes	2.0	ppm	6-8020	NSH
BTEXTLs	Total BTEX	2.892	ppm	6-8020	NSH
aaaTFTs	aaa-TFT (surr)	MI	%	74-121	NSH
4BFBs	4-BFB (surr)	88.	%	75-115	NSH
413_1S'D	TPH Analysis Prep(Date/Time)	01/11 1250	init.	6-3550	MLC
TPH'S	TPH(Total Petroleum Hydrocarbon	960	ppm	2-418.1	MLC

COMMENTS: BTEX Dil.Fx. X 5; m&p-Xylenes = 1.6 ppm; o-Xylene = 0.4 ppm

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dil.Fx.- Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated B=found in blank J=>mdl< reporting limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
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Rec 1/13/95

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LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: JAN. 12 1995 Page # 1

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Reviewed by:TMG
Customer#: 309
Job Number:

Attn: Richards, Susanne

Date Collected:01/06/95

Sample Number: 95000096
Project Name: ATOKA 1 ARTESIA N.M.
Sample ID: AT 1-20 96-101

Time Collected:1450

Date Received: 01/10/95

Test Code	Analyte	Result	Units	Method	Analyst
BTEXS'D	BTEX Analysis Prep(Date/Time)	01/10 1512	init.	6-5030	NSH
BZ8020S	Benzene	< 0.005	ppm	6-8020	NSH
TOL8020S	Toluene	.014	ppm	6-8020	NSH
EBZ8020S	Ethylbenzene	< 0.005	ppm	6-8020	NSH
XYLSTLs	Total Xylenes	< 0.010	ppm	6-8020	NSH
BTEXTLs	Total BTEX	< 0.034	ppm	6-8020	NSH
aaaTFTs	aaa-TFT (surr)	97.	%	74-121	NSH
4BFBs	4-BFB (surr)	98.	%	75-115	NSH
418_1S'D	TPH Analysis Prep(Date/Time)	01/11 1250	init.	6-3550	MLC
TPH'S	TPH(Total Petroleum Hydrocarbon	< 15	ppm	2-418.1	MLC

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dil.Fx.- Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated B=found in blank J=>mdl< reporting limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
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1/13/95
Larry Dodd

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713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: JAN. 12 1995 Page # 1

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Reviewed by:TMG
Customer#: 309
Job Number:

Attn: Richards, Susanne

Date Collected:01/07/95

Sample Number: 95000097
Project Name: ATOKA 1 ARTESIA N.M.
Sample ID: AT 1-19 81-86

Time Collected:0820

Date Received: 01/10/95

Test Code	Analyte	Result	Units	Method	Analyst
BTEXS'D	BTEX Analysis Prep(Date/Time)	01/10 1432	init.	6-5030	NSH
BZ8020S	Benzene	.053	ppm	6-8020	NSH
TOL8020S	Toluene	.61	ppm	6-8020	NSH
EBZ8020S	Ethylbenzene	.071	ppm	6-8020	NSH
XYLSTLs	Total Xylenes	.63	ppm	6-8020	NSH
BTEXTLs	Total BTEX	1.364	ppm	6-8020	NSH
aaaTFTs	aaa-TFT (surr)	113.	%	74-121	NSH
4BFBs	4-BFB (surr)	103.	%	75-115	NSH
418_1S'D	TPH Analysis Prep(Date/Time)	01/11 1250	init.	6-3550	MLC
TPH'S	TPH(Total Petroleum Hydrocarbon	140	ppm	2-418.1	MLC

COMMENTS: BTEX Dil.Fx. X 5; m&p-Xylenes = 0.51 ppm; o-Xylene = 0.12 ppm

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dil.Fx.- Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated B=found in blank J=>mdl< reporting limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
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Rev 1/13/95
Larry D Stell

TERRA LABORATORIES, LTD.
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713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: JAN. 12 1995 Page # 1

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Reviewed by:TMG
Customer#: 309
Job Number:

Attn: Richards, Susanne

Date Collected:01/07/95

Sample Number: 95000098
Project Name: ATOKA 1 ARTESIA N.M.
Sample ID: AT 1-19 110-115

Time Collected:1710

Date Received: 01/10/95

Test Code	Analyte	Result	Units	Method	Analyst
BTEXS'D	BTEX Analysis Prep(Date/Time)	01/10 1452	init.	6-5030	NSH
BZ8020S	Benzene	< 0.010	ppm	6-8020	NSH
TOL8020S	Toluene	.010	ppm	6-8020	TMG
EBZ8020S	Ethylbenzene	< 0.010	ppm	6-8020	NSH
XYLSTLs	Total Xylenes	< 0.020	ppm	6-8020	NSH
BTEXTLs	Total BTEX	< 0.050	ppm	6-8020	NSH
aaaTFTs	aaa-TFT (surr)	98.	%	74-121	NSH
4BFBs	4-BFB (surr)	94.	%	75-115	NSH
418_1S'D	TPH Analysis Prep(Date/Time)	01/11 1250	init.	6-3550	MLC
TPH'S	TPH(Total Petroleum Hydrocarbon	16	ppm	2-418.1	MLC

COMMENTS: BTEX Dil.Fx. X 5

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dil.Fx.- Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated B=found in blank J=>mdl< reporting limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
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RW 1/13/95
Larry Dodd

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LAB ANALYSIS REPORT

Report Date: JAN. 12 1995 Page # 1

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Reviewed by:TMG
Customer#: 309
Job Number:

Attn: Richards, Susanne

Date Collected:01/07/95

Sample Number: 95000099
Project Name: ATOKA 1 ARTESIA N.M.
Sample ID: AT 1-21 29-34

Time Collected:1345

Date Received: 01/10/95

Test Code	Analyte	Result	Units	Method	Analyst
BTEXS'D	BTEX Analysis Prep(Date/Time)	01/10 1531	init.	6-5030	NSH
BZ8020S	Benzene	< 0.005	ppm	6-8020	NSH
TOL8020S	Toluene	< 0.005	ppm	6-8020	NSH
EBZ8020S	Ethylbenzene	< 0.005	ppm	6-8020	NSH
XYLSTLs	Total Xylenes	< 0.010	ppm	6-8020	NSH
BTEXTLs	Total BTEX	< 0.025	ppm	6-8020	NSH
aaaTFTs	aaa-TFT (surr)	95.	%	74-121	NSH
4BFBs	4-BFB (surr)	96.	%	75-115	NSH
418_1S'D	TPH Analysis Prep(Date/Time)	01/11 1250	init.	6-3550	MLC
TPH'S	TPH(Total Petroleum Hydrocarbon	18	ppm	2-418.1	MLC

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dil.Fx.- Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated B=found in blank J=>mdl< reporting limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
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1/13/95

TERRA LABORATORIES, LTD.
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LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: JAN. 12 1995 Page # 1

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Reviewed by:TMG
Customer#: 309
Job Number:

Attn: Richards, Susanne

Date Collected:01/07/95

Sample Number: 95000100
Project Name: ATOKA 1 ARTESIA N.M.
Sample ID: AT 1-21 44-49

Time Collected:1525

Date Received: 01/10/95

Test Code	Analyte	Result	Units	Method	Analyst
BTEXS'D	BTEX Analysis Prep(Date/Time)	01/10 1551	init.	6-5030	NSH
BZ8020S	Benzene	.005	ppm	6-8020	TMG
TOL8020S	Toluene	.018	ppm	6-8020	TMG
EBZ8020S	Ethylbenzene	< 0.005	ppm	6-8020	NSH
XYLSTLs	Total Xylenes	< 0.014	ppm	6-8020	TMG
BTEXTLs	Total BTEX	< 0.042	ppm	6-8020	TMG
aaaTFTs	aaa-TFT (surr)	94.	%	74-121	NSH
4BFBs	4-BFB (surr)	89.	%	75-115	NSH
418_1S'D	TPH Analysis Prep(Date/Time)	01/11 1250	init.	6-3550	MLC
TPH'S	TPH(Total Petroleum Hydrocarbon	< 15	ppm	2-418.1	MLC

COMMENTS: m&p-Xylenes = 0.009 ppm

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dil.Fx.- Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated B=found in blank J=>mdl< reporting limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
5. SM: Standard Methods for the Examination of Water and Wastewater, 18th edition.
6. SW: SW-846, Test Methods for Evaluation of Solid Waste, Third edition. Update I, July 1992.

Rw 1/13/95
Gary Hall

TERRA LABORATORIES, LTD.
2525 SOUTH SHORE BLVD, SUITE 100
LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: JAN. 20 1995 Page # 1

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Attn: Richards, Susanne

Reviewed by:TMG

Job Number:

Date Collected:01/08/95

Sample Number: 95000101
Project Name: ATOKA 1 ARTESIA N.M.
Sample ID: MW-8

Time Collected:0830
Sample Type:
Date Received: 01/10/95

Test Code	Analyte	Result	Units	Method	Analyst
BTEXW'D	BTEX Analysis Prep(Date/Time)	01/10 1611	init.	6-5030	NSH
BZ8020W	Benzene	< 0.002	ppm	6-8020	NSH
TOL8020W	Toluene	< 0.002	ppm	6-8020	NSH
EBZ8020W	Ethylbenzene	< 0.002	ppm	6-8020	NSH
XYLSTLw	Total Xylenes	< 0.004	ppm	6-8020	NSH
BTEXTLw	Total BTEX	< 0.010	ppm	6-8020	NSH
aaaTFTw	aaa-TFT (surr)	90.	%	82-114	NSH
4BFBw	4-BFB (surr)	96.	%	85-115	NSH
TDS'D	TDS Analysis (Date/Time)	01/12 0800	init.	2-160.1	AM
TDS'RES	TDS(Total Dissolved Solids)	4800	mg/L	2-160.1	AM
HGT'W'D	Mercury Analysis (D/T)	01/18 0900	init.		EMJ
HgCVAAw	Mercury	< 0.0002	mg/L	6-7470	EMJ
DMiWW'D	Acid Digestion(Date/Time)	01/11 1130	init.	6-3015	RR
ICP'W1'D	ICP1 Analysis(Date/Time)	01/16 0930	init.		BLW
AsICPw	Arsenic	< 0.6	mg/L	6-6010	BLW
BaICPw	Barium	.05	mg/L	6-6010	BLW
CdICPw	Cadmium	< 0.03	mg/L	6-6010	BLW
CrICPw	Chromium	< 0.03	mg/L	6-6010	BLW
PbICPw	Lead	< 0.1	mg/L	6-6010	BLW
SeICPw	Selenium	< 0.6	mg/L	6-6010	BLW

Rw 1/20/95

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LAB ANALYSIS REPORT

Report Date: JAN. 20 1995

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Reviewed by:TMG

Job Number:

Attn: Richards, Susanne

Date Collected:01/08/95

Sample Number: 95000101
Project Name: ATOKA 1 ARTESIA N.M.
Sample ID: MW-8

Time Collected:0830
Sample Type:
Date Received: 01/10/95

Test Code	Analyte	Result	Units	Method	Analyst
AgICPw	Silver	< 0.03	mg/L	6-6010	BLW
ICP'W2'D	ICP2 Analysis(Date/Time)	01/12 1410	init.		BLW
CuICPw	Copper	< 0.03	mg/L	6-6010	BLW
ZnICPw	Zinc	.07	mg/L	6-6010	BLW
BNAXW'D	Base/neutral/acid Extraction(D/	01/13 1100	init.	6-3510	TMG
S8270'D	Semivolatile Organics (D/T)	01/17 2322	init.	6-8270	MSB
AcenpheW	Acenaphthene	< 0.010	mg/L	6-8270	MSB
AcenphyW	Acenaphthylene	< 0.010	mg/L	6-8270	MSB
AnthrcnW	Anthracene	< 0.010	mg/L	6-8270	MSB
BzaAnthW	Benzo(a)anthracene	< 0.010	mg/L	6-8270	MSB
BzaPyrnW	Benzo(a)pyrene	< 0.010	mg/L	6-8270	MSB
BzbFAntW	Benzo(b)fluoroanthene	< 0.010	mg/L	6-8270	MSB
BzghipeW	Benzo(g,h,i)perylene	< 0.010	mg/L	6-8270	MSB
BzkFAntW	Benzo(k)fluoroanthene	< 0.010	mg/L	6-8270	MSB
ChrysenW	Chrysene	< 0.010	mg/L	6-8270	MSB
dBzahAnW	Dibenz(a,h)anthracene	< 0.010	mg/L	6-8270	MSB
FAnthenW	Fluoranthene	< 0.010	mg/L	6-8270	MSB
FluorenW	Fluorene	< 0.010	mg/L	6-8270	MSB
IndnPyrW	Indeno(1,2,3-cd)pyrene	< 0.010	mg/L	6-8270	MSB
NaphthlW	Naphthalene	< 0.010	mg/L	6-8270	MSB

RW 1/20/95
Barry D. Sullivan

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LAB ANALYSIS REPORT

Report Date: JAN. 20 1995 Page # 3

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Attn: Richards, Susanne

Reviewed by:TMG

Job Number:

Date Collected:01/08/95

Sample Number: 95000101
Project Name: ATOKA 1 ARTESIA N.M.
Sample ID: MW-8

Time Collected:0830
Sample Type:
Date Received: 01/10/95

Test Code	Analyte	Result	Units	Method	Analyst
PhnAnthW	Phenanthrene	< 0.010	mg/L	6-8270	MSB
PyreneW	Pyrene	< 0.010	mg/L	6-8270	MSB
NitBzd5W	Nitrobenzene-d5 (surr)	68.	%	35-114	MSB
2FBiPhnW	2Fluorobiphenyl (surr)	51.	%	43-116	MSB
trPhd14W	Terphenyl-d14 (surr)	68.	%	33-141	MSB
ICP'W3'D	ICP3 Analysis(Date/Time)	01/19 1000	init.		BLW
CaICPw	Calcium	690	mg/L	6-6010	BLW
MgICPw	Magnesium	260	mg/L	6-6010	BLW
KICPw	Potassium	3.3	mg/L	6-6010	BLW
NaICPw	Sodium	580	mg/L	6-6010	BLW
SO4'D	Sulfate Analysis (D/T)	01/12 0920	init.		JMR
Sulfate	Sulfate	2100	mg/L	2-375.4	JMR
CLAUTO'D	Chloride, Titrimetric (D/T)	01/11 1300	init.		CJT
ClAuto	Chloride, Titrimetric	610	mg/L	3-325.2	CJT
ALK'D	Alkalinity Analysis (Date/Time)	01/16 0730	init.	2-310.1	CJT
MALK310	M-Alkalinity (CaCO3)	290	mg/L	2-310.1	CJT
PALK310	P-Alkalinity (CaCO3)	< 1	mg/L	2-310.1	JMH
HCO3ALK	Bicarbonate Alkalinity (CaCO3)	290	mg/L	2-310.1	JMH
CO3ALK	Carbonate Alkalinity (CaCO3)	< 1	mg/L	2-310.1	JMH

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dil.Fx.- Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Solid)
init = date & time initiated B=found in blank J=>mdl< reporting limit

RW 1/20/95
Larry Dahlen

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
5. SM: Standard Methods for the Examination of Water and Wastewater, 18th edition.
6. SW: SW-846, Test Methods for Evaluation of Solid Waste, Third edition. Update I, July 1992.

QUALITY CONTROL REPORT

Report To: Brown and Caldwell
Terra Laboratories Sample No(s). 95000095 - 95000101

			Precision			Accuracy	
Analyte	Units	Blank	Orig	Dup	RPD(%)	MSR(%)	LCSR(%)
BTEX (Batch 011095S) Sample No. 95000076 Spike							
MTBE	ppb	< 5	18.2	19.5	7.0	98	
Benzene	ppb	< 5	19.6	19.7	0.5	99	90
Toluene	ppb	< 5	19.9	20.0	0.5	100	95
Ethylbenzene	ppb	< 5	19.0	19.0	0.0	95	85
Xylenes	ppb	< 10	55.5	56.2	1.3	94	92
TPH (Batch 011195S)							
Sample No. 95000100	mg/kg	< 15	< 15	< 15	-		82
TDS (Batch 011295)							
Sample No. 95000101	mg/L	< 20	4846	4672	3.6		100
BTEX (Batch 011095W) Sample No. 95000049 Spike							
MTBE	ppb	< 2	20.0	21.2	6	100	
Benzene	ppb	< 2	19.8	20.6	2	103	97
Toluene	ppb	< 2	20.1	20.8	3	101	95
Ethylbenzene	ppb	< 2	19.1	19.9	4	100	92
Xylenes	ppb	< 4	56.7	59	4	98	90
Cyclohexane	ppb	< 2	51.8	50.1	3	86	
Mercury (Batch 011895WL)							
Sample No. 95000058	µg/L	< 0.0002	0.513	0.533	3.8	102	102
Sample No. 95000101	µg/L	< 0.0002	0.513	0.513	0	102	102
Sample No. 95000101	µg/L	< 0.0002	0.513	0.533	3.8	102	102
ICP (Batch A011695WL) Sample No. 95000087 Spike							
As	ppm	< 0.6	2.000	2.015	0.75	100	97
Ba	ppm	< 0.03	2.849	2.799	1.8	88	92
Cd	ppm	< 0.03	1.870	1.852	0.97	94	98
Cr	ppm	< 0.03	1.887	1.824	3.4	94	98
Pb	ppm	< 0.1	2.006	1.995	0.55	93	99
Se	ppm	< 0.6	2.217	2.342	5.5	111	98
Ag	ppm	< 0.03	1.842	1.819	1.3	92	99
ICP (Batch A011295W2) Sample No. 95000104 Spike							
Cu	ppm	< 0.03	1.868	1.866	0.1	93	91
Zn	ppm	< 0.04	2.611	2.632	0.8	96	97

RW 1/23/95
Gary Dahlquist

QUALITY CONTROL REPORT

Report To: Brown and Caldwell
Terra Laboratories Sample No(s). 95000095 - 95000101

			Precision			Accuracy	
Analyte	Units	Blank	Orig	Dup	RPD(%)	MSR(%)	LCSR(%)
Semivolatiles (Batch 011795WL) Blank Spike							
Pyridine	mg/L	< 0.002	59.8	62.0	3.6		60
1,4-Dichlorobenzene	mg/L	< 0.001	88.5	91.0	2.7		89
Hexachloroethane	mg/L	< 0.001	102	105	2.9		102
Nitrobenzene	mg/L	< 0.001	91.3	95.3	4.3		91
Hexachlorobutadiene	mg/L	< 0.001	90.4	92.6	2.4		90
2,4-Dinitrotoluene	mg/L	< 0.001	94.6	92.4	2.4		95
Hexachlorobenzene	mg/L	< 0.002	89.0	88.6	0.45		89
Prep 01/13/95							
ICP (Batch 011995W3) Blank Spike							
Ca	ppm	< 0.6	2.04	1.97	3.5		102
Mg	ppm	< 0.1	2.02	2.03	0.49		101
K	ppm	< 2.0	21.70	22.28	2.6		109
Na	ppm	< 0.6	2.05	2.12	3.4		103
Sulfate (Batch 011295W)							
Sample No. 95000101	mg/L	< 1	1786	2056	14	90	104
Chlorides (Batch 011195)							
Sample No.95000101	mg/L	< 1	611	578	5.6	76	100
Alkalinity (Batch 011695)							
Sample No. 95000101	mg/L	< 1	291	295	1.4		95

RW 1/23/95
Larry D. Wallace

TERRA LABORATORIES LTD.

2525 South Shore Blvd. League City, Texas 77573 (713) 334-5052 Fax: (713) 334-3116

CHAIN OF CUSTODY

REPORT TO:			REMIT TO:		
COMPANY Brown & Caldwell			COMPANY Susanne Richard Brown & Caldwell		
ADDRESS			ADDRESS		
CITY Houston Tx	STATE Tx	ZIP	CITY	STATE	ZIP
ATTN Susanne Richard	PHONE 713 7590999	FAX	ATTN	PHONE	FAX
Client Comments:			Project Name: Atoka 1 Artesia, NM.	P.O. #	
			Turnaround Time Standard	Release #	

ANALYSES REQUESTED

per Susanne Richards cations/anions = Na, K, Ca, Mg Cl, SO4, bicarbonate, carbonate 1/10/95 DM

DATE	24HR TIME	MATRIX	COMPOSITE	GRAB	SAMPLE DESCRIPTION	NUMBER CONTAINERS	BTEX 8020	TPH 418.1	PAH's 610	TDS Cations/Anions ☆	Total Metals	TERRA SAMPLE NO.
1/6/95	1130	Soil		X	AT1-20 81-86	2	X	X				95-0095 *
1/6/95	1450	Soil		X	AT1-20 96-101	2	X	X				-0096
1/7/95	820	Soil		X	AT1-19 81-86	2	X	X				-0097
1/7/95	1710	Soil		X	AT1-19 110-115	2	X	X				-0098
1/7/95	1345	Soil		X	AT1-21 29-34	2	X	X				-0099
1/7/95	1525	Soil		X	AT1-21 44-49	2	X	X				-0100
1/8/95	830	Water		X	MW-8	5	X		X	X	X	☆ Total Metals are As, Ba, Cd, Cr, Cu, Pb, Hg, Se, Ag, Zn 95-0101

Collected by:	Date:	Time:	Received by Terra:	Date:	Time:
Alan J. Fear	1/6/95-1/8/95		[signature]	1-10-95	10:00
Relinquished by: Alan J. Fear	Date: 1/9/95	Time: 6:00 am	Received by:	Date:	Time:
Relinquished by:	Date:	Time:	Received by:	Date:	Time:

Remarks: per Susanne Richards PAH's can be run by 8270. Also invoice Bill Kendrick, Enron 1/12/95 DM

TEMP 1°C RT

* sample container has the description of AT1-20 84-86 1-10-95

APPENDIX H

Laboratory Analytical Results and Chain-of-Custody for Ground Water Samples

Terra Laboratories, Ltd.
Quality Analytical Services

December 20, 1994

Lynn Wright
Brown and Caldwell
1415 Louisiana, Suite 2500
Houston, TX 77002

Re: Seven (7) liquid samples (Project Name: Atoka 1) received on 12/06/94

Dear Mr. Wright:

Attached are the final reports of analysis of the samples referenced above as per your analysis and/or method requests.

The samples were received in good condition and at 0 & 6^{o} Centigrade.

We appreciate this opportunity to serve Brown and Caldwell. Please let me, or Linda McKee, know if there is any other way we can help you.

Sincerely,

Larry D. Wallace
Laboratory Director

2525 South Shore Blvd. ♦ League City, Texas 77573 ♦ (713) 334-5052 Fax: (713) 334-3116

TERRA LABORATORIES, LTD.
2525 SOUTH SHORE BLVD, SUITE 100
LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: DEC. 19 1994 Page # 1

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Attn: Wright, Lynn

Sample Number: 94008429
Project Name: ATOKA 1
Sample ID: MW-3

Reviewed by:TMG
Customer#: 309
Job Number:

Date Collected:12/02/94

Time Collected:1100

Date Received: 12/06/94

Test Code	Analyte	Result	Units	Method	Analyst
BTEXW'D	BTEX Analysis Prep(Date/Time)	12/08 1801	init.	6-5030	PRS
BZ8020W	Benzene	.014	ppm	6-8020	PRS
TOL8020W	Toluene	< 0.002	ppm	6-8020	PRS
EBZ8020W	Ethylbenzene	< 0.002	ppm	6-8020	PRS
XYLSTLw	Total Xylenes	< 0.004	ppm	6-8020	PRS
BTEXTLw	Total BTEX	< 0.022	ppm	6-8020	PRS
aaaTFTw	aaa-TFT (surr)	111.	%	82-114	PRS
4BFBw	4-BFB (surr)	102.	%	85-115	PRS
HGT'W'D	Mercury Analysis (D/T)	12/13 1430	init.		RR
HgCVAAw	Mercury	< 0.0002	mg/L	6-7470	RR
DMLWW'D	Acid Digestion(Date/Time)	12/07 1400	init.	6-3015	RR
ICP'W1'D	ICP1 Analysis(Date/Time)	12/13 2200	init.		BLW
AsICPw	Arsenic	< 0.6	mg/L	6-6010	BLW
BaICPw	Barium	.04	mg/L	6-6010	BLW
CdICPw	Cadmium	< 0.03	mg/L	6-6010	BLW
CrICPw	Chromium	< 0.03	mg/L	6-6010	BLW
PbICPw	Lead	< 0.1	mg/L	6-6010	BLW
SeICPw	Selenium	< 0.6	mg/L	6-6010	BLW
AgICPw	Silver	< 0.03	mg/L	6-6010	BLW
BNAXW'D	Base/neutral/acid Extraction(D/	12/06 1300	init.	6-3510	BKW

RW 12/19/94
Larry D Hall

TERRA LABORATORIES, LTD.
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LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: DEC. 19 1994 Page # 2

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Reviewed by:TMG
Customer#: 309
Job Number:

Attn: Wright, Lynn

Date Collected:12/02/94

Sample Number: 94008429
Project Name: ATOKA 1
Sample ID: MW-3

Time Collected:1100

Date Received: 12/06/94

Test Code	Analyte	Result	Units	Method	Analyst
S8270'D	Semivolatile Organics (D/T)	12/09 1943	init.	6-8270	MSB
AcenpheW	Acenaphthene	< 0.010	mg/L	6-8270	MSB
AcenphyW	Acenaphthylene	< 0.010	mg/L	6-8270	MSB
AnthrcnW	Anthracene	< 0.010	mg/L	6-8270	MSB
BzaAnthW	Benzo(a)anthracene	< 0.010	mg/L	6-8270	MSB
BzaPyrnW	Benzo(a)pyrene	< 0.010	mg/L	6-8270	MSB
BzbFAntW	Benzo(b)fluoroanthene	< 0.010	mg/L	6-8270	MSB
BzghipeW	Benzo(g,h,i)perylene	< 0.010	mg/L	6-8270	MSB
BzkFAntW	Benzo(k)fluoroanthene	< 0.010	mg/L	6-8270	MSB
ChrysenW	Chrysene	< 0.010	mg/L	6-8270	MSB
dBzahAnW	Dibenz(a,h)anthracene	< 0.010	mg/L	6-8270	MSB
FAnthenW	Fluoranthene	< 0.010	mg/L	6-8270	MSB
FluorenW	Fluorene	< 0.010	mg/L	6-8270	MSB
IndnPyrW	Indeno(1,2,3-cd)pyrene	< 0.010	mg/L	6-8270	MSB
NaphthlW	Naphthalene	< 0.010	mg/L	6-8270	MSB
PhnAnthW	Phenanthrene	< 0.010	mg/L	6-8270	MSB
PyreneW	Pyrene	< 0.010	mg/L	6-8270	MSB
NitBzd5W	Nitrobenzene-d5 (surr)	87.	%	35-114	MSB
2FbiPhnW	2Fluorobiphenyl (surr)	82.	%	43-116	MSB
TrPhd14W	Terphenyl-d14 (surr)	81.	%	33-141	MSB

RW 12/19/94
Larry Dillman

TERRA LABORATORIES, LTD.
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LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: DEC. 19 1994 Page # 3

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Reviewed by:TMG
Customer#: 309
Job Number:

Attn: Wright, Lynn

Date Collected:12/02/94

Sample Number: 94008429
Project Name: ATOKA 1
Sample ID: MW-3

Time Collected:1100

Date Received: 12/06/94

Test Code	Analyte	Result	Units	Method	Analyst
ICP'W3'D	ICP3 Analysis(Date/Time)	12/16 1336	init.		BLW
CaICPw	Calcium	600	mg/L	6-6010	BLW
MgICPw	Magnesium	550	mg/L	6-6010	BLW
KICPw	Potassium	8.5	mg/L	6-6010	BLW
NaICPw	Sodium	460	mg/L	6-6010	BLW
CLAUTO'D	Chloride, Titrimetric (D/T)	12/13 0930	init.		CJT
ClAuto	Chloride, Titrimetric	470	mg/L	3-325.2	CJT
SO4'D	Sulfate Analysis (D/T)	12/15 0930	init.		CJT
Sulfate	Sulfate	4900	mg/L	2-375.4	CJT
ALK'D	Alkalinity Analysis (Date/Time)	12/15 1630	init.	2-310.1	CJT
CO3ALK	Carbonate Alkalinity (CaCO3)	< 2	mg/L	2-310.1	CJT
HCO3ALK	Bicarbonate Alkalinity (CaCO3)	200	mg/L	2-310.1	CJT

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dil.Fx.- Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated B=found in blank J=>mdl< reporting limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
5. SM: Standard Methods for the Examination of Water and Wastewater, 18th edition.
6. SW: SW-846, Test Methods for Evaluation of Solid Waste, Third edition. Update I, July 1992.

Rev 12/19/94
Larry D Miller

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713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: DEC. 19 1994 Page # 1

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Reviewed by:TMG
Customer#: 309
Job Number:

Attn: Wright, Lynn

Date Collected:12/02/94

Sample Number: 94008430
Project Name: ATOKA 1
Sample ID: MW-4

Time Collected:1145

Date Received: 12/06/94

Test Code	Analyte	Result	Units	Method	Analyst
BTEXW'D	BTEX Analysis Prep(Date/Time)	12/08 1821	init.	6-5030	PRS
BZ8020W	Benzene	.23	ppm	6-8020	PRS
TOL8020W	Toluene	.060	ppm	6-8020	PRS
EBZ8020W	Ethylbenzene	< 0.002	ppm	6-8020	PRS
XYLSTLw	Total Xylenes	.13	ppm	6-8020	PRS
BTEXTLw	Total BTEX	< 0.422	ppm	6-8020	PRS
aaaTFTw	aaa-TFT (surr)	MI	%	82-114	PRS
4BFBw	4-BFB (surr)	103.	%	85-115	PRS
BNAXW'D	Base/neutral/acid Extraction(D/	12/06 1300	init.	6-3510	BKW
S8270'D	Semivolatile Organics (D/T)	12/09 2035	init.	6-8270	MSB
AcenpheW	Acenaphthene	< 0.010	mg/L	6-8270	MSB
AcenphyW	Acenaphthylene	< 0.010	mg/L	6-8270	MSB
AnthrcnW	Anthracene	< 0.010	mg/L	6-8270	MSB
BzaAnthW	Benzo(a)anthracene	< 0.010	mg/L	6-8270	MSB
BzaPyrnW	Benzo(a)pyrene	< 0.010	mg/L	6-8270	MSB
BzbFAntW	Benzo(b)fluoroanthene	< 0.010	mg/L	6-8270	MSB
BzghipeW	Benzo(g,h,i)perylene	< 0.010	mg/L	6-8270	MSB
BzkFAntW	Benzo(k)fluoroanthene	< 0.010	mg/L	6-8270	MSB
ChrysenW	Chrysene	< 0.010	mg/L	6-8270	MSB
dBzahAnW	Dibenz(a,h)anthracene	< 0.010	mg/L	6-8270	MSB

Rec 12/19/94
Larry Dohlman

TERRA LABORATORIES, LTD.
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713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: DEC. 19 1994 Page # 2

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Reviewed by:TMG
Customer#: 309
Job Number:

Attn: Wright, Lynn

Date Collected:12/02/94

Sample Number: 94008430
Project Name: ATOKA 1
Sample ID: MW-4

Time Collected:1145

Date Received: 12/06/94

Test Code	Analyte	Result	Units	Method	Analyst
FAnthenW	Fluoranthene	< 0.010	mg/L	6-8270	MSB
FluorenW	Fluorene	< 0.010	mg/L	6-8270	MSB
IndnPyrW	Indeno(1,2,3-cd)pyrene	< 0.010	mg/L	6-8270	MSB
NaphthlW	Naphthalene	< 0.010	mg/L	6-8270	MSB
PhnAnthW	Phenanthrene	< 0.010	mg/L	6-8270	MSB
PyreneW	Pyrene	< 0.010	mg/L	6-8270	MSB
NitBzd5W	Nitrobenzene-d5 (surr)	71.	%	35-114	MSB
2FbiPhnW	2Fluorobiphenyl (surr)	83.	%	43-116	MSB
TrPhd14W	Terphenyl-d14 (surr)	72.	%	33-141	MSB
HGT'W'D	Mercury Analysis (D/T)	12/13 1430	init.		RR
HgCVAAw	Mercury	< 0.0002	mg/L	6-7470	RR
DMIWW'D	Acid Digestion(Date/Time)	12/07 1400	init.	6-3015	RR
ICP'W1'D	ICP1 Analysis(Date/Time)	12/13 2200	init.		BLW
AsICPw	Arsenic	< 0.6	mg/L	6-6010	BLW
BaICPw	Barium	.04	mg/L	6-6010	BLW
CdICPw	Cadmium	< 0.03	mg/L	6-6010	BLW
CrICPw	Chromium	< 0.03	mg/L	6-6010	BLW
PbICPw	Lead	< 0.1	mg/L	6-6010	BLW
SeICPw	Selenium	< 0.6	mg/L	6-6010	BLW
AgICPw	Silver	< 0.03	mg/L	6-6010	BLW

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LEAGUE CITY, TX 77573
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LAB ANALYSIS REPORT

Report Date: DEC. 19 1994 Page # 3

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Reviewed by:TMG
Customer#: 309
Job Number:

Attn: Wright, Lynn

Date Collected:12/02/94

Sample Number: 94008430
Project Name: ATOKA 1
Sample ID: MW-4

Time Collected:1145

Date Received: 12/06/94

Test Code	Analyte	Result	Units	Method	Analyst
ICP'W3'D	ICP3 Analysis(Date/Time)	12/16 1336	init.		BLW
CaICPw	Calcium	740	mg/L	6-6010	BLW
MgICPw	Magnesium	270	mg/L	6-6010	BLW
KICPw	Potassium	1.9	mg/L	6-6010	BLW
NaICPw	Sodium	240	mg/L	6-6010	BLW
CLAUTO'D	Chloride, Titrimetric (D/T)	12/13 0930	init.		CJT
ClAuto	Chloride, Titrimetric	170	mg/L	3-325.2	CJT
SO4'D	Sulfate Analysis (D/T)	12/15 0930	init.		CJT
Sulfate	Sulfate	1900	mg/L	2-375.4	CJT
ALK'D	Alkalinity Analysis (Date/Time)	12/15 1630	init.	2-310.1	CJT
CO3ALK	Carbonate Alkalinity (CaCO3)	< 2	mg/L	2-310.1	CJT
HCO3ALK	Bicarbonate Alkalinity (CaCO3)	420	mg/L	2-310.1	CJT

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dil.Fx.- Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated B=found in blank J=>mdl< reporting limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
5. SM: Standard Methods for the Examination of Water and Wastewater, 18th edition.
6. SW: SW-846, Test Methods for Evaluation of Solid Waste, Third edition. Update I, July 1992.

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Larry Dodd

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LAB ANALYSIS REPORT

Report Date: DEC. 12 1994 Page # 1

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Reviewed by:TMG
Customer#: 309
Job Number:

Attn: Wright, Lynn

Date Collected:12/02/94

Sample Number: 94008431
Project Name: ATOKA 1
Sample ID: TB-1

Time Collected:1700

Date Received: 12/06/94

Test Code	Analyte	Result	Units	Method	Analyst
BTEXW'D	BTEX Analysis Prep(Date/Time)	12/08 1840	init.	6-5030	PRS
BZ8020W	Benzene	< 0.002	ppm	6-8020	PRS
TOL8020W	Toluene	< 0.002	ppm	6-8020	PRS
EBZ8020W	Ethylbenzene	< 0.002	ppm	6-8020	PRS
XYLSTLw	Total Xylenes	< 0.004	ppm	6-8020	PRS
BTEXTLw	Total BTEX	< 0.010	ppm	6-8020	PRS
aaaTFTw	aaa-TFT (surr)	91.	%	82-114	PRS
4BFBw	4-BFB (surr)	89.	%	85-115	PRS

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dil.Fx.- Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated B=found in blank J=>mdl< reporting limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
5. SM: Standard Methods for the Examination of Water and Wastewater, 18th edition.
6. SW: SW-846, Test Methods for Evaluation of Solid Waste, Third edition. Update I, July 1992.

12/14/94

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LAB ANALYSIS REPORT

Report Date: DEC. 19 1994 Page # 1

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Reviewed by:TMG
Customer#: 309
Job Number:

Attn: Wright, Lynn

Date Collected:12/02/94

Sample Number: 94008439
Project Name: ATOKA 1
Sample ID: MW-5 GRAB

Time Collected:1300
Date Received: 12/06/94

Test Code	Analyte	Result	Units	Method	Analyst
BTEXW'D	BTEX Analysis Prep(Date/Time)	12/09 1051	init.	6-5030	PRS
BZ8020W	Benzene	6.2	ppm	6-8020	PRS
TOL8020W	Toluene	13	ppm	6-8020	PRS
EBZ8020W	Ethylbenzene	1.1	ppm	6-8020	PRS
XYLSTLw	Total Xylenes	7.4	ppm	6-8020	PRS
BTEXTLw	Total BTEX	27.7	ppm	6-8020	PRS
aaaTFTw	aaa-TFT (surr)	105.	%	82-114	PRS
4BFBw	4-BFB (surr)	92.	%	85-115	PRS
BNAXW'D	Base/neutral/acid Extraction(D/	12/06 1300	init.	6-3510	BKW
58270'D	Semivolatile Organics (D/T)	12/09 2127	init.	6-8270	MSB
AcenpheW	Acenaphthene	< 0.010	mg/L	6-8270	MSB
AcenphyW	Acenaphthylene	< 0.010	mg/L	6-8270	MSB
AnthrcnW	Anthracene	< 0.010	mg/L	6-8270	MSB
BzaAnthW	Benzo(a)anthracene	< 0.010	mg/L	6-8270	MSB
BzaPyrnW	Benzo(a)pyrene	< 0.010	mg/L	6-8270	MSB
BzbFAntW	Benzo(b)fluoroanthene	< 0.010	mg/L	6-8270	MSB
BzghipeW	Benzo(g,h,i)perylene	< 0.010	mg/L	6-8270	MSB
BzkFAntW	Benzo(k)fluoroanthene	< 0.010	mg/L	6-8270	MSB
ChrysenW	Chrysene	< 0.010	mg/L	6-8270	MSB
dBzahAnW	Dibenz(a,h)anthracene	< 0.010	mg/L	6-8270	MSB

12/19/94
Larry D. Wallace

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LEAGUE CITY, TX 77573
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LAB ANALYSIS REPORT

Report Date: DEC. 19 1994

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Reviewed by:TMG
Customer#: 309
Job Number:

Attn: Wright, Lynn

Date Collected:12/02/94

Sample Number: 94008439
Project Name: ATOKA 1
Sample ID: MW-5 GRAB

Time Collected:1300
Date Received: 12/06/94

Test Code	Analyte	Result	Units	Method	Analyst
FAnthenW	Fluoranthene	< 0.010	mg/L	6-8270	MSB
FluorenW	Fluorene	< 0.010	mg/L	6-8270	MSB
IndnPyrW	Indeno(1,2,3-cd)pyrene	< 0.010	mg/L	6-8270	MSB
NaphthlW	Naphthalene	< 0.010	mg/L	6-8270	MSB
PhnAnthW	Phenanthrene	< 0.010	mg/L	6-8270	MSB
PyreneW	Pyrene	< 0.010	mg/L	6-8270	MSB
NitBzd5W	Nitrobenzene-d5 (surr)	70.	%	35-114	MSB
2FbiPhnW	2Fluorobiphenyl (surr)	78.	%	43-116	MSB
TrPhd14W	Terphenyl-d14 (surr)	69.	%	33-141	MSB
HGT'W'D	Mercury Analysis (D/T)	12/13 1430	init.		RR
HgCVAAw	Mercury	< 0.0002	mg/L	6-7470	RR
DMTWW'D	Acid Digestion(Date/Time)	12/07 1400	init.	6-3015	RR
ICP'W1'D	ICP1 Analysis(Date/Time)	12/13 2200	init.		BLW
AsICPw	Arsenic	< 0.6	mg/L	6-6010	BLW
BaICPw	Barium	.24	mg/L	6-6010	BLW
CdICPw	Cadmium	< 0.03	mg/L	6-6010	BLW
CrICPw	Chromium	< 0.03	mg/L	6-6010	BLW
PbICPw	Lead	< 0.1	mg/L	6-6010	BLW
SeICPw	Selenium	< 0.6	mg/L	6-6010	BLW
AgICPw	Silver	< 0.03	mg/L	6-6010	BLW

Rw 12/19/94
Larry Dillman

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LAB ANALYSIS REPORT

Report Date: DEC. 19 1994

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Attn: Wright, Lynn

Reviewed by:TMG
Customer#: 309
Job Number:

Date Collected:12/02/94
Time Collected:1300
Date Received: 12/06/94

Sample Number: 94008439
Project Name: ATOKA 1
Sample ID: MW-5 GRAB

Test Code	Analyte	Result	Units	Method	Analyst
ICP'W3'D	ICP3 Analysis(Date/Time)	12/16 1336	init.		BLW
CaICPw	Calcium	560	mg/L	6-6010	BLW
MgICPw	Magnesium	150	mg/L	6-6010	BLW
KICPw	Potassium	3.3	mg/L	6-6010	BLW
NaICPw	Sodium	370	mg/L	6-6010	BLW
CLAUTO'D	Chloride, Titrimetric (D/T)	12/13 0930	init.		CJT
ClAuto	Chloride, Titrimetric	530	mg/L	3-325.2	CJT
SO4'D	Sulfate Analysis (D/T)	12/15 0930	init.		CJT
Sulfate	Sulfate	1400	mg/L	2-375.4	CJT
ALK'D	Alkalinity Analysis (Date/Time)	12/15 1630	init.	2-310.1	CJT
CO3ALK	Carbonate Alkalinity (CaCO3)	< 2	mg/L	2-310.1	CJT
HCO3ALK	Bicarbonate Alkalinity (CaCO3)	570	mg/L	2-310.1	CJT

COMMENTS: BTEX Dil.Fx. X 50

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dil.Fx.- Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated B=found in blank J=>mdl< reporting limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
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6. SW: SW-846, Test Methods for Evaluation of Solid Waste, Third edition. Update I, July 1992.

Rw 12/19/94
Larry D Sullivan

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LAB ANALYSIS REPORT

Report Date: DEC. 19 1994 Page # 1

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Reviewed by:TMG
Customer#: 309
Job Number:

Attn: Wright, Lynn

Date Collected:12/02/94

Sample Number: 94008440
Project Name: ATOKA 1
Sample ID: MW-6 GRAB

Time Collected:1345
Date Received: 12/06/94

Test Code	Analyte	Result	Units	Method	Analyst
BTEXW'D	BTEX Analysis Prep(Date/Time)	12/08 1544	init.	6-5030	PRS
BZ8020W	Benzene	.36	ppm	6-8020	PRS
TOL8020W	Toluene	< 0.01	ppm	6-8020	PRS
EBZ8020W	Ethylbenzene	.050	ppm	6-8020	PRS
XYLSTLw	Total Xylenes	< 0.02	ppm	6-8020	PRS
BTEXTLw	Total BTEX	< 0.44	ppm	6-8020	PRS
aaaTFTw	aaa-TFT (surr)	104.	%	82-114	PRS
4BFBw	4-BFB (surr)	93.	%	85-115	PRS
BNAXW'D	Base/neutral/acid Extraction(D/	12/06 1300	init.	6-3510	BKW
S8270'D	Semivolatile Organics (D/T)	12/09 2218	init.	6-8270	MSB
AcenpheW	Acenaphthene	< 0.010	mg/L	6-8270	MSB
AcenphyW	Acenaphthylene	< 0.010	mg/L	6-8270	MSB
AnthrcnW	Anthracene	< 0.010	mg/L	6-8270	MSB
BzaAnthW	Benzo(a)anthracene	< 0.010	mg/L	6-8270	MSB
BzaPyrnW	Benzo(a)pyrene	< 0.010	mg/L	6-8270	MSB
BzbFAntW	Benzo(b)fluoroanthene	< 0.010	mg/L	6-8270	MSB
BzghipeW	Benzo(g,h,i)perylene	< 0.010	mg/L	6-8270	MSB
BzkFAntW	Benzo(k)fluoroanthene	< 0.010	mg/L	6-8270	MSB
ChrysenW	Chrysene	< 0.010	mg/L	6-8270	MSB
dBzahAnW	Dibenz(a,h)anthracene	< 0.010	mg/L	6-8270	MSB

RW 12/19/94
Larry Dillaha

TERRA LABORATORIES, LTD.
2525 SOUTH SHORE BLVD, SUITE 100
LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: DEC. 19 1994

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Attn: Wright, Lynn

Sample Number: 94008440
Project Name: ATOKA 1
Sample ID: MW-6 GRAB

Reviewed by:TMG
Customer#: 309
Job Number:

Date Collected:12/02/94

Time Collected:1345

Date Received: 12/06/94

Test Code	Analyte	Result	Units	Method	Analyst
FAnthenW	Fluoranthene	< 0.010	mg/L	6-8270	MSB
FluorenW	Fluorene	< 0.010	mg/L	6-8270	MSB
IndnPyrW	Indeno(1,2,3-cd)pyrene	< 0.010	mg/L	6-8270	MSB
NaphthlW	Naphthalene	< 0.010	mg/L	6-8270	MSB
PhnAnthW	Phenanthrene	< 0.010	mg/L	6-8270	MSB
PyreneW	Pyrene	< 0.010	mg/L	6-8270	MSB
NitBzd5W	Nitrobenzene-d5 (surr)	71.	%	35-114	MSB
2FbiPhnW	2Fluorobiphenyl (surr)	82.	%	43-116	MSB
TrPhd14W	Terphenyl-d14 (surr)	70.	%	33-141	MSB
HGT'W'D	Mercury Analysis (D/T)	12/13 1430	init.		RR
HgCVAAw	Mercury	< 0.0002	mg/L	6-7470	RR
DMiWW'D	Acid Digestion(Date/Time)	12/07 1400	init.	6-3015	RR
ICP'W1'D	ICP1 Analysis(Date/Time)	12/13 2200	init.		BLW
AsICPw	Arsenic	< 0.6	mg/L	6-6010	BLW
BaICPw	Barium	.48	mg/L	6-6010	BLW
CdICPw	Cadmium	< 0.03	mg/L	6-6010	BLW
CrICPw	Chromium	< 0.03	mg/L	6-6010	BLW
PbICPw	Lead	< 0.1	mg/L	6-6010	BLW
SeICPw	Selenium	< 0.6	mg/L	6-6010	BLW
AgICPw	Silver	< 0.03	mg/L	6-6010	BLW

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LAB ANALYSIS REPORT

Report Date: DEC. 19 1994 Page # 3

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Reviewed by:TMG
Customer#: 309
Job Number:

Attn: Wright, Lynn

Date Collected:12/02/94

Sample Number: 94008440
Project Name: ATOKA 1
Sample ID: MW-6 GRAB

Time Collected:1345
Date Received: 12/06/94

Test Code	Analyte	Result	Units	Method	Analyst
ICP'W3'D	ICP3 Analysis(Date/Time)	12/16 1336	init.		BLW
CaICPw	Calcium	210	mg/L	6-6010	BLW
MgICPw	Magnesium	100	mg/L	6-6010	BLW
KICPw	Potassium	3.5	mg/L	6-6010	BLW
NaICPw	Sodium	210	mg/L	6-6010	BLW
CLAUTO'D	Chloride, Titrimetric (D/T)	12/13 0930	init.		CJT
ClAuto	Chloride, Titrimetric	420	mg/L	3-325.2	CJT
SO4'D	Sulfate Analysis (D/T)	12/15 0930	init.		CJT
Sulfate	Sulfate	940	mg/L	2-375.4	CJT
ALK'D	Alkalinity Analysis (Date/Time)	12/15 1630	init.	2-310.1	CJT
CO3ALK	Carbonate Alkalinity (CaCO3)	< 2	mg/L	2-310.1	CJT
HCO3ALK	Bicarbonate Alkalinity (CaCO3)	230	mg/L	2-310.1	CJT

COMMENTS: BTEX Dil.Fx. X 5

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dil.Fx.- Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated B=found in blank J=>mdl< reporting limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
5. SM: Standard Methods for the Examination of Water and Wastewater, 18th edition.
6. SW: SW-846, Test Methods for Evaluation of Solid Waste, Third edition. Update I, July 1992.

Rev 12/19/94
Garry D. Miller

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LAB ANALYSIS REPORT

Report Date: DEC. 19 1994 Page # 1

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Reviewed by:TMG
Customer#: 309
Job Number:

Attn: Wright, Lynn

Date Collected:12/02/94

Sample Number: 94008441
Project Name: ATOKA 1
Sample ID: MW-7 GRAB

Time Collected:1430
Date Received: 12/06/94

Test Code	Analyte	Result	Units	Method	Analyst
BTEXW'D	BTEX Analysis Prep(Date/Time)	12/08 1604	init.	6-5030	PRS
BZ8020W	Benzene	.62	ppm	6-8020	PRS
TOL8020W	Toluene	1.1	ppm	6-8020	PRS
EBZ8020W	Ethylbenzene	.17	ppm	6-8020	PRS
XYLSTLw	Total Xylenes	1.1	ppm	6-8020	PRS
BTEXTLw	Total BTEX	2.99	ppm	6-8020	PRS
aaaTFTw	aaa-TFT (surr)	106.	%	82-114	PRS
4BFBw	4-BFB (surr)	MI	%	85-115	PRS
BNAXW'D	Base/neutral/acid Extraction(D/	12/06 1300	init.	6-3510	BKW
S8270'D	Semivolatile Organics (D/T)	12/09 2310	init.	6-8270	MSB
AcenpheW	Acenaphthene	< 0.010	mg/L	6-8270	MSB
AcenphyW	Acenaphthylene	< 0.010	mg/L	6-8270	MSB
AnthrcnW	Anthracene	< 0.010	mg/L	6-8270	MSB
BzaAnthW	Benzo(a)anthracene	< 0.010	mg/L	6-8270	MSB
BzaPyrnW	Benzo(a)pyrene	< 0.010	mg/L	6-8270	MSB
BzbFAntW	Benzo(b)fluoroanthene	< 0.010	mg/L	6-8270	MSB
BzghipeW	Benzo(g,h,i)perylene	< 0.010	mg/L	6-8270	MSB
BzkFAntW	Benzo(k)fluoroanthene	< 0.010	mg/L	6-8270	MSB
ChrysenW	Chrysene	< 0.010	mg/L	6-8270	MSB
dBzahAnW	Dibenz(a,h)anthracene	< 0.010	mg/L	6-8270	MSB

Rec 12/19/94
Larry D. Miller

TERRA LABORATORIES, LTD.
2525 SOUTH SHORE BLVD, SUITE 100
LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: DEC. 19 1994

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Reviewed by:TMG
Customer#: 309
Job Number:

Attn: Wright, Lynn

Date Collected:12/02/94

Sample Number: 94008441
Project Name: ATOKA 1
Sample ID: MW-7 GRAB

Time Collected:1430
Date Received: 12/06/94

Test Code	Analyte	Result	Units	Method	Analyst
FAnthenW	Fluoranthene	< 0.010	mg/L	6-8270	MSB
FluorenW	Fluorene	< 0.010	mg/L	6-8270	MSB
IndnPyrW	Indeno(1,2,3-cd)pyrene	< 0.010	mg/L	6-8270	MSB
NaphthlW	Naphthalene	< 0.010	mg/L	6-8270	MSB
PhnAnthW	Phenanthrene	< 0.010	mg/L	6-8270	MSB
PyreneW	Pyrene	< 0.010	mg/L	6-8270	MSB
NitBzd5W	Nitrobenzene-d5 (surr)	74.	%	35-114	MSB
2FbiPhnW	2Fluorobiphenyl (surr)	92.	%	43-116	MSB
trPhd14W	Terphenyl-d14 (surr)	58.	%	33-141	MSB
HGT'W'D	Mercury Analysis (D/T)	12/13 1430	init.		RR
HgCVAAw	Mercury	< 0.0002	mg/L	6-7470	RR
DMiWW'D	Acid Digestion(Date/Time)	12/07 1400	init.	6-3015	RR
ICP'W1'D	ICP1 Analysis(Date/Time)	12/13 2200	init.		BLW
AsICPw	Arsenic	< 0.6	mg/L	6-6010	BLW
BaICPw	Barium	1.2	mg/L	6-6010	BLW
CdICPw	Cadmium	< 0.03	mg/L	6-6010	BLW
CrICPw	Chromium	< 0.03	mg/L	6-6010	BLW
PbICPw	Lead	< 0.1	mg/L	6-6010	BLW
SeICPw	Selenium	< 0.6	mg/L	6-6010	BLW
AgICPw	Silver	< 0.03	mg/L	6-6010	BLW

RW 12/19/94
Larry D. Thacker

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LAB ANALYSIS REPORT

Report Date: DEC. 19 1994 Page # 3

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Reviewed by:TMG
Customer#: 309
Job Number:

Attn: Wright, Lynn

Date Collected:12/02/94

Sample Number: 94008441
Project Name: ATOKA 1
Sample ID: MW-7 GRAB

Time Collected:1430
Date Received: 12/06/94

Test Code	Analyte	Result	Units	Method	Analyst
ICP'W3'D	ICP3 Analysis(Date/Time)	12/16 1336	init.		BLW
CaICPw	Calcium	340	mg/L	6-6010	BLW
MgICPw	Magnesium	170	mg/L	6-6010	BLW
KICPw	Potassium	1.7	mg/L	6-6010	BLW
NaICPw	Sodium	200	mg/L	6-6010	BLW
CLAUTO'D	Chloride, Titrimetric (D/T)	12/13 0930	init.		CJT
ClAuto	Chloride, Titrimetric	350	mg/L	3-325.2	CJT
SO4'D	Sulfate Analysis (D/T)	12/15 0930	init.		CJT
Sulfate	Sulfate	1100	mg/L	2-375.4	CJT
ALK'D	Alkalinity Analysis (Date/Time)	12/15 1630	init.	2-310.1	CJT
CO3ALK	Carbonate Alkalinity (CaCO3)	< 2	mg/L	2-310.1	CJT
HCO3ALK	Bicarbonate Alkalinity (CaCO3)	620	mg/L	2-310.1	CJT

COMMENTS: BTEX Dil.Fx. X 5

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dil.Fx.- Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated B=found in blank J=>mdl< reporting limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
5. SM: Standard Methods for the Examination of Water and Wastewater, 18th edition.
6. SW: SW-846, Test Methods for Evaluation of Solid Waste, Third edition. Update I, July 1992.

Rev 12/19/94
Larry Dobbs

TERRA LABORATORIES, LTD.
2525 SOUTH SHORE BLVD, SUITE 100
LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: DEC. 12 1994 Page # 1

Brown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Reviewed by:TMG
Customer#: 309
Job Number:

Attn: Wright, Lynn

Date Collected:12/02/94

Sample Number: 94008442
Project Name: ATOKA 1
Sample ID: TB-2 GRAB

Time Collected:1700
Date Received: 12/06/94

Test Code	Analyte	Result	Units	Method	Analyst
BTEXW'D	BTEX Analysis Prep(Date/Time)	12/08 1919	init.	6-5030	PRS
BZ8020W	Benzene	< 0.002	ppm	6-8020	PRS
TOL8020W	Toluene	< 0.002	ppm	6-8020	PRS
EBZ8020W	Ethylbenzene	< 0.002	ppm	6-8020	PRS
XYLSTLw	Total Xylenes	< 0.004	ppm	6-8020	PRS
BTEXTLw	Total BTEX	< 0.010	ppm	6-8020	PRS
aaaTFTw	aaa-TFT (surr)	85.	%	82-114	PRS
4BFBw	4-BFB (surr)	84.	%	85-115	PRS

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dil.Fx.- Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Soil)
init = date & time initiated B=found in blank J=>mdl< reporting limit

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
5. SM: Standard Methods for the Examination of Water and Wastewater, 18th edition.
6. SW: SW-846, Test Methods for Evaluation of Solid Waste, Third edition. Update I, July 1992.

RW 12/14/94

QUALITY CONTROL REPORT

Report To: Brown and Caldwell
Terra Laboratories Sample No(s). 94008429 - 94008431 & 94008439 - 94008442

			Precision			Accuracy	
Analyte	Units	Blank	Orig	Dup	RPD(%)	MSR(%)	LCSR(%)
BTEX (Batch 120894W) Sample No. 94007540 Spike							
Benzene	ppb	< 2	72.6	79.6	9.0	102	113
Ethylbenzene	ppb	< 2	72.0	77.4	7.0	102	108
Toluene	ppb	< 2	62.7	67.4	7	102	115
Xylenes	ppb	< 4	160.6	168.8	5	102	111
Mercury (Batch 121394WL)							
Sample No. 94008429	µg/L	< 0.0002	0.497	0.517	3.9	99	103
ICP (Batch 121394WL) Sample No. 94008439 Spike							
As	ppm	< 0.6	1.931	1.912	1.0	97	99
Ba	ppm	< 0.03	1.879	1.847	1.7	83	97
Cd	ppm	< 0.03	1.755	1.701	3.1	88	97
Cr	ppm	< 0.03	1.745	1.695	2.9	87	99
Pb	ppm	< 0.1	1.785	1.750	2.0	89	100
Se	ppm	< 0.6	1.890	1.849	2.2	95	100
Ag	ppm	< 0.03	0.532	0.397	29.1**	27***	101
Ag*	ppm	< 0.03	1.765	1.695	4.0	93	

*Post Digestion Spike No. 94008439
**Elevated RPD, Post Digestion Spike also reported
***Matrix Spike Recovery low, Lab Control within limits, Post Digestion Spike also reported

Semivolatiles (Batch 120994WL) Sample No. 94008361 Spike							
1,4-Dichlorobenzene	mg/L	< 0.001	66.5	72.5	8.6	66	68
Nnitrosodinproplamine	mg/L	< 0.001	43.3	48.0	10.3	43	35
124-TriClBenzene	mg/L	< 0.001	71.0	76.1	6.9	71	68
Acenaphthene	mg/L	< 0.001	77.3	79.2	2.4	77	71
2,4-Dinitrotoluene	mg/L	< 0.001	81.8	84.5	3.2	82	67
Pyrene	mg/L	< 0.002	106	116	9.0	106	94
Phenol	mg/L	< 0.001	36.5	36.8	0.8	36	34
2-Chlorophenol	mg/L	< 0.001	85.8	92.0	7.0	86	79
4Chloro3methylphenol	mg/L	< 0.001	68.2	74.8	9.2	68	66
4-Nitrophenol	mg/L	< 0.001	71.4	68.8	3.7	71	62
Pentachlorophenol	mg/L	< 0.001	90.9	93.6	2.9	91	86
Prep 12/06/94							
ICP (Batch 121694W3) Sample No. 94008439 Spike							
K	ppm	< 2.0	22.412	22.507	0.4	97	96

RW 12/21/94
Larry D. Stallcup

QUALITY CONTROL REPORT

Report To: Brown and Caldwell
Terra Laboratories Sample No(s). 94008429 - 94008431 & 94008439 - 94008442

			Precision			Accuracy	
Analyte	Units	Blank	Orig	Dup	RPD(%)	MSR(%)	LCSR(%)
ICP (Batch A121694W3) Sample No. 94008439 Spike							
Ca	ppm	< 0.6	22.9	21.8	4.9	-	96
Ca*	ppm	< 0.6	34.5	-	-	94	96
Mg	ppm	< 0.1	6.9	6.6	4.4	-	93
Mg*	ppm	< 0.1	17.5	-	-	107	93
Na	ppm	< 0.6	16.7	16.1	3.7	-	98
Na*	ppm	< 0.6	26.0	-	-	95	98
*Post Digestion Spike No. 94008439							
Chloride (Batch 121394W)							
Sample No. 94008429	mg/L	< 1	456	473	3.6	75	99
Sulfate (Batch 121594W)							
Sample No. 94008429	mg/L	< 10	4864	4809	1.1	67*	103
*Matrix interference with spike recovery; LCS also reported							
Alkalinity (Batch 121594)							
Sample No. 94008429	mg/L	< 1	193	197	2.0		93
BTEX (Batch 120994W) Sample No. 94008546 Spike							
MTBE	ppb	< 2	19.6	17.7	10	89	
Benzene	ppb	< 2	24.9	23.2	7	116	104
Toluene	ppb	< 2	22.9	21.5	6	108	105
Ethylbenzene	ppb	< 2	22.9	21.3	7	107	108
Xylene	ppb	< 4	65.4	61.7	6	103	106

12/21/94
Larry D Sullivan

TERRA LABORATORIES LTD.

2525 South Shore Blvd. League City, Texas 77573 (713) 334-5052 Fax: (713) 334-3116

CHAIN OF CUSTODY

REPORT TO:		REMIT TO:	
COMPANY Brown & Caldwell		COMPANY SAME	
ADDRESS 1415 Louisiana, Ste. 2500		ADDRESS	
CITY Houston	STATE TX ZIP	CITY	STATE ZIP
ATTN Mr. Lynn Wright	PHONE 713/759-0999 FAX 713/759-0952	ATTN	PHONE FAX
Client Comments:		Project Name: Atoka 1	P.O. #
		Turnaround Time Standard	Release #

ANALYSES REQUESTED

DATE	24HR TIME	MATRIX	COMPOSITE	GRAB	SAMPLE DESCRIPTION	NUMBER CONTAINERS	BTEX 8020	PAH's	Total RCRA Metals	Major Cats & Ans.	TERRA SAMPLE NO.
12/2/94	1100/1115	GW			MW-3	5	X	X	X	X	94-8429
12/2/94	1145/1200	GW			MW-4	5	X	X	X	X	8430
		~~GW~~			~~MW-5~~	~~5~~	~~X~~	~~X~~	~~X~~	~~X~~	
		~~GW~~			~~MW-6~~	~~5~~	~~X~~	~~X~~	~~X~~	~~X~~	
		~~GW~~			~~MW-7~~	~~5~~	~~X~~	~~X~~	~~X~~	~~X~~	
12/2/94	1700	Water			TB-1	2	X				8431

Collected by:	Date:	Time:	Received by Terra:	Date:	Time:	Remarks
[signature]	12/5/94	1730	FED EX			wz 12-6-94 6°C
Relinquished by:	Date:	Time:	Received by: [signature]	Date: 12-6-94	Time: 1016	
Relinquished by:	Date:	Time:	Received by:	Date:	Time:	

TERRA LABORATORIES LTD.

2525 South Shore Blvd. League City, Texas 77573 (713) 334-5052 Fax: (713) 334-3116

CHAIN OF CUSTODY

TRANSWESTERN

REPORT TO:			REMIT TO:		
COMPANY Brown & Caldwell			COMPANY SAME		
ADDRESS 1415 Louisiana, Ste. 2500			ADDRESS		
CITY Houston	STATE Tx	ZIP 77002	CITY	STATE	ZIP
ATTN Mr. Lynn Wright	PHONE 713/759-0999	FAX 713/759-0952	ATTN	PHONE	FAX
Client Comments:			Project Name: ATOKA 1	P.O. #	
			Turnaround Time Standard	Release #	

ANALYSES REQUESTED

DATE	24HR TIME	MATRIX	COMPOSITE	GRAB	SAMPLE DESCRIPTION	NUMBER CONTAINERS	BTEX 8020	TPHT 8100	Total TCLP Metals	Major Cat's & An's	TERRA SAMPLE NO.
12/2/94	1300/1315	GW		X	MW-5	5	X	X	X	X	94-8439
	1345/1400			X	MW-6	5	X	X	X	X	8440
	1430/1445			X	MW-7	5	X	X	X	X	8441
	1700	Water		X	TB-2	2	X				8442

Collected by:	Date:	Time:	Received by Terra:	Date:	Time:	Remarks
J. L. Cropper	12/5/94	1780	FED EX			WZ 0°C 12-6-94
Relinquished by:	Date:	Time:	Received by:	Date:	Time:	
				12-6-94	1020	
Relinquished by:	Date:	Time:	Received by:	Date:	Time:	

TERRA LABORATORIES, LTD.
2525 SOUTH SHORE BLVD, SUITE 100
LEAGUE CITY, TX 77573
713/334-5052 FAX 713/334-3116

LAB ANALYSIS REPORT

Report Date: JAN. 20 1995

rown and Caldwell
1415 Louisiana, Suite 2500
Houston , TX 77002

Reviewed by:TMG

Job Number:

Attn: Richards, Susanne

Date Collected:01/08/95

ample Number: 95000101
Project Name: ATOKA 1 ARTESIA N.M.
Sample ID: MW-8

Time Collected:0830
Sample Type:
Date Received: 01/10/95

Test Code	Analyte	Result	Units	Method	Analyst
PhnAnthW	Phenanthrene	< 0.010	mg/L	6-8270	MSB
yreneW	Pyrene	< 0.010	mg/L	6-8270	MSB
NitBzd5W	Nitrobenzene-d5 (surr)	68.	%	35-114	MSB
2FbiPhnW	2Fluorobiphenyl (surr)	51.	%	43-116	MSB
rPhd14W	Terphenyl-d14 (surr)	68.	%	33-141	MSB
ICP'W3'D	ICP3 Analysis(Date/Time)	01/19 1000	init.		BLW
CaICPw	Calcium	690	mg/L	6-6010	BLW
MgICPw	Magnesium	260	mg/L	6-6010	BLW
KICPw	Potassium	3.3	mg/L	6-6010	BLW
NaICPw	Sodium	580	mg/L	6-6010	BLW
SO4'D	Sulfate Analysis (D/T)	01/12 0920	init.		JMR
Sulfate	Sulfate	2100	mg/L	2-375.4	JMR
CLAUTO'D	Chloride, Titrimetric (D/T)	01/11 1300	init.		CJT
ClAuto	Chloride, Titrimetric	610	mg/L	3-325.2	CJT
ALK'D	Alkalinity Analysis (Date/Time)	01/16 0730	init.	2-310.1	CJT
MALK310	M-Alkalinity (CaCO3)	290	mg/L	2-310.1	CJT
PALK310	P-Alkalinity (CaCO3)	< 1	mg/L	2-310.1	JMH
HCO3ALK	Bicarbonate Alkalinity (CaCO3)	290	mg/L	2-310.1	JMH
CO3ALK	Carbonate Alkalinity (CaCO3)	< 1	mg/L	2-310.1	JMH

COMMENTS:

FOOTNOTES: MI - Surrogate recovery is not reportable due to matrix interferences
Dil.Fx.- Minimum dilution required to allow acceptable quantitation
ppm = mg/L(Liquid), mg/kg(Solid) ppb = ug/L(Liquid), ug/kg(Solid)
init = date & time initiated B=found in blank J=>mdl< reporting limit

Rw 1/20/95
Larry Dahlen

Preparation and Analysis Method References:

1. ASTM: American Society for Testing and Materials, 1984.
2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes, 1978 (revised 1983).
3. EPA-600/4-82-057, Methods for Organic Chemical Analysis of Municipal & Industrial Wastewater, 1982.
4. HACH: Test Methods, accepted by EPA in November, 1983.
5. SM: Standard Methods for the Examination of Water and Wastewater, 18th edition.
6. SW: SW-846, Test Methods for Evaluation of Solid Waste, Third edition. Update I, July 1992.

QUALITY CONTROL REPORT

Report To: Brown and Caldwell
Terra Laboratories Sample No(s). 95000095 - 95000101

Analyte	Units	Blank	Precision			Accuracy	
			Orig	Dup	RPD(%)	MSR(%)	LCSR(%)
BTEX (Batch 011095S) Sample No. 95000076 Spike							
MTBE	ppb	< 5	18.2	19.5	7.0	98	
Benzene	ppb	< 5	19.6	19.7	0.5	99	90
Toluene	ppb	< 5	19.9	20.0	0.5	100	95
Ethylbenzene	ppb	< 5	19.0	19.0	0.0	95	85
Xylenes	ppb	< 10	55.5	56.2	1.3	94	92
TPH (Batch 011195S)							
Sample No. 95000100	mg/kg	< 15	< 15	< 15	-		82
TDS (Batch 011295)							
Sample No. 95000101	mg/L	< 20	4846	4672	3.6		100
BTEX (Batch 011095W) Sample No. 95000049 Spike							
MTBE	ppb	< 2	20.0	21.2	6	100	
Benzene	ppb	< 2	19.8	20.6	2	103	97
Toluene	ppb	< 2	20.1	20.8	3	101	95
Ethylbenzene	ppb	< 2	19.1	19.9	4	100	92
Xylenes	ppb	< 4	56.7	59	4	98	90
Cyclohexane	ppb	< 2	51.8	50.1	3	86	
Mercury (Batch 011895WL)							
Sample No. 95000058	µg/L	< 0.0002	0.513	0.533	3.8	102	102
Sample No. 95000101	µg/L	< 0.0002	0.513	0.513	0	102	102
Sample No. 95000101	µg/L	< 0.0002	0.513	0.533	3.8	102	102
ICP (Batch A011695WL) Sample No. 95000087 Spike							
As	ppm	< 0.6	2.000	2.015	0.75	100	97
Ba	ppm	< 0.03	2.849	2.799	1.8	88	92
Cd	ppm	< 0.03	1.870	1.852	0.97	94	98
Cr	ppm	< 0.03	1.887	1.824	3.4	94	98
Pb	ppm	< 0.1	2.006	1.995	0.55	93	99
Se	ppm	< 0.6	2.217	2.342	5.5	111	98
Ag	ppm	< 0.03	1.842	1.819	1.3	92	99
ICP (Batch A011295W2) Sample No. 95000104 Spike							
Cu	ppm	< 0.03	1.868	1.866	0.1	93	91
Zn	ppm	< 0.04	2.611	2.632	0.8	96	97

Rw 1/23/95
Larry Dellan

QUALITY CONTROL REPORT

Report To: Brown and Caldwell
Terra Laboratories Sample No(s). 95000095 - 95000101

			Precision			Accuracy	
Analyte	Units	Blank	Orig	Dup	RPD(%)	MSR(%)	LCSR(%)
Semivolatiles (Batch 011795WL) Blank Spike							
Pyridine	mg/L	< 0.002	59.8	62.0	3.6		60
1,4-Dichlorobenzene	mg/L	< 0.001	88.5	91.0	2.7		89
Hexachloroethane	mg/L	< 0.001	102	105	2.9		102
Nitrobenzene	mg/L	< 0.001	91.3	95.3	4.3		91
Hexachlorobutadiene	mg/L	< 0.001	90.4	92.6	2.4		90
2,4-Dinitrotoluene	mg/L	< 0.001	94.6	92.4	2.4		95
Hexachlorobenzene	mg/L	< 0.002	89.0	88.6	0.45		89
Prep 01/13/95							
ICP (Batch 011995W3) Blank Spike							
Ca	ppm	< 0.6	2.04	1.97	3.5		102
Mg	ppm	< 0.1	2.02	2.03	0.49		101
K	ppm	< 2.0	21.70	22.28	2.6		109
Na	ppm	< 0.6	2.05	2.12	3.4		103
Sulfate (Batch 011295W)							
Sample No. 95000101	mg/L	< 1	1786	2056	14	90	104
Chlorides (Batch 011195)							
Sample No.95000101	mg/L	< 1	611	578	5.6	76	100
Alkalinity (Batch 011695)							
Sample No. 95000101	mg/L	< 1	291	295	1.4		95

RW 1/23/95
Larry D. Wallace

TERRA LABORATORIES LTD.

2525 South Shore Blvd. League City, Texas 77573 (713) 334-5052 Fax: (713) 334-3116

CHAIN OF CUSTODY

REPORT TO:		REMIT TO:	
COMPANY	Brown & Caldwell	COMPANY	Susanne Richard Brown & Caldwell
ADDRESS		ADDRESS	
CITY	Houston Tx STATE Tx ZIP	CITY	STATE ZIP
ATTN	Susanne Richard PHONE 713 7540999 FAX	ATTN	PHONE FAX
Client Comments:		Project Name:	Atoka 1 Artesia, NM. P.O. #
		Turnaround Time	Standard Release #

ANALYSES REQUESTED

DATE	24HR TIME	MATRIX	COMPOSITE	GRAB	SAMPLE DESCRIPTION	NUMBER CONTAINERS	BTEX 8020	TPH 418.1	PAH's 610	TDS Cations/Anions	Total Metals ☆	TERRA SAMPLE NO.
1/6/95	1130	Soil		X	AT1-20 81-86	2	X	X				95-0095 *
1/6/95	1450	Soil		X	AT1-20 96-101	2	X	X				-0096
1/7/95	820	Soil		X	AT1-19 81-86	2	X	X				-0097
1/7/95	1710	Soil		X	AT1-19 110-115	2	X	X				-0098
1/7/95	1345	Soil		X	AT1-21 29-34	2	X	X				-0099
1/7/95	1525	Soil		X	AT1-21 44-49	2	X	X				-0100
1/8/95	830	Water		X	MW-8	5	X		X	X	X	☆ Total Metals are As, Ba, Cd, Cr, Cu, Pb, Hg, Se, Ag, Zn 95-010

per Susanne Richard cations/anions = Na, K, Ca, Mg Cl, SO_4, bicarbonate, carbonate 1/10/95 DM

Collected by:	Date:	Time:	Received by Terra:	Date:	Time:	Remarks
Alan J. Fear	1/6/95 - 1/8/95		[signature]	1-10-95	10:00	per Susanne Richard PAH's can be run by 8270. Also inform Bill Kendrick, Enron 1/21/95 DM. Temp 1°C RT
Relinquished by:	Date:	Time:	Received by:	Date:	Time:	* Sample container has the description of AT1-20 84-86 KR 1-10-95
Alan J. Fear	1/9/95	6:00 am				
Relinquished by:	Date:	Time:	Received by:	Date:	Time:	

APPENDIX I

Laboratory Analytical Reports and Chain-of-Custody for PSH Sample

CORE LABORATORIES

CORE LABORATORIES
A N A L Y T I C A L R E P O R T

Job Number: 946161
Prepared For:

BROWN & CALDWELL
LYNN WRIGHT
1415 LOUISIANA
HOUSTON, TX 77002

Date: 12/12/94

Signature M. Jean Waits

Date: 12/12/94

Name: M. Jean Waits

Title: Supervising Chemist

CORE LABORATORIES
P O BOX 34766
HOUSTON, TX 77234-4282

CORE LABORATORIES

Brown & Caldwell
ATTN: Lynn Wright

Job No: 946161-1
Sample Description: MW-1 Transwestern Atoka 1 12/02/94 1630

CAPILLARY ANALYSIS

	Wt.%	LV.%	Mole %
iso-Pentane	0.04	0.04	0.05
n-Pentane	0.07	0.08	0.10
2,2-Dimethylbutane	0.03	0.03	0.03
Cyclopentane	0.02	0.02	0.03
2,3-Dimethylbutane	0.08	0.08	0.10
2-Methylpentane	0.45	0.51	0.58
3-Methylpentane	0.35	0.39	0.46
n-Hexane	0.71	0.80	0.92
2,2-Dimethylpentane	0.11	0.12	0.13
Methylcyclopentane	0.63	0.62	0.83
2,4-Dimethylpentane	0.18	0.20	0.20
2,2,3-Trimethylbutane	0.05	0.06	0.06
Benzene	0.07	0.06	0.11
3,3-Dimethylpentane	0.12	0.13	0.13
Cyclohexane	2.15	2.06	2.87
2-Methylhexane	1.89	2.07	2.11
2,3-Dimethylpentane	0.52	0.56	0.59
1,1-Dimethylcyclopentane	0.23	0.23	0.26
3-Methylhexane	2.26	2.45	2.54
cis-1,3-Dimethylcyclopentane	0.44	0.44	0.50
trans-1,3-Dimethylcyclopentane	0.41	0.41	0.47
3-Ethylpentane	0.17	0.18	0.19
trans-1,2-Dimethylcyclopentane	0.67	0.66	0.77
n-Heptane	3.51	3.83	3.94
Methylcyclohexane	11.90	11.62	13.71
2,2-Dimethylhexane	0.59	0.63	0.58
Ethylcyclopentane	0.50	0.49	0.58
2,5-Dimethylhexane	0.60	0.65	0.59
2,4-Dimethylhexane	0.75	0.79	0.73
trans,cis-1,2,4-Trimethylcyclopentane	0.40	0.39	0.40
3,3-Dimethylhexane	0.27	0.28	0.26
trans,cis-1,2,3-Trimethylcyclopentane	0.30	0.30	0.30
2,3,4-Trimethylpentane	0.05	0.05	0.04
Toluene	1.05	0.91	1.28
2,3-Dimethylhexane	0.82	0.85	0.80
2-Methyl-3-Ethylpentane	0.11	0.11	0.10
1,1,2-Trimethylcyclopentane	0.04	0.03	0.04
2-Methylheptane	3.50	3.74	3.44
4-Methylheptane	1.88	1.99	1.85
cis,trans-1,2,4-Trimethylcyclopentane	0.08	0.08	0.08
3-Methylheptane	4.13	4.36	4.06

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CAPILLARY ANALYSIS

	Wt.%	LV.%	Mole %
cis-1,3-Dimethylcyclohexane	3.98	3.88	3.99
trans-1,4-Dimethylcyclohexane	1.74	1.70	1.74
2,2,4,4-Tetramethylpentane	0.84	0.88	0.74
2,2,5-Trimethylhexane	0.08	0.08	0.07
trans-1-Ethyl-3-Methylcyclopentane	0.24	0.22	0.24
cis-1-Ethyl-3-Methylcyclopentane	0.21	0.19	0.21
trans-1-Ethyl-2-Methylcyclopentane	0.37	0.35	0.37
1-Ethyl-1-Methylcyclopentane	0.10	0.09	0.10
trans-1,2-Dimethylcyclohexane	1.87	1.80	1.87
cis,cis-1,2,3-Trimethylcyclopentane	0.01	0.01	0.01
n-Octane	6.51	6.97	6.47
2-Methyl-4-Ethylhexane	0.05	0.05	0.04
2,3,5-Trimethylhexane	0.11	0.11	0.10
cis-1-Ethyl-2-Methylcyclopentane	0.07	0.07	0.07
2,2-Dimethylheptane	0.22	0.23	0.20
cis-1,2-Dimethylcyclohexane	1.04	0.96	1.04
4,4-Dimethylheptane	0.05	0.04	0.04
n-Propylcyclopentane	3.64	3.50	3.64
2,6-Dimethylheptane	0.89	0.87	0.78
1,1,3-Trimethylcyclohexane	1.02	1.00	0.89
3,5-Dimethylheptane	1.35	1.39	1.18
3,3-Dimethylheptane	0.32	0.33	0.28
3-Methyl-3-Ethylhexane	0.06	0.06	0.06
Ethylbenzene	0.41	0.36	0.44
2,3,4-Trimethylhexane	0.25	0.25	0.21
trans,trans-1,2,4-Trimethylcyclohexane	0.93	0.89	0.83
meta-Xylene	2.15	1.85	2.27
para-Xylene	0.67	0.58	0.71
2,3-Dimethylheptane	0.52	0.53	0.45
3,4-Dimethylheptane	0.31	0.32	0.27
4-Ethylheptane	0.29	0.30	0.25
2,3-Dimethyl-3-Ethylpentane	0.02	0.02	0.01
4-Methyloctane	1.37	1.42	1.20
2-Methyloctane	1.45	1.52	1.27
3-Ethylheptane	0.37	0.39	0.33
3-Methyloctane	1.98	2.05	1.73
ortho-Xylene	0.85	0.72	0.90
1,1,2-Trimethylcyclohexane	0.11	0.10	0.10
1-Methyl-2-Propylcyclopentane	0.43	0.42	0.38
cis-1-Ethyl-3-Methylcyclohexane	1.32	1.24	1.17
trans-1-Ethyl-4-Methylcyclohexane	0.59	0.56	0.53

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Job No: 946161-1
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CAPILLARY ANALYSIS

	Wt.%	LV.%	Mole %
iso-Butylcyclopentane	0.08	0.07	0.07
n-Nonane	3.29	3.42	2.88
Unidentified C-9 Compounds	0.89	0.92	0.78
trans-1-Ethyl-3-Methylcyclohexane	0.74	0.70	0.66
1-Methyl-1-Ethylcyclohexane	0.29	0.27	0.25
iso-Propylbenzene	0.10	0.08	0.09
sec-Butylcyclopentane	0.23	0.22	0.20
iso-Propylcyclohexane	0.42	0.39	0.37
2,2-Dimethyloctane	0.29	0.29	0.23
4,4-Dimethyloctane	0.09	0.09	0.07
3,5-Dimethyloctane	0.23	0.24	0.18
Propylcyclohexane	1.07	1.01	0.95
n-Butylcyclopentane	0.19	0.18	0.17
3,3-Dimethyloctane	0.08	0.08	0.06
n-Propylbenzene	0.38	0.33	0.36
1,3-Dimethyl-2-Ethylcyclohexane	0.12	0.11	0.10
meta-Ethyltoluene	0.41	0.35	0.38
para-Ethyltoluene	0.28	0.25	0.26
1,3,5-Trimethylbenzene	0.71	0.62	0.67
4-Ethyloctane	0.08	0.08	0.06
5-Methylnonane	0.31	0.31	0.24
4-Methylnonane	0.58	0.60	0.46
ortho-Ethyltoluene	0.54	0.46	0.50
3-Ethyloctane	0.09	0.09	0.07
3-Methylnonane	0.58	0.59	0.46
trans-1-Methyl-4-isopropylcyclohexane	0.07	0.07	0.06
1,2,4-Trimethylbenzene	0.31	0.26	0.29
cis-1-Methyl-3-Propylcyclohexane	0.24	0.22	0.19
iso-Butylcyclohexane	0.23	0.21	0.19
cis-1-Methyl-4-isopropylcyclohexane	0.02	0.02	0.02
1-Ethyl-2,3-Dimethylcyclohexane	0.07	0.06	0.05
iso-Butylbenzene	0.16	0.14	0.13
n-Decane	1.15	1.17	0.91
Unidentified C-10 Compounds	1.60	1.63	1.26
1,2,3-Trimethylbenzene	0.06	0.05	0.05
Indane	0.08	0.06	0.07
1-Methyl-4-isopropylbenzene	0.10	0.09	0.08
sec-Butylcyclohexane	0.28	0.26	0.23
1-Methyl-2-isopropylbenzene	0.16	0.13	0.13
1,3-Diethylbenzene	0.16	0.14	0.13
1-Methyl-3-Propylbenzene	0.14	0.12	0.12

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Sample Description: MW-1 Transwestern Atoka 1 12/02/94 1630

CAPILLARY ANALYSIS

	Wt.%	LV.%	Mole %
1-Methyl-4-Propylbenzene	0.03	0.02	0.02
n-Butylbenzene	0.04	0.04	0.04
1,2-Diethylbenzene	0.02	0.01	0.01
1-Methyl-2-Propylbenzene	0.09	0.08	0.07
4-Methyldecane	0.10	0.10	0.07
1,4-Dimethyl-2-Ethylbenzene	0.14	0.12	0.11
1,3-Dimethyl-4-Ethylbenzene	0.04	0.03	0.03
3-Methyldecane	0.09	0.09	0.07
1,2-Dimethyl-4-Ethylbenzene	0.02	0.01	0.01
1,3-Dimethyl-2-Ethylbenzene	0.02	0.02	0.02
1,2-Dimethyl-3-Ethylbenzene	0.09	0.07	0.07
n-Undecane	0.39	0.39	0.28
Unidentified C-11 Compounds	0.56	0.56	0.40
1,2,4,5-Tetramethylbenzene	0.01	0.01	0.01
1,2,3,5-Tetramethylbenzene	0.02	0.02	0.02
1,2,3,4-Tetramethylbenzene	0.01	0.01	0.01
trans-1-Methyl(4-Methylpentane)cyclopentane	0.01	0.01	0.01
1-Ter-Butyl-3,5-Dimethylbenzene	0.05	0.04	0.03
n-Dodecane	0.15	0.14	0.10
Unidentified C12 Compounds	0.20	0.17	0.14
Tridecane	0.10	0.08	0.06
	100.00	100.00	100.00

Paraffins,	LV%=	16.89
Naphthenes,	LV%=	38.11
Aromatics,	LV%=	8.01
Isoparaffins,	LV%=	33.70
Olefins,	LV%=	0.00
Unidentified,	LV%=	3.29
Total=		100.00

NATIONAL ENVIRONMENTAL TESTING, INC.

CORE LABS

CHAIN OF CUSTODY RECORD

COMPANY: BROWN & CALDWELL
ADDRESS: 1415 LOUISIANA, STE. 2500
PHONE: 713/754-0999 FAX: 713/754-0952
PROJECT NAME/LOCATION: Transwestern — Atoka 1
PROJECT NUMBER: 1618.02
PROJECT MANAGER: Mr. Lynn Wright

REPORT TO: Mr. Lynn Wright
INVOICE TO: SAME
P.O. NO.
NET QUOTE NO.

SAMPLED BY (PRINT NAME): Jackie Cooper, Jr.
SIGNATURE: Jackie Cooper, Jr.
(PRINT NAME)
SIGNATURE

DATE	TIME	SAMPLE IDENTIFICATION	MATRIX	# and Type of Containers	Capillary Analysis	COMMENTS
12/4/94	1630	MW-1				Please return cooler to NET per address on top of cooler

CONDITION OF SAMPLE: BOTTLES INTACT? YES / NO
FIELD FILTERED? YES / NO
COC SEALS PRESENT AND INTACT? YES / NO
VOLATILES FREE OF HEADSPACE? YES / NO
TEMPERATURE UPON RECEIPT:
Bottles supplied by NET? YES / NO

SAMPLE REMAINDER DISPOSAL: RETURN SAMPLE REMAINDER TO CLIENT VIA
I REQUEST NET TO DISPOSE OF ALL SAMPLE REMAINDERS DATE

RELINQUISHED BY:	DATE/TIME	RECEIVED BY:	RELINQUISHED BY:	DATE/TIME	RECEIVED FOR NET BY:
	12/5/94 1730	FED EX			

METHOD OF SHIPMENT

REMARKS:

PT 1 - ORIGINAL - WHITE PT 2 - NET PROJECT MANAGER - YELLOW PT 3 - CUSTOMER COPY - PINK