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REPORTS

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**Environmental Investigation
of the Lovington Paddock
Site**

Lea County, New Mexico

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Executive Summary

Pure Resources, Inc. (Pure) contracted ARCADIS G&M, Inc. (ARCADIS) to review historical documentation of the 1998-2002 investigation of hydrocarbon sources and groundwater plumes at the Lovington Paddock area of southeastern New Mexico. After evaluating these previous investigations, ARCADIS presented Pure with a work plan to further investigate the status and sources of hydrocarbon impacts in soils and groundwater.

The objectives of the investigation work plan were:

- determine the degree and timing of future impacts to receptors based upon the extent and concentration of the plume(s) and aquifer characteristics;
- define the sources of soil and groundwater contamination; and
- obtain pertinent soil and groundwater data applicable to the selection of a remedial technology for soil and groundwater.

Thirteen monitor wells were constructed for the project. Soil and groundwater samples were collected from the wells to evaluate the nature and extent of contamination at the site and other data pertinent to meeting the objectives of the work plan.

Soils Evaluation

During the drilling of each monitoring well, soil samples were collected either as drill cuttings or rock cores. A Photo Ionization Detector (PID) was used to screen the soil samples for volatile hydrocarbons.

Two cross sections have been prepared of PID values recorded from the soils in selected site monitor wells. The cross sections are meant to illustrate the vertical and horizontal nature and extent of soil impacts across the site.

BTEX compounds were detected in 12 of the 24 soil samples submitted for analysis indicating the detection of BTEX in soils from seven of the 13 monitor wells completed. The NMOC Standard for BTEX in soils at this site is 50 parts per million (ppm). Three soil samples exceeded the 50-ppm BTEX standard.

No soil samples at this site exceeded the NMOCD individual standard for benzene (10 ppm). The range of benzene detects was from 8.08 mg/Kg in MW-H to 0.0458 in MW-C.

The NMOCD Standard for Total Petroleum Hydrocarbons (TPH) at this site is 100 ppm. Eight monitoring well soil samples exceeded 100 ppm TPH.

Some soil samples were analyzed for polyaromatic hydrocarbons (PAH). No samples contained significant concentrations of PAH and no soil sample detected benzo(a)pyrene.

Hydrocarbon fingerprint analyses were conducted on ten soil samples. The purpose of the analyses was to determine the type or types of the original sourcing material(s) and the apparent age of impacts. The laboratory determined that the source of the impact in the soils is due to crude oil but indicated the possibility of varying ages of impact because of variability in the degree of weathering of the crude oil.

Groundwater Evaluation

Groundwater samples were collected from each monitoring well to determine the quality of the groundwater for general ionic chemistry, BTEX, TPH by gasoline range and diesel range, and, in some cases, PAH.

General Ionic Chemistry

Only MW-D, located due east of the old disposal pit, has an elevated total dissolved solids concentration of 1,144 mg/L. The groundwater in this monitoring well has a chloride concentration of 356 mg/L and also has the highest calcium, magnesium and sodium concentration of any monitoring well tested. The chloride ion concentrations of all the other monitor wells tested are less than 200 mg/L with most concentrations less than 100 mg/L.

Hydrocarbon Impacts

The human health standard for benzene was exceeded in each well in which benzene was detected including monitoring wells MW-A, B, C, D, H, I and N. The highest concentration of benzene (2.41 mg/L) in groundwater was found in MW-N. However, both MW-A and MW-C also showed high benzene concentrations, 1.64 mg/L and 2.16

mg/L, respectively, in the same order of magnitude as MW-N. The human health standard for benzene is 0.01 mg/L.

Four groundwater samples, one each from monitoring wells MW-A, H, M and N, were tested for PAHs and benzo(a)pyrene but these compounds were not detected.

Groundwater Gradient

The groundwater gradient map for July 9, 2003 indicates that the general groundwater flow is to the east-southeast at a gradient of approximately 0.012 feet per foot across the project area. This is a significant change from the northeasterly gradient and dip of the gradient for the site prior to the completion of nearby water supply wells. The results of these hydrodynamic changes are that any prior hydrocarbon plumes are now moving in a new direction, approximately 70 degrees southward from their previous position, and at an increased flow rate due to the steeper hydraulic gradient.

No phase separated hydrocarbons (PSH) were observed in any monitoring well during gauging events. The fact that PSH was not observed, even though PSH had been recorded in several previous monitoring wells, may indicate that PSH has been adsorbed onto soils in the capillary fringe due to the significant decline in the water table since the completion of agricultural water supply wells.

Introduction

Pure Resources Inc. (Pure) was concerned about the potential human health and environmental impacts to subsurface soils and groundwater from historical releases of hydrocarbons (crude oil) that occurred on the ATB 1-1 Site (site), located in the Lovington Paddock production area in Lea County, New Mexico. Pure contracted ARCADIS G&M, Inc. (ARCADIS) to review historical documentation of the 1998-2002 investigation of hydrocarbon sources and groundwater plumes at or adjacent to the site. After evaluating these previous investigations, ARCADIS presented Pure with a work plan to further investigate the status and sources of hydrocarbon impacts in soils and groundwater.

Based upon the workplan developed by ARCADIS, field investigations began on June 16 and were completed on July 9, 2003. This report is a documentation of the field activities, observations, analytical results of soil and groundwater sampling and presentations of the data gathered. The report also offers interpretations of the data and recommendations for further investigations and remedial actions.

Site Location And Background

The site is located in Lea County, southeastern New Mexico, in the southeast quarter of the southeast quarter of Section 1 Township 17 South Range 36 East (Figure 1). The site is approximately one mile west of the intersection of New Mexico State Highway 17 and Stiles Road, a few miles south of the town of Lovington.

Area operations at the site include various oil production operations and aboveground (as well as buried) pipelines crossing the site. In addition, there is an udder cream manufacturing facility, AST WEST, located immediately south of the site (Figure 2). Effluent from the udder cream manufacturing process is used to sprinkle irrigates an area immediately north of the AST WEST fence line and within the site investigation area.

A dairy cattle farm is located to the east and southeast of the site. Goff Dairies is using groundwater supply wells, labeled as WW-1, 2, 3 and 4 on Figure 2, for the irrigation of cattle feed crops.

Previous groundwater investigations conducted for Pure Resources, and its antecedent operator, by Highlander Environmental Corp. (Highlander) included the installation of eleven soil borings and the drilling of ten monitoring wells into the shallowest groundwater-bearing zone identified as the Ogallala Aquifer. Of the ten monitoring wells, the groundwater in eight wells indicated impact with varying concentrations of hydrocarbons including wells with PSH. The wells indicating no groundwater impact were MW-1 (located to the northwest of the ATB1-1 pit) and MW-8 (centrally located at the extreme northern extent of the site investigation).

An initial environmental investigation of the site in 1998 (conducted by Highlander for Titan Exploration, Inc.) discovered evidence of soil and groundwater contamination by crude oil on the property at the ATB 1-1 location. Subsequent investigations, years 1999-2002, conducted for Pure by Highlander to delineate the nature and extent of the contamination, resulted in a much larger area of concern than that first investigated. However, the investigations had not completed the delineation of contamination nor, in every case, had the studies determined the source of the contamination.

In early 2002, Goff Dairies completed several water supply wells for the purpose of irrigating lands that to the south and east of the site. As a result of the irrigation water production, significant changes in the area groundwater water levels, groundwater flow direction and gradient have occurred. Also AST WEST appears to be operating at least one water supply well. As a result of changes in the groundwater conditions, the existing site groundwater monitoring wells (MWs 1 through 10) were rendered useless when the water levels fell to depths below the lowest part of the well screens. The rate of water level decline in the wells on site was reported to be more than three feet in approximately a three-month interval in early 2002. New replacement monitoring wells were necessary to provide continuing monitoring of aquifer hydraulics and groundwater quality.

Based upon the previous investigations and the results of the current study, the historical uniform northeast groundwater gradient has been changed to an east-southeast gradient and also steepened as an apparent result of the pumping of four new (2001) Goff water supply wells. These water supply wells are located at varying distances of approximately 600-1,300 feet from the site monitor wells. In addition, the change in the groundwater gradient from a general northeast to southeast trend means that the existing plumes are now moving in a new direction complicating the interpretation of plume geometry and the interpretation of the source(s) of groundwater plumes.

Site Investigations**Purposes and Objectives Of Investigation**

The purposes and objectives of the investigation are composed of three elements:

- First, determine the degree and timing of future impacts to receptors based upon the extent and concentration of the plume(s) and aquifer characteristics;
- Second, define the sources of soil and groundwater contamination; and
- Finally, obtain pertinent soil and groundwater data applicable and necessary for the selection for the best available technology for remediation of soil and groundwater.

Based upon the primacy of the three purposes of investigation as previously mentioned, there were three areas that required either additional sourcing soil or groundwater plume delineation. These areas were:

- Former ATB 1-1 Pit area and MW-9 Area;
- Pipeline Area A – Monitor Well 10 (SB11); and
- Former West Tank Pad- Pipeline Area B- Monitor well 6.

Plan A

A total of seven monitoring wells were installed to delineate the extent of groundwater plumes.

Three monitoring wells were installed around Pipeline Area A- MW-10 (SB11). The three monitoring wells (A, B and C) were advanced to the east, southeast and northeast of MW-10, respectively, at approximate distances of 100 to 150 feet for the purpose of determining the downgradient extent of the PSH plume (and/or the dissolved hydrocarbon plume's) as observed in MW-10: the plume's present orientation and movement towards receptors; and the extent of soil contamination.

For the purpose of determining the extent and orientation of the groundwater plume(s) to the northeast of Former Pit Area (MW-5 and MW-3) and Former West Tank Pad-

Pipeline Area B (MW-6), three monitoring wells were drilled. These monitoring wells (D, E, and F) were drilled approximately 150 feet southeast, east-northeast and northeast of MW-5, respectively. In addition, a fourth monitor well (G) was drilled approximately 130 feet northwest of MW-5 to ensure that there is no source or plume in that direction.

Monitoring wells were completed as four-inch wells into the shallowest aquifer with 40 feet of screen placed at the bottom of each well. Solid threaded-joint schedule 40 PVC casing was used above the screens. The surface completion includes a heavy steel casing protector with a lockable cap.

Plan B

A total of six monitor wells were drilled for source identification. Source identification involved the drilling of monitor wells to evaluate soils and groundwater toward the apparent "original" upgradient plume position. "Original" gradient means the groundwater gradient prior to the gradient rotation caused by the water supply well production. Determination of the source area could establish the remediation scheme to cut off the source of groundwater impact.

Two monitor wells were drilled around the Pipeline Area A- MW-10 (SB11). Monitor well (H) was advanced to the south of MW-10 approximately 50 feet. This well was drilled to investigate source areas south of the EOTT pipeline. Monitor well (I) was drilled midway between MW-10 and MW-4, an approximate distance of 50 feet west from MW-10. The purpose of this well is to determine if the PSH and/or dissolved plume observed in MW-10 is the same as that observed in MW-4.

Four monitor wells were drilled around the Former Pit Area (MW-5 and MW-3) and Former West Tank Pad- Pipeline Area B- MW-6. Monitor well (J) was drilled approximately 50 feet SW of MW-6 to evaluate an upgradient source. Monitor well (K) was scheduled to be drilled to the south if well (J) had indications of significant contamination. However, well (K) was not drilled based upon a lack of significant field observations of soil and groundwater contamination. Monitor well (L) was drilled 75 feet northeast of MW-6 and 75 feet southwest of MW-3 to investigate the possible continuity of the plume to the northeast from MW-6 to MW-3. Monitor well (M) was drilled 100 feet northwest of MW-6. The purpose of this location was to determine the lateral extension of potential source soil impact and assist in defining the upgradient extent of the plume. Monitor well (N) was drilled approximately 125 feet southeast of MW-6 and approximately 50 feet north-northwest of MW-4. The purpose

of this well was to determine the continuity of source material for the groundwater plume and the continuity of the plume itself from the MW-6 area toward the MW-4 area. It was also drilled to determine the movement of plumes to the east-southeast in response to the water supply wells pumpage.

Investigation Methodologies

Investigation activities were conducted according to the work plan. The methods for each task are discussed here. This section also presents the results of each type of data collection conducted during the investigation. These include observations and measurements made in the field as well as laboratory analytical data.

During the drilling of each monitoring well, soil samples were collected either as drill cuttings or rock cores. A PID was used to screen the soil samples for volatile hydrocarbons. The soils samples were also visually inspected and logged. Discrete soil samples were collected with a split-spoon/rock core device, PID screened in the same manner and preserved for laboratory analysis. Decontamination procedures were performed on the sampling device to minimize potential for cross-contamination between sampling intervals. Monitor well/boring logs for the 13 wells are found in Appendix A. In addition, New Mexico Office of the State Engineer Well Records are located in Appendix B.

An unstable borehole occurred during air drilling of monitor well MW-A. As a result during subsequent drilling, drilling fluids were used to maintain the integrity of the borehole. The monitoring wells were developed upon installation. The well development removed any drilling fluids used during the installation as well as remove suspended sand, silt or clay. Initially, each well was bailed to remove settled sand, silt or clay. Following the bailing, the wells were purged with a submersible pump for approximately three hours or until 1,000 gallons were removed. Additionally, purging continued until pH, temperature, conductivity, dissolved oxygen and oxidation-reduction potential values of the groundwater had stabilized.

Upon completion of well installation and development, groundwater samples were collected and preserved for laboratory analysis. Samples were collected using disposable bailers to minimize potential for cross-contamination between sampling locations.

Soils**Soil Evaluation Results****Field Observations – Photoionization Detector Results**

Soil samples collected during the drilling of the monitoring wells did not have, for the most part, any field appearance of staining. Hydrocarbon odors from samples were, in most cases, the initial indication of impact.

As stated previously, drill cuttings and rock cores were collected during the drilling of each monitor well. A portion of drill cuttings and rock cores were placed into Ziploc bags and allowed to degas into the bag. Subsequently, the probe of the PID was placed into the bag and a sample of the bagged gas was extracted and measured by the instrument. PID results are reported as parts per million (ppm). In general and to some extent, impacted soils will degas the volatile range hydrocarbons that are subsequently measured by the PID. In general, the higher the PID reading of a soil sample, the higher the impact from volatile hydrocarbons in that sample. PID measurements are shown on the monitor well/boring logs in Appendix A.

PID readings can be used for comparison between borings and as an indicator of the proximity of a source. In a relative sense and assuming that a release is at or very near the surface of the ground, shallow indications of soil impact indicate that the source is close by. In general, as one moves away from the site of a surface or near surface release, the concentration of hydrocarbons in the vadose zone will decrease and the depth to first hydrocarbon impact will increase.

Two cross sections have been prepared of PID measurements recorded from the soils in site monitor wells; one cross-sections runs Northwest to Southeast (Figure 3) and the other South to North (Figure 4). The cross sections are meant to illustrate the vertical and horizontal nature and extent of soil impacts across the site.

The PID values are plotted with respect to depth below ground level. Approximately 2 feet of elevation difference exists across the Northwest to Southeast Cross Section while there is no notable difference in elevation change on the South to North Cross Section. For this reason, no compensation was made for the elevation on the cross sections. The PID readings are presented on a logarithmic scale of 0.2, 2, 20, 200 and 2000 ppm. Readings above two ppm are shaded in green to indicate potential hydrocarbon impact. Two ppm was chosen as the PID measurement base level that

would indicate potential soil impact. Field background PID readings of up to two ppm were recorded for the site.

Several general conclusions can be made from a study of the cross sections. At this site, when there is hydrocarbon impact in a well, the base of the impacted soils is approximately 70-75 feet below ground level (bgl). This is somewhat above the current depth to water that is approximately at 80 to 83 feet bgl. However, the groundwater level in the past was significantly higher than it is today. When there is deep hydrocarbon impact in a well, there is often an increase in the PID readings that occurs in the depth range of 40-50' bgl. This depth may indicate a geological phenomenon controlling transport of the fluids through the vadose zone or it may indicate the original depth to the top of the capillary zone. i.e., the zone immediately above the water table in which capillary pressure wicks groundwater up into the soils. If this depth represents the top of the capillary zone, then hydrocarbon transport at these depths is more like that which takes place in the groundwater. Spreading of impact in the capillary zone would be controlled by the groundwater gradient and proximity to a source. However, as the distance from the source increases hydraulically downgradient, the degree of impact in the capillary zone will decrease. This can be observed in the South to North cross section. Although Monitor Well D has a significant dissolved phase BTEX concentration there is little impact in the capillary zone as indicated by PID values. On this cross section as one nears the source area to the south, soil impact becomes progressively shallower both in terms of the capillary zone and the vadose zone.

The Northwest to Southeast Cross Section was prepared to demonstrate the variability of impact across an area of soil impact. As can be seen the distance between borings is generally small but significant variability (decreases and increases) in soil impact take place within short distances. In addition, the visualization of the PID values in borings allows an interpretation of the distance(s) to a source(s) (release).

Purposes for Sampling Soils for Laboratory Analysis

Soil samples were collected during the installation of the monitoring wells and submitted to the laboratory to establish verified concentrations for potential contaminants and to establish the vertical and horizontal extent of volatile and semi-volatile organic compounds in the soils. The analytical results are summarized in Tables 1 and 2. Laboratory reports for soils are found in Appendix C and laboratory reports for groundwater are found in Appendix D.

Soil Sampling

All monitoring wells drilled were soil sampled by screening well cuttings with a PID for volatile hydrocarbons, visual inspection and logging. In addition, discrete soil samples were collected with a split-spoon/rock core device where PID readings indicated elevated hydrocarbon impact. The discrete samples, and in some cases drill cuttings, were preserved for laboratory analysis. The laboratory analyses included BTEX, TPH by gasoline range (GRO) and diesel range (DRO) and in some cases PAH. Tables 1 and 2 present the analytical results obtained from the analysis of soil samples collected at various intervals for hydrocarbon compounds and semi-volatile organic compounds respectively.

Hydrocarbon Compounds in Soils

There were 24 soil samples submitted to the laboratory for hydrocarbon analysis. The soil sample intervals were generally chosen based upon PID readings of drill samples and discrete soil samples. Samples were selected for laboratory analysis at both high and low PID measurements and over shallow and deep intervals.

Drill cuttings and split-spoon/rock core samples screened with a PID indicated impact ranging from approximately 50-75 feet below ground level in MW-A, B, C and I. However, PID readings collected during the installation of MW-H indicated impacted soil ranging from the surface to 75 feet. All elevated PID readings had corresponding elevated analytical results. PID measurements collected during the monitoring well drilling are presented Appendix A (Monitoring Well and Boring Logs).

BTEX and Benzene

BTEX compounds were detected in 12 of the 24 soil samples submitted for analysis and represent the detection of BTEX in soils from seven of the 13 borings completed for this study. Monitoring wells that did not detect BTEX compounds were located on the extreme north, northwest and western portion of the site. These included monitoring wells MW-F, G, M, L, and J (see Figure 5).

Five soil samples from a total of four borings, MW-A, C, H and I, detected all four of the BTEX compounds. However, individual samples from several wells did not detect benzene but did detect the other three BTEX compounds.

The samples from borings MW-D and MW-E detected only xylenes and a shallow soil sample from MW-N reported only toluene.

The sample exhibiting the highest individual concentration of all four BTEX compounds was from monitor well MW-H (74-75').

The NMOCD Standard for BTEX in soils at this site is 50 parts per million (ppm). Three soil samples exceeded the 50-ppm BTEX standard. The three samples were MW-A (70-71 feet), MW-B (65-66 feet) and MW-H (74-75 feet).

No soil samples at this site exceeded the NMOCD individual standard for benzene (10 ppm). The range of benzene concentrations detected was from 8.08 mg/Kg in MW-H to 0.0458 in MW-C.

Total Petroleum Hydrocarbons (TPH) Gasoline Range Organics & Diesel Range Organics

TPH (DRO)

TPH (DRO) (Figure 6) was reported at more than the detection limit of 50 ppm in nine of the 24-soil samples submitted for laboratory analysis including samples from MWs A, B, C, H and I. TPH (DRO) values ranged from 162 to 4,690 mg/Kg. The highest reported value was from MW-A (70-71').

Monitoring wells that did not detect TPH (DRO) compounds were located on the extreme north, northwest, northeast, west and southwestern portion of site.

TPH (GRO)

TPH (GRO) (Figure 7) was reported at more than the detection limit of 1 ppm in all 24-soil samples submitted for analysis. The range of detected TPH GRO values was a low of 2.9 mg/Kg to a high of 793 mg/Kg in MW-H (74-75'). These results are presented in Table 1.

TPH Standard

The NMOCD Standard for TPH at this site is 100 ppm. This is the standard for TPH GRO or TPH DRO individually or when both species are summed together. Eight monitoring/boring hole soil samples exceeded 100 ppm TPH. Samples exceeding the TPH standard included MW-A (70-71 feet), MW-B (65-66 feet), MW-C (60-61 feet),

MW-H (20-21.5, 40-41, and 70-71 feet) and MW-I (55-56 and 70-71 feet). All of these samples exceeded the TPH standard both in the diesel range and the gasoline range except for MW-I (70-71), which was detected at 43.9 ppm TPH GRO.

Seven soil samples exceeded the TPH standard in the gasoline range including MW-A (70-71 feet), MW-B (65-66 feet), MW-C (60-61 feet), MW-H (20-21.5, 40-41, and 70-71 feet) and MW-I (55-56 feet).

Semi-Volatile Organic Compounds in Soils

As presented in Table 2, ten soil samples were collected from eight monitoring wells and analyzed for semi-volatile organic compounds of naphthalene and other PAHs including benzo(a)pyrene. Soil samples detecting PAHs were from monitoring wells MW-H (two samples), MW-I (two samples) and MW-F (one sample). No soil sample detected benzo(a)pyrene. There were no laboratory detections for semi-volatile organics in the soil samples submitted for laboratory analysis from MW-A, J, L, M or N.

The soil sample from MW-F detected 8 PAHs including phenanthrene, anthracene, fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene and benzo(k)fluoranthene.

The most commonly detected PAH was phenanthrene, which was reported in five samples. The concentrations of phenanthrene in soil samples varied from 1.82 to 0.0241 mg/Kg. Phenanthrene was detected in MW-F (75-76 feet), MW-H (20-21.5 and 74-75 feet) and MW-I (55-56 and 70-71 feet).

Anthracene was detected in two samples at concentrations varying from 0.0314 to 0.0066 mg/Kg. Both of these were from MW-I in sample intervals (55-56') and (70-71').

Naphthalene was detected in two samples from MW-H (20-21.5 and 74-75 feet) with concentrations of 0.422 mg/Kg and 2.79 mg/Kg, respectively.

Hydrocarbon Fingerprint Analysis

Hydrocarbon fingerprint analyses were conducted on ten soil samples collected from eight monitoring wells. The purpose of the analyses was to determine the type or types of the original sourcing material(s) and the apparent age of the impact. Soil samples from eight monitoring wells were analyzed at Trace Analysis, Lubbock, Texas using pentane extraction, and analyzed by gas chromatography, flame ionization detector, capillary column and direct injection. Copies of the graphs from the analyses are found in Appendix B. The chromatograph from a fresh crude oil standard was used for comparison to the graphs of the soils analyzed.

Of the ten samples analyzed only five of them contained sufficient hydrocarbons useful for fingerprint analysis. The following five soil samples could not be interpreted due to low hydrocarbon concentrations; MW-F (75-76'), MW-L (74-75'), MW-M (74-75') and MW-N (74-75').

Below are the results of the fingerprint analyses as described by Trace Analysis:

- The laboratory reports that the source of the impacts in all of the usable soil chromatographs is due to crude oil:
- The fingerprint analysis of soil in MW-A (70-71') indicates the hydrocarbons in the sample are those of fresh crude. Minimum, if any, aging was indicated:
- The hydrocarbons scan of MW-H (20-21.5') indicates fresh crude oil with no significant aging:
- MW-H (74-75') indicates fresh crude oil with some aging:
- MW-I (55-56') indicates fresh crude oil with some aging: and
- MW-I (70-71') indicates aged crude oil.

Groundwater

Groundwater Evaluation Results

Groundwater Gradient

Water levels were taken from each of the monitoring wells on July 9, 2003 and again on August 18, 2003. No PSH was recorded or observed in any monitoring well during either gauging event. The first gauging of the wells coincided with the survey of the wells conducted to establish the location and elevations of monitoring wells and other pertinent site features. Table 3 has been prepared from the surveying and first gauging data to establish the groundwater elevation in each monitoring well. The groundwater elevation data has been used to prepare Figure 8. Water levels were obtained on August 18, 2003. The water levels recorded on August 18 are approximately 1.3 to 3.5 feet lower than the water levels recorded in July. However, the groundwater flow direction remains the same as in the July event, but the gradient has steepened on the eastern side of the site. This may indicate that active groundwater withdrawals from Goff Dairy water wells were occurring during the August gauging event.

The groundwater gradient map for July 9, 2003 indicates that the general groundwater flow is to the east-southeast at a gradient of approximately 0.012 feet per foot across the project area. Comparing the July 2003 map to the groundwater map prepared by Highlander in February 2002 demonstrates some radical changes in the groundwater flow direction and gradient. In the Highlander February 2002 gauging event, the groundwater flow was shown as being to the northeast at a gradient of 0.004 feet per foot. Comparing that data to the July 2003 data indicates that the groundwater flow direction has been rotated approximately 70 degrees to the south and the gradient has increased three times the previous gradient to 0.012 feet/foot during the last 17 months (2/2002 to 7/2003). Also, groundwater elevations have been significantly lowered due, apparently, to the dewatering of the aquifer by irrigation water wells installed by the Goff Dairy and located as shown in Figure 2. The lowering of the groundwater level at the site has been approximately 11 feet over the same 17-month period. The decline in water level is an average number because the closer a monitoring well is to the groundwater producing wells the greater is the observed water level decline in that monitoring well.

The results of these hydrodynamic changes are that any prior hydrocarbon plumes are now moving in a new direction, approximately 70 degrees southward from their previous position, and at an increased flow rate, up to three times their previous

groundwater flow velocity. However, the estimated groundwater flow rates have not been determined.

Another apparent result of the lowering of the water table, as a result of the dewatering of the aquifer by irrigation water wells, is the extended depth interval in wells over which hydrocarbon contamination now exists above the water table. That is, an extended "smear zone" has been created in the soil interval below the vadose zone and above the saturated zone, i.e., the capillary zone. The extended capillary zone hydrocarbon accumulation is a result of the progressive lowering of the saturated zone (as result of the dewatering) while the hydrocarbons, in the main, preferentially adsorb to the capillary zone soils. No PSH was observed in any new monitoring well when wells were gauged one week after well development and sampling occurred, nor was PSH observed during the August 18, 2003 gauging event. It is hypothesized that no PSH is observed because portions of the free phase hydrocarbons and the dissolved phase hydrocarbons have been adsorbed to the capillary zone soils as discussed above. PSH had been observed in MW-4 and MW-10 previously until the lowering water levels dewatered the wells. More than ten feet of PSH was recorded in MW-10 in October 2001. By February 2002, after the water level had dropped approximately two feet, the PSH in MW-10 had decreased to 5.82 feet. Beyond this point in time, MW-10 was no longer useful for monitoring groundwater.

Purposes for Sampling Groundwater

Groundwater samples were collected from each monitoring well to establish the quality of the groundwater for its general ionic chemistry (major minerals) and the concentrations of volatile and semi-volatile organic compounds in the water. Certain health and environmental effects may be associated with these concentrations. By comparing and illustrating the distribution of the concentrations, judgments can be made of the cause of any contamination and the timing and effects of such contamination on receptors.

Groundwater Sampling

Groundwater from each monitoring well was sampled for laboratory analysis. All monitoring wells were analyzed for major minerals, BTEX and TPH by gasoline range and diesel range, and in some cases PAH. Tables 4, 5 and 6 present the analytical results obtained from groundwater sampling for major minerals, BTEX and TPH concentrations and PAH compounds, respectively.

Major Minerals

The major minerals analyses of the groundwater are presented in Table 4. The analyses indicate that the general water quality at the site is good. The total dissolved solids concentration, with one exception, varies between 386 to 664 mg/L. Only MW-D, located due east of the old disposal pit, has an elevated total dissolved solids concentration of 1,144 mg/L. This monitor well's groundwater has chlorides of 356 mg/L and also has the highest calcium, magnesium and sodium content of any monitoring well tested. The chloride content of all the other monitor wells is less than 200 mg/L with most of the wells demonstrating less than 100 mg/L. The New Mexico Domestic Water Supply Standard for chloride is 250 mg/L. The groundwater from monitoring well MW-D exceeds this standard.

Hydrocarbon Compounds in Groundwater

BTEX and Benzene

Groundwater samples were tested for BTEX. The results of the laboratory testing are presented in Table 5. A map depicting an interpretation of the benzene plume at the site is found as Figure 9.

BTEX compounds were detected in seven of the 13 individual groundwater samples from monitoring wells. Monitoring wells that did not detect any BTEX compounds were located on the extreme northeastern, north and western portion of the site. The remaining groundwater samples detecting BTEX compounds were located on the western and central portion of the site.

The only hydrocarbon compound detected in groundwater samples that exceeds the New Mexico Human Health Standard is benzene. The Human Health Standard for benzene is 0.01 mg/L. The health standard is exceeded in each well in which benzene was detected including monitoring wells MW-A, B, C, D, H, I and N. The most contaminated groundwater was from MW-N which had a benzene concentration of 2.41 mg/L. However, both MW-A and MW-C also showed high benzene concentrations, 1.64 mg/L and 2.16 mg/L, respectively, in the same order of magnitude as MW-N. Although toluene, ethylbenzene and xylenes were not detected in the groundwater sample from MW-N, the elevated detection limit for these compounds (likely resulting from the dilution of the sample as required for analysis) probably masks their detection.

The benzene plume (Figure 9) illustrates the groundwater impact to be concentrated in the area of monitoring wells MW-N, C and A. These wells are located in the southern portion of the site. The monitoring wells located in the northern portion of the site were below the NMOC Human Health Standards with the exception of MW-D. In addition, the benzene plume is elongated along the former and new groundwater flow paths (Figure 8) with benzene concentrations decreasing in the downgradient directions. The highest dissolved benzene concentration in the groundwater is also up gradient of MW-H, which appears to be at or very near a surface hydrocarbon spill with high hydrocarbon impacts from the surface to the groundwater.

TPH

The groundwater from each monitor well was analyzed for TPH both in the GRO and DRO range. No TPH (DRO) was detected in any sample above the detection limit of 5 mg/L. TPH results are found in Table 5.

TPH GRO was detected in 8 of the 13 samples and the range of detected concentrations was 0.349 mg/L to 4.7 mg/L. The well with the highest concentration of TPH GRO was monitoring well MW-C.

Monitor wells MW-E, MW-L and MW-M did not detect TPH GRO above the method detection limit of 0.1 mg/L and monitor wells MW-F and MW-G were undetected for TPH GRO above 0.5 mg/L.

Semi-Volatile Organic Compounds

Four groundwater samples were laboratory tested for the semivolatile organic compounds of naphthalene and other polyaromatic hydrocarbon compounds (PAHs) including benzo(a)pyrene as presented in Table 6. The State of New Mexico has established Human Health Standards for PAHs and benzo(a)pyrene in groundwater. These standards are for total PAHs (including naphthalene) of 0.03 mg/L and for benzo(a)pyrene 0.0007 mg/L.

The four-groundwater samples tested were from monitoring wells MW-A, H, M and N. The original sampling plan was to analyze PAHs from groundwater that contained some detection of TPH in the diesel range organic compounds (DRO). However, no well detected any DRO (Table 5) above the detection limit of 50 mg/L. As a result, groundwater samples were selected from field observed heavily contaminated wells (MW-A, H & N) and from a well (MW-M) that had no field observed contamination.

PAHs and benzo(a)pyrene were not detected in any of the four groundwater samples analyzed for semi-volatile organic compounds. Although some site soils samples have detected PAHs, most PAHs have low solubility in water.

Hydrocarbon Fingerprinting Analyses

No PSH was observed in any monitoring well. Therefore, hydrocarbon fingerprinting analyses were performed on groundwater from the following monitoring wells:

MW-A
MW-H
MW-I
MW-N

With respect to hydrocarbon fingerprint analysis only, the concentrations of hydrocarbons in these samples were insufficient to use for fingerprinting. As reported by Trace Analysis, all of the samples had no significant peaks.

Interpretations

The following sections discuss the interpretations of the data collected during the groundwater and soil investigations. In addition, interpretations are presented for groundwater delineation and source delineation based on the evidence produced by the investigations to date.

There appears to be no less than three source areas. Two of the source areas are reasonably defined.

Former ATB 1-1 Pit area and MW-9 Area

The soil and groundwater contamination associated with the former ATB-1 pit previously identified by Highlander investigations remains unchanged by this investigation. Highlander drilled boring BH-5 in the center of the ATB 1-1 Pit. This boring showed hydrocarbon contamination from the surface of the ground to the water table indicating that the local groundwater plume was a result of leakage from the pit.

At present, the groundwater plume associated with this source area appears to be areally limited. The areal limitation is evidenced by the non-detection of volatile and semi-volatile hydrocarbons in groundwater samples from monitoring wells MW-E, F

and G. Only monitor well MW-D indicates that volatile hydrocarbons are migrating to the east and/or east-southeast from the source area and the former plume area. This interpretation is consistent with the revised groundwater gradient resulting from water well pumping in the area. Also, the elevated total dissolved solids and chloride contents of MW-D indicate that the impact is associated with the former pit.

Pipeline Area A – Monitor Well 10 (SB11)

The second source area is associated with the confluence of pipelines around monitoring wells MW-10 and MW-H. The hydrocarbon contamination indicated by high PID measurements in the entire soil section in MW-H, as confirmed by laboratory soil analyses, indicate that a crude oil release in this area is associated with soils and groundwater contamination. Monitor well MW-10 had a similar, if somewhat less magnitude indication of a spill(s) from very near the surface of the ground to the water table. Considering that monitor wells MW-H and MW-10 are approximately 50 feet apart, the extent of the surface area soil contamination indicates that the spill must be large or more than one event. This is consistent with the degree and extent of impact in the groundwater. However, the low PID readings in shallow soils for monitoring well MW-I, located approximately 60 feet west of MW-10, indicate that the source did not likely reach this far to the west. This leads us to hypothesize that the spill is immediately in the MW-10 to MW-H area and perhaps extends to the east.

Contouring interpretations of the deep soil hydrocarbon plumes for this MW10 and MW-H area (using the highest concentrations for BTEX, TPH GRO and TPH DRO, respectively, from the depth interval of 55 feet to 75 feet bgl), indicate that each deep soil plume for these substances appears in the shape of an ellipse or an elliptical nose, the long axis of which is situated to the east of MW-H and oriented northeast – southwest. This area east of MW-H may be the center of the release site.

Groundwater contamination associated with this source is significant. The groundwater in monitoring wells MW-A, B and C has significant hydrocarbon impacts. Monitor well MW-H, located at what appears to be a source area has a significantly lesser groundwater impact. This indicates that the release may have occurred long enough in the past for the heavily impacted groundwater to have moved away from the source. Initially, this groundwater movement was to the northeast until groundwater pumpage altered the groundwater gradient toward the east-southeast. As a result, the plume is now moving southeasterly as indicated by the elevated hydrocarbon concentrations in groundwater for monitor well MW-B.

Former West Tank Pad- Pipeline Area B- Monitor Well 6

The location of the third source area has not been adequately determined. The soil and groundwater data may indicate more than one source. The third source(s) area is located on the west-southwestern side of the site in the area tested by monitoring wells MW-J and M. PID and soil sample analyses from these wells indicate low-level hydrocarbon concentrations as TPH GRO. Groundwater data indicates low levels of TPH GRO in monitoring well MW-J but no indications of hydrocarbons in MW-M. Taken together, this information indicates that MW-M is at the extreme western end of a release area. Toward the east from MW-M and MW-J, monitoring well MW-N is located between the two former tank pads. Except for the surficial soil sample from MW-N that had a PID reading of 450 ppm and was described as containing a tarry substance, the remainder of the drilling samples from MW-N showed PID readings generally within background levels. According to Highlander, BH-6 and BH-7, located within the firewall of the two tank pads, did not show any subsurface contamination. However, the boring logs of these wells presented in the Highlander report indicate a steady 2 units of OVM for shallow soils in BH-6 and 3 to 8 units OVM in BH-7. While these are low to very low readings, they may be indicative of an old source or the fringe of a more distant source. Field observations of drill cuttings rarely mention any soil staining, so staining does not appear to be useful in determining the degree of contamination from site crude oil. The Highlander boring log for MW-6 does not indicate the collection of any OVM readings for the shallow soils at the MW-6 location although a value of 4 units is shown for a single sample (60-61 feet bgl). This may indicate that no OVM measurements were made over the other interval in MW-6 or they were not detected. Without this information from MW-6, it is possible that it is at or near the source.

Down the present hydraulic gradient, the groundwater in MW-N is highly impacted with the highest benzene (2.41 mg/L) concentration detected in the present round of sampling. The TPH GRO for the groundwater in this well was 2.14 mg/L. Although this seems anomalous, the standards for BTEX and TPH GRO are different and the dilution used in the BTEX analyses may have induced some error into the determination of the BTEX concentrations. It is not likely that the source of this groundwater contamination could be linked to the source to the east unless the groundwater gradient was at one time toward the west. There is no evidence at this time for a gradient toward the west. Only northeast and southeast gradients have been reported for the site. Using this logic, a source should exist in the area of the former tank pads or to the south-southwest of them.

Hydrocarbon Fingerprint analysis

Hydrocarbon fingerprint analyses for site soils indicated that there appeared to be differing ages of hydrocarbons. All of the samples indicated that crude oil was the original source of the hydrocarbons. The laboratory indicates that the age of crude oil in the soils for Pipeline Area A – Monitor Well 10 (SB11) appears to be greater as one proceeds to the west. There are at least two possible explanations for this data. One possibility is that the data represents two or more sources. Since the data does not represent continuous samples across the area but only discrete analyses, it is not possible to use this information alone to draw a specific conclusion. However, the fact that the shallow soil sample MW-H (20-21.5) indicates “fresh crude oil” means that the immediate area around MW-H is a release site. Furthermore, the interpretation that the crude oil in the deep soil sample MW-H(74-75”) has some aging likely indicates that an older unrelated spill exists below the fresh crude spill. Correlative to this interpretation are the results from MW-I that indicate “some aging” and “aged crude oil” for the shallow soil sample MW-I (55-56”) and the deeper soil sample MW-I (70-71”), respectively.

Other

Monitor well MW-L was drilled to determine the possibility that impacted groundwater from the southwest was currently moving or had previously moved toward the north and the Former ATB 1-1 Pit. No groundwater impact was found at MW-L. Shallow soil PID readings indicate soil impact. However, laboratory analyses of two soil samples from MW-L did not detect any volatile or semi-volatile organic compounds. TPH GRO for these samples measured 13.1 and 14.8 mg/Kg.

Recommendations

The following sections discuss recommendations for further investigations for soil and groundwater. In addition, interpretations are made for groundwater delineation and source delineation based on the evidence yielded by the investigations to date.

Former ATB 1-1 Pit area and MW-9 Area

The groundwater plume in this area is defined toward the northeast, north and west. Only the groundwater in monitoring well MW-D has hydrocarbon impact. This plume should be moving to the east-southeast in response to the groundwater gradient. Further downgradient delineation of the plume is necessary. Remediation of the plume should begin when the extent of the plume in the southeastern direction is known.

The chloride concentration in monitor well MW-D is elevated. A monitoring well that will fully penetrate the aquifer should be drilled to determine the nature and extent of chlorides.

Pipeline Area A – Monitor Well 10 (SB11)

Shallow excavations and/or a series of soil borings should be placed in the area extending from the vicinity of MW-10 and MW-H toward the east-southeast. The purpose of these excavations or borings will be to finalize the identification of the release. This release appears to have caused the most significant portion of the groundwater problem for human health or environmental concerns, because it may result in the earliest impact to the area groundwater production wells.

The extent of the groundwater impact with respect to the groundwater production wells must be established. The irrigation wells should be sampled immediately to determine if there is any impact evident in the wells at the present time. Based upon these findings an additional group of groundwater delineation wells should be constructed until the plume is fully delineated.

A remedial pilot project should be undertaken as soon as possible. An applicable remedial pilot project (system) is discussed later in this section.

Former West Tank Pad- Pipeline Area B- Monitor Well 6

A series of soil borings should be placed in the area extending from the vicinity of MW-J eastward and southward for the purpose of finalizing the identification of the release.

Remedial Pilot Project

A remedial pilot project should be initiated as soon as possible. ARCADIS recommends a biosparging system that would use low flow rate air sparging. The advantage of these systems is the effectiveness of the process in reducing hydrocarbon contents in the media, the simplicity of operation and the relatively low costs of operation and maintenance.

Biosparging is process for in situ remediation that is particularly effective for the remediation of soils and groundwater impacted with petroleum hydrocarbons. The air injection rates into the sparge wells are relatively low, generally less than 10 SCFM. The sparge well in this geologic setting will be constructed with screens set within 10-

15 feet of the surface and extend to below the water table. A drop tube is installed to the bottom of the saturated screened interval with a simple diffusion device at the end. The sparge well will be completed so the surface is sealed, and injected air will be forced out of the sparge well screen into the saturated zone. This obviates the need for soil vapor recovery. The injected air travels up the well bore, migrates to some degree into the adjacent saturated zone formation, exits the water surface in the well bore, and then migrates into the adjacent vadose zone. The sparge well screen will extend into the vadose zone within 10 to 15 feet of the surface.

In the saturated well bore, there will be some volatilization of impacting BTEX hydrocarbons. There will also be stimulation of aerobic biodegradation. The volatilized BTEX hydrocarbons will flow into the vadose zone, where mixed with the oxygen in the injected air they will rapidly be biodegraded. The oxygen in the injected air will also stimulate the biodegradation of petroleum hydrocarbons that are present as an absorbed phase in the vadose zone and the capillary fringe.

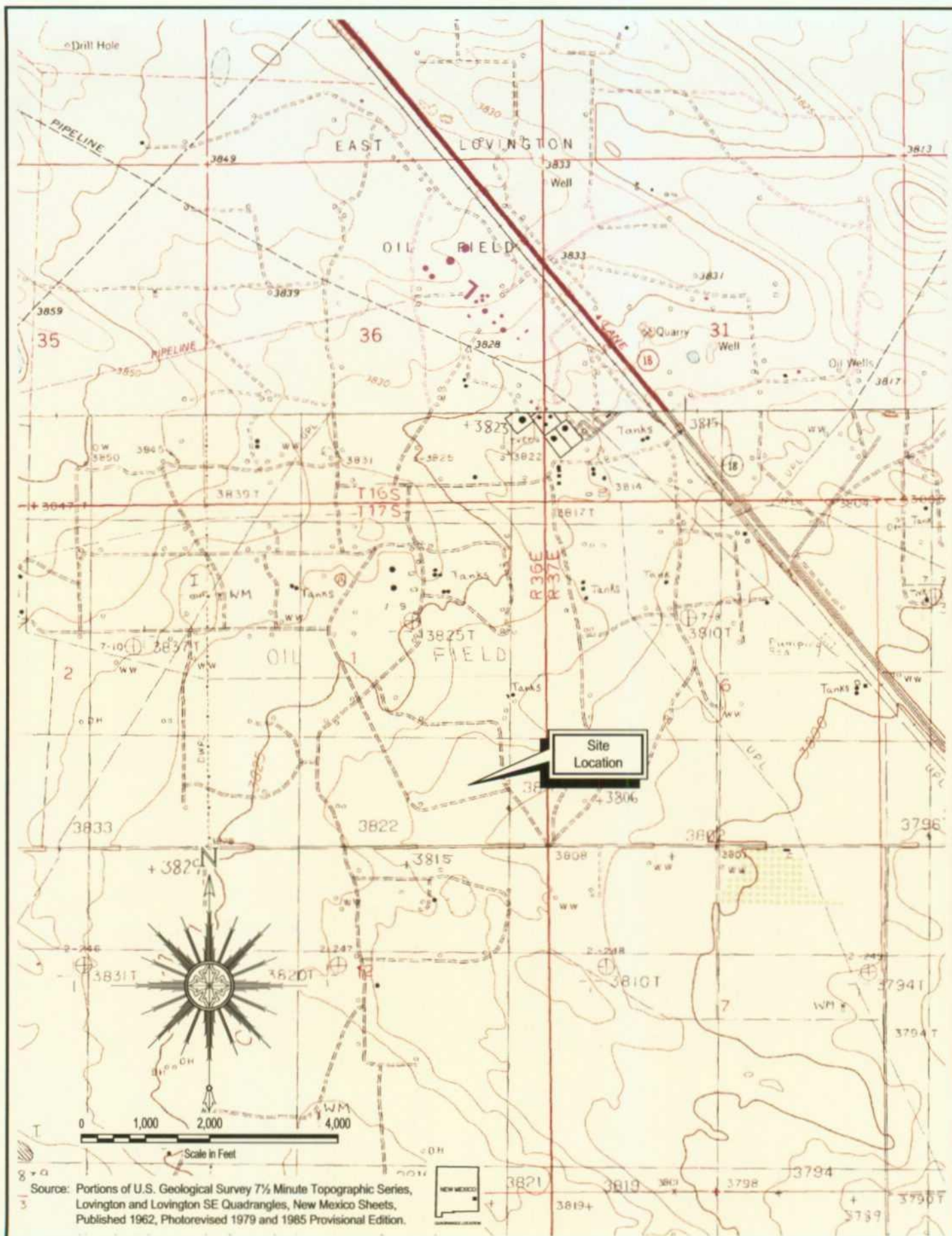
The rise of the air in the well bore will also cause some upwelling of the groundwater adjacent to the well. This will stimulate some level of advective groundwater flow away from the well, extending the impact of the biosparge well laterally. The pilot test will be designed to evaluate the radius of influence in soils and groundwater in both the vadose and saturated zones.

Along with the aerobic stimulation accompanying air sparging, native aerobic biota will increase in number and increase the manufacture of biosurfactants. Biosurfactants can be useful in releasing hydrocarbons adsorbed to the soil and may increase the potential for phase separate hydrocarbon recovery and further increasing the hydrocarbon removal rate from impacted media.

A biosparge pilot project would consist of a single new sparge well placed in the vicinity of existing monitoring wells. The existing monitoring wells would be used to evaluate the efficiency of the biosparge system through the collection of groundwater samples and soil gas samples. The zone of influence around a sparge well is estimated to be approximately 50 feet.

FIGURES

27
28



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L. Markham

Project Director
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Area Manager
A. Schmidt

Pure Resources, Inc.
Lovington Paddock Site

Site Location Map

Lea County, New Mexico

Technical Review
S. Tischer

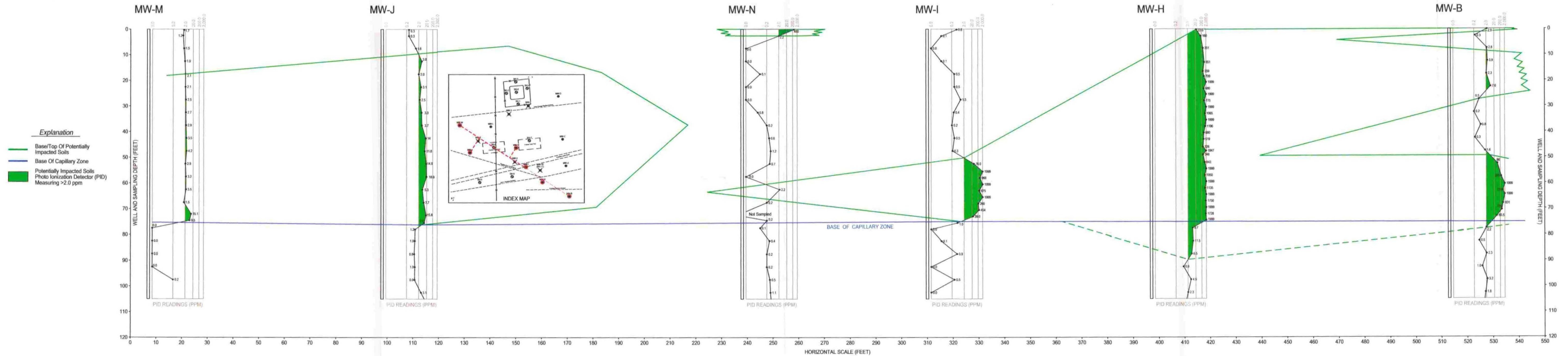
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Figure
1

NORTHWEST

SOUTHEAST



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Figure

3

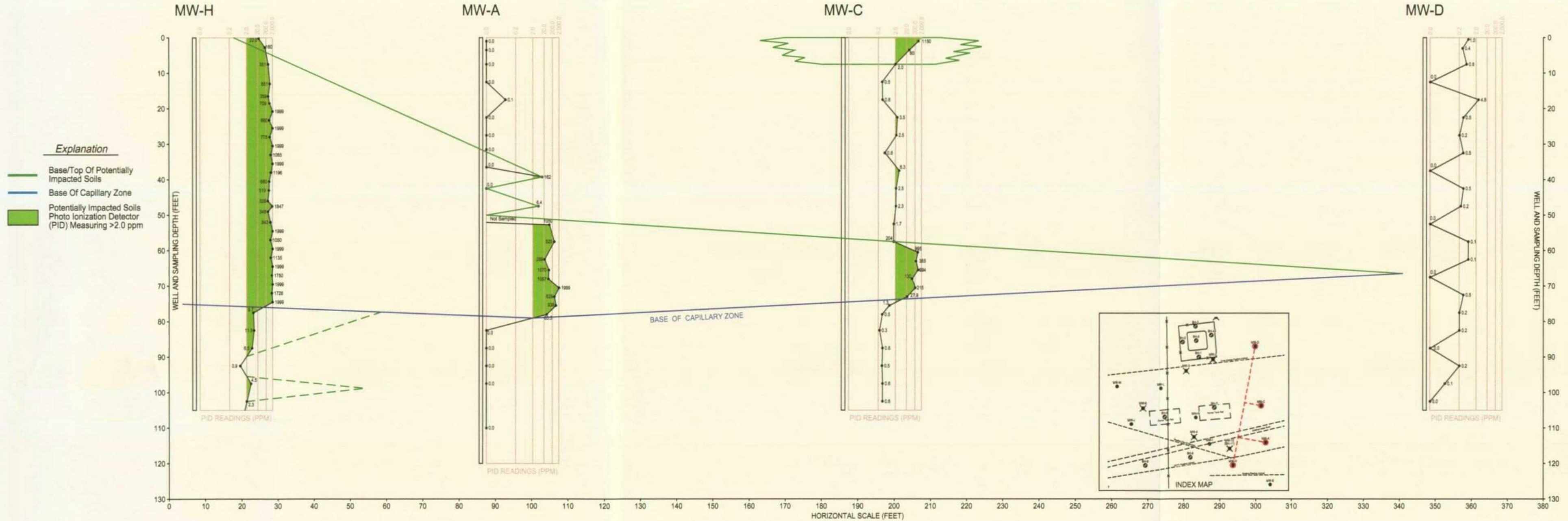
Pure Resources, Inc.
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Northwest - Southeast PID Cross Section

Lea County, New Mexico

SOUTH

NORTH



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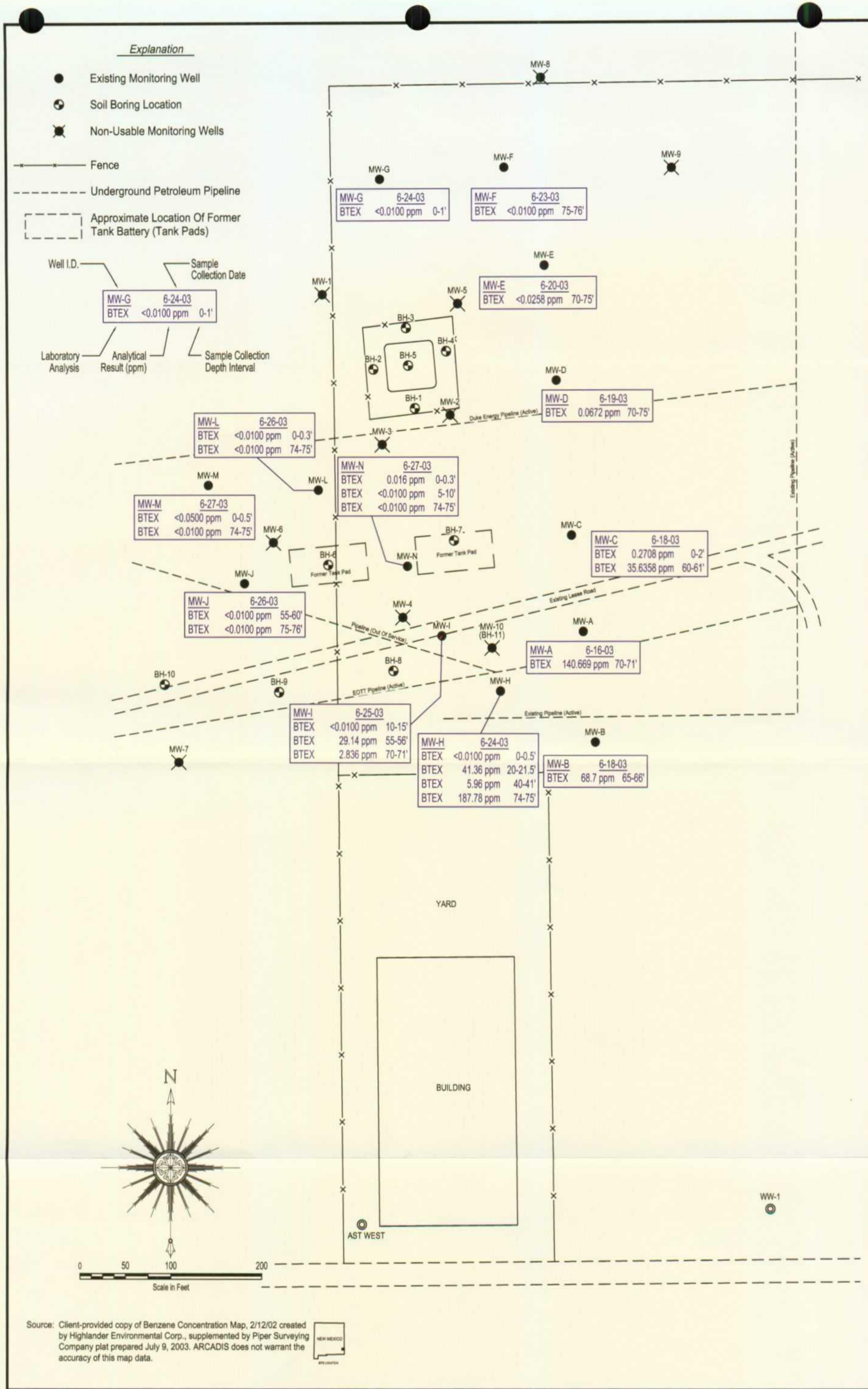
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Figure
4

Pure Resources, Inc.
Lovington Paddock Site
South - North PID Cross Section
Lea County, New Mexico

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	Pure Resources, Inc. Lovington Paddock Site			Task Manager L. Markham	Unique Number 31-014-00551
	BTEX In Soils Summary Map Lea County, New Mexico			Project Number MT000803.0001	Figure 5

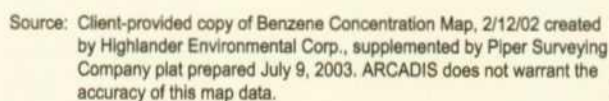
- Existing Monitoring Well
- ⊕ Soil Boring Location
- ⊗ Non-Usable Monitoring Wells

Underground Petroleum Pipeline

Approximate Location Of Former
Tank Battery (Tank Pads)

Well I.D. Sample Collection Date

Laboratory Analysis Analytical Result (ppm) Sample Collection Depth Interval



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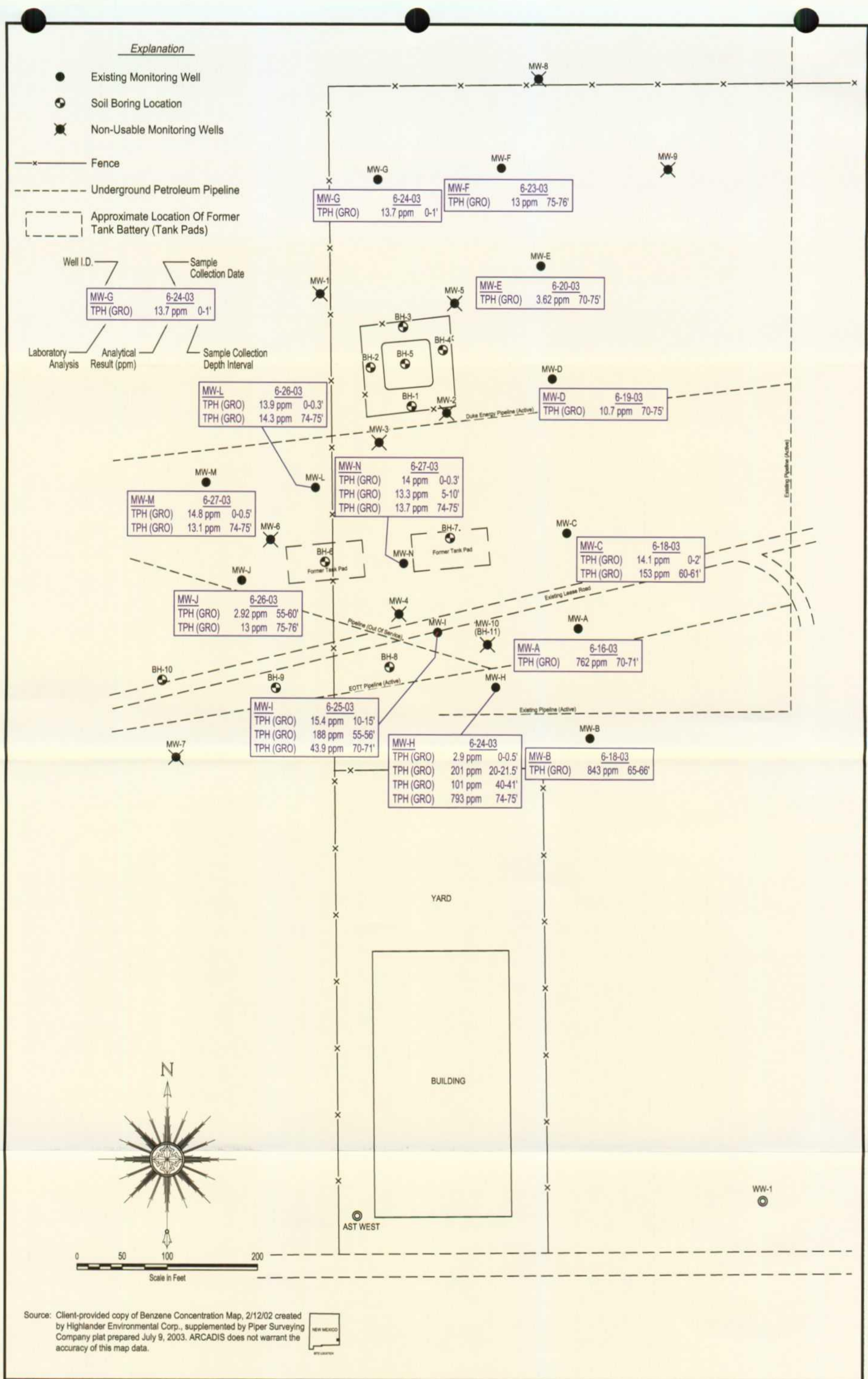
Unique Number	31-014-00552
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Figure 6

Total Petroleum Hydrocarbons (DRO) In Soils Summary Map

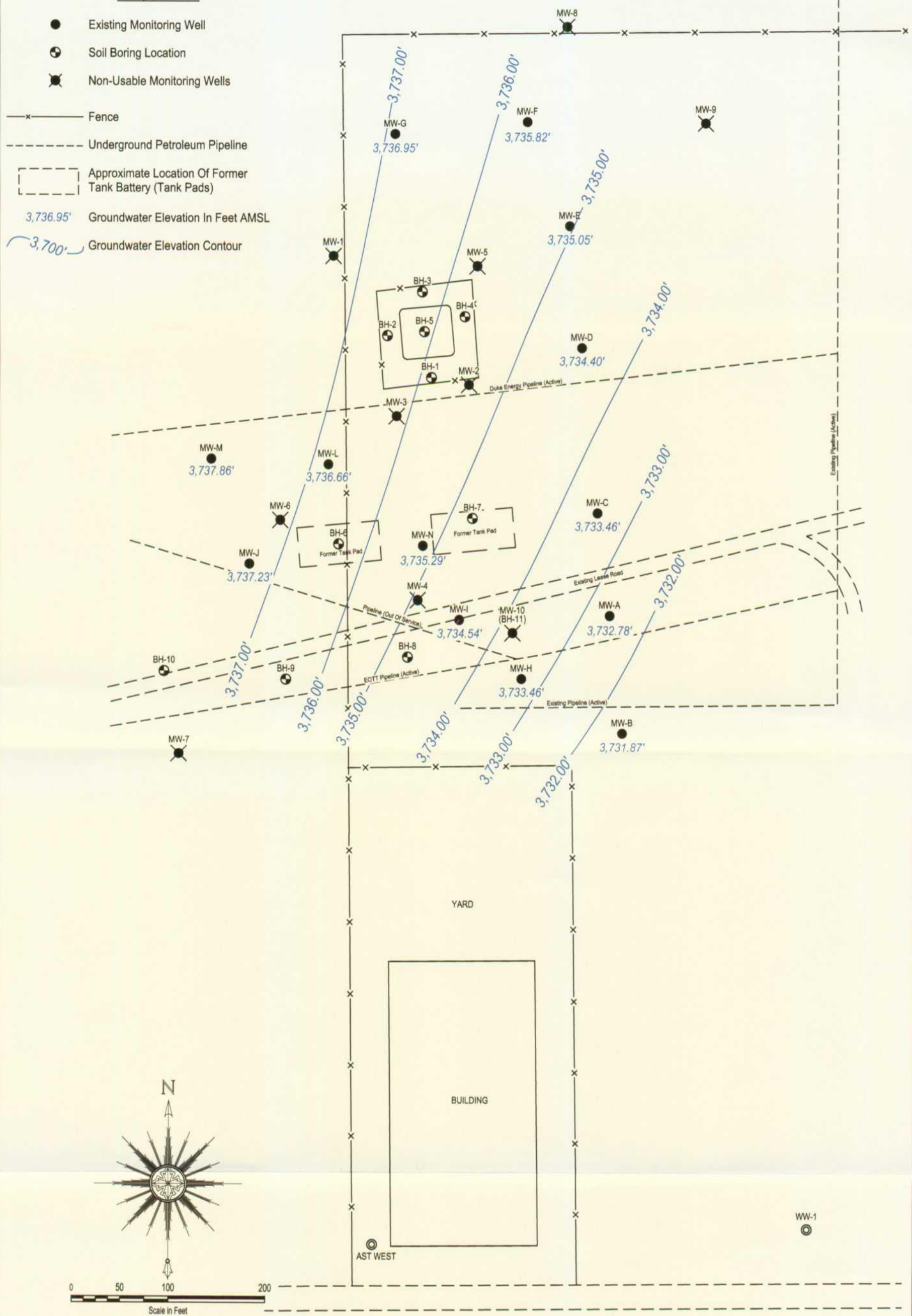
Lea County, New Mexico



Source: Client-provided copy of Benzene Concentration Map, 2/12/02 created by Highlander Environmental Corp., supplemented by Piper Surveying Company plat prepared July 9, 2003. ARCADIS does not warrant the accuracy of this map data.

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		Pure Resources, Inc. Lovington Paddock Site			Task Manager L. Markham	Unique Number 31-014-00553
		Total Petroleum Hydrocarbons (GRO) In Soils Summary Map			Project Number MT000803.0001	Figure 7
		Lea County, New Mexico				

 Existing Monitoring Well
 Soil Boring Location
 Non-Usable Monitoring Wells
 Fence
 Underground Petroleum Pipeline
 Approximate Location Of Former Tank Battery (Tank Pads)
3,736.95' Groundwater Elevation In Feet AMSL
3,700' Groundwater Elevation Contour



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Pure Resources, Inc.
Lovington Paddock Site

Task Manager
L. Markham

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Project Number

Figure

MT000803.0001

8

Groundwater Gradient Map (July, 2003)

Lea County, New Mexico

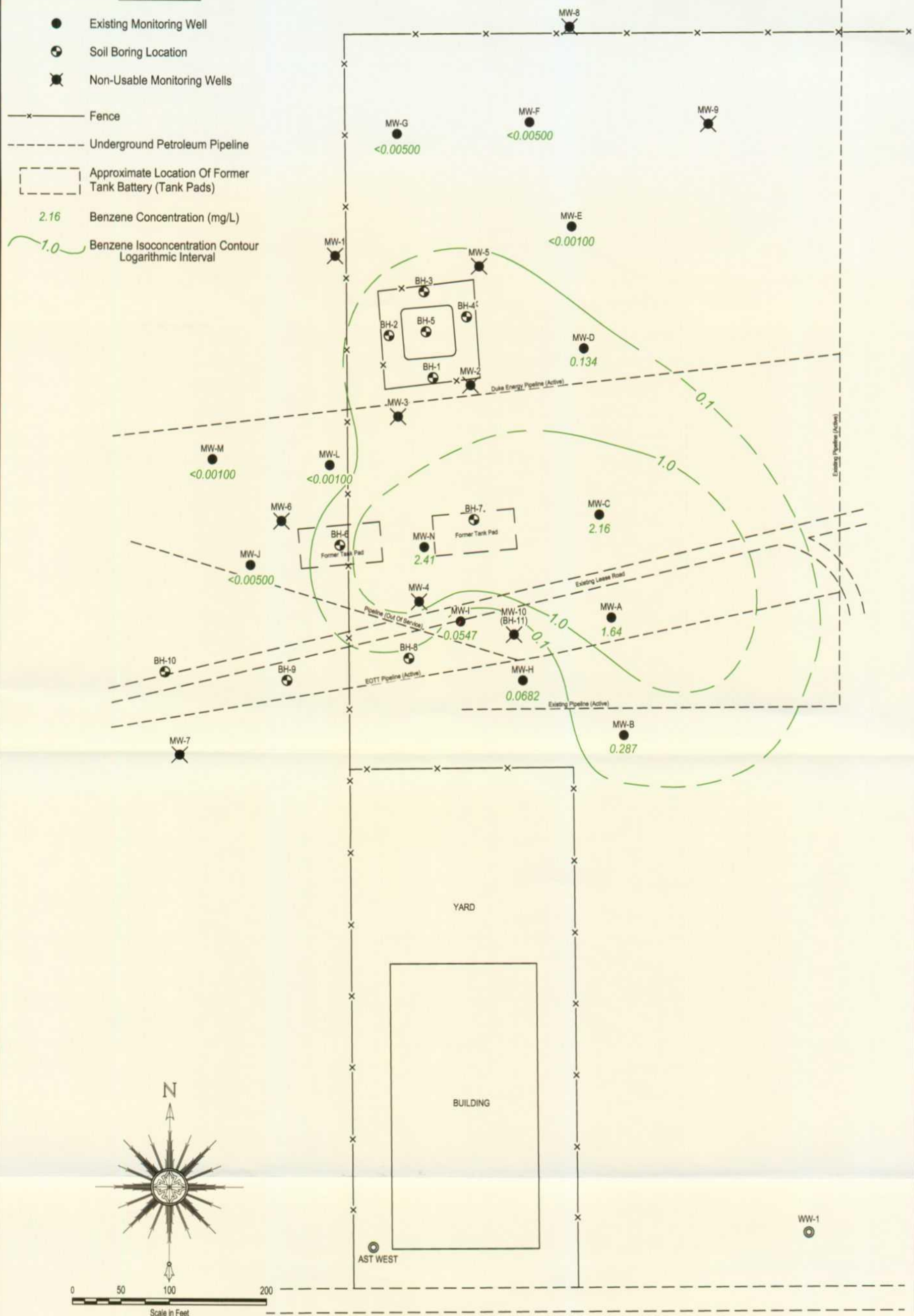
- Existing Monitoring Well
- ⊙ Soil Boring Location
- ⊗ Non-Usable Monitoring Wells

Underground Petroleum Pipeline

Approximate Location Of Former
Tank Battery (Tank Pads)

2.16 Benzene Concentration (mg/L)

1.0 Benzene Isoconcentration Contour
Logarithmic Interval



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31-014-00555

Project Number

Figure

MT000803.0001

9

Pure Resources, Inc.
Lovington Paddock Site
Groundwater Isoconcentrations For Benzene (mg/L) July, 2003

Lea County, New Mexico

TABLES



TABLE 1

Table 1
Pure Resources-Lovington Paddock Site
Soil Hydrocarbon Compound Analytical Results
Lovington, Lea County, New Mexico

Well ID	Depths	Sample Date	Benzene (mg/Kg)	Toluene (mg/Kg)	Ethylbenzene (mg/Kg)	Xylenes (mg/Kg)	BTEX (mg/Kg)	FOC %	TPH DRO (mg/Kg)	TPH GRO (mg/Kg)	Naphthalene (mg/Kg)
MW-A	70-71	6/16/2003	0.469	30.3	24.3	85.6	140.669	1.28	4690	762	<0.00594
MW-B	65-66	6/18/2003	<0.100	13.9	10.9	43.9	68.7	NS	2180	843	NS
MW-C	0-2	6/18/2003	<0.0100	0.041	0.0638	0.166	0.2708	NS	<50.0	14.1	NS
MW-C	60-61	6/18/2003	0.0458	4.75	5.54	25.3	35.6358	NS	2930	153	NS
MW-D	70-75	6/19/2003	<0.0100	<0.0100	<0.0100	0.0672	0.0672	NS	<50.0	10.7	NS
MW-E	70-75	6/20/2003	<0.0100	<0.0100	<0.0100	0.0258	0.0258	0.96	<50.0	3.62	NS
MW-F	75-76	6/23/2003	<0.0100	<0.0100	<0.0100	<0.0100	0	0.7	<50.0	13	<0.00594
MW-G	0-1	6/24/2003	<0.0100	<0.0100	<0.0100	<0.0100	0	NS	<50.0	13.7	NS
MW-G	71-72	6/24/2003	NS	NS	NS	NS	0	0.57	NS	NS	NS
MW-H	0-0.5	6/24/2003	<0.0100	<0.0100	<0.0100	<0.0100	0	NS	<50.0	2.9	NS
MW-H	20-21.5	6/24/2003	2.72	9.39	3.55	25.7	41.36	0.58	162	201	0.422
MW-H	40-41	6/24/2003	<0.0100	0.709	0.611	4.64	5.96	NS	726	101	NS
MW-H	74-75	6/24/2003	8.08	65.1	26.9	87.7	187.78	0.75	3970	793	2.79
MW-I	10-15	6/25/2003	<0.0100	<0.0100	<0.0100	<0.0100	0	NS	<50.0	15.4	NS
MW-I	55-56	6/25/2003	1.08	7.34	4.62	16.1	29.14	0.79	1500	188	<0.00594
MW-I	70-71	6/25/2003	<0.0500	0.173	0.603	2.06	2.836	1	208	43.9	<0.00594
MW-J	55-60	6/26/2003	<0.0100	<0.0100	<0.0100	<0.0100	0	NS	<50.0	2.92	NS
MW-J	75-76	6/26/2003	<0.0100	<0.0100	<0.0100	<0.0100	0	0.63	<50.0	13	<0.00594
MW-L	0-0.3	6/26/2003	<0.0100	<0.0100	<0.0100	<0.0100	0	NS	<50.0	13.9	NS
MW-L	74-75	6/26/2003	<0.0100	<0.0100	<0.0100	<0.0100	0	0.4	<50.0	14.3	<0.00594
MW-M	0-0.5	6/27/2003	<0.0500	<0.0500	<0.0500	<0.0500	0	NS	<50.0	14.8	NS
MW-M	74-75	6/27/2003	<0.0100	<0.0100	<0.0100	<0.0100	0	0.43	<50.0	13.1	<0.00594
MW-N	0-0.3	6/27/2003	<0.0100	0.016	<0.0100	<0.0100	0.016	NS	<50.0	14	NS
MW-N	5-10	6/27/2003	<0.0100	<0.0100	<0.0100	<0.0100	0	NS	<50.0	13.3	NS
MW-N	74-75	6/27/2003	<0.0100	<0.0100	<0.0100	<0.0100	0	0.51	<50.0	13.7	<0.00594

NS - Not Sampled

14.1 detected
4690 detected < NMOC D Std.

TABLE 2

Table 2
Pure Resources-Lovington Paddock Site
Soil Semi-Volatile Compound Analytical Summary
Lovington, Lea County, New Mexico

Well ID	Depths	Sample Date	Naphthalene (mg/Kg)	Acenaphthylene (mg/Kg)	Acenaphthene (mg/Kg)	Fluorene (mg/Kg)	Phenanthrene (mg/Kg)
MW-A	70-71	6/16/2003	<0.00594	<0.00594	<0.00594	<0.00594	<0.00594
MW-B	65-66	6/18/2003	NS	NS	NS	NS	NS
MW-C	0-2	6/18/2003	NS	NS	NS	NS	NS
MW-C	60-61	6/18/2003	NS	NS	NS	NS	NS
MW-D	70-75	6/19/2003	NS	NS	NS	NS	NS
MW-E	70-75	6/20/2003	NS	NS	NS	NS	NS
MW-F	75-76	6/23/2003	<0.00594	<0.00594	<0.00594	<0.00594	0.0241
MW-G	0-1	6/24/2003	NS	NS	NS	NS	NS
MW-G	71-72	6/24/2003	NS	NS	NS	NS	NS
MW-H	0-0.5	6/24/2003	NS	NS	NS	NS	NS
MW-H	20-21.5	6/24/2003	0.422	<0.00594	<0.00594	<0.00594	0.224
MW-H	40-41	6/24/2003	NS	NS	NS	NS	NS
MW-H	74-75	6/24/2003	2.79	<0.00594	<0.00594	<0.00594	1.82
MW-I	10-15	6/25/2003	NS	NS	NS	NS	NS
MW-I	55-56	6/25/2003	<0.00594	<0.00594	<0.00594	<0.00594	0.237
MW-I	70-71	6/25/2003	<0.00594	<0.00594	<0.00594	<0.00594	0.0446
MW-J	55-60	6/26/2003	NS	NS	NS	NS	NS
MW-J	75-76	6/26/2003	<0.00594	<0.00594	<0.00594	<0.00594	<0.00594
MW-L	0-0.3	6/26/2003	NS	NS	NS	NS	NS
MW-L	74-75	6/26/2003	<0.00594	<0.00594	<0.00594	<0.00594	<0.00594
MW-M	0-0.5	6/27/2003	NS	NS	NS	NS	NS
MW-M	74-75	6/27/2003	<0.00594	<0.00594	<0.00594	<0.00594	<0.00594
MW-N	0-0.3	6/27/2003	NS	NS	NS	NS	NS
MW-N	5-10	6/27/2003	NS	NS	NS	NS	NS
MW-N	74-75	6/27/2003	<0.00594	<0.00594	<0.00594	<0.00594	<0.00594

NS - Not Sampled

14.1	detected
4690	detected > NMOCD Std.

Table 2
Pure Resources-Lovington Paddock Site
Soil Semi-Volatile Compound Analytical Summary
Lovington, Lea County, New Mexico

Well ID	Depths	Sample Date	Anthracene (mg/Kg)	Fluoranthene (mg/Kg)	Pyrene (mg/Kg)	Benzo(a)anthracene (mg/Kg)	Chrysene (mg/Kg)
MW-A	70-71	6/16/2003	<0.00594	<0.00594	<0.00594	<0.00594	<0.00594
MW-B	65-66	6/18/2003	NS	NS	NS	NS	NS
MW-C	0-2	6/18/2003	NS	NS	NS	NS	NS
MW-C	60-61	6/18/2003	NS	NS	NS	NS	NS
MW-D	70-75	6/19/2003	NS	NS	NS	NS	NS
MW-E	70-75	6/20/2003	NS	NS	NS	NS	NS
MW-F	75-76	6/23/2003	<0.00594	0.0356	0.038	0.0135	0.0208
MW-G	0-1	6/24/2003	NS	NS	NS	NS	NS
MW-G	71-72	6/24/2003	NS	NS	NS	NS	NS
MW-H	0-0.5	6/24/2003	NS	NS	NS	NS	NS
MW-H	20-21.5	6/24/2003	<0.00594	<0.00594	<0.00594	<0.00594	<0.00594
MW-H	40-41	6/24/2003	NS	NS	NS	NS	NS
MW-H	74-75	6/24/2003	<0.00594	<0.00594	<0.00594	<0.00594	<0.00594
MW-I	10-15	6/25/2003	NS	NS	NS	NS	NS
MW-I	55-56	6/25/2003	0.0314	<0.00594	<0.00594	<0.00594	<0.00594
MW-I	70-71	6/25/2003	0.0066	<0.00594	<0.00594	<0.00594	<0.00594
MW-J	55-60	6/26/2003	NS	NS	NS	NS	NS
MW-J	75-76	6/26/2003	<0.00594	<0.00594	<0.00594	<0.00594	<0.00594
MW-L	0-0.3	6/26/2003	NS	NS	NS	NS	NS
MW-L	74-75	6/26/2003	<0.00594	<0.00594	<0.00594	<0.00594	<0.00594
MW-M	0-0.5	6/27/2003	NS	NS	NS	NS	NS
MW-M	74-75	6/27/2003	<0.00594	<0.00594	<0.00594	<0.00594	<0.00594
MW-N	0-0.3	6/27/2003	NS	NS	NS	NS	NS
MW-N	5-10	6/27/2003	NS	NS	NS	NS	NS
MW-N	74-75	6/27/2003	<0.00594	<0.00594	<0.00594	<0.00594	<0.00594

NS - Not Sampled

14.1	detected
4690	detected > NMOCID Std.

Table 2
Pure Resources-Lovington Paddock Site
Soil Semi-Volatile Compound Analytical Summary
Lovington, Lea County, New Mexico

Well ID	Depths	Sample Date	Benzo(b)fluoranthene (mg/Kg)	Benzo(k)fluoranthene (mg/Kg)	Benzo(a)pyrene (mg/Kg)
MW-A	70-71	6/16/2003	<0.00594	<0.00594	<0.00594
MW-B	65-66	6/18/2003	NS	NS	NS
MW-C	0-2	6/18/2003	NS	NS	NS
MW-C	60-61	6/18/2003	NS	NS	NS
MW-D	70-75	6/19/2003	NS	NS	NS
MW-E	70-75	6/20/2003	NS	NS	NS
MW-F	75-76	6/23/2003	0.0158	0.0116	<0.00594
MW-G	0-1	6/24/2003	NS	NS	NS
MW-G	71-72	6/24/2003	NS	NS	NS
MW-H	0-0.5	6/24/2003	NS	NS	NS
MW-H	20-21.5	6/24/2003	<0.00594	<0.00594	<0.00594
MW-H	40-41	6/24/2003	NS	NS	NS
MW-H	74-75	6/24/2003	<0.00594	<0.00594	<0.00594
MW-I	10-15	6/25/2003	NS	NS	NS
MW-I	55-56	6/25/2003	<0.00594	<0.00594	<0.00594
MW-I	70-71	6/25/2003	<0.00594	<0.00594	<0.00594
MW-J	55-60	6/26/2003	NS	NS	NS
MW-J	75-76	6/26/2003	<0.00594	<0.00594	<0.00594
MW-L	0-0.3	6/26/2003	NS	NS	NS
MW-L	74-75	6/26/2003	<0.00594	<0.00594	<0.00594
MW-M	0-0.5	6/27/2003	NS	NS	NS
MW-M	74-75	6/27/2003	<0.00594	<0.00594	<0.00594
MW-N	0-0.3	6/27/2003	NS	NS	NS
MW-N	5-10	6/27/2003	NS	NS	NS
MW-N	74-75	6/27/2003	<0.00594	<0.00594	<0.00594

NS - Not Sampled

14.1 detected

4690 detected > NMOCID Std.

Table 2
Pure Resources-Lovington Paddock Site
Soil Semi-Volatile Compound Analytical Summary
Lovington, Lea County, New Mexico

Well ID	Depths	Sample Date	Indeno(1,2,3-cd)pyrene (mg/Kg)	Dibenzo(a,h)anthracene (mg/Kg)	Benzo(g,h,i)perylene (mg/Kg)
MW-A	70-71	6/16/2003	<0.00594	<0.00594	<0.00594
MW-B	65-66	6/18/2003	NS	NS	NS
MW-C	0-2	6/18/2003	NS	NS	NS
MW-C	60-61	6/18/2003	NS	NS	NS
MW-D	70-75	6/19/2003	NS	NS	NS
MW-E	70-75	6/20/2003	NS	NS	NS
MW-F	75-76	6/23/2003	<0.00594	<0.00594	<0.00594
MW-G	0-1	6/24/2003	NS	NS	NS
MW-G	71-72	6/24/2003	NS	NS	NS
MW-H	0-0.5	6/24/2003	NS	NS	NS
MW-H	20-21.5	6/24/2003	<0.00594	<0.00594	<0.00594
MW-H	40-41	6/24/2003	NS	NS	NS
MW-H	74-75	6/24/2003	<0.00594	<0.00594	<0.00594
MW-I	10-15	6/25/2003	NS	NS	NS
MW-I	55-56	6/25/2003	<0.00594	<0.00594	<0.00594
MW-I	70-71	6/25/2003	<0.00594	<0.00594	<0.00594
MW-J	55-60	6/26/2003	NS	NS	NS
MW-J	75-76	6/26/2003	<0.00594	<0.00594	<0.00594
MW-L	0-0.3	6/26/2003	NS	NS	NS
MW-L	74-75	6/26/2003	<0.00594	<0.00594	<0.00594
MW-M	0-0.5	6/27/2003	NS	NS	NS
MW-M	74-75	6/27/2003	<0.00594	<0.00594	<0.00594
MW-N	0-0.3	6/27/2003	NS	NS	NS
MW-N	5-10	6/27/2003	NS	NS	NS
MW-N	74-75	6/27/2003	<0.00594	<0.00594	<0.00594

NS - Not Sampled

14.1	detected
4690	detected > NMOCD Std.

TABLE 3

Table 3
Pure Resources-Lovington Paddock Site
Monitoring Well Completion Summary
Lovington, Lea County, New Mexico

Well ID	Date Drilled	Well Diameter	Stick Up	Surveyed Top of Casing Elevation	Surveyed Concrete Elevation	Surveyed Ground Elevation	Completed Well Depth (BGL)	Completed Well Depth Elevation
MW-A	6/16/2003	4	2.5	3816.04	3813.53	3813.03	97.5	3715.53
MW-B	6/19/2003	4	2.57	3816.09	3813.48	3812.98	105	3707.98
MW-C	6/18/2003	4	2.52	3817.04	3814.49	3813.99	105	3708.99
MW-D	6/19/2003	4	2.51	3816.08	3813.56	3813.16	105	3708.16
MW-E	6/20/2003	4	2.38	3816.31	3813.82	3813.32	105	3708.32
MW-F	6/20/2003	4	2.59	3816.69	3814.10	3813.60	105	3708.6
MW-G	6/24/2003	4	2.43	3818.23	3815.68	3815.18	105	3710.18
MW-H	6/25/2003	4	2.58	3816.74	3814.14	3813.64	105	3708.64
MW-I	6/25/2003	4	2.56	3816.94	3814.37	3813.87	105	3708.87
MW-J	6/26/2003	4	2.5	3817.66	3815.11	3814.61	105	3709.61
MW-L	6/26/2003	4	2.55	3818.35	3815.78	3815.28	105	3710.28
MW-M	6/27/2003	4	2.5	3817.88	3815.34	3814.84	105	3709.84
MW-N	6/27/2003	4	2.55	3817.70	3815.12	3814.62	105	3709.62

Table 3
Pure Resources-Lovington Paddock Site
Monitoring Well Completion Summary
Lovington, Lea County, New Mexico

Well ID	Date Drilled	Top of Screen (BGL)	Bottom of Screen (BGL)	Top of Screen Elevation	Bottom of Screen Elevation	Depth to Water	GWE Date	Groundwater Elevation
MW-A	6/16/2003	57.5	97.5	3755.53	3715.53	83.26	7/9/2003	3732.78
MW-B	6/19/2003	65	105	3747.98	3707.98	84.22	7/9/2003	3731.87
MW-C	6/18/2003	65	105	3748.99	3708.99	83.58	7/9/2003	3733.46
MW-D	6/19/2003	65	105	3748.16	3708.16	81.68	7/9/2003	3734.40
MW-E	6/20/2003	65	105	3748.32	3708.32	81.26	7/9/2003	3735.05
MW-F	6/20/2003	65	105	3748.6	3708.6	80.87	7/9/2003	3735.82
MW-G	6/24/2003	65	105	3750.18	3710.18	81.28	7/9/2003	3736.95
MW-H	6/25/2003	65	105	3748.64	3708.64	83.28	7/9/2003	3733.46
MW-I	6/25/2003	65	105	3748.87	3708.87	82.40	7/9/2003	3734.54
MW-J	6/26/2003	65	105	3749.61	3709.61	80.43	7/9/2003	3737.23
MW-L	6/26/2003	65	105	3750.28	3710.28	81.69	7/9/2003	3736.66
MW-M	6/27/2003	65	105	3749.84	3709.84	80.02	7/9/2003	3737.86
MW-N	6/27/2003	65	105	3749.62	3709.62	82.41	7/9/2003	3735.29

TABLE 4

Table 4
Pure Resources-Lovington Paddock Site
Groundwater Major Minerals Analytical Results
Lovington, Lea County, New Mexico

Well ID	Sample Date	Total Alkalinity (mg/L as CaCO ₃)	Bromide (mg/L)	Dissolved Calcium (mg/L)	Dissolved Potassium (mg/L)	Dissolved Magnesium (mg/L)	Dissolved Sodium (mg/L)	Dissolved Iron (mg/L)	Total Iron (mg/L)	Chloride (mg/L)	Fluoride (mg/L)
DUP	7/2/2003	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-A	7/2/2003	254	NS	95.1	2.35	15.3	26.3	<0.0500	1.69	61.7	1.39
MW-B	7/2/2003	210	NS	74.2	5.37	11.1	21.6	<0.0500	0.875	53.3	1.56
MW-C	7/1/2003	332	NS	108	2.71	17.7	35.1	<0.0500	0.352	29	1.3
MW-D	6/27/2003	264	1.27	203	2.81	29.9	76	<0.0500	3.48	356	<1.00
MW-E	6/27/2003	190	<1.00	44.8	2.92	6.99	63.1	<0.0500	0.611	29.8	1.75
MW-F	6/26/2003	158	NS	78	2.17	11.3	42.2	<0.0500	4.63	61.4	1.61
MW-G	6/26/2003	154	NS	68.3	2.13	10.3	39.2	<0.0500	2.34	48.7	1.55
MW-H	7/2/2003	222	NS	63.4	2.46	11.9	31.5	<0.0500	0.707	35.2	1.64
MW-I	7/2/2003	284	NS	111	2.79	17	37.5	<0.0500	4.69	43	1.35
MW-J	7/1/2003	170	NS	72	3.12	11.5	44.7	<0.0500	0.129	64.9	1.58
MW-L	7/1/2003	178	NS	72.3	2.75	11.5	55.2	<0.0500	2.65	106	2.21
MW-M	7/1/2003	156	NS	100	3.25	16.2	61.4	<0.0500	0.874	181	1.58
MW-N	7/2/2003	264	NS	94	2.4	14.9	40.6	<0.0500	0.527	67.4	1.61

NS - Not Sampled

Table 4
Pure Resources-Lovington Paddock Site
Groundwater Major Minerals Analytical Results
Lovington, Lea County, New Mexico

Well ID	Sample Date	Sulfate (mg/L)	Nitrite-N (mg/L)	Nitrate-N (mg/L)	pH (s.u.)	Specific Conductance (umhos/cm)	TDS (mg/L)	Carbon Dioxide (mg/L)	Methane (ug/L)	Nitrogen (mg/L)	Oxygen (mg/L)
DUP	7/2/2003	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-A	7/2/2003	28.5	0.0229	3.14	7.3	759	488	NS	NS	NS	NS
MW-B	7/2/2003	33.1	<0.0100	3.33	7.4	653	386	27	4.1	15	3.4
MW-C	7/1/2003	42.2	<0.0100	2.12	7.3	784	508	72	16	16	1.2
MW-D	6/27/2003	88.5	0.0533	2.54	7.2	1750	1144	50	2.4	15	3.3
MW-E	6/27/2003	56.1	<0.0100	2.47	7.4	620	392	12	0.4	13	5.3
MW-F	6/26/2003	59.9	<0.0100	2.95	7.5	689	420	10	0.66	13	6.2
MW-G	6/26/2003	45.5	<0.0100	3.05	7.5	619	404	11	0.79	15	5.9
MW-H	7/2/2003	40.1	0.0243	3.35	7.5	614	392	20	3.2	15	5.1
MW-I	7/2/2003	46.5	<0.0100	2.79	7.2	856	541	NS	NS	NS	NS
MW-J	7/1/2003	44.6	<0.0100	3.6	7.6	704	416	17	1.4	17	5.2
MW-L	7/1/2003	31.2	<0.0100	3.46	7.6	802	497	NS	NS	NS	NS
MW-M	7/1/2003	51.5	<0.0100	3.74	8.9	1020	664	14	0.59	15	6.2
MW-N	7/2/2003	38.4	<0.0100	3.09	7.1	796	493	NS	NS	NS	NS

NS - Not Sampled

TABLE 5

Table 5
Pure Resources-Lovington Paddock Site
Groundwater Hydrocarbon Compound Analytical Results
Lovington, Lea County, New Mexico

Well ID	Sample Date	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylene (mg/L)	TPH DRO (mg/L)	TPH GRO (mg/L)	TOC (mg/L)	Naphthalene (mg/L)
MW-A	7/2/2003	1.64	0.233	0.0314	0.0722	<5.00	2.3	4.77	<0.000200
MW-B	7/2/2003	0.287	0.0264	0.0051	0.0133	<5.00	0.879	5.34	NS
DUP (of B)	7/2/2003	0.308	0.0282	0.0056	0.0143	<5.00	0.951	NS	NS
MW-C	7/1/2003	2.16	0.0285	<0.0100	0.0507	<5.00	4.7	3.52	NS
MW-D	6/27/2003	0.134	<0.00100	<0.00100	0.0022	<5.00	0.349	6.77	NS
MW-E	6/27/2003	<0.00100	<0.00100	<0.00100	<0.00100	<5.00	<0.100	<1.00	NS
MW-F	6/26/2003	<0.00500	<0.00500	<0.00500	<0.00500	<5.00	<0.500	34.9	NS
MW-G	6/26/2003	<0.00500	<0.00500	<0.00500	<0.00500	<5.00	<0.500	1.03	NS
MW-H	7/2/2003	0.0682	0.0366	0.0019	0.0058	<5.00	0.707	1.94	<0.000200
MW-I	7/2/2003	0.0547	0.0192	0.0015	0.0016	<5.00	0.294	71.8	NS
MW-J	7/1/2003	<0.00500	<0.00500	<0.00500	<0.00500	<5.00	0.668	4.77	NS
MW-L	7/1/2003	<0.00100	<0.00100	<0.00100	<0.00100	<5.00	<0.100	<1.00	NS
MW-M	7/1/2003	<0.00100	<0.00100	<0.00100	<0.00100	<5.00	<0.100	<1.00	<0.000200
MW-N	7/2/2003	2.41	<0.0500	<0.0500	<0.0500	<5.00	2.14	NS	<0.000200

NS - Not Sampled

14.1 detected

4690 detected > NMOCD Std.

TABLE 6

Table 6
Pure Resources-Lovington Paddock Site
Groundwater Semi-volatile Organic Compound Analytical Results
Lovington, Lea County, New Mexico

Well ID	Sample Date	Naphthalene (mg/L)	Acenaphthylene (mg/L)	Acenaphthene (mg/L)	Fluorene (mg/L)	Phenanthrene (mg/L)	Anthracene (mg/L)	Fluoranthene (mg/L)	Pyrene (mg/L)
DUP	7/2/2003	NS	NS	NS	NS	NS	NS	NS	NS
MW-A	7/2/2003	<0.000200	<0.000200	<0.000200	<0.000200	<0.000200	<0.000200	<0.000200	<0.000200
MW-B	7/2/2003	NS	NS	NS	NS	NS	NS	NS	NS
MW-C	7/1/2003	NS	NS	NS	NS	NS	NS	NS	NS
MW-D	6/27/2003	NS	NS	NS	NS	NS	NS	NS	NS
MW-E	6/27/2003	NS	NS	NS	NS	NS	NS	NS	NS
MW-F	6/26/2003	NS	NS	NS	NS	NS	NS	NS	NS
MW-G	6/26/2003	NS	NS	NS	NS	NS	NS	NS	NS
MW-H	7/2/2003	<0.000200	<0.000200	<0.000200	<0.000200	<0.000200	<0.000200	<0.000200	<0.000200
MW-I	7/2/2003	NS	NS	NS	NS	NS	NS	NS	NS
MW-J	7/1/2003	NS	NS	NS	NS	NS	NS	NS	NS
MW-L	7/1/2003	NS	NS	NS	NS	NS	NS	NS	NS
MW-M	7/1/2003	<0.000200	<0.000200	<0.000200	<0.000200	<0.000200	<0.000200	<0.000200	<0.000200
MW-N	7/2/2003	<0.000200	<0.000200	<0.000200	<0.000200	<0.000200	<0.000200	<0.000200	<0.000200

NS - Not Sampled

Table 6
Pure Resources-Lovington Paddock Site
Groundwater Semi-volatile Organic Compound Analytical Results
Lovington, Lea County, New Mexico

Well ID	Sample Date	Benzo(a)anthracene (mg/L)	Chrysene (mg/L)	Benzo(b)fluoranthene (mg/L)	Benzo(k)fluoranthene (mg/L)	Benzo(a)pyrene (mg/L)	Indeno(1,2,3-cd)pyrene (mg/L)
DUP	7/2/2003	NS	NS	NS	NS	NS	NS
MW-A	7/2/2003	<0.000200	<0.000200	<0.000200	<0.000200	<0.000200	<0.000200
MW-B	7/2/2003	NS	NS	NS	NS	NS	NS
MW-C	7/1/2003	NS	NS	NS	NS	NS	NS
MW-D	6/27/2003	NS	NS	NS	NS	NS	NS
MW-E	6/27/2003	NS	NS	NS	NS	NS	NS
MW-F	6/26/2003	NS	NS	NS	NS	NS	NS
MW-G	6/26/2003	NS	NS	NS	NS	NS	NS
MW-H	7/2/2003	<0.000200	<0.000200	<0.000200	<0.000200	<0.000200	<0.000200
MW-I	7/2/2003	NS	NS	NS	NS	NS	NS
MW-J	7/1/2003	NS	NS	NS	NS	NS	NS
MW-L	7/1/2003	NS	NS	NS	NS	NS	NS
MW-M	7/1/2003	<0.000200	<0.000200	<0.000200	<0.000200	<0.000200	<0.000200
MW-N	7/2/2003	<0.000200	<0.000200	<0.000200	<0.000200	<0.000200	<0.000200

NS - Not Sampled

Table 6
Pure Resources-Lovington Paddock Site
Groundwater Semi-volatile Organic Compound Analytical Results
Lovington, Lea County, New Mexico

Well ID	Sample Date	Dibenzo(a,h)anthracene (mg/L)	Benzo(g,h,i)perylene (mg/L)
DUP	7/2/2003	NS	NS
MW-A	7/2/2003	<0.000200	<0.000200
MW-B	7/2/2003	NS	NS
MW-C	7/1/2003	NS	NS
MW-D	6/27/2003	NS	NS
MW-E	6/27/2003	NS	NS
MW-F	6/26/2003	NS	NS
MW-G	6/26/2003	NS	NS
MW-H	7/2/2003	<0.000200	<0.000200
MW-I	7/2/2003	NS	NS
MW-J	7/1/2003	NS	NS
MW-L	7/1/2003	NS	NS
MW-M	7/1/2003	<0.000200	<0.000200
MW-N	7/2/2003	<0.000200	<0.000200

NS - Not Sampled

APPENDIX A



ARCADIS

Appendix A

Well Logs



ARCADIS

WELL LOG

WELL NO.

MW-A

1004 N. Big Spring St. Suite 300, Midland, TX 79701-3383 Tel: 432/687-5400 Fax: 432/687-5401

Page 1 of 2

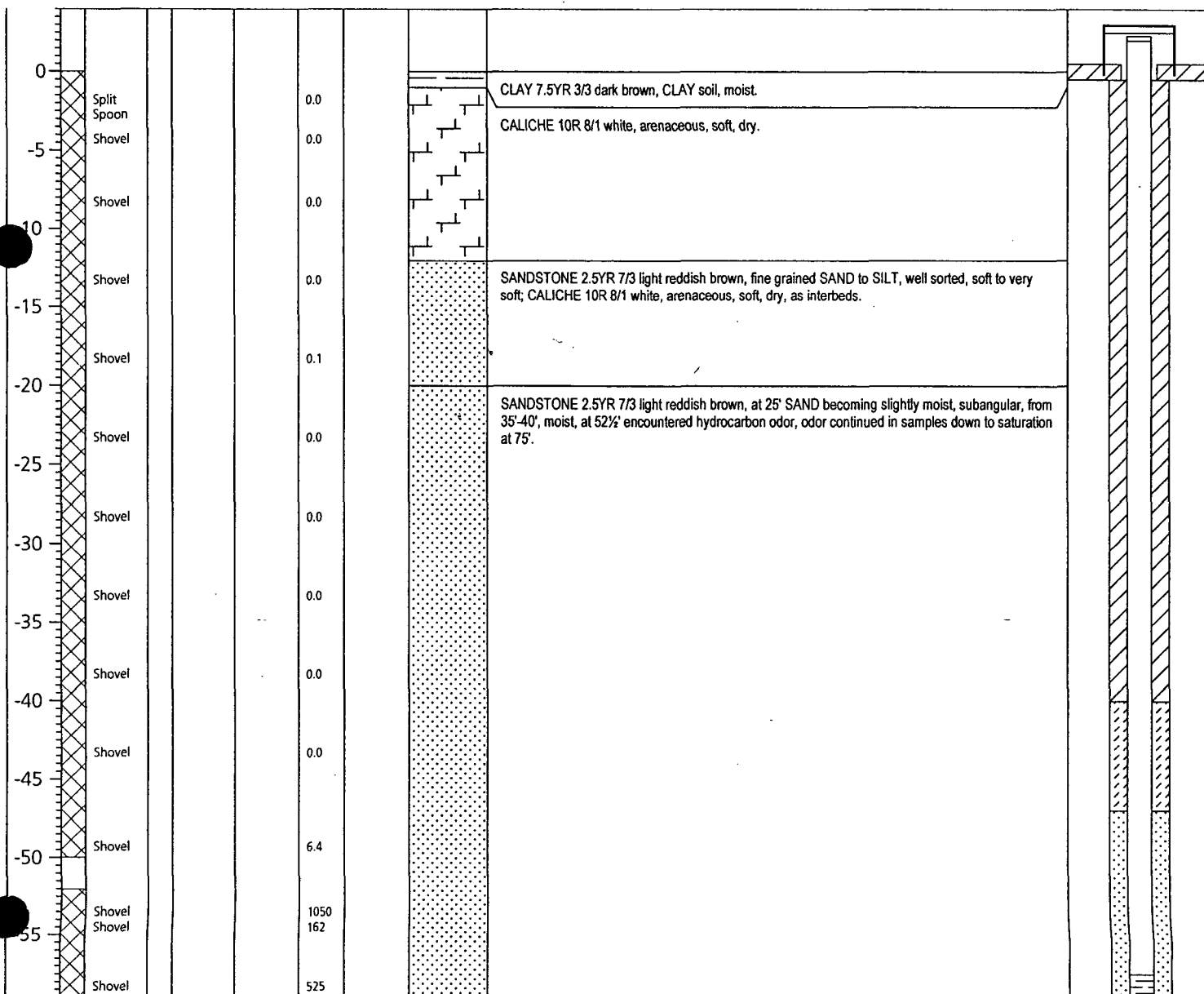
PROJECT NUMBER: MT000803.0001
CLIENT NAME: Pure Resources, Inc.
PROJECT NAME: Lovington Paddock Site
SITE LOCATION: Lea County, New Mexico

STATIC WATER LEVEL: 83.26' MEAS. PT.: T.O.C. DATE: 7/9/03
HOLE SIZE(S): 7 7/8" TOTAL DEPTH: -120.0'
SURFACE COMPLETION: 8" Locking Steel Sleeve, 4"x4"x6" Conc. Slab

	TYPES	DEPTHS
GROUT TYPE:	Portland Cement	-40.0' to Surface
SEAL TYPE:	Bentonite Chips	-47.0' to -40.0'
SCREEN PACK:	8/16 Sand	-97.5' to -47.0'
CASING TYPE:	4" Diameter Sch. 40 PVC Blank	-57.5' to 2.0'
—	—	—
WELL SCREEN:	4" Diameter Sch. 40 PVC, 0.020" slots	-97.5' to -57.5'
PLUG BACK:	8/16 Sand	

DRILLING CO: White Drilling Co.
DRILLING METHOD: Rotary
SAMPLE METHOD: Shovel/Rock Core
DATE BEGUN: 06/16/03 DATE COMPLETED: 06/16/03
DRILLER: B. Atkins ELEVATION (SURF.): 3,813.03'
LOGGER: R. Lang ELEVATION (T.O.C.): 3,816.04'
FILE NAME: MW-A.dat UNIQUE NUMBER: 31-014-00522

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U. S. C. S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
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ARCADIS

WELL LOG

WELL NO.

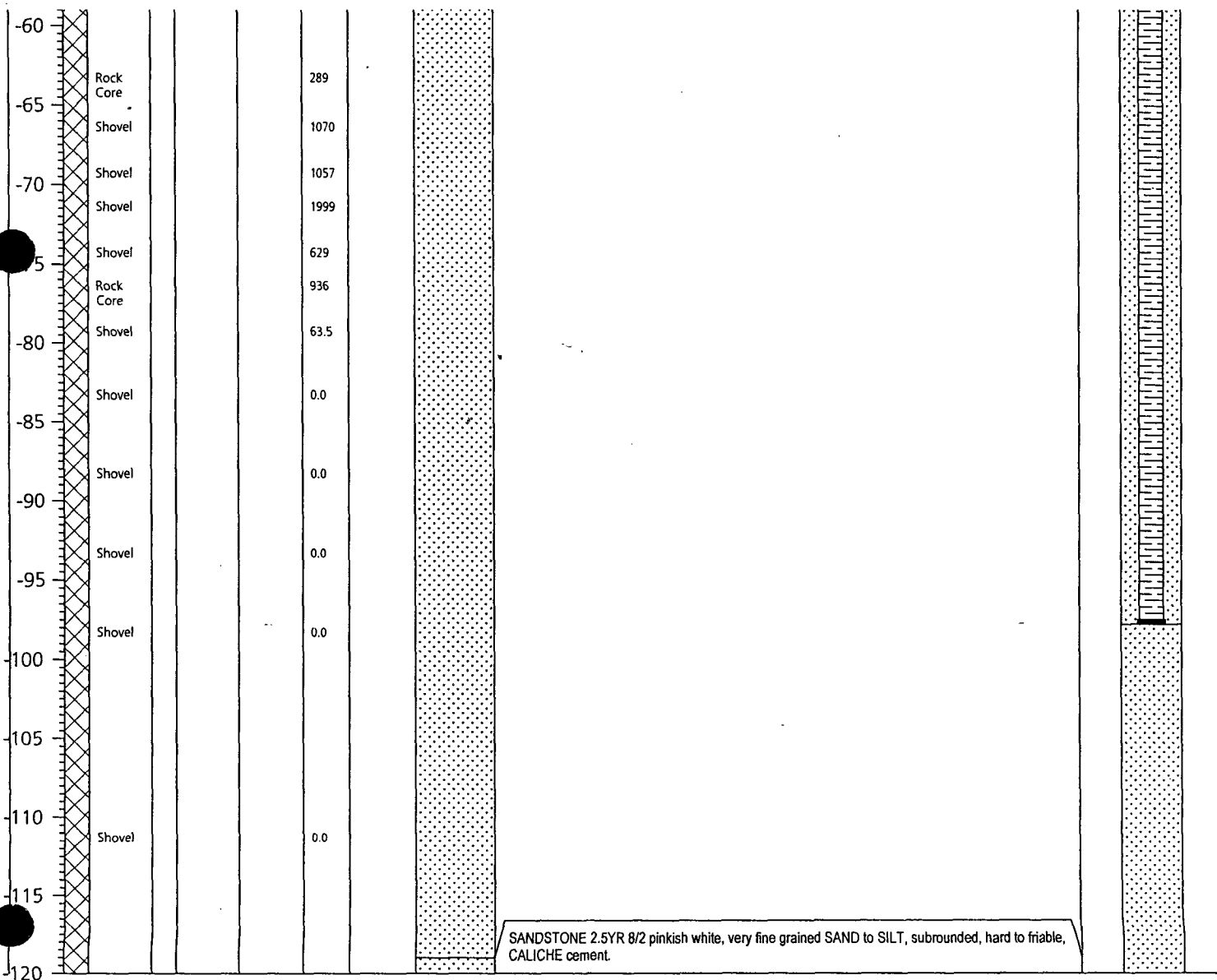
MW-A

1004 N. Big Spring St. Suite 300, Midland, TX 79701-3383 Tel: 432/687-5400 Fax: 432/687-5401

Page 2 of 2

PROJECT NUMBER:	MT000803.0001	STATIC WATER LEVEL:	83.26'	MEAS. PT.:	T.O.C.	DATE:	7/9/03
CLIENT NAME:	Pure Resources, Inc.	HOLE SIZE(S):	7 7/8"			TOTAL DEPTH:	-120.0'
PROJECT NAME:	Lovington Paddock Site	SURFACE COMPLETION:		8" Locking Steel Sleeve, 4'x4'x6" Conc. Slab			
SITE LOCATION:	Lea County, New Mexico			TYPES		DEPTHS	
DRILLING CO:	White Drilling Co.	GROUT TYPE:	Portland Cement			-40.0' to Surface	
DRILLING METHOD:	Rotary	SEAL TYPE:	Bentonite Chips			-47.0' to -40.0'	
SAMPLE METHOD:	Shovel/Rock Core	SCREEN PACK:	8/16 Sand			-97.5' to -47.0'	
DATE BEGUN:	06/16/03	DATE COMPLETED:	06/16/03			-57.5' to 2.0'	
DRILLER:	B. Atkins	ELEVATION (SURF.):	3,813.03'				
LOGGER:	R. Lang	ELEVATION (T.O.C.):	3,816.04'				
FILE NAME:	MW-A.dat	UNIQUE NUMBER:	31-014-00522				
		WELL SCREEN:	4" Diameter Sch. 40 PVC, 0.020" slots			-97.5' to -57.5'	
		PLUG BACK:	8/16 Sand				

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U. S. C. S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
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ARCADIS

WELL LOG

WELL NO.

MW-B

1004 N. Big Spring St. Suite 300, Midland, TX 79701-3383 Tel: 432/687-5400 Fax: 432/687-5401

Page 1 of 2

PROJECT NUMBER: MT000803.0001
CLIENT NAME: Pure Resources, Inc.
PROJECT NAME: Lovington Paddock Site
SITE LOCATION: Lea County, New Mexico
DRILLING CO: White Drilling Co.
DRILLING METHOD: Rotary
SAMPLE METHOD: Shovel/Rock Core
DATE BEGUN: 06/19/03
DRILLER: B. Atkins
LOGGER: R. Lang
FILE NAME: MW-B.dat
STATIC WATER LEVEL: 84.22' MEAS. PT.: T.O.C.
HOLE SIZE(S): 7 7/8"
SURFACE COMPLETION: 8" Locking Steel Sleeve, 4"x4"x6" Conc. Slab
GROUT TYPE: Portland Cement
SEAL TYPE: Bentonite Chips
SCREEN PACK: 8/16 Sand
CASING TYPE: 4" Diameter Sch. 40 PVC Blank
DATE COMPLETED: 06/19/03
ELEVATION (SURF.): 3,812.98'
ELEVATION (T.O.C.): 3,816.09'
UNIQUE NUMBER: 31-014-00523
WELL SCREEN: 4" Diameter Sch. 40 PVC, 0.020" slots
PLUG BACK: 8/16 Sand
DATE: 7/9/03
TOTAL DEPTH: -105.0'

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U. S. C. S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
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0	Split Spoon					2.9			CLAY 7.5YR 3/4 dark brown, CLAY soil, moist.	
-5	Shovel					0.3			CALICHE 10R 8/1 white, arenaceous, soft, dry.	
-10	Shovel					2.8			SAND 10R 8/1 pink, very fine grained SAND to SILT, subangular, calcareous, CALICHE 10R 8/1 white, soft, as interbeds.	
-15	Shovel					3.9				
-20	Shovel					2.3				
-25	Shovel					7.0				
-30	Shovel					0.5			SAND 10R 8/4 pink, very fine grained, loose.	
-35	Shovel					0.2				
-40	Shovel					0.8				
-45	Shovel					0.3			SANDSTONE 10R 8/3 pink, very fine grained SAND, subangular, well sorted, hard, calcareous cement.	
-50	Shovel					1.6			SAND 10R 8/4 pink, very fine grained, loose, petroleum odor at 58', became moist at 71', at 75' began drilling with water.	



WELL LOG

WELL NO.

MW-B

1004 N. Big Spring St. Suite 300, Midland, TX 79701-3383 Tel: 432/687-5400 Fax: 432/687-5401

Page 2 of 2

PROJECT NUMBER: MT000803.0001
CLIENT NAME: Pure Resources, Inc.
PROJECT NAME: Lovington Paddock Site
SITE LOCATION: Lea County, New Mexico

STATIC WATER LEVEL: 84.22' MEAS. PT.: T.O.C. DATE: 7/9/03
HOLE SIZE(S): 7 7/8" TOTAL DEPTH: -105.0'
SURFACE COMPLETION: 8" Locking Steel Sleeve, 4'x4'x6" Conc. Slab

	TYPES	DEPTHS
GROUT TYPE:	Portland Cement	-50.0' to Surface
SEAL TYPE:	Bentonite Chips	-55.0' to -50.0'
SCREEN PACK:	8/16 Sand	-105.0' to -50.0'
CASING TYPE:	4" Diameter Sch. 40 PVC Blank	-65.0' to 2.0'
DATE BEGUN:	06/19/03	DATE COMPLETED: 06/19/03
DRILLER:	B. Atkins	ELEVATION (SURF.): 3,812.98'
LOGGER:	R. Lang	ELEVATION (T.O.C.): 3,816.09'
FILE NAME:	MW-B.dat	UNIQUE NUMBER: 31-014-00523
WELL SCREEN:	4" Diameter Sch. 40 PVC, 0.020" slots	-105.0' to -65.0'
PLUG BACK:	8/16 Sand	

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U. S. C. S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
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-55	X	Shovel				86				
-55	X	Shovel				265				
-60	X	Rock Core				1466				
-65	X	Shovel				733				
-65	X	Rock Core				1999				
-70	X	Rock Core				831				
-70	X	Rock Core				335				
-75	X	Shovel				60.5				
-75	X	Shovel				2.2				
-80	X	Shovel				0.5			SAND 10R 8/4 pink, CALICHE 2.5Y 1/8 white, arenaceous, hard, as interbeds.	
-85	X	Shovel				2.3				
-90	X	Shovel				1.0				
-95	X	Shovel				3.2				
-100	X	Shovel				1.8				
-105	X	Shovel								



WELL LOG

WELL NO.

MW-C

1004 N. Big Spring St. Suite 300, Midland, TX 79701-3383 Tel: 432/687-5400 Fax: 432/687-5401

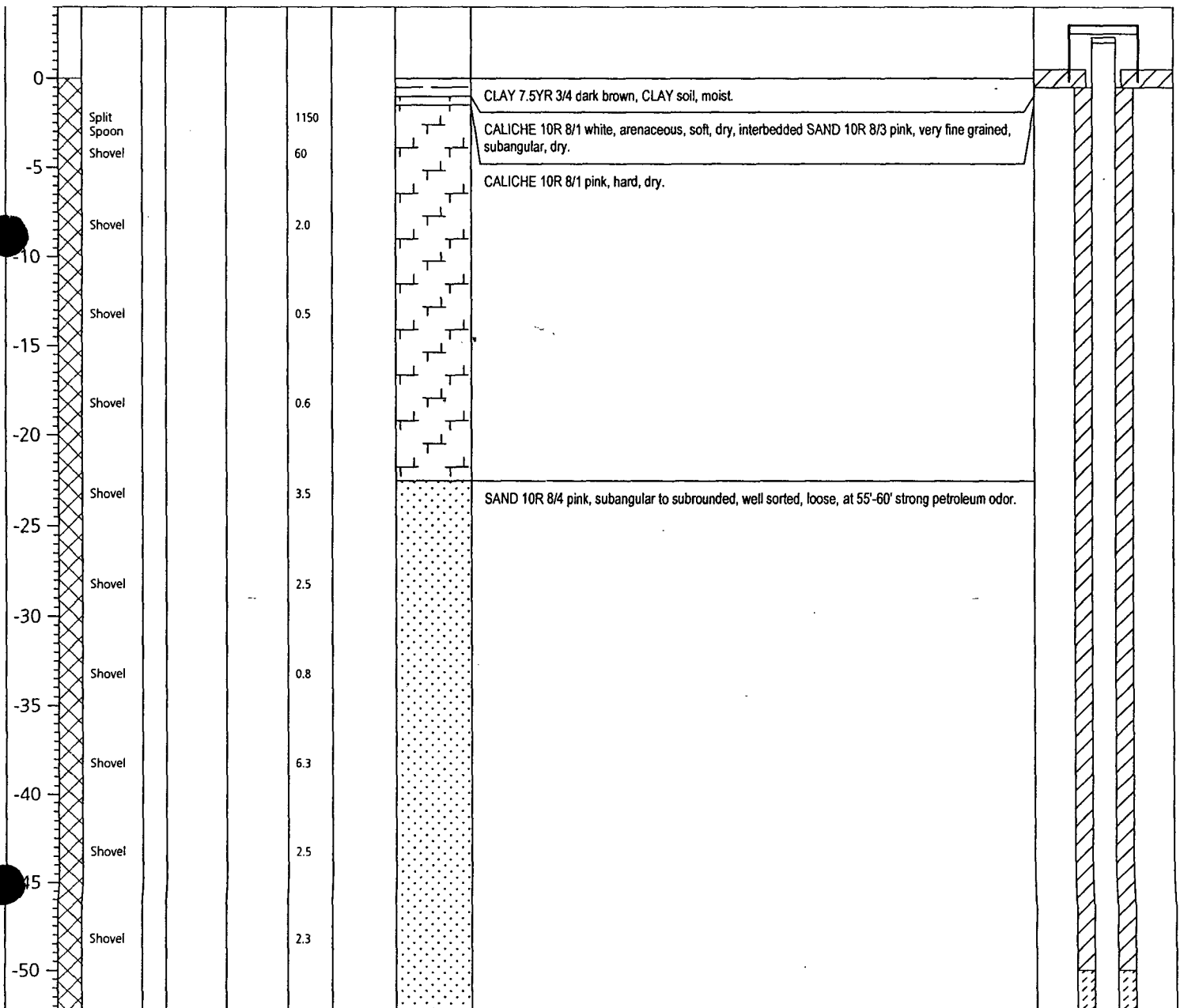
Page 1 of 2

PROJECT NUMBER: MT000803.0001
CLIENT NAME: Pure Resources, Inc.
PROJECT NAME: Lovington Paddock Site
SITE LOCATION: Lea County, New Mexico

STATIC WATER LEVEL: 83.58' MEAS. PT.: T.O.C. DATE: 7/9/03
HOLE SIZE(S): 7 7/8" TOTAL DEPTH: -105.0'
SURFACE COMPLETION: 8" Locking Steel Sleeve, 4"x4"x6" Conc. Slab

	TYPES	DEPTHS
GROUT TYPE:	Portland Cement	-50.0' to Surface
SEAL TYPE:	Bentonite Chips	-55.0' to -50.0'
SCREEN PACK:	8/16 Sand	-105' to -50.0'
CASING TYPE:	4" Diameter Sch. 40 PVC Blank	-65.0' to 2.0'
—	—	—
DRILLER: B. Atkins	ELEVATION (SURF.): 3,813.99'	—
LOGGER: R. Lang	ELEVATION (T.O.C.): 3,817.04'	—
FILE NAME: MW-C.dat	UNIQUE NUMBER: 31-014-00524	WELL SCREEN: 4" Diameter Sch. 40 PVC, 0.020" slots
	PLUG BACK: 8/16 Sand	-105.0' to -65.0'

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U. S. C. S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
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ARCADIS

WELL LOG

WELL NO.

MW-C

1004 N. Big Spring St. Suite 300, Midland, TX 79701-3383 Tel: 432/687-5400 Fax: 432/687-5401

Page 2 of 2

PROJECT NUMBER:	MT000803.0001	STATIC WATER LEVEL:	83.58'	MEAS. PT.:	T.O.C.	DATE:	7/9/03
CLIENT NAME:	Pure Resources, Inc.	HOLE SIZE(S):	7 7/8"			TOTAL DEPTH:	-105.0'
PROJECT NAME:	Lovington Paddock Site	SURFACE COMPLETION:		8" Locking Steel Sleeve, 4'x4'x6" Conc. Slab			
SITE LOCATION:	Lea County, New Mexico			TYPES		DEPTHS	
DRILLING CO:	White Drilling Co.	GROUT TYPE:	Portland Cement			-50.0' to Surface	
DRILLING METHOD:	Rotary	SEAL TYPE:	Bentonite Chips			-55.0' to -50.0'	
SAMPLE METHOD:	Shovel/Rock Core	SCREEN PACK:	8/16 Sand			-105' to -50.0'	
DATE BEGUN:	06/18/03	DATE COMPLETED:	06/18/03			-65.0' to 2.0'	
DRILLER:	B. Atkins	ELEVATION (SURF.):	3,813.99'			—	
LOGGER:	R. Lang	ELEVATION (T.O.C.):	3,817.04'			—	
FILE NAME:	MW-C.dat	UNIQUE NUMBER:	31-014-00524	WELL SCREEN:	4" Diameter Sch. 40 PVC, 0.020" slots	-105.0' to -65.0'	
				PLUG BACK:	8/16 Sand		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U. S. C. S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
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-55	Shovel					1.7				
-60	Shovel					204				
-65	Rock Core					995			SANDSTONE 10R 8/4 pink, very fine grained SAND to SILT, subangular, very friable to loose, well sorted, argillaceous, calcareous, strong petroleum odor at 71', moist; began drilling with water at 76', CALICHE 10R 8/3 pink, firm, fossiliferous, as interbeds.	
-70	Shovel					385				
-75	Rock Core					994				
-80	Shovel					130				
-85	Rock Core					215				
-90	Shovel					27.9				
-95	Rock Core					1.3				
-100	Shovel					0.5				
-105	Shovel					0.3				
	Shovel					0.6				
	Shovel					0.5				
	Shovel					0.6				



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WELL LOG

WELL NO.

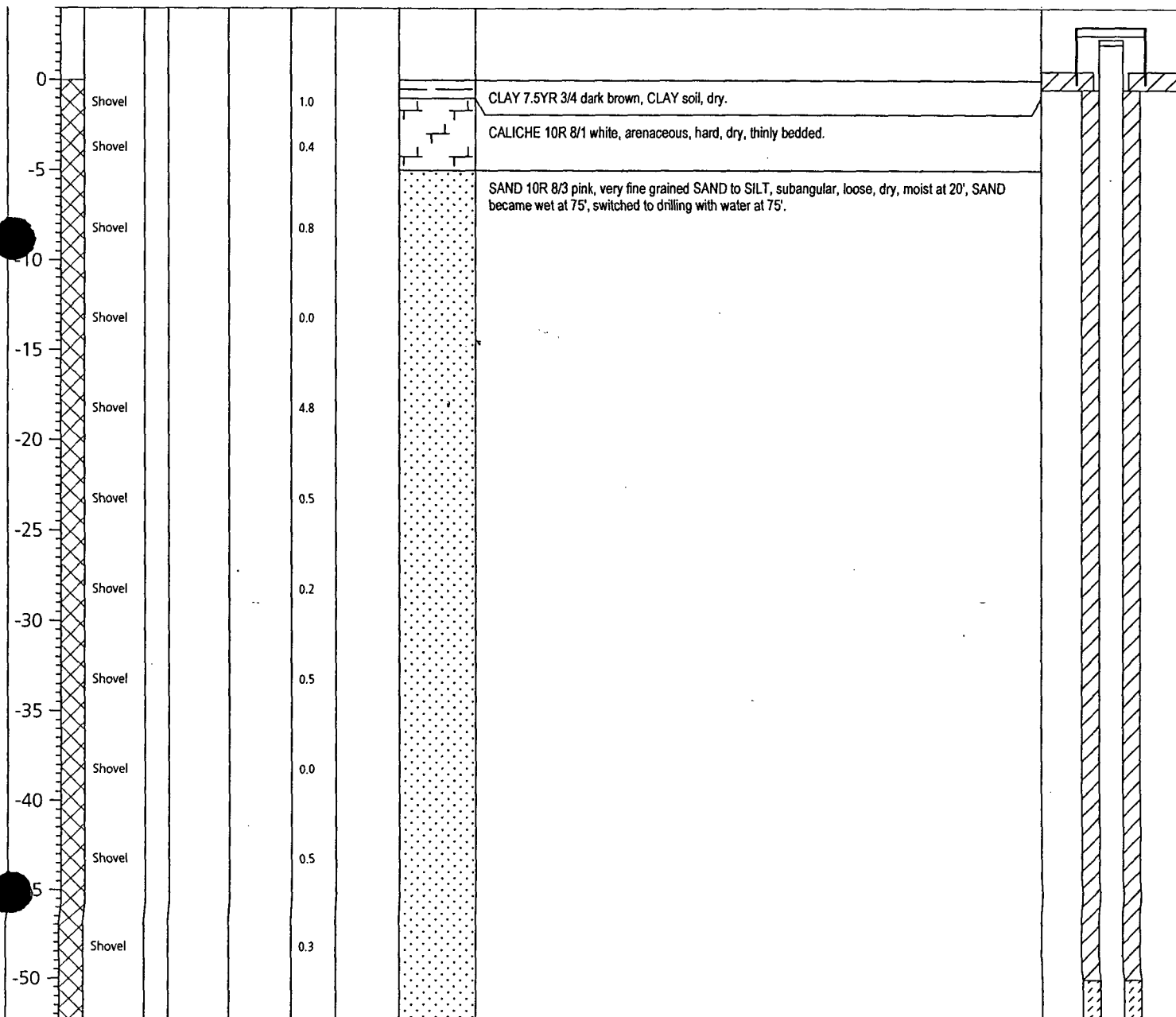
MW-D

1004 N. Big Spring St. Suite 300, Midland, TX 79701-3383 Tel: 432/687-5400 Fax: 432/687-5401

Page 1 of 2

PROJECT NUMBER:	MT000803.0001	STATIC WATER LEVEL:	81.68'	MEAS. PT.:	T.O.C.	DATE:	7/9/03
CLIENT NAME:	Pure Resources, Inc.	HOLE SIZE(S):	7 7/8"			TOTAL DEPTH:	-105.0'
PROJECT NAME:	Lovington Paddock Site	SURFACE COMPLETION:		8" Locking Steel Sleeve, 4'x4'x6" Conc. Slab			
SITE LOCATION:	Lea County, New Mexico	TYPES		DEPTHS			
DRILLING CO:	White Drilling Co.	GROUT TYPE:	Portland Cement			-50.0' to Surface	
DRILLING METHOD:	Rotary	SEAL TYPE:	Bentonite Chips			-55.0' to -50.0'	
SAMPLE METHOD:	Shovel	SCREEN PACK:	8/16 Sand			-105' to -50.0'	
DATE BEGUN:	06/19/03	CASING TYPE:	4" Diameter Sch. 40 PVC Blank			-65.0' to 2.0'	
DATE COMPLETED:	06/19/03	—				—	
DRILLER:	B. Atkins	ELEVATION (SURF.):	3,813.16'			—	
LOGGER:	R. Lang	ELEVATION (T.O.C.):	3,816.08'	WELL SCREEN:	4" Diameter Sch. 40 PVC, 0.020" slots	-105.0' to -65.0'	
FILE NAME:	MW-D.dat	UNIQUE NUMBER:	31-014-00525	PLUG BACK:	8/16 Sand		

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U. S. C. S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
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WELL LOG

WELL NO.

MW-D

Page 2 of 2

1004 N. Big Spring St. Suite 300, Midland, TX 79701-3383 Tel: 432/687-5400 Fax: 432/687-5401

PROJECT NUMBER: MT000803.0001
CLIENT NAME: Pure Resources, Inc.
PROJECT NAME: Lovington Paddock Site
SITE LOCATION: Lea County, New Mexico

STATIC WATER LEVEL:	81.68'	MEAS. PT.:	T.O.C.	DATE:	7/9/03
HOLE SIZE(S):	7 7/8"			TOTAL DEPTH:	-105.0'
SURFACE COMPLETION:	8" Locking Steel Sleeve, 4'x4'x6" Conc. Slab				
	TYPES			DEPTHS	

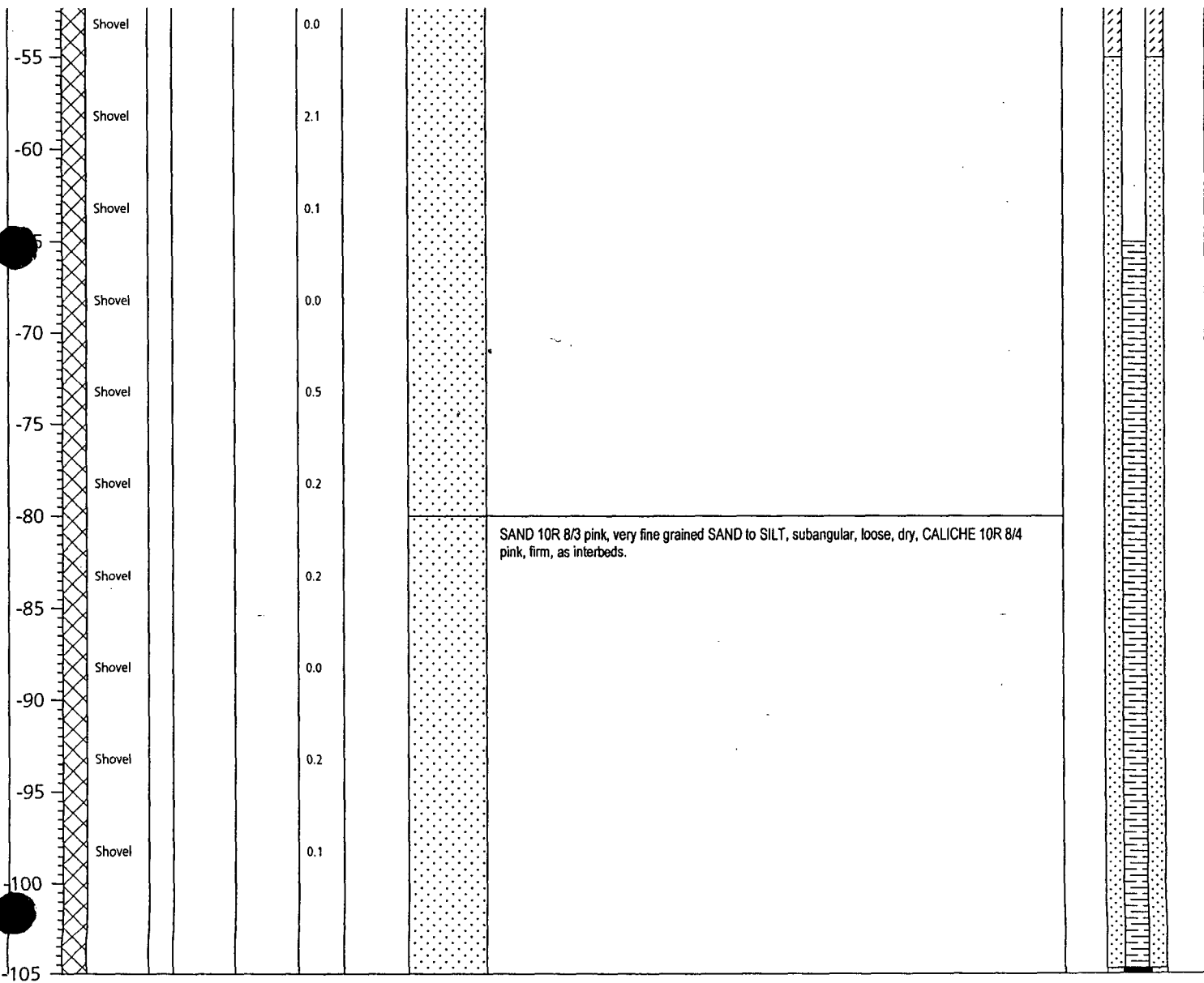
DRILLING CO: White Drilling Co.
DRILLING METHOD: Rotary
SAMPLE METHOD: Shovel
DATE BEGUN: 06/19/03 DA

GROUT TYPE:	Portland Cement	-50.0' to Surface
SEAL TYPE:	Bentonite Chips	-55.0' to -50.0'
SCREEN PACK:	8/16 Sand	-105' to -50.0'
CASING TYPE:	4" Diameter Sch. 40 PVC Blank	-65.0' to 2.0'

DRILLER:	B. Atkins	ELEVATION (SURF.):	3,813.16'
LOGGER:	R. Lang	ELEVATION (T.O.C.):	3,816.08'
FILE NAME:	MW-D.dat	UNIQUE NUMBER:	31-014-00525

WELL SCREEN: 4" Diameter Sch. 40 PVC, 0.020" slots -105.0' to -65.0'
PLUG BACK: 8/16 Sand

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U. S. C. S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
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WELL NO

MW-E

Page 1 of 2

1004 N. Big Spring St. Suite 300, Midland, TX 79701-3383 Tel: 432/687-5400 Fax: 432/687-5401

STATIC WATER LEVEL: 81.26' MEAS. PT.: T.O.C. DATE: 7/9/03
 HOLE SIZE(S): 7 7/8" TOTAL DEPTH: -105.0'
 SURFACE COMPLETION: 8" Locking Steel Sleeve, 4'x4'x6" Conc. Slab

GROUT TYPE: Portland Cement -50.0' to Surface

SEAL TYPE:	Bentonite Chips	-55.0' to -50.0'
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SCREEN PACK: 8/16 Sand -105' to -50.0'

DATE COMPLETED: 06/20/03

ELEVATION (SURF.): 3,813.32'

ELEVATION (T.O.C.): 3,816.31'

UNIQUE NUMBER: 31-014-00526

CASING TYPE: 4" Diameter Sch. 40 PVC Blank

WELL SCREEN: 4" Diameter Sch. 40 PVC, 0.020" slots

PLUG BACK: 8/16 Sand

DEPTH (Feet)	DEPTH (Meters)	SOIL TYPE	DESCRIPTION
0	2.0	CLAY	7.5YR 3/4 dark brown, CLAY soil, dry.
-5	5.0	CALICHE	10R 8/1 white, arenaceous, hard, dry; SAND 10R 8/1 white, very fine grained, subangular, loose, as interbeds.
-10	3.2		
-15	3.9		
-20	4.3	SAND	10R 8/3 pink, very fine grained, subangular, loose, frosted, becoming moist at 70'.
-25	3.5		
-30	4.2		
-35	4.5		
-40	4.7		
-45	3.5		
-50	15.5		



WELL NO.

MW-E

Page 2 of 2

1004 N. Big Spring St. Suite 300, Midland, TX 79701-3383 Tel: 432/687-5400 Fax: 432/687-5401

PROJECT NUMBER: MT000803.0001
CLIENT NAME: Pure Resources, Inc.
PROJECT NAME: Lovington Paddock Site
SITE LOCATION: Lea County, New Mexico

STATIC WATER LEVEL:	81.26'	MEAS. PT.: T.O.C.	DATE:	7/9/03
HOLE SIZE(S):	7 7/8"		TOTAL DEPTH:	-105.0'
SURFACE COMPLETION:	8" Locking Steel Sleeve, 4'x4'x6" Conc. Slab			

DRILLING CO: White Drilling Co.

GROUT TYPE:	Portland Cement	-50.0' to Surface
SEAL TYPE:	Bentonite Chips	-55.0' to -50.0'
SCREEN PACK:	8/16 Sand	-105' to -50.0'
CASING TYPE:	4" Diameter Sch. 40 PVC Blank	-65.0' to 2.0'

DRILLING METHOD: Rotary

CASING TYPE: 4" Diameter Sch. 40 PVC Blank

DATE BEGUN: 06/20/03

DATE COMPLETED: 06/20/03

DRILLER: B. Atkins

ELEVATION (SURF.): 3,813.32'

LOGGER: R. Lang

ELEVATION (T.O.C.): 3,816.31'

FILE NAME: MW-E.dat

UNIQUE NUMBER: 31-014-00526

WELL SCREEN: 4" Diameter Sch. 40 PVC, 0.020" slots -105.0' to -65.0'
PLUG BACK: 8/16 Sand

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ARCADIS

WELL LOG

WELL NO.

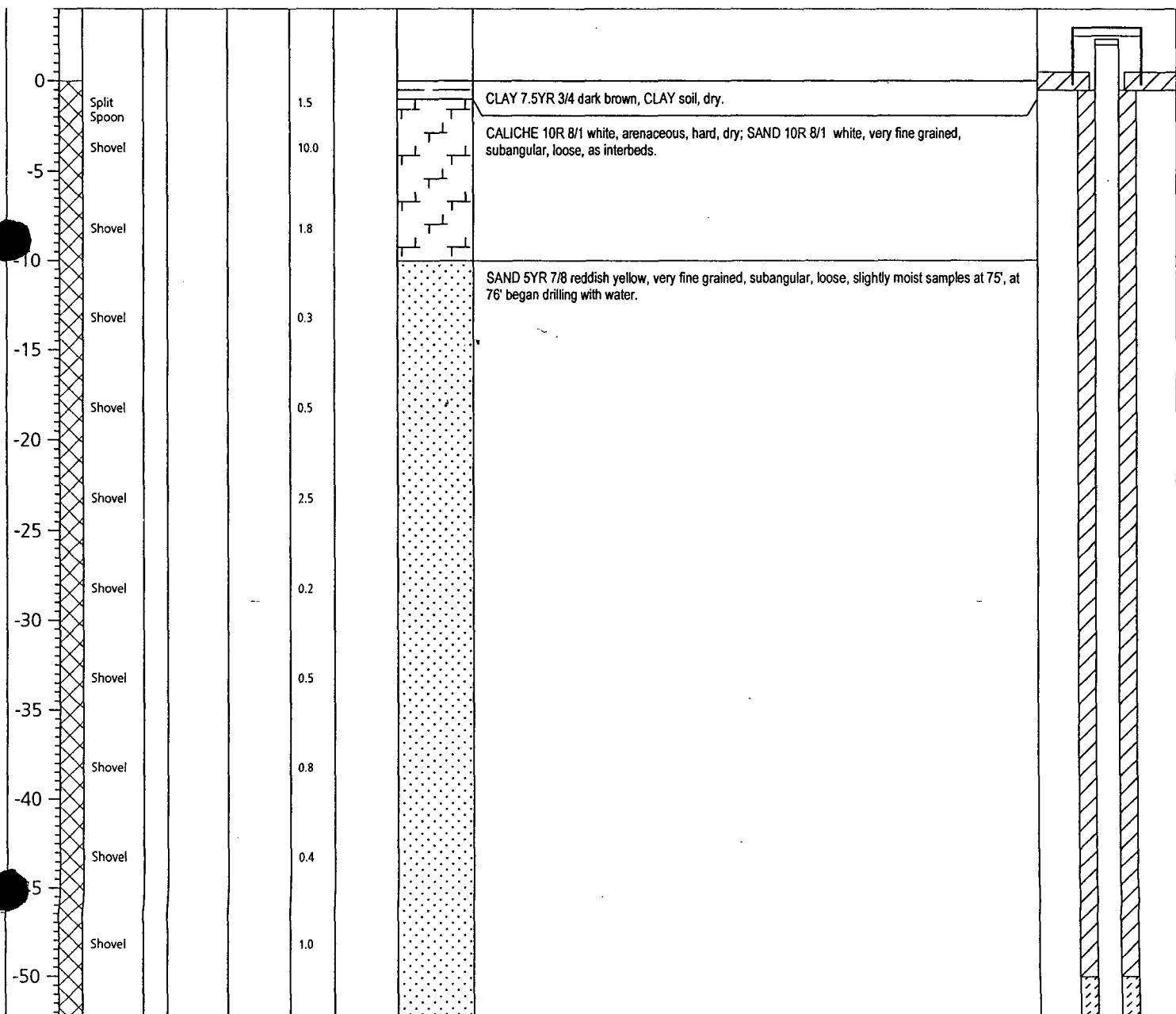
MW-F

1004 N. Big Spring St. Suite 300, Midland, TX 79701-3383 Tel: 432/687-5400 Fax: 432/687-5401

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PROJECT NUMBER: MT000803.0001
CLIENT NAME: Pure Resources, Inc.
PROJECT NAME: Lovington Paddock Site
SITE LOCATION: Lea County, New Mexico
STATIC WATER LEVEL: 80.87' MEAS. PT.: T.O.C. DATE: 7/9/03
HOLE SIZE(S): 7 7/8" TOTAL DEPTH: -105.0'
SURFACE COMPLETION: 8" Locking Steel Sleeve, 4"x4"x6" Conc. Slab
TYPES DEPTHS
GROUT TYPE: Portland Cement -50.0' to Surface
SEAL TYPE: Bentonite Chips -55.0' to -50.0'
SCREEN PACK: 8/16 Sand -105' to -50.0'
CASING TYPE: 4" Diameter Sch. 40 PVC Blank -65.0' to 2.0'
DATE BEGUN: 06/20/03 DATE COMPLETED: 06/20/03
DRILLER: B. Atkins ELEVATION (SURF.): 3,813.60'
LOGGER: R. Lang ELEVATION (T.O.C.): 3,816.69'
FILE NAME: MW-F.dat UNIQUE NUMBER: 31-014-00527 WELL SCREEN: 4" Diameter Sch. 40 PVC, 0.020" slots -105.0' to -65.0'
PLUG BACK: 8/16 Sand

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U. S. C. S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
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ARCADIS

WELL LOG

WELL NO.

MW-F

1004 N. Big Spring St. Suite 300, Midland, TX 79701-3383 Tel: 432/687-5400 Fax: 432/687-5401

Page 2 of 2

PROJECT NUMBER: MT000803.0001
CLIENT NAME: Pure Resources, Inc.
PROJECT NAME: Lovington Paddock Site
SITE LOCATION: Lea County, New Mexico

STATIC WATER LEVEL: 80.87' MEAS. PT.: T.O.C. DATE: 7/9/03
HOLE SIZE(S): 7 7/8" TOTAL DEPTH: -105.0'
SURFACE COMPLETION: 8" Locking Steel Sleeve, 4'x4'x6" Conc. Slab

	TYPES	DEPTHS
GROUT TYPE:	Portland Cement	-50.0' to Surface
SEAL TYPE:	Bentonite Chips	-55.0' to -50.0'
SCREEN PACK:	8/16 Sand	-105' to -50.0'
CASING TYPE:	4" Diameter Sch. 40 PVC Blank	-65.0' to 2.0'
DATE BEGUN:	06/20/03	DATE COMPLETED: 06/20/03
DRILLER:	B. Atkins	ELEVATION (SURF.): 3,813.60'
LOGGER:	R. Lang	ELEVATION (T.O.C.): 3,816.69'
FILE NAME:	MW-F.dat	UNIQUE NUMBER: 31-014-00527
WELL SCREEN:	4" Diameter Sch. 40 PVC, 0.020" slots	-105.0' to -65.0'
PLUG BACK:	8/16 Sand	

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U. S. C. S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
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-55	X	Shovel				1.5				
-60	X	Shovel				1.5				
-65	X	Shovel				0.3				
-70	X	Shovel				0.5				
-75	X	Shovel				0.3				
-78	X	Rock Core				0.8				
-80	X	Shovel				0.1				
-85	X	Shovel				0.0			SAND 5YR 7/8 reddish yellow, very fine grained, subangular, loose; CALICHE 5YR 7/4 pink, firm to hard, arenaceous, as interbeds.	
-90	X	Shovel				0.5				
-95	X	Shovel				0.5				
-100	X	Shovel				0.1				
-105	X	Shovel								



ARCADIS

WELL LOG

WELL NO.

MW-G

1004 N. Big Spring St. Suite 300, Midland, TX 79701-3383 Tel: 432/687-5400 Fax: 432/687-5401

Page 1 of 2

PROJECT NUMBER: MT000803.0001
CLIENT NAME: Pure Resources, Inc.
PROJECT NAME: Lovington Paddock Site
SITE LOCATION: Lea County, New Mexico
DRILLING CO: White Drilling Co.
DRILLING METHOD: Rotary
SAMPLE METHOD: Split Spoon/Shovel/Rock Core
DATE BEGUN: 06/24/03 DATE COMPLETED: 06/24/03
DRILLER: B. Atkins
LOGGER: R. Lang
FILE NAME: MW-G.dat

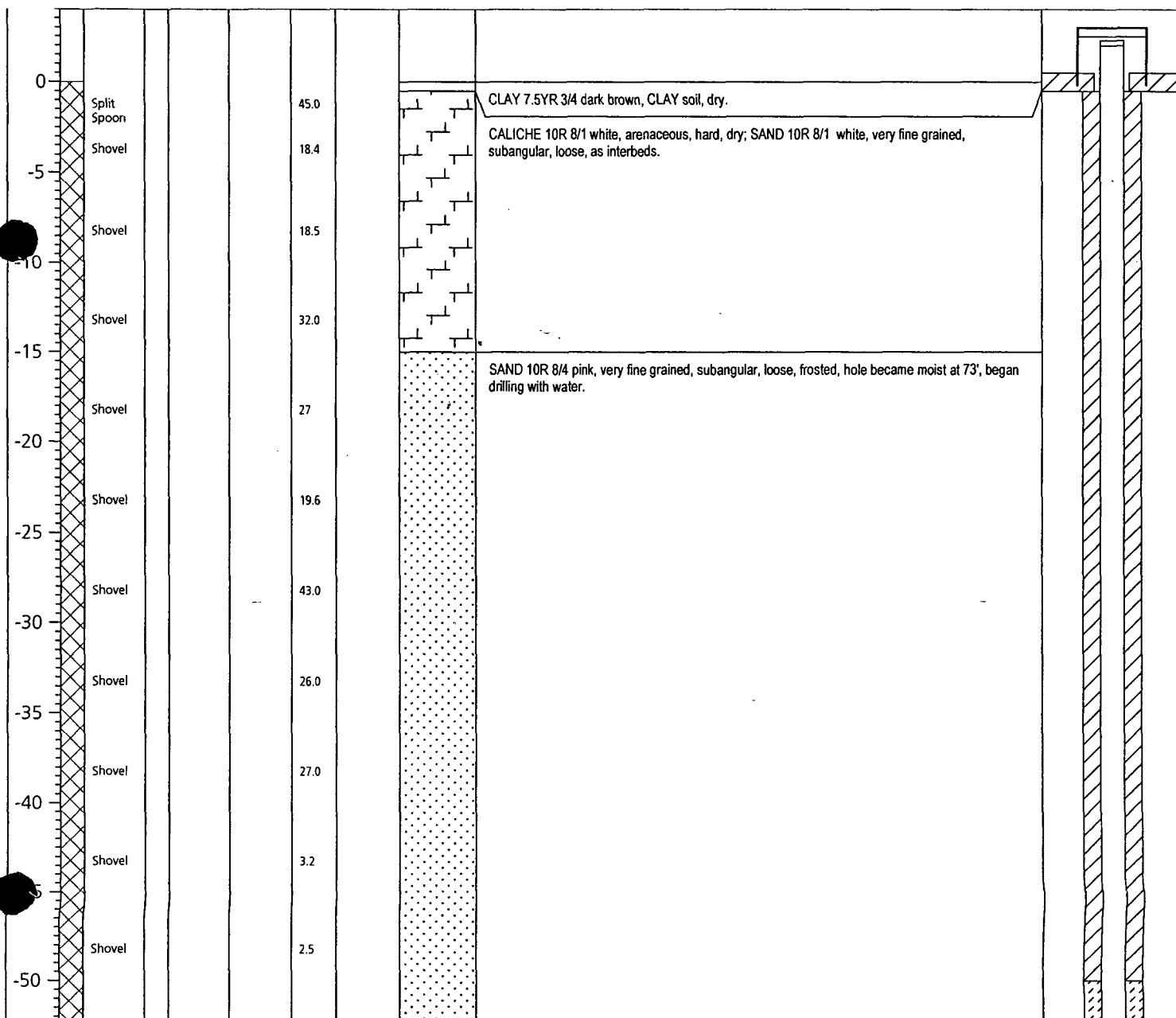
STATIC WATER LEVEL: 81.28' MEAS. PT.: T.O.C.
HOLE SIZE(S): 7 7/8"
SURFACE COMPLETION: 8" Locking Steel Sleeve, 4"x4"x6" Conc. Slab
GROUT TYPE: Portland Cement
SEAL TYPE: Bentonite Chips
SCREEN PACK: 8/16 Sand
CASING TYPE: 4" Diameter Sch. 40 PVC Blank
WELL SCREEN: 4" Diameter Sch. 40 PVC, 0.020" slots
PLUG BACK: 8/16 Sand

DATE: 7/9/03
TOTAL DEPTH: -105.0'

TYPES	DEPTHS
Portland Cement	-50.0' to Surface
Bentonite Chips	-55.0' to -50.0'
8/16 Sand	-105' to -50.0'
4" Diameter Sch. 40 PVC Blank	-65.0' to 2.0'
—	—
4" Diameter Sch. 40 PVC, 0.020" slots	-105.0' to -65.0'
8/16 Sand	—

ELEVATION (SURF.): 3,815.18'
ELEVATION (T.O.C.): 3,818.23'
UNIQUE NUMBER: 31-014-00528

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U. S. C. S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
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WELL LOG



WELL NO.

MW-H

1004 N. Big Spring St. Suite 300, Midland, TX 79701-3383 Tel: 432/687-5400 Fax: 432/687-5401

Page 1 of 2

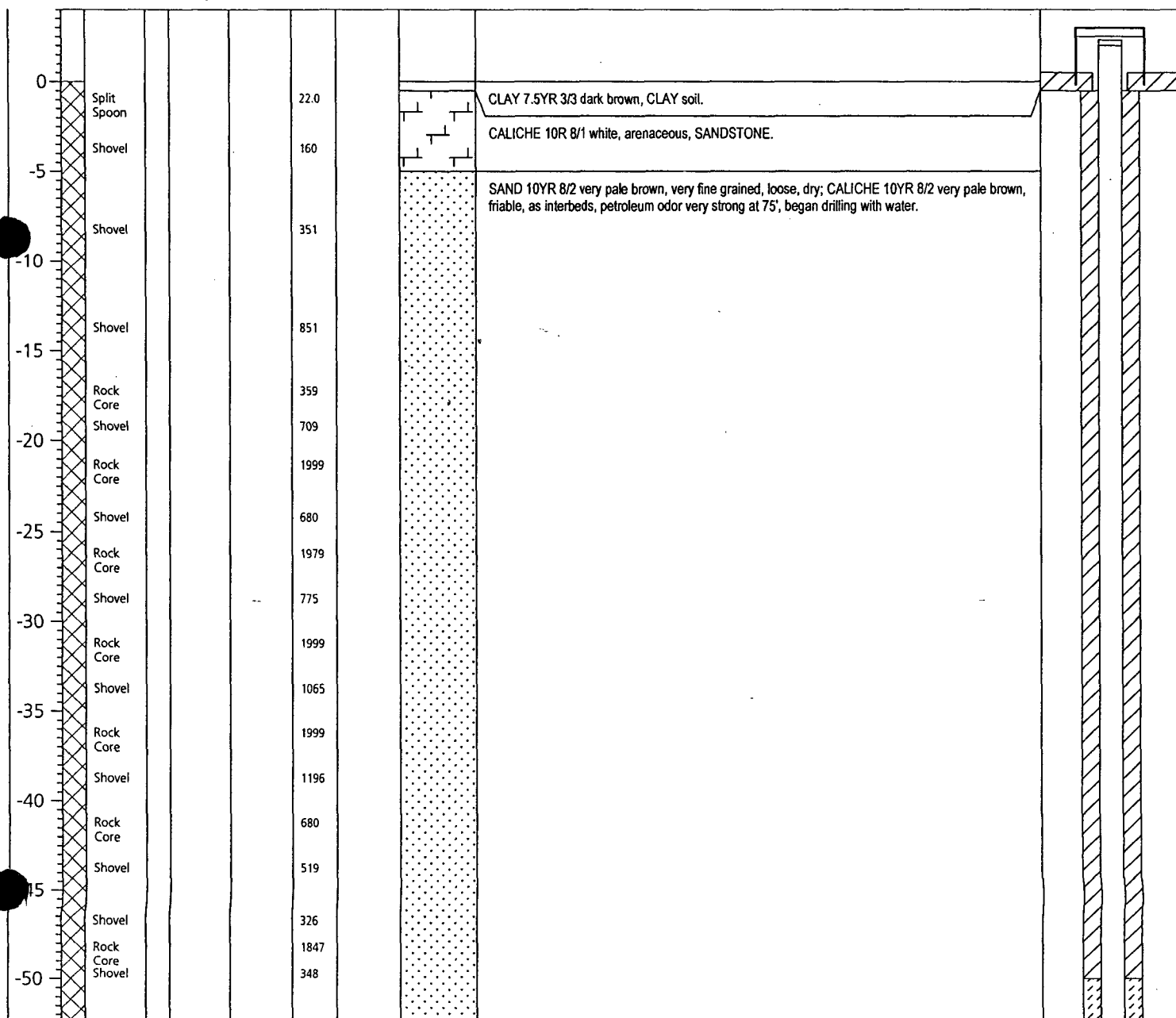
PROJECT NUMBER: MT000803.0001
CLIENT NAME: Pure Resources, Inc.
PROJECT NAME: Lovington Paddock Site
SITE LOCATION: Lea County, New Mexico

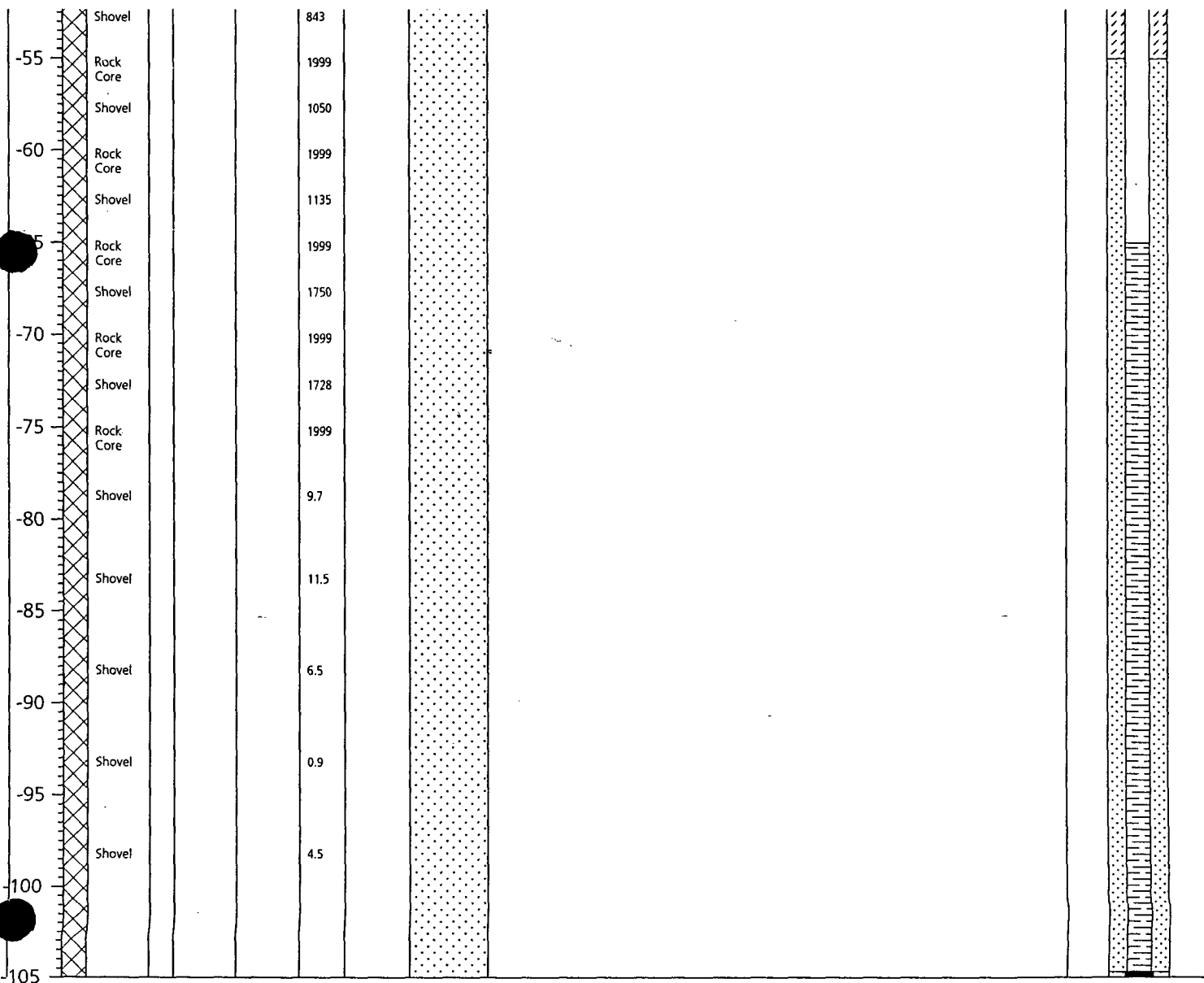
STATIC WATER LEVEL: 83.28' MEAS. PT.: T.O.C. DATE: 7/9/03
 HOLE SIZE(S): 7 7/8" TOTAL DEPTH: -105.0'
 SURFACE COMPLETION: 8" Locking Steel Sleeve, 4'x4'x6" Conc. Slab

DRILLING CO:	White Drilling Co.		
DRILLING METHOD:	Rotary		
SAMPLE METHOD:	Split Spoon/Shovel/Rock Core		
DATE BEGUN:	06/25/03	DATE COMPLETED:	06/25/03
DRILLER:	B. Atkins	ELEVATION (SURF.):	3,813.64'
LOGGER:	R. Lang	ELEVATION (T.O.C.):	3,816.74'
FILE NAME:	MW-H.dat	UNIQUE NUMBER:	31-014-00529

GROUT TYPE:	Portland Cement	-50.0' to Surface
SEAL TYPE:	Bentonite Chips	-55.0' to -50.0'
SCREEN PACK:	8/16 Sand	-105' to -50.0'
CASING TYPE:	4" Diameter Sch. 40 PVC Blank	-65.0' to 2.0'
	—	—
WELL SCREEN:	4" Diameter Sch. 40 PVC, 0.020" slots	-105.0' to -65.0'
PLUG BACK:	8/16 Sand	

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U. S. C. S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
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ARCADIS

WELL LOG

WELL NO.

MW-1

1004 N. Big Spring St. Suite 300, Midland, TX 79701-3383 Tel: 432/687-5400 Fax: 432/687-5401

Page 1 of 2

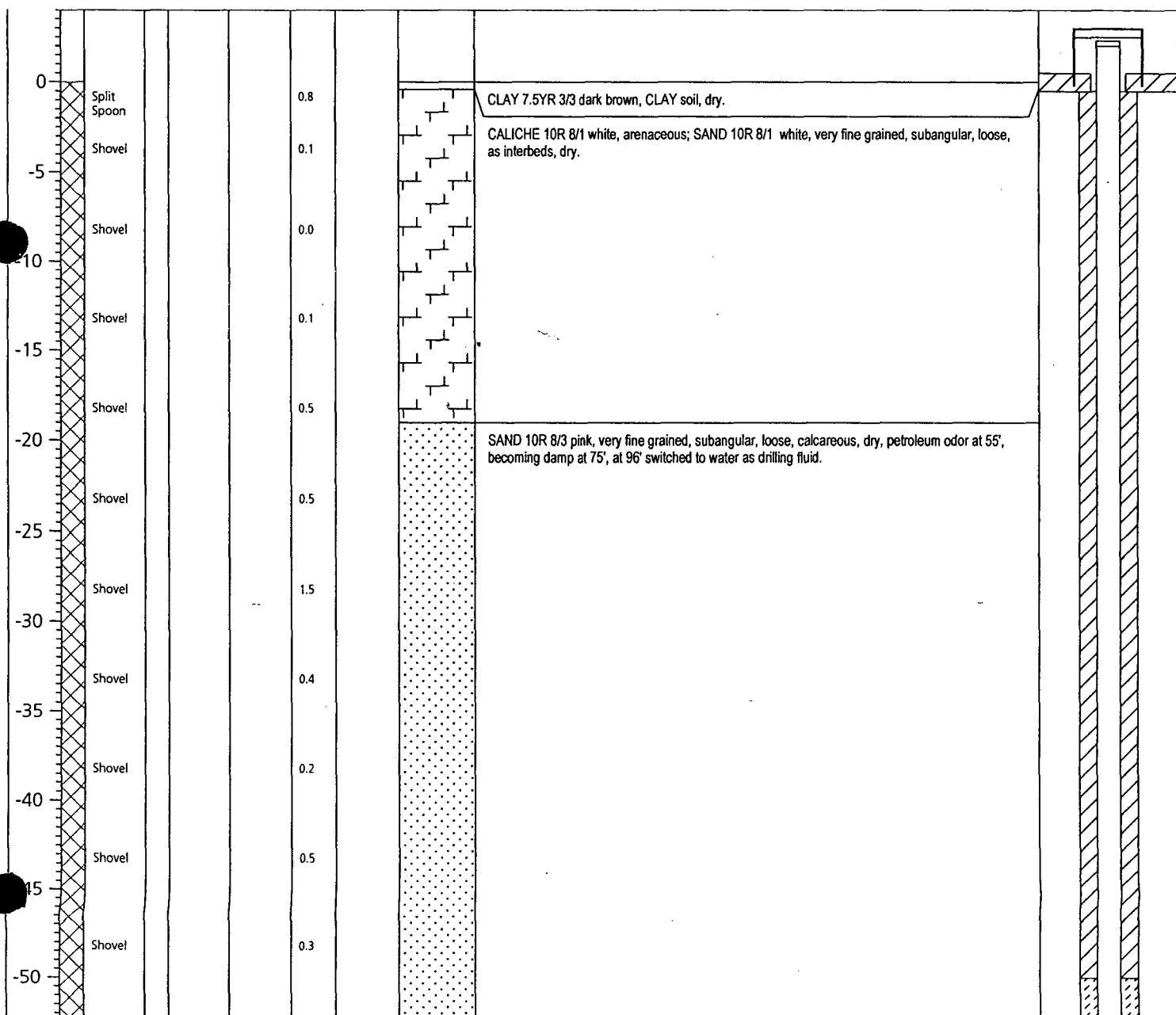
PROJECT NUMBER: MT000803.0001
CLIENT NAME: Pure Resources, Inc.
PROJECT NAME: Lovington Paddock Site
SITE LOCATION: Lea County, New Mexico

STATIC WATER LEVEL: 82.40' MEAS. PT.: T.O.C. DATE: 7/9/03
HOLE SIZE(S): 7 7/8" TOTAL DEPTH: -105.0'
SURFACE COMPLETION: 8" Locking Steel Sleeve, 4"x4"x6" Conc. Slab

	TYPES	DEPTHS
GROUT TYPE:	Portland Cement	-50.0' to Surface
SEAL TYPE:	Bentonite Chips	-55.0' to -50.0'
SCREEN PACK:	8/16 Sand	-105' to -50.0'
CASING TYPE:	4" Diameter Sch. 40 PVC Blank	-65.0' to 2.0'
	—	—
	—	—
WELL SCREEN:	4" Diameter Sch. 40 PVC, 0.020" slots	-105.0' to -65.0'
PLUG BACK:	8/16 Sand	

DRILLING CO: White Drilling Co.
DRILLING METHOD: Rotary
SAMPLE METHOD: Split Spoon/Shovel/Rock Core
DATE BEGUN: 06/25/03 DATE COMPLETED: 06/25/03
DRILLER: B. Atkins ELEVATION (SURF.): 3,814.37'
LOGGER: R. Lang ELEVATION (T.O.C.): 3,816.94'
FILE NAME: MW-1.dat UNIQUE NUMBER: 31-014-00530

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U. S. C. S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
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WELL LOG

WELL NO.

MW-J

1004 N. Big Spring St. Suite 300, Midland, TX 79701-3383 Tel: 432/687-5400 Fax: 432/687-5401

Page 1 of 2

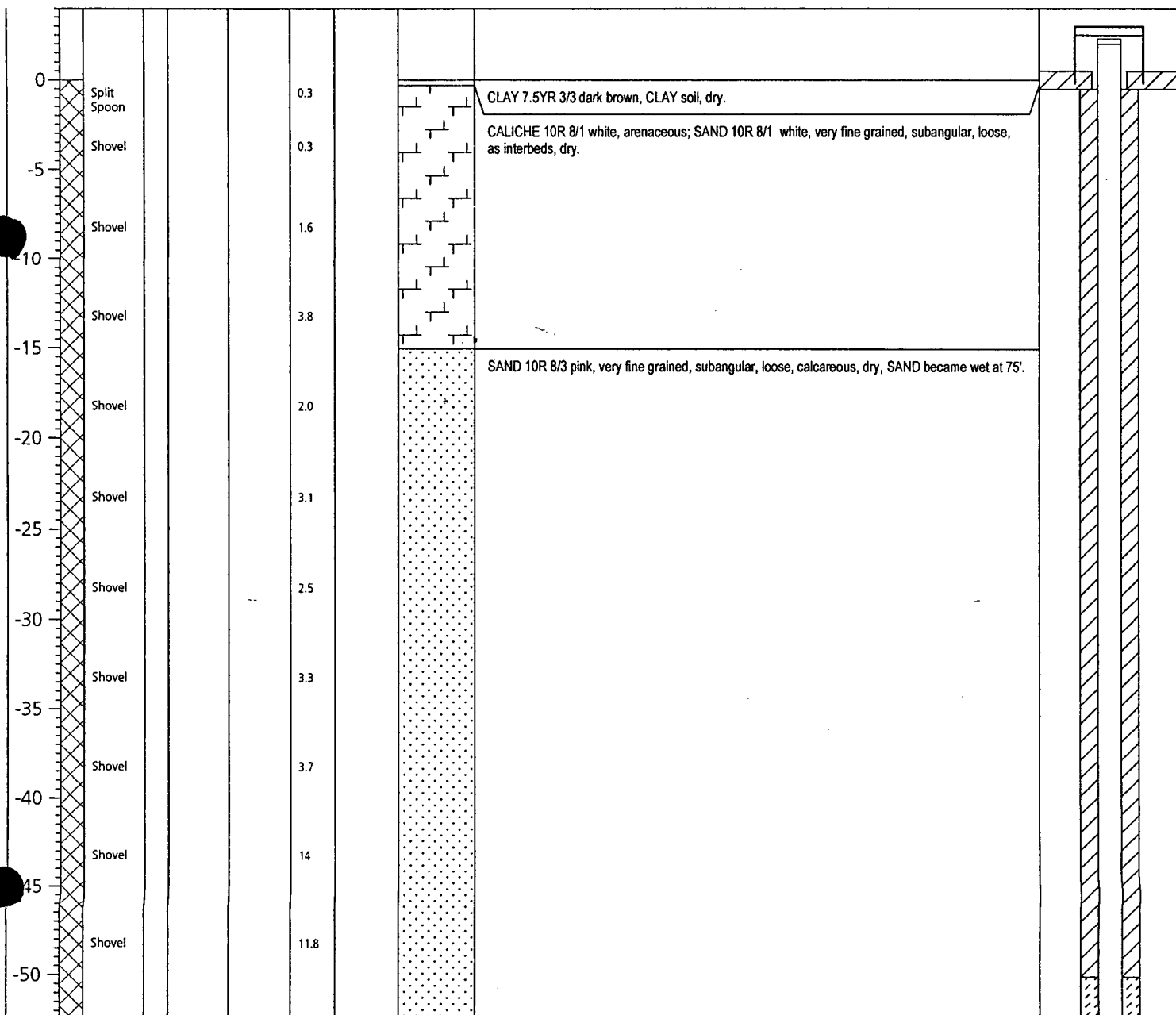
PROJECT NUMBER: MT000803.0001
CLIENT NAME: Pure Resources, Inc.
PROJECT NAME: Lovington Paddock Site
SITE LOCATION: Lea County, New Mexico

STATIC WATER LEVEL: 80.43' MEAS. PT.: T.O.C. DATE: 7/9/03
HOLE SIZE(S): 7 7/8" TOTAL DEPTH: -105.0'
SURFACE COMPLETION: 8" Locking Steel Sleeve, 4'x4'x6" Conc. Slab

DRILLING CO: White Drilling Co.
DRILLING METHOD: Rotary
SAMPLE METHOD: Split Spoon/Shovel/Rock Core
DATE BEGUN: 06/26/03 DATE COMPLETED: 06/26/03
DRILLER: B. Atkins ELEVATION (SURF.): 3,814.61'
LOGGER: R. Lang ELEVATION (T.O.C.): 3,817.66'
FILE NAME: MW-J.dat UNIQUE NUMBER: 31-014-00531

	TYPES	DEPTHS
GROUT TYPE:	Portland Cement	-50.0' to Surface
SEAL TYPE:	Bentonite Chips	-55.0' to -50.0'
SCREEN PACK:	8/16 Sand	-105' to -50.0'
CASING TYPE:	4" Diameter Sch. 40 PVC Blank	-65.0' to 2.0'
	—	—
WELL SCREEN:	4" Diameter Sch. 40 PVC, 0.020" slots	-105.0' to -65.0'
PLUG BACK:	8/16 Sand	

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U. S. C. S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
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WELL LOG

WELL NO.

MW-J

1004 N. Big Spring St. Suite 300, Midland, TX 79701-3383 Tel: 432/687-5400 Fax: 432/687-5401

Page 2 of 2

PROJECT NUMBER: MT000803.0001
CLIENT NAME: Pure Resources, Inc.
PROJECT NAME: Lovington Paddock Site
SITE LOCATION: Lea County, New Mexico

STATIC WATER LEVEL: 80.43' MEAS. PT.: T.O.C. DATE: 7/9/03
HOLE SIZE(S): 7 7/8" TOTAL DEPTH: -105.0'
SURFACE COMPLETION: 8" Locking Steel Sleeve, 4'x4'x6" Conc. Slab
TYPES DEPTHS

DRILLING CO: White Drilling Co.
DRILLING METHOD: Rotary
SAMPLE METHOD: Split Spoon/Shovel/Rock Core
DATE BEGUN: 06/26/03 DATE COMPLETED: 06/26/03

GROUT TYPE: Portland Cement -50.0' to Surface
SEAL TYPE: Bentonite Chips -55.0' to -50.0'
SCREEN PACK: 8/16 Sand -105' to -50.0'
CASING TYPE: 4" Diameter Sch. 40 PVC Blank -65.0' to 2.0'
— —
— —

DRILLER: B. Atkins ELEVATION (SURF.): 3,814.61'
LOGGER: R. Lang ELEVATION (T.O.C.): 3,817.66'
FILE NAME: MW-J.dat UNIQUE NUMBER: 31-014-00531 WELL SCREEN: 4" Diameter Sch. 40 PVC, 0.020" slots -105.0' to -65.0'
PLUG BACK: 8/16 Sand

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U. S. C. S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
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-55	Shovel					14.9				
	Shovel					18.9				
-60	Shovel					5.3				
	Shovel					7.7				
-70	Shovel					15.5				
	Shovel					9.0				
-75	Rock Core					1.2				
	Shovel					1.0				
-80	Shovel					0.8				
	Shovel					1.0				
-85	Shovel					0.9				
	Shovel									
-90	Shovel									
	Shovel									
-95	Shovel									
	Shovel									
-100	Shovel									
	Shovel									
-105	Shovel									

SAND 10R 8/3 pink, very fine grained, subangular, loose, calcareous, dry; CALICHE 10R 8/3 pink, arenaceous, as interbeds.



ARCADIS

WELL LOG

WELL NO.

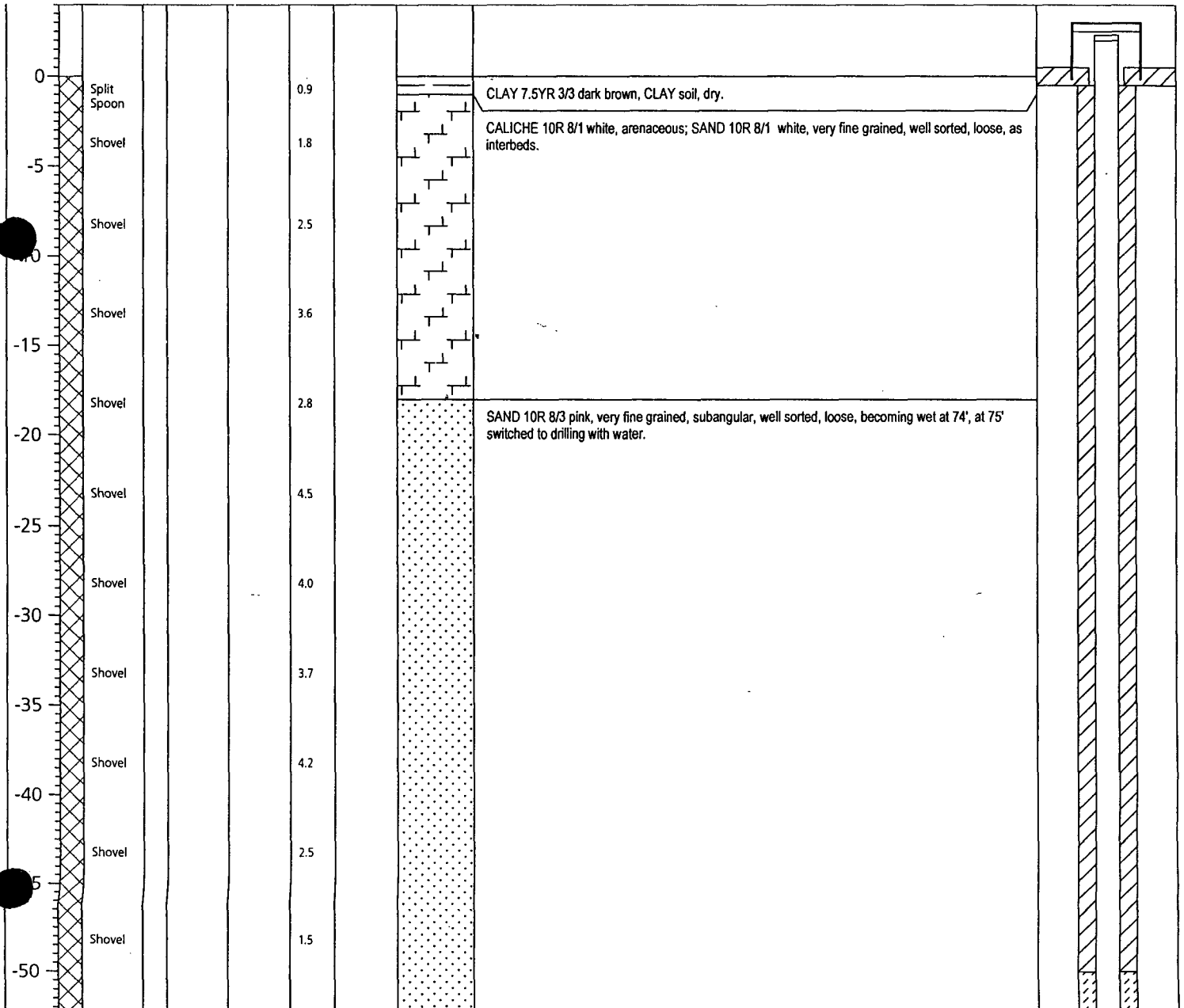
MW-L

1004 N. Big Spring St. Suite 300, Midland, TX 79701-3383 Tel: 432/687-5400 Fax: 432/687-5401

Page 1 of 2

PROJECT NUMBER:	MT000803.0001	STATIC WATER LEVEL:	81.69'	MEAS. PT.:	T.O.C.	DATE:	7/9/03
CLIENT NAME:	Pure Resources, Inc.	HOLE SIZE(S):	7 7/8"			TOTAL DEPTH:	-105.0'
PROJECT NAME:	Lovington Paddock Site	SURFACE COMPLETION:		8" Locking Steel Sleeve, 4'x4'x6" Conc. Slab			
SITE LOCATION:	Lea County, New Mexico			TYPES		DEPTHS	
DRILLING CO:	White Drilling Co.	GROUT TYPE:	Portland Cement			-50.0' to Surface	
DRILLING METHOD:	Rotary	SEAL TYPE:	Bentonite Chips			-55.0' to -50.0'	
SAMPLE METHOD:	Split Spoon/Shovel/Rock Core	SCREEN PACK:	8/16 Sand			-105' to -50.0'	
DATE BEGUN:	06/26/03	DATE COMPLETED:	06/26/03			-65.0' to 2.0'	
DRILLER:	B. Atkins	ELEVATION (SURF.):	3,815.28'				
LOGGER:	R. Lang	ELEVATION (T.O.C.):	3,818.35'				
FILE NAME:	MW-L.dat	UNIQUE NUMBER:	31-014-00532				
		WELL SCREEN:	4" Diameter Sch. 40 PVC, 0.020" slots			-105.0' to -65.0'	
		PLUG BACK:	8/16 Sand				

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U. S. C. S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
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ARCADIS

WELL LOG

WELL NO.

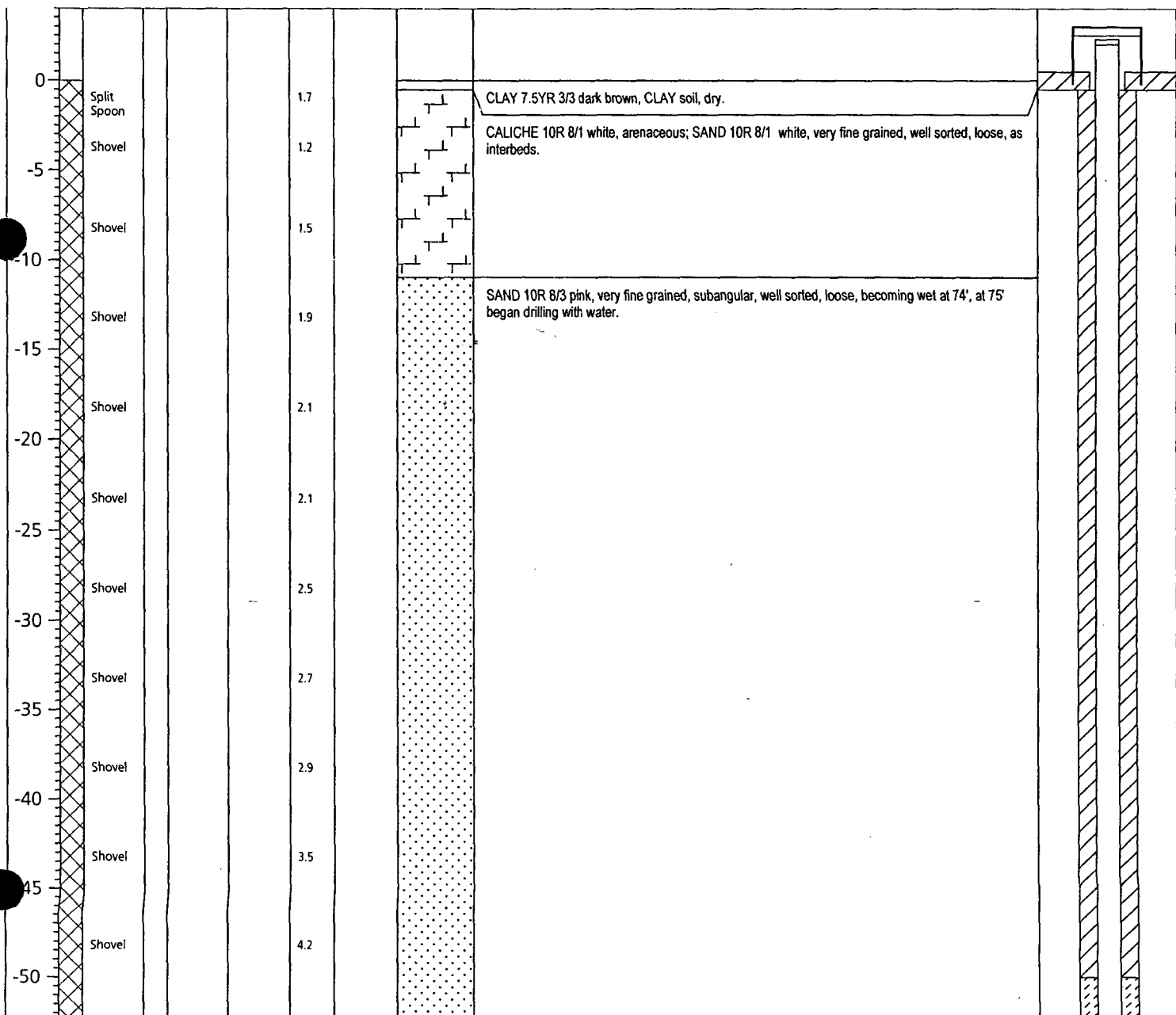
MW-M

1004 N. Big Spring St. Suite 300, Midland, TX 79701-3383 Tel: 432/687-5400 Fax: 432/687-5401

Page 1 of 2

PROJECT NUMBER: MT000803.0001 STATIC WATER LEVEL: 80.02' MEAS. PT.: T.O.C. DATE: 7/9/03
 CLIENT NAME: Pure Resources, Inc. HOLE SIZE(S): 7 7/8" TOTAL DEPTH: -105.0'
 PROJECT NAME: Lovington Paddock Site SURFACE COMPLETION: 8" Locking Steel Sleeve, 4'x4'x6" Conc. Slab
 SITE LOCATION: Lea County, New Mexico TYPES DEPTHS
 DRILLING CO: White Drilling Co. GROUT TYPE: Portland Cement -50.0' to Surface
 DRILLING METHOD: Rotary SEAL TYPE: Bentonite Chips -55.0' to -50.0'
 SAMPLE METHOD: Split Spoon/Shovel/Rock Core SCREEN PACK: 8/16 Sand -105' to -50.0'
 DATE BEGUN: 06/27/03 DATE COMPLETED: 06/27/03 CASING TYPE: 4" Diameter Sch. 40 PVC Blank -65.0' to 2.0'
 DRILLER: B. Atkins ELEVATION (SURF.): 3,814.84' WELL SCREEN: 4" Diameter Sch. 40 PVC, 0.020" slots -105.0' to -65.0'
 LOGGER: R. Lang ELEVATION (T.O.C.): 3,817.88' PLUG BACK: 8/16 Sand
 FILE NAME: MW-M.dat UNIQUE NUMBER: 31-014-00533

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U. S. C. S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
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WELL NO.

MW-M

1004 N. Big Spring St. Suite 300, Midland, TX 79701-3383 Tel: 432/687-5400 Fax: 432/687-5401

Page 2 of 2

STATIC WATER LEVEL:	80.02'	MEAS. PT.: T.O.C.	DATE:	7/9/03
HOLE SIZE(S):	7 7/8"		TOTAL DEPTH:	-105.0'
SURFACE COMPLETION:	8" Locking Steel Sleeve, 4'x4'x6" Conc. Slab			
	TYPES		DEPTHS	

GROUT TYPE:	Portland Cement	-50.0' to Surface
SEAL TYPE:	Bentonite Chips	-55.0' to -50.0'
SCREEN PACK:	8/16 Sand	-105' to -50.0'
CASING TYPE:	4" Diameter Sch. 40 PVC Blank	-65.0' to 2.0'
	—	—
		—
WELL SCREEN:	4" Diameter Sch. 40 PVC, 0.020" slots	-105.0' to -65.0'
PLUG BACK:	8/16 Sand	

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U. S. C. S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
-55	Shovel					2.9				
-60	Shovel					3.2				
-65	Shovel					3.5				
-70	Shovel					1.5				
-75	Rock Core					15.1				
-80	Shovel					9.5			SAND 10R 8/3 pink, very fine grained, subangular, well sorted, loose; CALICHE 8/1 white, arenaceous, soft, as thin interbeds.	
-85	Shovel					0.0				
-90	Shovel					0.0				
-95	Shovel					0.0				
-100	Shovel					0.0				
-105	Shovel					0.2				



ARCADIS

WELL LOG

WELL NO.

MW-N

1004 N. Big Spring St. Suite 300, Midland, TX 79701-3383 Tel: 432/687-5400 Fax: 432/687-5401

Page 1 of 2

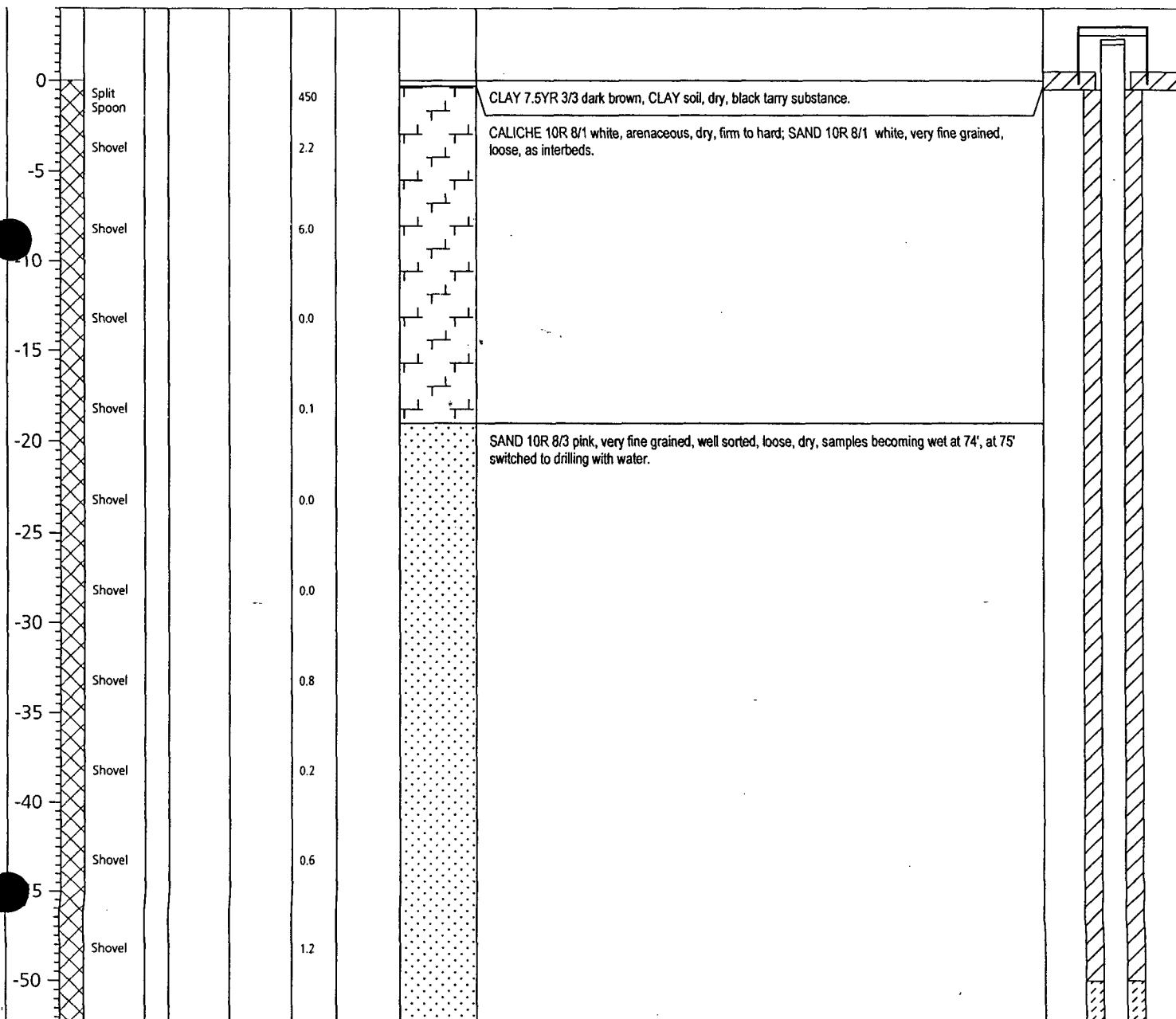
PROJECT NUMBER: MT000803.0001
CLIENT NAME: Pure Resources, Inc.
PROJECT NAME: Lovington Paddock Site
SITE LOCATION: Lea County, New Mexico

STATIC WATER LEVEL: 82.41' MEAS. PT.: T.O.C. DATE: 7/9/03
HOLE SIZE(S): 7 7/8" TOTAL DEPTH: -105.0'
SURFACE COMPLETION: 8" Locking Steel Sleeve, 4"x4"x6" Conc. Slab

	TYPES	DEPTHS
GROUT TYPE:	Portland Cement	-50.0' to Surface
SEAL TYPE:	Bentonite Chips	-55.0' to -50.0'
SCREEN PACK:	8/16 Sand	-105' to -50.0'
CASING TYPE:	4" Diameter Sch. 40 PVC Blank	-65.0' to 2.0'
	—	—
	—	—
WELL SCREEN:	4" Diameter Sch. 40 PVC, 0.020" slots	-105.0' to -65.0'
PLUG BACK:	8/16 Sand	

DRILLING CO: White Drilling Co.
DRILLING METHOD: Rotary
SAMPLE METHOD: Split Spoon/Shovel/Rock Core
DATE BEGUN: 06/27/03 DATE COMPLETED: 06/27/03
DRILLER: B. Atkins ELEVATION (SURF.): 3,814.62'
LOGGER: R. Lang ELEVATION (T.O.C.): 3,817.70'
FILE NAME: MW-N.dat UNIQUE NUMBER: 31-014-00534

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U. S. C. S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
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ARCADIS

WELL LOG

WELL NO.

MW-N

1004 N. Big Spring St. Suite 300, Midland, TX 79701-3383 Tel: 432/687-5400 Fax: 432/687-5401

Page 2 of 2

PROJECT NUMBER:	MT000803.0001	STATIC WATER LEVEL:	82.41'	MEAS. PT.:	T.O.C.	DATE:	7/9/03
AGENT NAME:	Pure Resources, Inc.	HOLE SIZE(S):	7 7/8"			TOTAL DEPTH:	-105.0'
OBJECT NAME:	Lovington Paddock Site	SURFACE COMPLETION:		8" Locking Steel Sleeve, 4'x4'x6" Conc. Slab			
SITE LOCATION:	Lea County, New Mexico			TYPES		DEPTHS	
DRILLING CO:	White Drilling Co.	GROUT TYPE:	Portland Cement			-50.0' to Surface	
DRILLING METHOD:	Rotary	SEAL TYPE:	Bentonite Chips			-55.0' to -50.0'	
SAMPLE METHOD:	Split Spoon/Shovel/Rock Core	SCREEN PACK:	8/16 Sand			-105' to -50.0'	
DATE BEGUN:	06/27/03	DATE COMPLETED:	06/27/03			-65.0' to 2.0'	
DRILLER:	B. Atkins	ELEVATION (SURF.):	3,814.62'				
LOGGER:	R. Lang	ELEVATION (T.O.C.):	3,817.70'				
FILE NAME:	MW-N.dat	UNIQUE NUMBER:	31-014-00534				
		WELL SCREEN:	4" Diameter Sch. 40 PVC, 0.020" slots			-105.0' to -65.0'	
		PLUG BACK:	8/16 Sand				

DEPTH	SAMPLED	SAMPLING METHOD	ANALYZED	MOISTURE	RECOVERY	OVM READING	U. S. C. S. CLASS	LITHOLOGY	DESCRIPTION	WELL INSTALLATION
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-55	Shovel					0.7				
	Shovel					0.0				
-60	Shovel					2.2				
-65	Shovel					0.2				
-70	Shovel					NS				
-75	Rock Core					0.2				
-80	Shovel					0.1				
-85	Shovel					0.4				
-90	Shovel					0.2				
-95	Shovel					0.2				
-100	Shovel					0.5				
-105									SAND 10R 8/3 pink, very fine grained, well sorted, loose, dry; CALICHE 10R 8/3 pink, firm to soft, as interbeds.	

APPENDIX B



ARCADIS

Appendix B

State Engineers Well Records

File Number: _____

NEW MEXICO OFFICE OF THE STATE ENGINEER
WELL RECORD

1. OWNER OF WELL

Name: Pure Resources, Inc. Work Phone: _____
Contact: Mr. Pete Wilkinson Home Phone: _____
Address: 500 W. Illinois St.
City: Midland State: TX Zip: 79701

2. LOCATION OF WELL (A, B, C, or D required, E or F if known)

A. 1/4 1/4 1/4 Section: 1 Township: 17S Range: 36E N.M.P.M.
in Lea County.
B. X = _____ feet, Y = _____ feet, N.M. Coordinate System
Zone in the _____ Grant.
U.S.G.S. Quad Map _____
C. Latitude: 32 d 51 m 32.3 s Longitude: 103 d 18 m 11.5 s
D. East _____ (m), North _____ (m), UTM Zone 13, NAD _____ (27 or 83)
E. Tract No. _____, Map No. _____ of the _____ Hydrographic Survey
F. Lot No. _____, Block No. _____ of Unit/Tract _____ of the
_____ Subdivision recorded in _____ County.
G. Other: _____
H. Give State Engineer File Number if existing well: _____
I. On land owned by (required): Pure Resources, Inc.

3. DRILLING CONTRACTOR

License Number: WD-1456
Name: John W. White/White Drilling Work Phone: (325) 893-2950
Agent: William Atkins Home Phone: (325) 893-2950
Mailing Address: P.O. Box 906
City: Clyde State: TX Zip: 79510

4. DRILLING RECORD MW-A

Drilling began: 6/16/03 ; Completed: 6/16/03 ; Type tools: air/mud rotary
Size of hole: 7 7/8 in.; Total depth of well: 120.0 ft.;
Completed well is: shallow (shallow, artesian);
Depth to water upon completion of well: 79.45 ft.

File Number: _____
Form: wr-20

Trn Number: _____

File Number: _____

**NEW MEXICO OFFICE OF THE STATE ENGINEER
WELL RECORD**

MW-A

5. PRINCIPAL WATER-BEARING STRATA

Depth in Feet		Thickness	Description of	Estimated Yield
From	To	in feet	water-bearing formation	(GPM)
73.0	79.5	6.5	Tan sand. Water @ 79.45	n/a

6. RECORD OF CASING

Diameter (inches)	Pounds per ft.	Threads per in.	Depth in Feet		Length (feet)	Type of Shoe	Perforations	
			Top	Bottom			From	To
4.0	Sch.40	4	0.0	57.5	57.5	PVC Riser		
4.0	Sch.40	4	57.5	97.5	40.0	PVC Screen	02057.5	97.5

7. RECORD OF MUDDING AND CEMENTING

Depth in Feet		Hole	Sacks	Cubic Feet	Method of Placement - tremmie pipe
From	To	Diameter	of mud	of Cement	
120.0	97.5	7 7/8			hole sanded in
97.5	40.0	7 7/8	129		8/16 sand
40.0	35.0	7 7/8	2		Bentonite hole plug
35.0	0.0	7 7/8	8	7.973	cement

8. PLUGGING RECORD

Plugging Contractor: _____
 Address: _____
 Plugging Method: _____
 Date Well Plugged: _____

Plugging approved by: _____
 State Engineer Representative

No.	Depth in Feet		Cubic Feet of Cement
	Top	Bottom	
1			
2			
3			
4			
5			

File Number: _____
 Form: wr-20

Trn Number: _____

File Number: _____

NEW MEXICO OFFICE OF THE STATE ENGINEER
WELL RECORD

MW-A

9. LOG OF HOLE

[illegible]

File Number: _____
Form: wr-20

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Trn Number: _____

File Number: _____

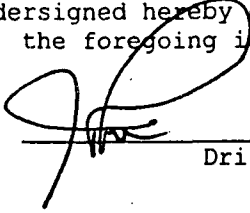
**NEW MEXICO OFFICE OF THE STATE ENGINEER
WELL RECORD**

MW-A

10. ADDITIONAL STATEMENTS OR EXPLANATIONS:

Hydrocarbon odor @ 52.0

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above described hole.


Driller

7-24-03
(mm/dd/year)

=====

FOR STATE ENGINEER USE ONLY

Quad ____; FWL ____; FSL ____; Use ____; Location No. ____

File Number: _____
Form: wr-20

page 4 of 4

Trn Number: _____

File Number: _____

NEW MEXICO OFFICE OF THE STATE ENGINEER
WELL RECORD

1. OWNER OF WELL

Name: Pure Resources, Inc. Work Phone: _____
Contact: Mr. Pete Wilkinson Home Phone: _____
Address: 500 W. Illinois St.
City: Midland State: TX Zip: 79701

2. LOCATION OF WELL (A, B, C, or D required, E or F if known)

A. 1/4 1/4 1/4 Section: 1 Township: 17S Range: 36E N.M.P.M.
in Lea County.
B. X = _____ feet, Y = _____ feet, N.M. Coordinate System
Zone in the _____ Grant.
U.S.G.S. Quad Map _____
C. Latitude: 32 d 51 m 32.3 s Longitude: 103 d 18 m 11.5 s
D. East _____ (m), North _____ (m), UTM Zone 13, NAD _____ (27 or 83)
E. Tract No. _____, Map No. _____ of the _____ Hydrographic Survey
F. Lot No. _____, Block No. _____ of Unit/Tract _____ of the
_____ Subdivision recorded in _____ County.
G. Other: _____
H. Give State Engineer File Number if existing well: _____
I. On land owned by (required): Pure Resources, Inc.

3. DRILLING CONTRACTOR

License Number: WD-1456
Name: John W. White/White Drilling CWork Phone: (325) 893-2950
Agent: William Atkins Home Phone: (325) 893-2950
Mailing Address: P.O. Box 906
City: Clyde State: TX Zip: 79510

4. DRILLING RECORD MW-B

Drilling began: 6/18/03 ; Completed: 6/19/03 ; Type tools: air/mud rotary
Size of hole: 7 7/8 in.; Total depth of well: 105.0 ft.;
Completed well is: shallow (shallow, artesian);
Depth to water upon completion of well: 80.0 ft.

File Number: _____
Form: wr-20

Trn Number: _____

File Number: _____

NEW MEXICO OFFICE OF THE STATE ENGINEER
WELL RECORD

MW-B

5. PRINCIPAL WATER-BEARING STRATA

Depth in Feet		Thickness	Description of	Estimated Yield
From	To	in feet	water-bearing formation	(GPM)
80.0	80.0		Tan sand	n/a

6. RECORD OF CASING

Diameter	Pounds	Threads	Depth in Feet		Length	Type of Shoe	Perforations	
(inches)	per ft.	per in.	Top	Bottom	(feet)		From	To
4.0	Sch. 40	4	0.0	65.0	65.0	PVC Riser		
4.0	Sch. 40	4	65.0	105.0	40.0	PVC Screen.020	65.0	105.0

7. RECORD OF MUDDING AND CEMENTING

Depth in Feet		Hole	Sacks	Cubic Feet	Method of Placement-
From	To	Diameter	of mud	of Cement	tremmie pipe
105.0	55.0	7 7/8	23		8/16 sand
55.0	50.0	7 7/8	2		Bentonite hole plug
50.0	0.0	7 7/8	11	11.39	cement

8. PLUGGING RECORD

Plugging Contractor: _____
Address: _____
Plugging Method: _____
Date Well Plugged: _____

Plugging approved by: _____
State Engineer Representative

	No. Depth in Feet		Cubic Feet of Cement
	Top	Bottom	
1	_____	_____	_____
2	_____	_____	_____
3	_____	_____	_____
4	_____	_____	_____
5	_____	_____	_____

File Number: _____
Form: wr-20

Trn Number: _____
page 2 of 4

File Number: _____

NEW MEXICO OFFICE OF THE STATE ENGINEER
WELL RECORD

MW-B

9. LOG OF HOLE

[illegible]

File Number: _____
Form: wr-20

page 3 of 4

Trn Number:

Trn Number:

File Number: _____

NEW MEXICO OFFICE OF THE STATE ENGINEER
WELL RECORD

1. OWNER OF WELL

Name: Pure Resources, Inc. Work Phone: _____
Contact: Mr. Pete Wilkinson Home Phone: _____
Address: 500 W. Illinois St.
City: Midland State: TX Zip: 79701

2. LOCATION OF WELL (A, B, C, or D required, E or F if known)

A. 1/4 1/4 1/4 Section: 1 Township: 17S Range: 36E N.M.P.M.
in Lea County.

B. X = _____ feet, Y = _____ feet, N.M. Coordinate System
Zone in the _____ Grant.
U.S.G.S. Quad Map _____

C. Latitude: 32 d 51 m 32.3 s Longitude: 103 d 18 m 11.5 s

D. East _____ (m), North _____ (m), UTM Zone 13, NAD _____ (27 or 83)

E. Tract No. _____, Map No. _____ of the _____ Hydrographic Survey

F. Lot No. _____, Block No. _____ of Unit/Tract _____ of the
_____ Subdivision recorded in _____ County.

G. Other: _____

H. Give State Engineer File Number if existing well: _____

I. On land owned by (required): Pure Resources, Inc.

3. DRILLING CONTRACTOR

License Number: WD-1456

Name: John W. White/White Drilling Work Phone: (325) 893-2950

Agent: William Atkins Home Phone: (325) 893-2950

Mailing Address: P.O. Box 906

City: Clyde State: TX Zip: 79510

4. DRILLING RECORD MW-C

Drilling began: 6/18/03; Completed: 6/18/03; Type tools: air/mud rotary
Size of hole: 7 7/8 in.; Total depth of well: 105.0 ft.;
Completed well is: shallow (shallow, artesian);
Depth to water upon completion of well: 80.10 ft.

File Number: _____
Form: wr-20

Trn Number: _____
page 1 of 4

File Number: _____

**NEW MEXICO OFFICE OF THE STATE ENGINEER
WELL RECORD**

MW-C

5. PRINCIPAL WATER-BEARING STRATA

Depth in Feet		Thickness	Description of	Estimated Yield
From	To	in feet	water-bearing formation	(GPM)
72.0	80.10	8.1	Tan sand	n/a
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

6. RECORD OF CASING

Diameter (inches)	Pounds per ft.	Threads per in.	Depth in Feet		Length (feet)	Type of Shoe	Perforations	
			Top	Bottom			From	To
4.0	Sch.40	4	0.0	65.0	65.0	PVC Riser		
4.0	Sch.40	4	65.0	105.0	40.0	PVC Screen.020	65.0	105.0
_____	_____	_____	_____	_____	_____	_____	_____	_____

7. RECORD OF MUDDING AND CEMENTING

Depth in Feet		Hole	Sacks	Cubic Feet	Method of Placement - tremmie pipe
From	To	Diameter	of mud	of Cement	
105.0	55.0	7 7/8	23		8/16 sand
55.0	50.0	7 7/8	2		bentonite hole plug
50.0	0.0	7 7/8	11	11.39	cement
_____	_____	_____	_____	_____	_____

8. PLUGGING RECORD

Plugging Contractor: _____
 Address: _____
 Plugging Method: _____
 Date Well Plugged: _____

Plugging approved by: _____
 State Engineer Representative

	No. Depth in Feet		Cubic Feet of Cement
	Top	Bottom	
1	_____	_____	_____
2	_____	_____	_____
3	_____	_____	_____
4	_____	_____	_____
5	_____	_____	_____

File Number: _____
 Form: wr-20

Trn Number: _____
 page 2 of 4

File Number: _____

NEW MEXICO OFFICE OF THE STATE ENGINEER
WELL RECORD

MW-C

9. LOG OF HOLE

[illegible]

File Number:

Form: wr-20

Trn Number: _____

Trn Number:

File Number: _____

NEW MEXICO OFFICE OF THE STATE ENGINEER
WELL RECORD

1. OWNER OF WELL

Name: Pure Resources, Inc. Work Phone: _____
Contact: Mr. Pete Wilkinson Home Phone: _____
Address: 500 W. Illinois St.
City: Midland State: TX Zip: 79701

2. LOCATION OF WELL (A, B, C, or D required, E or F if known)

A. 1/4 1/4 1/4 Section: 1 Township: 17S Range: 36E N.M.P.M.
in Lea County.
B. X = _____ feet, Y = _____ feet, N.M. Coordinate System
Zone in the _____ Grant.
U.S.G.S. Quad Map _____
C. Latitude: 32 d 51 m 32.3 s Longitude: 103 d 18 m 11.5 s
D. East _____ (m), North _____ (m), UTM Zone 13, NAD ____ (27 or 83)
E. Tract No. _____, Map No. _____ of the _____ Hydrographic Survey
F. Lot No. _____, Block No. _____ of Unit/Tract _____ of the
_____ Subdivision recorded in _____ County.
G. Other: _____
H. Give State Engineer File Number if existing well: _____
I. On land owned by (required): Pure Resources, Inc.

3. DRILLING CONTRACTOR

License Number: WD-1456
Name: John W. White/White Drilling CWork Phone: (325) 893-2950
Agent: William Atkins Home Phone: (325) 893-2950
Mailing Address: P.O. Box 906
City: Clyde State: TX Zip: 79510

4. DRILLING RECORD MW-D

Drilling began: 6/19/03 ; Completed: 6/19/03 ; Type tools: air/mud rotary
Size of hole: 7 7/8 in.; Total depth of well: 105.0 ft.;
Completed well is: shallow (shallow, artesian);
Depth to water upon completion of well: 79.64 ft.

File Number: _____
Form: wr-20

Trn Number: _____
page 1 of 4

File Number: _____

**NEW MEXICO OFFICE OF THE STATE ENGINEER
WELL RECORD**

MW-D

5. PRINCIPAL WATER-BEARING STRATA

Depth in Feet		Thickness	Description of	Estimated Yield
From	To	in feet	water-bearing formation	(GPM)
72.0	80.0	6.0	Tan sand	n/a

6. RECORD OF CASING

Diameter (inches)	Pounds per ft.	Threads per in.	Depth in Feet		Length (feet)	Type of Shoe	Perforations	
			Top	Bottom			From	To
4.0	Sch.40	4.0	0.0	65.0	65.0	PVC Riser		
4.0	Sch.40	4.0	65.0	105.0	40.0	PVC Screen	.020	65.0 105.0

7. RECORD OF MUDDING AND CEMENTING

Depth in Feet		Hole	Sacks	Cubic Feet	Method of Placement - tremmie pipe
From	To	Diameter	of mud	of Cement	
105.0	55.0	7 7/8	23.0		8/16 sand
55.0	50.0	7 7/8	2.0		bentonite hole plug
50.0	0.0	7 7/8	11.0	11.39	cement

8. PLUGGING RECORD

Plugging Contractor: _____
 Address: _____
 Plugging Method: _____
 Date Well Plugged: _____

Plugging approved by: _____
 State Engineer Representative

	No. Depth in Feet		Cubic Feet of Cement
	Top	Bottom	
1	_____	_____	_____
2	_____	_____	_____
3	_____	_____	_____
4	_____	_____	_____
5	_____	_____	_____

File Number: _____
 Form: wr-20

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File Number: _____

NEW MEXICO OFFICE OF THE STATE ENGINEER
WELL RECORD

MW-D

9. LOG OF HOLE

[illegible]

File Number: _____
Form: wr-20

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Trn Number: _____

Trn Number:

File Number: _____

NEW MEXICO OFFICE OF THE STATE ENGINEER
WELL RECORD

1. OWNER OF WELL

Name: Pure Resources, Inc. Work Phone: _____
Contact: Mr. Pete Wilkinson Home Phone: _____
Address: 500 W. Illinois St.
City: Midland State: TX Zip: 79701

2. LOCATION OF WELL (A, B, C, or D required, E or F if known)

A. 1/4 1/4 1/4 Section: 1 Township: 17S Range: 36E N.M.P.M.
in Lea County.

B. X = _____ feet, Y = _____ feet, N.M. Coordinate System
Zone in the _____ Grant.
U.S.G.S. Quad Map _____

C. Latitude: 32 d 51 m 32.3 s Longitude: 103 d 18 m 11.5 s

D. East _____ (m), North _____ (m), UTM Zone 13, NAD _____ (27 or 83)

E. Tract No. _____, Map No. _____ of the _____ Hydrographic Survey

F. Lot No. _____, Block No. _____ of Unit/Tract _____ of the
_____ Subdivision recorded in _____ County.

G. Other: _____

H. Give State Engineer File Number if existing well: _____

I. On land owned by (required): Pure Resources, Inc.

3. DRILLING CONTRACTOR

License Number: WD-1456
Name: John W. White/White Drilling Work Phone: (325) 893-2950
Agent: William Atkins Home Phone: (325) 893-2950
Mailing Address: P.O. Box 906
City: Clyde State: TX Zip: 79510

4. DRILLING RECORD MW-E

Drilling began: 6/20/03; Completed: 6/20/03; Type tools: air/mud rotary
Size of hole: 7 7/8 in.; Total depth of well: 105.0 ft.;
Completed well is: shallow (shallow, artesian);
Depth to water upon completion of well: 79.55 ft.

File Number: _____
Form: wr-20

Trn Number: _____
page 1 of 4

File Number: _____

**NEW MEXICO OFFICE OF THE STATE ENGINEER
WELL RECORD**

MW-E

5. PRINCIPAL WATER-BEARING STRATA

Depth in Feet		Thickness	Description of	Estimated Yield
From	To	in feet	water-bearing formation	(GPM)
79.55	79.55		Tan sand	n/a

6. RECORD OF CASING

Diameter (inches)	Pounds per ft.	Threads per in.	Depth in Feet		Length (feet)	Type of Shoe	Perforations	
			Top	Bottom			From	To
4.0	Sch.40	4.0	0.0	65.0		PVC Riser		
4.0	Sch.40	4.0	65.0	105.0		PVC Screen	.020	65.0 105.0

7. RECORD OF MUDDING AND CEMENTING

Depth in Feet		Hole	Sacks	Cubic Feet	Method of Placement - tremmie pipe
From	To	Diameter	of mud	of Cement	
105.0	55.0	7 7/8	24		8/16 sand
55.0	50.0	7 7/8	2		bentonite hole plug
50.0	0.0	7 7/8	11	11.39	cement

8. PLUGGING RECORD

Plugging Contractor: _____
Address: _____
Plugging Method: _____
Date Well Plugged: _____

Plugging approved by: _____
State Engineer Representative

	No. Depth in Feet		Cubic Feet of Cement
	Top	Bottom	
1			
2			
3			
4			
5			

File Number: _____
Form: wr-20

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File Number: _____

NEW MEXICO OFFICE OF THE STATE ENGINEER
WELL RECORD

MW-E

9. LOG OF HOLE

[illegible]

File Number: _____
Form: wr-20

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Trn Number:

Trn Number:

File Number: _____

NEW MEXICO OFFICE OF THE STATE ENGINEER
WELL RECORD

1. OWNER OF WELL

Name: Pure Resources, Inc. Work Phone: _____
Contact: Mr. Pete Wilkinson Home Phone: _____
Address: 500 W. Illinois St.
City: Midland State: TX Zip: 79701

2. LOCATION OF WELL (A, B, C, or D required, E or F if known)

A. 1/4 1/4 1/4 Section: 1 Township: 17S Range: 36E N.M.P.M.
in Lea County.
B. X = _____ feet, Y = _____ feet, N.M. Coordinate System
Zone in the _____ Grant.
U.S.G.S. Quad Map _____
C. Latitude: 32 d 51 m 32.3 s Longitude: 103 d 18 m 11.5 s
D. East _____ (m), North _____ (m), UTM Zone 13, NAD ____ (27 or 83)
E. Tract No. _____, Map No. _____ of the _____ Hydrographic Survey
F. Lot No. _____, Block No. _____ of Unit/Tract _____ of the
_____ Subdivision recorded in _____ County.
G. Other: _____
H. Give State Engineer File Number if existing well: _____
I. On land owned by (required): Pure Resources, Inc.

3. DRILLING CONTRACTOR

License Number: WD-1456
Name: John W. White/White Drilling Work Phone: (325) 893-2950
Agent: William Atkins Home Phone: (325) 893-2950
Mailing Address: P.O. Box 906
City: Clyde State: TX Zip: 79510

4. DRILLING RECORD MW-F

Drilling began: 6/23/03; Completed: 6/23/03; Type tools: air/mud rotary
Size of hole: 7 7/8 in.; Total depth of well: 105.0 ft.;
Completed well is: shallow (shallow, artesian);
Depth to water upon completion of well: 78.2 ft.

File Number: _____
Form: wr-20

Trn Number: _____
page 1 of 4

File Number: _____

NEW MEXICO OFFICE OF THE STATE ENGINEER WELL RECORD

MW-F

5. PRINCIPAL WATER-BEARING STRATA

Depth in Feet		Thickness	Description of	Estimated Yield
From	To	in feet	water-bearing formation	(GPM)
73.5	78.2	4.7	Tan sand	n/a
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

6. RECORD OF CASING

Diameter (inches)	Pounds per ft.	Threads per in.	Depth in Feet		Length (feet)	Type of Shoe	Perforations	
			Top	Bottom			From	To
4.0	Sch.40	4.0	0.0	65.0	65.0	PVC Riser		
4.0	Sch.40	4.0	65.0	105.0	40.0	PVC Screen	.020	65.0 105.0
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____

7. RECORD OF MUDDING AND CEMENTING

Depth in Feet		Hole	Sacks	Cubic Feet	Method of Placement - tremmie pipe
From	To	Diameter	of mud	of Cement	
105.0	55.0	7 7/8	23		8/16 sand
55.0	50.0	7 7/8	2		bentonite hole plug
50.0	0.0	7 7/8	11	11.39	cement
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

8. PLUGGING RECORD

Plugging Contractor: _____
 Address: _____
 Plugging Method: _____
 Date Well Plugged: _____

Plugging approved by: _____
 State Engineer Representative

No.	Depth in Feet		Cubic Feet of Cement
	Top	Bottom	
1	_____	_____	_____
2	_____	_____	_____
3	_____	_____	_____
4	_____	_____	_____
5	_____	_____	_____

File Number: _____
 Form: wr-20

Trn Number: _____

File Number: _____

NEW MEXICO OFFICE OF THE STATE ENGINEER
WELL RECORD

MW-F

9. LOG OF HOLE

[illegible]

File Number: _____
Form: wr-20

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Trn Number: _____

Trn Number: _____

File Number: _____

NEW MEXICO OFFICE OF THE STATE ENGINEER
WELL RECORD

1. OWNER OF WELL

Name: Pure Resources, Inc. Work Phone: _____
Contact: Mr. Pete Wilkinson Home Phone: _____
Address: 500 W. Illinois St.
City: Midland State: TX Zip: 79701

2. LOCATION OF WELL (A, B, C, or D required, E or F if known)

A. 1/4 1/4 1/4 Section: 1 Township: 17S Range: 36E N.M.P.M.
in Lea County.
B. X = _____ feet, Y = _____ feet, N.M. Coordinate System
Zone in the _____ Grant.
U.S.G.S. Quad Map _____
C. Latitude: 32 d 51 m 32.3 s Longitude: 103 d 18 m 11.5 s
D. East _____ (m), North _____ (m), UTM Zone 13, NAD _____ (27 or 83)
E. Tract No. _____, Map No. _____ of the _____ Hydrographic Survey
F. Lot No. _____, Block No. _____ of Unit/Tract _____ of the
_____ Subdivision recorded in _____ County.
G. Other: _____
H. Give State Engineer File Number if existing well: _____
I. On land owned by (required): Pure Resources, Inc.

3. DRILLING CONTRACTOR

License Number: WD-1456
Name: John W. White/White Drilling Work Phone: (325) 893-2950
Agent: William Atkins Home Phone: (325) 893-2950
Mailing Address: P.O. Box 906
City: Clyde State: TX Zip: 79510

4. DRILLING RECORD MW-G

Drilling began: 6/24/03; Completed: 6/24/03; Type tools: air/mud rotary
Size of hole: 7 7/8 in.; Total depth of well: 105.0 ft.;
Completed well is: shallow (shallow, artesian);
Depth to water upon completion of well: 78.7 ft.

File Number: _____
Form: wr-20

Trn Number: _____

File Number: _____

NEW MEXICO OFFICE OF THE STATE ENGINEER
WELL RECORD

MW-G

5. PRINCIPAL WATER-BEARING STRATA

Depth in Feet		Thickness	Description of	Estimated Yield
From	To	in feet	water-bearing formation	(GPM)
78.7	78.7		Tan sand.	n/a

6. RECORD OF CASING

Diameter	Pounds	Threads	Depth in Feet		Length	Type of Shoe	Perforations	
(inches)	per ft.	per in.	Top	Bottom	(feet)		From	To
4.0	Sch.40	4.0	0.0	65.0	65.0	PVC Riser		
4.0	Sch. 40	4.0	65.0	105.0	40.0	PVC Screen.020	65.0	105.0

7. RECORD OF MUDDING AND CEMENTING

Depth in Feet		Hole	Sacks	Cubic Feet	Method of Placement	- tremmie pipe	
From	To	Diameter	of mud	of Cement			
105.0	55.0	7 7/8	21		8/16 sand		
55.0	50.0	7 7/8	2		bentonite hole plug		
50.0	0.0	7 7/8	11	11.39	cement		

8. PLUGGING RECORD

Plugging Contractor: _____
Address: _____
Plugging Method: _____
Date Well Plugged: _____

Plugging approved by: _____
State Engineer Representative

	No. Depth in Feet		Cubic Feet of Cement
	Top	Bottom	
1	_____	_____	_____
2	_____	_____	_____
3	_____	_____	_____
4	_____	_____	_____
5	_____	_____	_____

File Number: _____
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page 2 of 4

File Number: _____

NEW MEXICO OFFICE OF THE STATE ENGINEER
WELL RECORD

MW-G

9. LOG OF HOLE

[illegible]

File Number: _____
Form: wr-20

page 3 of 4

Trn Number:

Trn Number:

File Number: _____

**NEW MEXICO OFFICE OF THE STATE ENGINEER
WELL RECORD**

1. OWNER OF WELL

Name: Pure Resources, Inc. Work Phone: _____
Contact: Mr. Pete Wilkinson Home Phone: _____
Address: 500 W. Illinois St.
City: Midland State: TX Zip: 79701

2. LOCATION OF WELL (A, B, C, or D required, E or F if known)

A. 1/4 1/4 1/4 Section: 1 Township: 17S Range: 36E N.M.P.M.
in Lea County.
B. X = _____ feet, Y = _____ feet, N.M. Coordinate System
Zone in the _____ Grant.
U.S.G.S. Quad Map _____
C. Latitude: 32 d 51 m 32.3 s Longitude: 103 d 18 m 11.5 s
D. East _____ (m), North _____ (m), UTM Zone 13, NAD _____ (27 or 83)
E. Tract No. _____, Map No. _____ of the _____ Hydrographic Survey
F. Lot No. _____, Block No. _____ of Unit/Tract _____ of the
_____ Subdivision recorded in _____ County.
G. Other: _____
H. Give State Engineer File Number if existing well: _____
I. On land owned by (required): Pure Resources, Inc.

3. DRILLING CONTRACTOR

License Number: WD-1456
Name: John W. White/White Drilling CWork Phone: (325) 893-2950
Agent: William Atkins Home Phone: (325) 893-2950
Mailing Address: P.O. Box 906
City: Clyde State: TX Zip: 79510

4. DRILLING RECORD MW-H

Drilling began: 6/24/03; Completed: 6/25/03; Type tools: air/mud rotary
Size of hole: 7 7/8 in.; Total depth of well: 105.0 ft.;
Completed well is: shallow (shallow, artesian);
Depth to water upon completion of well: 80.0 ft.

File Number: _____
Form: wr-20

page 1 of 4

Trn Number: _____

File Number: _____

NEW MEXICO OFFICE OF THE STATE ENGINEER
WELL RECORD

MW-H

5. PRINCIPAL WATER-BEARING STRATA

Depth in Feet		Thickness in feet	Description of water-bearing formation	Estimated Yield (GPM)
From	To			
80.0	80.0		Tan sand.	n/a

6. RECORD OF CASING

Diameter (inches)	Pounds per ft.	Threads per in.	Depth in Feet		Length (feet)	Type of Shoe	Perforations	
			Top	Bottom			From	To
4.0	Sch.40	4.0	0.0	65.0	65.0	PVC Riser		
4.0	Sch.40	4.0	65.0	105.0	40.0	PVC Screen.	020	65.0 105.0

7. RECORD OF MUDDING AND CEMENTING

Depth in Feet		Hole Diameter	Sacks of mud	Cubic Feet of Cement	Method of Placement - tremmie pipe
From	To				
105.0	55.0	7 7/8	23		8/16 sand
55.0	50.0	7 7/8	2		bentonite hole plug
50.0	0.0	7 7/8	11	11.39	cement

8. PLUGGING RECORD

Plugging Contractor: _____
Address: _____
Plugging Method: _____
Date Well Plugged: _____

Plugging approved by: _____
State Engineer Representative

	No. Depth in Feet		Cubic Feet of Cement
	Top	Bottom	
1	_____	_____	_____
2	_____	_____	_____
3	_____	_____	_____
4	_____	_____	_____
5	_____	_____	_____

File Number: _____
Form: wr-20

Trn Number: _____
page 2 of 4

File Number: _____

NEW MEXICO OFFICE OF THE STATE ENGINEER
WELL RECORD

MW-H

9. LOG OF HOLE

[illegible]

File Number: _____
Form: wr-20

page 3 of 4

Trn Number:

File Number: _____

NEW MEXICO OFFICE OF THE STATE ENGINEER
WELL RECORD

MW-H

10. ADDITIONAL STATEMENTS OR EXPLANATIONS:

Hydrocarbon odor @ 15.0 L.F.

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above described hole.

Driller

7.24-03
(mm/dd/year)

FOR STATE ENGINEER USE ONLY

Quad _____; FWL _____; FSL _____; Use _____; Location No. _____

File Number: _____
Form: wr-20

page 4 of 4

Trn Number: _____

File Number: _____

NEW MEXICO OFFICE OF THE STATE ENGINEER
WELL RECORD

1. OWNER OF WELL

Name: Pure Resources, Inc. Work Phone: _____
Contact: Mr. Pete Wilkinson Home Phone: _____
Address: 500 W. Illinois St.
City: Midland State: TX Zip: 79701

2. LOCATION OF WELL (A, B, C, or D required, E or F if known)

A. 1/4 1/4 1/4 Section: 1 Township: 17S Range: 36E N.M.P.M.
in Lea County.
B. X = _____ feet, Y = _____ feet, N.M. Coordinate System
Zone in the _____ Grant.
U.S.G.S. Quad Map _____
C. Latitude: 32 d 51 m 32.3 s Longitude: 103 d 18 m 11.5 s
D. East _____ (m), North _____ (m), UTM Zone 13, NAD _____ (27 or 83)
E. Tract No. _____, Map No. _____ of the _____ Hydrographic Survey
F. Lot No. _____, Block No. _____ of Unit/Tract _____ of the
_____ Subdivision recorded in _____ County.
G. Other: _____
H. Give State Engineer File Number if existing well: _____
I. On land owned by (required): Pure Resources, Inc.

3. DRILLING CONTRACTOR

License Number: WD-1456
Name: John W. White/White Drilling CWork Phone: (325) 893-2950
Agent: William Atkins Home Phone: (325) 893-2950
Mailing Address: P.O. Box 906
City: Clyde State: TX Zip: 79510

4. DRILLING RECORD MW-I

Drilling began: 6/25/03; Completed: 6/25/03; Type tools: air/mud rotary
Size of hole: 7 7/8 in.; Total depth of well: 105.0 ft.;
Completed well is: shallow (shallow, artesian);
Depth to water upon completion of well: 75.0 ft.

File Number: _____
Form: wr-20

page 1 of 4

Trn Number: _____

File Number: _____

**NEW MEXICO OFFICE OF THE STATE ENGINEER
WELL RECORD**

MW-I

5. PRINCIPAL WATER-BEARING STRATA

Depth in Feet		Thickness	Description of	Estimated Yield
From	To	in feet	water-bearing formation	(GPM)
75.0	75.0		Tan sand	n/a
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

6. RECORD OF CASING

Diameter	Pounds	Threads	Depth in Feet		Length	Type of Shoe	Perforations	
(inches)	per ft.	per in.	Top	Bottom	(feet)		From	To
4.0	Sch.40	4.0	0.0	65.0	65.0	PVC Riser		
4.0	Sch.40	4.0	65.0	105.0	40.0	PVC Screen	65.0	105.0/.020
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____

7. RECORD OF MUDDING AND CEMENTING

Depth in Feet		Hole	Sacks	Cubic Feet	Method of Placement - tremmie pipe
From	To	Diameter	of mud	of Cement	
105.0	55.0	7 7/8	23		8/16 sand
55.0	50.0	7 7/8	2		bentonite hole plug
50.0	0.0	7 7/8	11	11.39	cement
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

8. PLUGGING RECORD

Plugging Contractor: _____
 Address: _____
 Plugging Method: _____
 Date Well Plugged: _____

Plugging approved by: _____
 State Engineer Representative

	No. Depth in Feet	Cubic Feet of Cement
	Top Bottom	
1	_____	_____
2	_____	_____
3	_____	_____
4	_____	_____
5	_____	_____

File Number: _____
 Form: wr-20

Trn Number: _____
 page 2 of 4

File Number: _____

NEW MEXICO OFFICE OF THE STATE ENGINEER
WELL RECORD

MW-I

9. LOG OF HOLE

[illegible]

File Number: _____
Form: wr-20

page 3 of 4

Trn Number: _____

Trn Number: _____

page 4 of 4

File Number: _____

NEW MEXICO OFFICE OF THE STATE ENGINEER
WELL RECORD

1. OWNER OF WELL

Name: Pure Resources, Inc. Work Phone: _____
Contact: Mr. Pete Wilkinson Home Phone: _____
Address: 500 W. Illinois St.
City: Midland State: TX Zip: 79701

2. LOCATION OF WELL (A, B, C, or D required, E or F if known)

A. 1/4 1/4 1/4 Section: 1 Township: 17S Range: 36E N.M.P.M.
in Lea County.

B. X = _____ feet, Y = _____ feet, N.M. Coordinate System
Zone in the _____ Grant.
U.S.G.S. Quad Map _____

C. Latitude: 32 d 51 m 32.3 s Longitude: 103 d 18 m 11.5 s

D. East _____ (m), North _____ (m), UTM Zone 13, NAD _____ (27 or 83)

E. Tract No. _____, Map No. _____ of the _____ Hydrographic Survey

F. Lot No. _____, Block No. _____ of Unit/Tract _____ of the
Subdivision recorded in _____ County.

G. Other: _____

H. Give State Engineer File Number if existing well: _____

I. On land owned by (required): Pure Resources, Inc.

3. DRILLING CONTRACTOR

License Number: WD-1456

Name: John W. White/White Drilling Work Phone: (325) 893-2950
Agent: William Atkins Home Phone: (325) 893-2950
Mailing Address: P.O. Box 906
City: Clyde State: TX Zip: 79510

4. DRILLING RECORD MW-J

Drilling began: 6/26/03; Completed: 6/26/03; Type tools: air/mud rotary
Size of hole: 7 7/8 in.; Total depth of well: 105.0 ft.;
Completed well is: shallow (shallow, artesian);
Depth to water upon completion of well: 77.0 ft.

File Number: _____
Form: wr-20

Trn Number: _____

File Number: _____

**NEW MEXICO OFFICE OF THE STATE ENGINEER
WELL RECORD**

MW-J

5. PRINCIPAL WATER-BEARING STRATA

Depth in Feet		Thickness	Description of water-bearing formation	Estimated Yield (GPM)
From	To	in feet		
75.0	73.0	2.0	Tan sand	n/a
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

6. RECORD OF CASING

Diameter (inches)	Pounds per ft.	Threads per in.	Depth in Feet		Length (feet)	Type of Shoe	Perforations	
			Top	Bottom			From	To
4.0	Sch.40	4.0	0.0	65.0	65.0	PVC Riser		
4.0	Sch.40	4.0	65.0	105.0	40.0	PVC Screen	.020	65.0 105.0
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____

7. RECORD OF MUDDING AND CEMENTING

Depth in Feet		Hole	Sacks	Cubic Feet	Method of Placement-tremmie pipe
From	To	Diameter	of mud	of Cement	
105.0	55.0	7 7/8	23		8/16 sand
55.0	50.0	7 7/8	2		bentonite hole plug
50.0	0.0	7 7/8	11	11.39	cement
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

8. PLUGGING RECORD

Plugging Contractor: _____
Address: _____
Plugging Method: _____
Date Well Plugged: _____

Plugging approved by: _____
State Engineer Representative

	No. Depth in Feet		Cubic Feet of Cement
	Top	Bottom	
1	_____	_____	_____
2	_____	_____	_____
3	_____	_____	_____
4	_____	_____	_____
5	_____	_____	_____

File Number: _____
Form: wr-20

Trn Number: _____
page 2 of 4

File Number: _____

NEW MEXICO OFFICE OF THE STATE ENGINEER
WELL RECORD

MW-J

9. LOG OF HOLE

[illegible]

File Number: _____

Form: WR-20

Trn Number: _____

Trn Number:

File Number: _____

NEW MEXICO OFFICE OF THE STATE ENGINEER
WELL RECORD

1. OWNER OF WELL

Name: Pure Resources, Inc. Work Phone: _____
Contact: Mr. Pete Wilkinson Home Phone: _____
Address: 500 W. Illinois St.
City: Midland State: TX Zip: 79701

2. LOCATION OF WELL (A, B, C, or D required, E or F if known)

A. 1/4 1/4 1/4 Section: 1 Township: 17S Range: 36E N.M.P.M.
in Lea County.
B. X = _____ feet, Y = _____ feet, N.M. Coordinate System
Zone in the _____ Grant.
U.S.G.S. Quad Map _____
C. Latitude: 32 d 51 m 32.3 s Longitude: 103 d 18 m 11.5 s
D. East _____ (m), North _____ (m), UTM Zone 13, NAD _____ (27 or 83)
E. Tract No. _____, Map No. _____ of the _____ Hydrographic Survey
F. Lot No. _____, Block No. _____ of Unit/Tract _____ of the
_____ Subdivision recorded in _____ County.
G. Other: _____
H. Give State Engineer File Number if existing well: _____
I. On land owned by (required): Pure Resources, Inc.

3. DRILLING CONTRACTOR

License Number: WD-1456
Name: John W. White/White Drilling Work Phone: (325) 893-2950
Agent: William Atkins Home Phone: (325) 893-2950
Mailing Address: P.O. Box 906
City: Clyde State: TX Zip: 79510

4. DRILLING RECORD MW-L

Drilling began: 6/26/03; Completed: 6/26/03; Type tools: air/mud rotary
Size of hole: 7 7/8 in.; Total depth of well: 105.0 ft.;
Completed well is: shallow (shallow, artesian);
Depth to water upon completion of well: 77.10 ft.

File Number: _____
Form: wr-20

Trn Number: _____

File Number: _____

**NEW MEXICO OFFICE OF THE STATE ENGINEER
WELL RECORD**

MW-L

5. PRINCIPAL WATER-BEARING STRATA

Depth in Feet		Thickness	Description of	Estimated Yield
From	To	in feet	water-bearing formation	(GPM)
77.1	77.1		Tan sand	n/a

6. RECORD OF CASING

Diameter	Pounds	Threads	Depth in Feet		Length	Type of Shoe	Perforations	
(inches)	per ft.	per in.	Top	Bottom	(feet)		From	To
4.0	Sch.40	4.0	0.0	65.0	65.0	PVC Riser		
4.0	Sch.40	4.0	65.0	105.0	40.0	PVC Screen.020	65.0	105.0

7. RECORD OF MUDDING AND CEMENTING

Depth in Feet		Hole	Sacks	Cubic Feet	Method of Placement - tremmie pipe
From	To	Diameter	of mud	of Cement	
105.0	55.0	7 7/8	23		8/16 sand
55.0	50.0	7 7/8	2		bentonite hole plug
50.0	0.0	7 7/8	11	11.39	cement

8. PLUGGING RECORD

Plugging Contractor: _____
 Address: _____
 Plugging Method: _____
 Date Well Plugged: _____

Plugging approved by: _____
 State Engineer Representative

No.	Depth in Feet	Cubic Feet of Cement
	Top Bottom	
1		
2		
3		
4		
5		

File Number: _____
 Form: wr-20

Trn Number: _____
 page 2 of 4

File Number: _____

NEW MEXICO OFFICE OF THE STATE ENGINEER
WELL RECORD

MW-L

9. LOG OF HOLE

[illegible]

File Number: _____
Form: wr-20

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Trn Number: _____

Trn Number:

File Number: _____

**NEW MEXICO OFFICE OF THE STATE ENGINEER
WELL RECORD**

1. OWNER OF WELL

Name: Pure Resources, Inc. Work Phone: _____
Contact: Mr. Pete Wilkinson Home Phone: _____
Address: 500 W. Illinois St.
City: Midland State: TX Zip: 79701

2. LOCATION OF WELL (A, B, C, or D required, E or F if known)

A. 1/4 1/4 1/4 Section: 1 Township: 17S Range: 36E N.M.P.M.
in Lea County.

B. X = _____ feet, Y = _____ feet, N.M. Coordinate System
Zone in the _____ Grant.
U.S.G.S. Quad Map _____

C. Latitude: 32 d 51 m 32.3 s Longitude: 103 d 18 m 11.5 s

D. East _____ (m), North _____ (m), UTM Zone 13, NAD _____ (27 or 83)

E. Tract No. _____, Map No. _____ of the _____ Hydrographic Survey

F. Lot No. _____, Block No. _____ of Unit/Tract _____ of the
Subdivision recorded in _____ County.

G. Other: _____

H. Give State Engineer File Number if existing well: _____

I. On land owned by (required): Pure Resources, Inc.

3. DRILLING CONTRACTOR

License Number: WD-1456
Name: John W. White/White Drilling CWork Phone: (325) 893-2950
Agent: William Atkins Home Phone: (325) 893-2950
Mailing Address: P.O. Box 906
City: Clyde State: TX Zip: 79510

4. DRILLING RECORD MW-M

Drilling began: 6/27/03 ; Completed: 6/27/03 ; Type tools: air/mud rotary
Size of hole: 7 7/8 in.; Total depth of well: 105.0 ft.;
Completed well is: shallow (shallow, artesian);
Depth to water upon completion of well: 76.0 ft.

File Number: _____

Form: wr-20

Trn Number: _____

File Number: _____

NEW MEXICO OFFICE OF THE STATE ENGINEER WELL RECORD

MW-M

5. PRINCIPAL WATER-BEARING STRATA

Depth in Feet		Thickness	Description of water-bearing formation	Estimated Yield (GPM)
From	To	in feet		
76.0	76.0		Tan sand	n/a

6. RECORD OF CASING

Diameter (inches)	Pounds per ft.	Threads per in.	Depth in Feet		Length (feet)	Type of Shoe	Perforations	
			Top	Bottom			From	To
4.0	Sch.40	4.0	0.0	65.0	65.0	PVC Riser		
4.0	Sch.40	4.0	65.0	105.0	40.0	PVC Screen	020	65.0 105.0

7. RECORD OF MUDDING AND CEMENTING

Depth in Feet		Hole	Sacks	Cubic Feet	Method of Placement - tremmie pipe
From	To	Diameter	of mud	of Cement	
105.0	55.0	7 7/8	25		8/16 sand
55.0	50.0	7 7/8	2		bentonite hole plug
50.0	0.0	7 7/8	11	11.39	cement

8. PLUGGING RECORD

Plugging Contractor: _____
 Address: _____
 Plugging Method: _____
 Date Well Plugged: _____

Plugging approved by: _____
 State Engineer Representative

	No. Depth in Feet		Cubic Feet of Cement
	Top	Bottom	
1	_____	_____	_____
2	_____	_____	_____
3	_____	_____	_____
4	_____	_____	_____
5	_____	_____	_____

File Number: _____
 Form: wr-20

Trn Number: _____
 page 2 of 4

File Number: _____

NEW MEXICO OFFICE OF THE STATE ENGINEER
WELL RECORD

MW-M

9. LOG OF HOLE

[illegible]

File Number: _____
Form: wr-20

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Trn Number: _____

page 4 of 4 Trn Number: _____

File Number: _____

NEW MEXICO OFFICE OF THE STATE ENGINEER
WELL RECORD

1. OWNER OF WELL

Name: Pure Resources, Inc. Work Phone: _____
Contact: Mr. Pete Wilkinson Home Phone: _____
Address: 500 W. Illinois St.
City: Midland State: TX Zip: 79701

2. LOCATION OF WELL (A, B, C, or D required, E or F if known)

A. 1/4 1/4 1/4 Section: 1 Township: 17S Range: 36E N.M.P.M.
in Lea County.

B. X = _____ feet, Y = _____ feet, N.M. Coordinate System
Zone in the _____ Grant.
U.S.G.S. Quad Map _____

C. Latitude: 32 d 51 m 32.3 s Longitude: 103 d 18 m 11.5 s

D. East _____ (m), North _____ (m), UTM Zone 13, NAD _____ (27 or 83)

E. Tract No. _____, Map No. _____ of the _____ Hydrographic Survey

F. Lot No. _____, Block No. _____ of Unit/Tract _____ of the
_____ Subdivision recorded in _____ County.

G. Other: _____

H. Give State Engineer File Number if existing well: _____

I. On land owned by (required): Pure Resources, Inc.

3. DRILLING CONTRACTOR

License Number: WD-1456

Name: John W. White/White Drilling Work Phone: (325) 893-2950
Agent: William Atkins Home Phone: (325) 893-2950
Mailing Address: P.O. Box 906
City: Clyde State: TX Zip: 79510

4. DRILLING RECORD MW-N

Drilling began: 6/27/03; Completed: 6/27/03; Type tools: air/mud rotary
Size of hole: 7 7/8 in.; Total depth of well: 105.0 ft.;
Completed well is: shallow (shallow, artesian);
Depth to water upon completion of well: 78.0 ft.

File Number: _____
Form: wr-20

Trn Number: _____

File Number: _____

**NEW MEXICO OFFICE OF THE STATE ENGINEER
WELL RECORD**

MW-N

5. PRINCIPAL WATER-BEARING STRATA

Depth in Feet		Thickness in feet	Description of water-bearing formation	Estimated Yield (GPM)
From	To			
78.0	78.0		Tan sand	n/a

6. RECORD OF CASING

Diameter (inches)	Pounds per ft.	Threads per in.	Depth in Feet		Length (feet)	Type of Shoe	Perforations	
			Top	Bottom			From	To
4.0	Sch.40	4.0	0.0	65.0	65.0	PVC Riser		
4.0	Sch.40	4.0	65.0	105.0	40.0	PVC Screen	020	65.0 105.0

7. RECORD OF MUDDING AND CEMENTING

Depth in Feet		Hole Diameter	Sacks of mud	Cubic Feet of Cement	Method of Placement - tremmie pipe
From	To				
105.0	55.0	7 7/8	24		8/16 sand
55.0	50.0	7 7/8	2		bentonite hole plug
50.0	0.0	7 7/8	11	11.39	cement

8. PLUGGING RECORD

Plugging Contractor: _____
 Address: _____
 Plugging Method: _____
 Date Well Plugged: _____

Plugging approved by: _____
 State Engineer Representative

	No. Depth in Feet		Cubic Feet of Cement
	Top	Bottom	
1			
2			
3			
4			
5			

File Number: _____
 Form: wr-20

Trn Number: _____
 page 2 of 4

File Number: _____

NEW MEXICO OFFICE OF THE STATE ENGINEER
WELL RECORD

MW-N

9. LOG OF HOLE.

[illegible]

File Number: _____
Form: wr-20

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Trn Number: _____

Trn Number:

APPENDIX C



ARCADIS

Appendix C

Soil Laboratory Reports

Summary Report

Frank Keifer
Arcadis Geraghty & Miller
1004 N. Big Spring St.
Suite 300
Midland, TX 79701

Report Date: June 27, 2003

Work Order: 3062303

Project Location: Lovington, NM
Project Number: MT000803.0001

RECEIVED
JUL 10 2003
ARCADIS Geraghty & Miller

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
10946	MW-A 70-71	soil	2003-06-16	18:12	2003-06-20
10947	MW-B 65-66	soil	2003-06-18	18:15	2003-06-20
10948	MW-C 0-2	soil	2003-06-18	09:20	2003-06-20
10949	MW-C 60-61	soil	2003-06-18	10:20	2003-06-20
10950	MW-D70-75	soil	2003-06-19	15:32	2003-06-20
10951	MW-E 70-75	soil	2003-06-20	09:47	2003-06-20

Sample - Field Code	BTEX				TPH DRO	TPH GRO
	Benzene (mg/Kg)	Toluene (mg/Kg)	Ethylbenzene (mg/Kg)	Xylene (isomers) (mg/Kg)	DRO (mg/Kg)	GRO (mg/Kg)
10946 - MW-A 70-71	0.469	30.3	24.3	85.6	4690	762
10947 - MW-B 65-66	<0.100	13.9	10.9	43.9	2180	843
10948 - MW-C 0-2	<0.0100	0.0410	0.0638	0.166	<50.0	14.1
10949 - MW-C 60-61	0.0458	4.75	5.54	25.3	2930	153
10950 - MW-D70-75	<0.0100	<0.0100	<0.0100	0.0672	<50.0	10.7
10951 - MW-E 70-75	<0.0100	<0.0100	<0.0100	0.0258	<50.0	3.62

Sample: 10946 - MW-A 70-71

Param	Flag	Result	Units	RL
FOC		1.28	%	0.00
Naphthalene		<0.00594	mg/Kg	0.180
Acenaphthylene		<0.00594	mg/Kg	0.180
Acenaphthene		<0.00594	mg/Kg	0.180
Fluorene		<0.00594	mg/Kg	0.180
Phenanthrene		<0.00594	mg/Kg	0.180
Anthracene		<0.00594	mg/Kg	0.180
Fluoranthene		<0.00594	mg/Kg	0.180
Pyrene		0.0544	mg/Kg	0.180
Benzo(a)anthracene		<0.00594	mg/Kg	0.180
Chrysene		<0.00594	mg/Kg	0.180
Benzo(b)fluoranthene		<0.00594	mg/Kg	0.180
Benzo(k)fluoranthene		<0.00594	mg/Kg	0.180
Benzo(a)pyrene		<0.00594	mg/Kg	0.180
Indeno(1,2,3-cd)pyrene		<0.00594	mg/Kg	0.180

continued ...

Report Date: June 27, 2003
MT000803.0001

Work Order: 3062303

Page Number: 2 of 2
Lovington, NM

sample 10946 continued ...

Param	Flag	Result	Units	RL
Dibenzo(a,h)anthracene		<0.00594	mg/Kg	0.180
Benzo(g,h,i)perylene		<0.00594	mg/Kg	0.180

Sample: 10951 - MW-E 70-75

Param	Flag	Result	Units	RL
FOC		0.960	%	0.00



6701 Aberdeen Avenue, Suite 9
155 McCutcheon, Suite H

Lubbock, Texas 79424 800•378•1296
El Paso, Texas 79932 888•588•3443
E-Mail: lab@traceanalysis.com

806•794•1296 FAX 806•794•1298
915•585•3443 FAX 915•585•4944

ANALYTICAL RESULTS FOR
ARCADIS GERAGHTY & MILLER
Attention: Frank Keifer
1004 N. Big Spring St., Suite 300
Midland, TX 79701

June 27, 2003
Receiving Date: 06/20/2003
Sample Type: Soil
Project No: MT000803.0001
Project Location: Lovington, NM

Work Order: 3062303
Prep Date: 06/25/2003
Analysis Date: 06/25/2003
Sampling Date: 06/16/2003
Sample Condition: I & C
Sample Received by: BS
Project Name: NA

TA#: 10946
FIELD CODE: MW-A 70-71

FINGERPRINT

Soil sample 10946 was extracted with pentane and analyzed by GC, FID, capillary column and direct injection. The graph of sample 10946 indicates the hydrocarbons in the sample are those of fresh crude. Minimum, if any, aging is indicated. Significant concentrations of organics other than crude are not shown to be present in the sample. (Graphs attached).

CHEMIST: BP

Director, Dr. Blair Leftwich

6-27-03

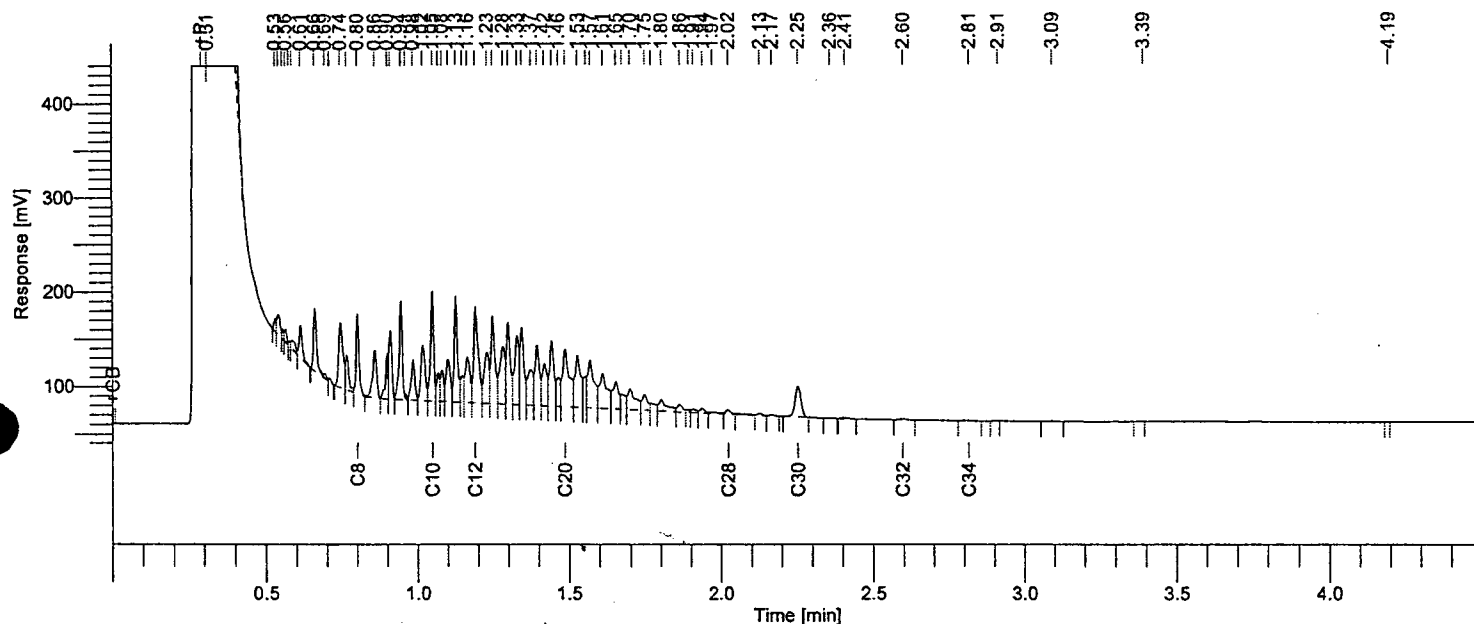
DATE

Software Version : 6.1.2.0.1:D19
 Operator : Turbochrom
 Sample Number : 121
 AutoSampler : BUILT-IN
 Instrument Name : TPH1
 Instrument Serial # : None
 Delay Time : 0.00 min
 Sampling Rate : 12.5000 pts/s
 Volume Injected : 1.000000 ul
 Sample Amount : 1.0000
 Data Acquisition Time : 6/26/03 4:09:08 PM

Date : 6/26/03 5:36:51 PM
 Sample Name : 10946
 Study : 2483
 Rack/Vial : 0/39
 Channel : A
 A/D mV Range : 1000
 End Time : 4.50 min
 Area Reject : 0.000000
 Dilution Factor : 20.00
 Cycle : 121

Raw Data File : D:\Data\TPH1\GTT1A121.raw <Modified>
 Result File : D:\Data\TPH1\GTT1A121.rst
 Inst Method : d:\methods\tph1extsur from D:\Data\TPH1\GTT1A121.rst
 Proc Method : D:\Methods\TPH1DRO.mth
 Calib Method : D:\Methods\TPH1DRO.mth
 Sequence File : D:\Sequence\GTT1A.seq

10946
 1:20 dilution



Analytical Method: TX1005
 Reporting Units: mg/Kg
 Matrix: soil

Component Name	Adjusted Amount	Raw Amount	Area [μV s]
Diesel	4687.7	234.4	1588355.09
Surrogate	139.8	7.0	47904.95
			1636260.04

Report stored in ASCII file: D:\Data\TPH1\GTT1A121.TX0

Software Version : 6.1.2.0.1:D19
 Operator : Turbochrom
 Sample Number : 019
 AutoSampler : BUILT-IN
 Instrument Name : TPH2
 Instrument Serial # : None
 Delay Time : 0.00 min
 Sampling Rate : 25.0000 pts/s
 Volume Injected : 1.000000 ul
 Sample Amount : 1.0000
 Data Acquisition Time : 10/10/01 10:22:15 PM

Date : 10/23/01 9:40:55 AM
 Sample Name : Fresh Crude Oil
 Study : QC14735
 Rack/Vial : 0/19
 Channel : A
 A/D mV Range : 1000
 End Time : 4.54 min
 Area Reject : 0.000000
 Dilution Factor : 400.00
 Cycle : 19

*Fresh Crude Oil
 Standard
 1:400 Dilution*

Raw Data File : D:\Data\TPH2\KWT2A019-20011015-103045.raw <Modified>

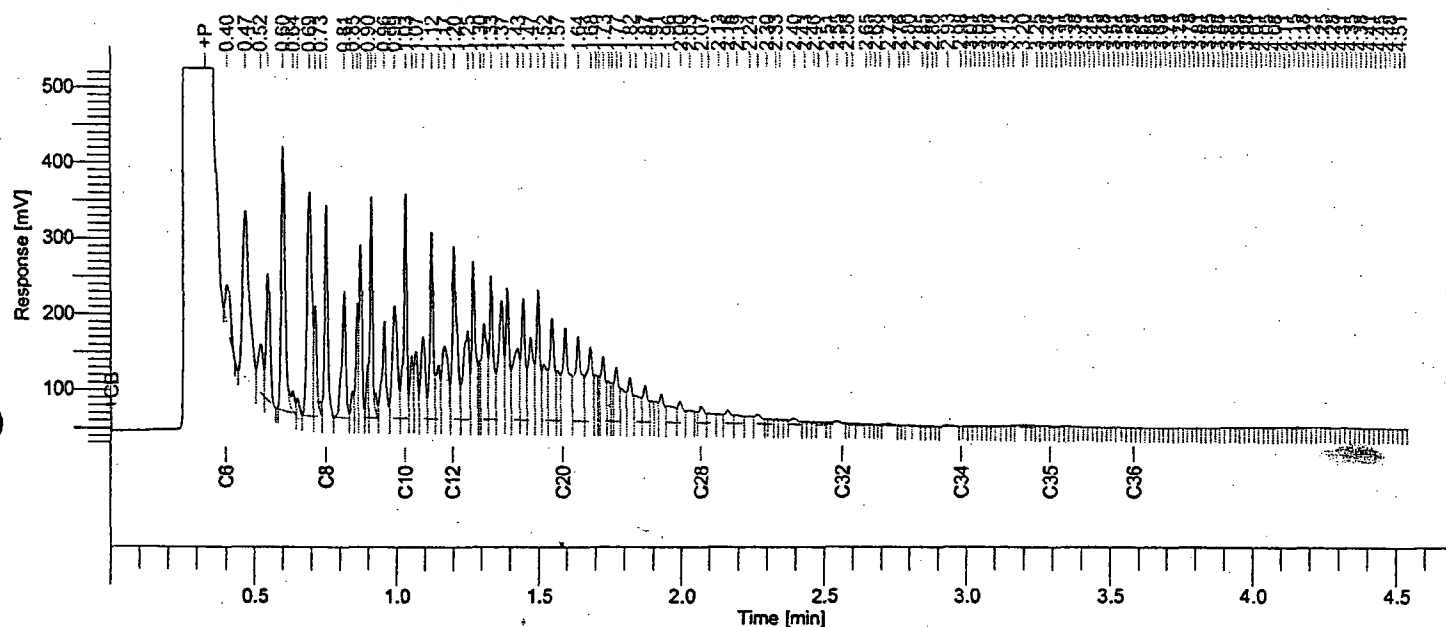
Result File : D:\Data\TPH2\KWT2A019-20011015-103048.rst

Inst Method : D:\Methods\TPH2EXTSUR from D:\Data\TPH2\KWT2A019-20011015-103048.rst

Proc Method : D:\Methods\TPH2EXTSUR.mth from D:\Data\TPH2\KWT2A019-20011015-103048.rst

Calib Method : D:\Methods\TPH2EXTSUR.mth from D:\Data\TPH2\KWT2A019-20011015-103048.rst

Sequence File : D:\Sequence\KWT2A.seq



TX1005

Analytical Method: TX1005

Reporting Units: mg/Kg

Matrix: soil

Component Name	Adjusted Amount	Raw Amount	Area [μV s]
TPH AS GASOLINE	475537.0	1188.8	4462405.81
TPH AS DIESEL	367389.7	918.5	2976773.19
C30=	6422.6	16.1	40919.37
			7480098.37

Report stored in ASCII file: D:\Data\TPH2\KWT2A019-20011015-103048.TX0

TRACE ANALYSIS, INC.

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Analytical and Quality Control Report

Frank Keifer
Arcadis Geraghty & Miller
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Report Date: June 27, 2003

Work Order: 3062303

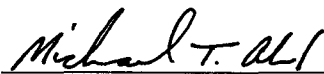
Project Location: Lovington, NM
Project Number: MT000803.0001

Enclosed are the Analytical Report and Quality Control Report for the following sample(s) submitted to TraceAnalysis, Inc.

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
10946	MW-A 70-71	soil	2003-06-16	18:12	2003-06-20
10947	MW-B 65-66	soil	2003-06-18	18:15	2003-06-20
10948	MW-C 0-2	soil	2003-06-18	09:20	2003-06-20
10949	MW-C 60-61	soil	2003-06-18	10:20	2003-06-20
10950	MW-D70-75	soil	2003-06-19	15:32	2003-06-20
10951	MW-E 70-75	soil	2003-06-20	09:47	2003-06-20

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

This report consists of a total of 16 pages and shall not be reproduced except in its entirety, without written approval of TraceAnalysis, Inc.


Dr. Blair Leftwich, Director

Analytical Report

Sample: 10946 - MW-A 70-71

Analysis: BTEX
QC Batch: 2570
Prep Batch: 2338

Analytical Method: S 8021B
Date Analyzed: 2003-06-28
Date Prepared: 2003-06-28

Prep Method: S 5035
Analyzed By: BS
Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		0.469	mg/Kg	50	0.00100
Toluene	1	30.3	mg/Kg	50	0.00100
Ethylbenzene	2	24.3	mg/Kg	50	0.00100
Xylene (isomers)	3	85.6	mg/Kg	50	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)	4	0.816	mg/Kg	50	0.0200	82	58.9 - 129
4-Bromofluorobenzene (4-BFB)	5	3.96	mg/Kg	50	0.0200	396	44.4 - 133

Sample: 10946 - MW-A 70-71

Analysis: FOC
QC Batch: 2427
Prep Batch: 2206

Analytical Method: SM D2974-87
Date Analyzed: 2003-06-26
Date Prepared: 2003-06-24

Prep Method: N/A
Analyzed By: JSW
Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
FOC		1.28	%	1	0.00

Sample: 10946 - MW-A 70-71

Analysis: PAH
QC Batch: 2667
Prep Batch: 2433

Analytical Method: S 8270C
Date Analyzed: 2003-07-02
Date Prepared: 2003-07-03

Prep Method: S 3510C
Analyzed By: RC
Prepared By: JH

Parameter	Flag	RL Result	Units	Dilution	RL
Naphthalene		<0.00594	mg/Kg	0.033	0.180
Acenaphthylene		<0.00594	mg/Kg	0.033	0.180
Acenaphthene		<0.00594	mg/Kg	0.033	0.180
Fluorene		<0.00594	mg/Kg	0.033	0.180
Phenanthrene		<0.00594	mg/Kg	0.033	0.180
Anthracene		<0.00594	mg/Kg	0.033	0.180
Fluoranthene		<0.00594	mg/Kg	0.033	0.180
Pyrene		0.0544	mg/Kg	0.033	0.180
Benzo(a)anthracene		<0.00594	mg/Kg	0.033	0.180
Chrysene		<0.00594	mg/Kg	0.033	0.180
Benzo(b)fluoranthene		<0.00594	mg/Kg	0.033	0.180

continued ...

¹Estimated concentration. Value greater than standard curve.

²Estimated concentration. Value greater than standard curve.

³Estimated concentration. Value greater than standard curve.

⁴Changed spike amount from 0.1 to 0.02 due to dilution.

⁵High surrogate recovery due to peak interference.

sample 10946 continued ...

Parameter	Flag	RL Result	Units	Dilution	RL
Benzo(k)fluoranthene		<0.00594	mg/Kg	0.033	0.180
Benzo(a)pyrene		<0.00594	mg/Kg	0.033	0.180
Indeno(1,2,3-cd)pyrene		<0.00594	mg/Kg	0.033	0.180
Dibenzo(a,h)anthracene		<0.00594	mg/Kg	0.033	0.180
Benzo(g,h,i)perylene		<0.00594	mg/Kg	0.033	0.180

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Nitrobenzene-d5		1.39	mg/Kg	0.033	80.0	53	27.9 - 109
2-Fluorobiphenyl		1.35	mg/Kg	0.033	80.0	51	30.8 - 106
Terphenyl-d14		1.50	mg/Kg	0.033	80.0	57	40.3 - 113

Sample: 10946 - MW-A 70-71

Analysis: TPH DRO Analytical Method: Mod. 8015B Prep Method: N/A
QC Batch: 2483 Date Analyzed: 2003-06-25 Analyzed By: BP
Prep Batch: 2261 Date Prepared: 2003-06-25 Prepared By: WG

Parameter	Flag	RL Result	Units	Dilution	RL
DRO		4690	mg/Kg	20	50.0

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane	⁶	140	mg/Kg	20	7.50	93	45 - 152

Sample: 10946 - MW-A 70-71

Analysis: TPH GRO Analytical Method: S 8015B Prep Method: S 5035
QC Batch: 2572 Date Analyzed: 2003-06-28 Analyzed By: BS
Prep Batch: 2338 Date Prepared: 2003-06-28 Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
GRO		762	mg/Kg	50	0.100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)	⁷	26.9	mg/Kg	50	0.0200	2690	73 - 120
4-Bromofluorobenzene (4-BFB)	⁸	48.0	mg/Kg	50	0.0200	4800	78 - 120

Sample: 10947 - MW-B 65-66

Analysis: BTEX Analytical Method: S 8021B Prep Method: S 5035
QC Batch: 2570 Date Analyzed: 2003-06-28 Analyzed By: BS
Prep Batch: 2338 Date Prepared: 2003-06-28 Prepared By: BS

⁶Changed spike amount from 150 to 7.5 due to post prep dilution.

⁷High surrogate recovery due to peak interference. Sample was run twice.

⁸High surrogate recovery due to peak interference. Sample was run twice.

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.100	mg/Kg	100	0.00100
Toluene		13.9	mg/Kg	100	0.00100
Ethylbenzene		10.9	mg/Kg	100	0.00100
Xylene (isomers)	9	43.9	mg/Kg	100	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)	¹⁰	1.47	mg/Kg	100	0.0100	147	58.9 - 129
4-Bromofluorobenzene (4-BFB)	¹¹	2.45	mg/Kg	100	0.0100	245	44.4 - 133

Sample: 10947 - MW-B 65-66

Analysis: TPH DRO Analytical Method: Mod. 8015B Prep Method: N/A
QC Batch: 2483 Date Analyzed: 2003-06-25 Analyzed By: BP
Prep Batch: 2261 Date Prepared: 2003-06-25 Prepared By: WG

Parameter	Flag	RL Result	Units	Dilution	RL
DRO		2180	mg/Kg	1	50.0

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane	162		mg/Kg	1	150	108	45 - 152

Sample: 10947 - MW-B 65-66

Analysis: TPH GRO Analytical Method: S 8015B Prep Method: S 5035
QC Batch: 2572 Date Analyzed: 2003-06-28 Analyzed By: BS
Prep Batch: 2338 Date Prepared: 2003-06-28 Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
GRO		843	mg/Kg	100	0.100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)	¹²	68.0	mg/Kg	100	0.0100	6800	73 - 120
4-Bromofluorobenzene (4-BFB)	¹³	15.7	mg/Kg	100	0.0100	1570	78 - 120

Sample: 10948 - MW-C 0-2

Analysis: BTEX Analytical Method: S 8021B Prep Method: S 5035
QC Batch: 2517 Date Analyzed: 2003-06-26 Analyzed By: BS
Prep Batch: 2289 Date Prepared: 2003-06-26 Prepared By: BS

⁹Estimated concentration. Value greater than standard curve.

¹⁰High surrogate recovery due to peak interference.

¹¹High surrogate recovery due to peak interference.

¹²High surrogate recovery due to peak interference. Sample was run twice.

¹³High surrogate recovery due to peak interference. Sample was run twice.

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.0100	mg/Kg	10	0.00100
Toluene		0.0410	mg/Kg	10	0.00100
Ethylbenzene		0.0638	mg/Kg	10	0.00100
Xylene (isomers)		0.166	mg/Kg	10	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.845	mg/Kg	10	0.100	84	58.9 - 129
4-Bromofluorobenzene (4-BFB)		1.02	mg/Kg	10	0.100	102	44.4 - 133

Sample: 10948 - MW-C 0-2

Analysis: TPH DRO Analytical Method: Mod. 8015B Prep Method: N/A
QC Batch: 2483 Date Analyzed: 2003-06-25 Analyzed By: BP
Prep Batch: 2261 Date Prepared: 2003-06-25 Prepared By: WG

Parameter	Flag	RL Result	Units	Dilution	RL
DRO		<50.0	mg/Kg	1	50.0

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		133	mg/Kg	1	150	88	45 - 152

Sample: 10948 - MW-C 0-2

Analysis: TPH GRO Analytical Method: S 8015B Prep Method: S 5035
QC Batch: 2531 Date Analyzed: 2003-06-26 Analyzed By: BS
Prep Batch: 2289 Date Prepared: 2003-06-26 Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
GRO		14.1	mg/Kg	10	0.100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.919	mg/Kg	10	0.100	92	73 - 120
4-Bromofluorobenzene (4-BFB)		1.14	mg/Kg	10	0.100	114	78 - 120

Sample: 10949 - MW-C 60-61

Analysis: BTEX Analytical Method: S 8021B Prep Method: S 5035
QC Batch: 2517 Date Analyzed: 2003-06-26 Analyzed By: BS
Prep Batch: 2289 Date Prepared: 2003-06-26 Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		0.0458	mg/Kg	10	0.00100
Toluene	14	4.75	mg/Kg	10	0.00100

continued ...

¹⁴Estimated concentration greater than standard curve.

sample 10949 continued ...

Parameter	Flag	RL Result	Units	Dilution	RL
Ethylbenzene	15	5.54	mg/Kg	10	0.00100
Xylene (isomers)	16	25.3	mg/Kg	10	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.854	mg/Kg	10	0.100	85	58.9 - 129
4-Bromofluorobenzene (4-BFB)	17	4.60	mg/Kg	10	0.100	460	44.4 - 133

Sample: 10949 - MW-C 60-61

Analysis: TPH DRO Analytical Method: Mod. 8015B Prep Method: N/A
QC Batch: 2483 Date Analyzed: 2003-06-25 Analyzed By: BP
Prep Batch: 2261 Date Prepared: 2003-06-25 Prepared By: WG

Parameter	Flag	RL Result	Units	Dilution	RL
DRO		2930	mg/Kg	5	50.0

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane	18	148	mg/Kg	5	30.0	99	45 - 152

Sample: 10949 - MW-C 60-61

Analysis: TPH GRO Analytical Method: S 8015B Prep Method: S 5035
QC Batch: 2531 Date Analyzed: 2003-06-26 Analyzed By: BS
Prep Batch: 2289 Date Prepared: 2003-06-26 Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
GRO		153	mg/Kg	10	0.100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		1.03	mg/Kg	10	0.100	103	73 - 120
4-Bromofluorobenzene (4-BFB)	19	13.1	mg/Kg	10	0.100	1310	78 - 120

Sample: 10950 - MW-D70-75

Analysis: BTEX Analytical Method: S 8021B Prep Method: S 5035
QC Batch: 2517 Date Analyzed: 2003-06-26 Analyzed By: BS
Prep Batch: 2289 Date Prepared: 2003-06-26 Prepared By: BS

¹⁵Estimated concentration greater than standard curve.

¹⁶Estimated concentration greater than standard curve.

¹⁷High surrogate recovery due to peak interference.

¹⁸Changed spike amount from 150 to 30 due to post prep dilution.

¹⁹High surrogate recovery due to peak interference. ICV, CCV show the method to be in control.

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.0100	mg/Kg	10	0.00100
Toluene		<0.0100	mg/Kg	10	0.00100
Ethylbenzene		<0.0100	mg/Kg	10	0.00100
Xylene (isomers)		0.0672	mg/Kg	10	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.863	mg/Kg	10	0.100	86	58.9 - 129
4-Bromofluorobenzene (4-BFB)		0.887	mg/Kg	10	0.100	89	44.4 - 133

Sample: 10950 - MW-D70-75

Analysis: TPH DRO	Analytical Method: Mod. 8015B	Prep Method: N/A
QC Batch: 2483	Date Analyzed: 2003-06-25	Analyzed By: BP
Prep Batch: 2261	Date Prepared: 2003-06-25	Prepared By: WG

Parameter	Flag	RL Result	Units	Dilution	RL
DRO		<50.0	mg/Kg	1	50.0

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		139	mg/Kg	1	150	93	45 - 152

Sample: 10950 - MW-D70-75

Analysis: TPH GRO	Analytical Method: S 8015B	Prep Method: S 5035
QC Batch: 2531	Date Analyzed: 2003-06-26	Analyzed By: BS
Prep Batch: 2289	Date Prepared: 2003-06-26	Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
GRO		10.7	mg/Kg	10	0.100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.859	mg/Kg	10	0.100	86	73 - 120
4-Bromofluorobenzene (4-BFB)		0.950	mg/Kg	10	0.100	95	78 - 120

Sample: 10951 - MW-E 70-75

Analysis: BTEX	Analytical Method: S 8021B	Prep Method: S 5035
QC Batch: 2517	Date Analyzed: 2003-06-26	Analyzed By: BS
Prep Batch: 2289	Date Prepared: 2003-06-26	Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.0100	mg/Kg	10	0.00100
Toluene		<0.0100	mg/Kg	10	0.00100
Ethylbenzene		<0.0100	mg/Kg	10	0.00100

continued ...

sample 10951 continued ...

Parameter	Flag	RL Result	Units	Dilution	RL
Xylene (isomers)		0.0258	mg/Kg	10	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.907	mg/Kg	10	0.100	91	58.9 - 129
4-Bromofluorobenzene (4-BFB)		0.873	mg/Kg	10	0.100	87	44.4 - 133

Sample: 10951 - MW-E 70-75

Analysis:	FOC	Analytical Method:	SM D2974-87	Prep Method:	N/A
QC Batch:	2427	Date Analyzed:	2003-06-26	Analyzed By:	JSW
Prep Batch:	2206	Date Prepared:	2003-06-24	Prepared By:	JSW

Parameter	Flag	RL Result	Units	Dilution	RL
FOC		0.960	%	1	0.00

Sample: 10951 - MW-E 70-75

Analysis:	TPH DRO	Analytical Method:	Mod. 8015B	Prep Method:	N/A
QC Batch:	2483	Date Analyzed:	2003-06-25	Analyzed By:	BP
Prep Batch:	2261	Date Prepared:	2003-06-25	Prepared By:	WG

Parameter	Flag	RL Result	Units	Dilution	RL
DRO		<50.0	mg/Kg	1	50.0

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		129	mg/Kg	1	150	86	45 - 152

Sample: 10951 - MW-E 70-75

Analysis:	TPH GRO	Analytical Method:	S 8015B	Prep Method:	S 5035
QC Batch:	2531	Date Analyzed:	2003-06-26	Analyzed By:	BS
Prep Batch:	2289	Date Prepared:	2003-06-26	Prepared By:	BS

Parameter	Flag	RL Result	Units	Dilution	RL
GRO		3.62	mg/Kg	10	0.100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.787	mg/Kg	10	0.100	79	73 - 120
4-Bromofluorobenzene (4-BFB)		0.839	mg/Kg	10	0.100	84	78 - 120

Method Blank (1) QC Batch: 2483

Parameter	Flag	Result	Units	RL
DRO		<50.0	mg/Kg	50

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		122	mg/Kg	1	150	81	45 - 152

Method Blank (1) QC Batch: 2517

Parameter	Flag	Result	Units	RL
Benzene		<0.0100	mg/Kg	0.001
Toluene		<0.0100	mg/Kg	0.001
Ethylbenzene		<0.0100	mg/Kg	0.001
Xylene (isomers)		<0.0100	mg/Kg	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.947	mg/Kg	10	0.100	95	58.9 - 129
4-Bromofluorobenzene (4-BFB)		0.819	mg/Kg	10	0.100	82	44.4 - 133

Method Blank (1) QC Batch: 2531

Parameter	Flag	Result	Units	RL
GRO		1.11	mg/Kg	0.1

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.896	mg/Kg	10	0.100	90	73 - 120
4-Bromofluorobenzene (4-BFB)		0.891	mg/Kg	10	0.100	89	78 - 120

Method Blank (1) QC Batch: 2570

Parameter	Flag	Result	Units	RL
Benzene		<0.0100	mg/Kg	0.001
Toluene		<0.0100	mg/Kg	0.001
Ethylbenzene		<0.0100	mg/Kg	0.001
Xylene (isomers)		<0.0100	mg/Kg	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.982	mg/Kg	10	0.100	98	58.9 - 129
4-Bromofluorobenzene (4-BFB)		0.981	mg/Kg	10	0.100	98	44.4 - 133

Method Blank (1) QC Batch: 2572

Parameter	Flag	Result	Units	RL
GRO		1.46	mg/Kg	0.1

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.901	mg/Kg	10	0.100	90	73 - 120
4-Bromofluorobenzene (4-BFB)		1.05	mg/Kg	10	0.100	105	78 - 120

Method Blank (1) QC Batch: 2667

Parameter	Flag	Result	Units	RL
Naphthalene		<0.00594	mg/Kg	0.18
Acenaphthylene		<0.00594	mg/Kg	0.18
Acenaphthene		<0.00594	mg/Kg	0.18
Fluorene		<0.00594	mg/Kg	0.18
Phenanthrene		<0.00594	mg/Kg	0.18
Anthracene		<0.00594	mg/Kg	0.18
Fluoranthene		<0.00594	mg/Kg	0.18
Pyrene		<0.00594	mg/Kg	0.18
Benzo(a)anthracene		<0.00594	mg/Kg	0.18
Chrysene		<0.00594	mg/Kg	0.18
Benzo(b)fluoranthene		<0.00594	mg/Kg	0.18
Benzo(k)fluoranthene		<0.00594	mg/Kg	0.18
Benzo(a)pyrene		<0.00594	mg/Kg	0.18
Indeno(1,2,3-cd)pyrene		<0.00594	mg/Kg	0.18
Dibenzo(a,h)anthracene		<0.00594	mg/Kg	0.18
Benzo(g,h,i)perylene		<0.00594	mg/Kg	0.18

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Nitrobenzene-d5		1.99	mg/Kg	0.033	80.0	75	27.9 - 109
2-Fluorobiphenyl		1.86	mg/Kg	0.033	80.0	70	30.8 - 106
Terphenyl-d14		2.03	mg/Kg	0.033	80.0	77	40.3 - 113

Duplicate (1) QC Batch: 2427

Param	Duplicate Result	Sample Result	Units	Dilution	RPD	RPD Limit
FOC	0.930	0.960	%	1	3	24

Laboratory Control Spike (LCS-1) QC Batch: 2483

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
DRO ²⁰	268	321	mg/Kg	1	250	<21.1	107	18	68 - 126	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

²⁰LCS recovery within range. RPD within 20%

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
n-Triacontane	121	128	mg/Kg	1	150	81	85	33 - 144

Laboratory Control Spike (LCS-1) QC Batch: 2517

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Benzene	0.955	0.965	mg/Kg	10	0.100	<0.00131	96	1	83.4 - 112	35
Toluene	0.964	0.967	mg/Kg	10	0.100	<0.00365	96	0	82.6 - 112	36
Ethylbenzene	0.935	0.933	mg/Kg	10	0.100	<0.00492	93	0	80.3 - 114	40
Xylene (isomers)	2.86	2.86	mg/Kg	10	0.300	<0.00314	95	0	78.9 - 114	39

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.933	0.872	mg/Kg	10	0.100	93	87	74.7 - 114
4-Bromofluorobenzene (4-BFB)	0.932	0.897	mg/Kg	10	0.100	93	90	76.2 - 110

Laboratory Control Spike (LCS-1) QC Batch: 2531

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
GRO	9.68	8.20	mg/Kg	10	1.00	<0.381	97	16	76.3 - 125	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	1.10	0.931	mg/Kg	10	0.100	110	93	73.7 - 114
4-Bromofluorobenzene (4-BFB)	1.01	0.916	mg/Kg	10	0.100	101	92	76.2 - 110

Laboratory Control Spike (LCS-1) QC Batch: 2570

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Benzene	0.875	0.902	mg/Kg	10	0.100	<0.00131	88	3	83.4 - 112	35
Toluene	0.897	0.926	mg/Kg	10	0.100	<0.00365	90	3	82.6 - 112	36
Ethylbenzene	0.882	0.896	mg/Kg	10	0.100	<0.00492	88	2	80.3 - 114	40
Xylene (isomers)	2.70	2.75	mg/Kg	10	0.300	<0.00314	90	2	78.9 - 114	39

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.975	0.970	mg/Kg	10	0.100	98	97	74.7 - 114
4-Bromofluorobenzene (4-BFB)	1.01	0.938	mg/Kg	10	0.100	101	94	76.2 - 110

Laboratory Control Spike (LCS-1) QC Batch: 2572

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
GRO	0.937	0.887	mg/Kg	1	1.00	<0.0381	94	5	76.3 - 125	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate		LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)		0.0823	0.109	mg/Kg	1	0.100	82	109	73.7 - 114
4-Bromofluorobenzene (4-BFB)	2122	0.122	0.117	mg/Kg	1	0.100	122	117	76.2 - 110

Laboratory Control Spike (LCS-1) QC Batch: 2667

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit	
Naphthalene	60.1	60.4	mg/Kg	1	80.0	<0.00150	75	0	11.2 - 103	20	
Acenaphthylene	68.4	68.6	mg/Kg	1	80.0	<0.00136	86	0	27.5 - 110	20	
Acenaphthene	65.5	64.6	mg/Kg	1	80.0	<0.00158	82	1	24.3 - 108	20	
Fluorene	66.0	65.4	mg/Kg	1	80.0	<0.00210	82	1	28.8 - 109	20	
Phenanthrene	65.5	64.9	mg/Kg	1	80.0	<0.00144	82	1	37.4 - 110	20	
Anthracene	62.5	61.7	mg/Kg	1	80.0	<0.00163	78	1	33.9 - 102	20	
Fluoranthene	68.6	68.0	mg/Kg	1	80.0	<0.00183	86	1	41.9 - 108	20	
Pyrene	64.5	65.1	mg/Kg	1	80.0	<0.00313	81	1	43.6 - 120	20	
Benzo(a)anthracene	64.6	64.4	mg/Kg	1	80.0	<0.00348	81	0	47.2 - 106	20	
Chrysene	2324	75.9	75.9	mg/Kg	1	80.0	<0.00412	95	0	38 - 91.5	20
Benzo(b)fluoranthene	62.0	62.3	mg/Kg	1	80.0	<0.00592	78	0	28.2 - 109	20	
Benzo(k)fluoranthene	62.9	62.1	mg/Kg	1	80.0	<0.00358	79	1	43.7 - 121	20	
Benzo(a)pyrene	63.9	62.9	mg/Kg	1	80.0	<0.00466	80	2	41.9 - 114	20	
Indeno(1,2,3-cd)pyrene	71.3	70.2	mg/Kg	1	80.0	<0.00531	89	2	36.6 - 129	20	
Dibenzo(a,h)anthracene	76.0	74.9	mg/Kg	1	80.0	<0.00578	95	1	25.3 - 102	20	
Benzo(g,h,i)perylene	68.4	67.7	mg/Kg	1	80.0	<0.00486	86	1	33.8 - 147	20	

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Nitrobenzene-d5	64.3	65.6	mg/Kg	1	80.0	80	82	0 - 128
2-Fluorobiphenyl	61.1	60.0	mg/Kg	1	80.0	76	75	14.7 - 122
Terphenyl-d14	60.8	61.1	mg/Kg	1	80.0	76	76	35 - 141

Matrix Spike (MS-1) QC Batch: 2483

Param	MS Result	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
DRO	239	243	mg/Kg	1	250	<21.1	96	2	65 - 114	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	MS Result	MSD Result	Units	Dil.	Spike Amount	MS Rec.	MSD Rec.	Rec. Limit
n-Triacontane	129	131	mg/Kg	1	150	86	87	33 - 144

²¹High surrogate recovery due to peak interference.

²²High surrogate recovery due to peak interference.

²³The average of the spike compound percent recoveries show that process is in control.

²⁴The average of the spike compound percent recoveries show that process is in control.

Matrix Spike (MS-1) QC Batch: 2517

Param	MS Result	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Benzene	0.858	0.869	mg/Kg	10	0.100	<0.00131	86	1	58 - 107	22
Toluene	0.870	0.884	mg/Kg	10	0.100	<0.00365	87	2	59 - 110	20
Ethylbenzene	0.888	0.895	mg/Kg	10	0.100	<0.00492	89	1	58.4 - 113	15
Xylene (isomers)	2.70	2.72	mg/Kg	10	0.300	<0.00314	90	1	54.3 - 114	19

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	MS Result	MSD Result	Units	Dil.	Spike Amount	MS Rec.	MSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.771	0.718	mg/Kg	10	0.1	77	72	50.6 - 114
4-Bromofluorobenzene (4-BFB)	0.817	0.747	mg/Kg	10	0.1	82	75	52 - 110

Matrix Spike (MS-1) QC Batch: 2531

Param	MS Result	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
GRO ²⁵	14.1	7.51	mg/Kg	10	1.00	<0.381	141	61	32.9 - 152	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	MS Result	MSD Result	Units	Dil.	Spike Amount	MS Rec.	MSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	²⁶ 0.667	0.726	mg/Kg	10	0.1	67	73	50.6 - 114
4-Bromofluorobenzene (4-BFB)	²⁷ 1.07	0.909	mg/Kg	10	0.1	107	91	52 - 110

Matrix Spike (MS-1) QC Batch: 2570

Param	MS Result	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Benzene	0.918	0.851	mg/Kg	10	0.100	<0.00131	92	8	58 - 107	22
Toluene ²⁸	1.00	0.726	mg/Kg	10	0.100	<0.00365	100	32	59 - 110	20
Ethylbenzene	0.923	0.896	mg/Kg	10	0.100	<0.00492	92	3	58.4 - 113	15
Xylene (isomers)	3.32	3.19	mg/Kg	10	0.300	<0.00314	111	4	54.3 - 114	19

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	MS Result	MSD Result	Units	Dil.	Spike Amount	MS Rec.	MSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.948	0.868	mg/Kg	10	0.1	95	87	50.6 - 114
4-Bromofluorobenzene (4-BFB)	²⁹ 1.66	1.60	mg/Kg	10	0.1	166	160	52 - 110

Matrix Spike (MS-1) QC Batch: 2572

²⁵RPD outside normal limits. LCS, LCSD show the method to be in control.

²⁶Low surrogate recovery due to matrix interference. ICV, CCV show the method to be in control.

²⁷Low surrogate recovery due to matrix interference. ICV, CCV show the method to be in control.

²⁸RPD outside normal limits. ICV, CCV show the method to be in control.

²⁹High surrogate recovery due to peak interference.

³⁰High surrogate recovery due to peak interference.

Param	MS Result	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
GRO	³¹³² 159	168	mg/Kg	10	1.00	127.655	313	6	32.9 - 152	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	MS Result	MSD Result	Units	Dil.	Spike Amount	MS Rec.	MSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	³³³⁴ 2.07	2.28	mg/Kg	10	0.1	129	150	50.6 - 114
4-Bromofluorobenzene (4-BFB)	³⁵³⁶ 15.6	22.7	mg/Kg	10	0.1	553	1263	52 - 110

Standard (ICV-1) QC Batch: 2483

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
DRO		mg/Kg	250	277	111	75 - 125	2003-06-25

Standard (CCV-1) QC Batch: 2483

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
DRO		mg/Kg	250	279	111	75 - 125	2003-06-25

Standard (ICV-1) QC Batch: 2517

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0989	99	85 - 115	2003-06-26
Toluene		mg/L	0.100	0.0987	99	85 - 115	2003-06-26
Ethylbenzene		mg/L	0.100	0.0963	96	85 - 115	2003-06-26
Xylene (isomers)		mg/L	0.300	0.294	98	85 - 115	2003-06-26

Standard (CCV-1) QC Batch: 2517

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0957	96	85 - 115	2003-06-26
Toluene		mg/L	0.100	0.0962	96	85 - 115	2003-06-26
Ethylbenzene		mg/L	0.100	0.0933	93	85 - 115	2003-06-26
Xylene (isomers)		mg/L	0.300	0.287	96	85 - 115	2003-06-26

Standard (ICV-1) QC Batch: 2531

³¹Outside normal limits due to matrix interference. LCS, LCSD, show the method to be in control.

³²Outside normal limits due to matrix interference. LCS, LCSD show the method to be in control.

³³High surrogate recovery due to peak interference.

³⁴High surrogate recovery due to peak interference.

³⁵High surrogate recovery due to peak interference.

³⁶High surrogate recovery due to peak interference.

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
GRO		mg/L	1.00	0.876	88	85 - 115	2003-06-26

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limit
Trifluorotoluene (TFT)		0.102	mg/L	1	0.100	102	73 - 120
4-Bromofluorobenzene (4-BFB)		0.0888	mg/L	1	0.100	89	78 - 120

Standard (CCV-1) QC Batch: 2531

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
GRO		mg/L	1.00	0.865	86	85 - 115	2003-06-26

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limit
Trifluorotoluene (TFT)		0.0904	mg/L	1	0.100	90	73 - 120
4-Bromofluorobenzene (4-BFB)		0.0954	mg/L	1	0.100	95	78 - 120

Standard (ICV-1) QC Batch: 2570

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0922	92	85 - 115	2003-06-28
Toluene		mg/L	0.100	0.0927	93	85 - 115	2003-06-28
Ethylbenzene		mg/L	0.100	0.0914	91	85 - 115	2003-06-28
Xylene (isomers)		mg/L	0.300	0.279	93	85 - 115	2003-06-28

Standard (CCV-1) QC Batch: 2570

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0967	97	85 - 115	2003-06-28
Toluene		mg/L	0.100	0.0992	99	85 - 115	2003-06-28
Ethylbenzene		mg/L	0.100	0.0949	95	85 - 115	2003-06-28
Xylene (isomers)		mg/L	0.300	0.289	96	85 - 115	2003-06-28

Standard (ICV-1) QC Batch: 2572

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
GRO		mg/L	1.00	1.07	107	85 - 115	2003-06-28

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limit
Trifluorotoluene (TFT)	³⁷	0.131	mg/L	1	0.100	131	73 - 120

continued ...

³⁷High surrogate recovery due to peak interference.

standard continued ...

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limit
4-Bromofluorobenzene (4-BFB)	³⁸	0.121	mg/L	1	0.100	121	78 - 120

Standard (CCV-1) QC Batch: 2572

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
GRO		mg/L	1.00	0.924	92	85 - 115	2003-06-28

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limit
Trifluorotoluene (TFT)		0.104	mg/L	1	0.100	104	73 - 120
4-Bromofluorobenzene (4-BFB)		0.113	mg/L	1	0.100	113	78 - 120

Standard (CCV-1) QC Batch: 2667

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Naphthalene		mg/Kg	60.0	59.5	99	80 - 120	2003-07-02
Acenaphthylene		mg/Kg	60.0	60.2	100	80 - 120	2003-07-02
Acenaphthene		mg/Kg	60.0	60.7	101	80 - 120	2003-07-02
Fluorene		mg/Kg	60.0	61.0	102	80 - 120	2003-07-02
Phenanthrene		mg/Kg	60.0	59.7	100	80 - 120	2003-07-02
Anthracene		mg/Kg	60.0	60.1	100	80 - 120	2003-07-02
Fluoranthene		mg/Kg	60.0	60.4	101	80 - 120	2003-07-02
Pyrene		mg/Kg	60.0	59.7	100	80 - 120	2003-07-02
Benzo(a)anthracene		mg/Kg	60.0	59.9	100	80 - 120	2003-07-02
Chrysene		mg/Kg	60.0	59.3	99	80 - 120	2003-07-02
Benzo(b)fluoranthene		mg/Kg	60.0	59.1	98	80 - 120	2003-07-02
Benzo(k)fluoranthene		mg/Kg	60.0	65.5	109	80 - 120	2003-07-02
Benzo(a)pyrene		mg/Kg	60.0	61.6	103	80 - 120	2003-07-02
Indeno(1,2,3-cd)pyrene		mg/Kg	60.0	62.8	105	80 - 120	2003-07-02
Dibenzo(a,h)anthracene		mg/Kg	60.0	63.1	105	80 - 120	2003-07-02
Benzo(g,h,i)perylene		mg/Kg	60.0	63.0	105	80 - 120	2003-07-02

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limit
Nitrobenzene-d5		62.5	mg/Kg	1	60.0	104	80 - 120
2-Fluorobiphenyl		58.7	mg/Kg	1	60.0	98	80 - 120
Terphenyl-d14		59.9	mg/Kg	1	60.0	100	80 - 120

³⁸High surrogate recovery due to peak interference.

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ARCADIS GERAGHTY & MILLER

Laboratory Task Order No./P.O. No.

CHAIN-OF-CUSTODY RECORD

Page 1 of 1

Project Number/Name	MT 000 803,000/
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Project Location Livingston NM

Laboratory face

Project Manager Frank Kieffer

Sampler(s)/Affiliation Ralph Lang

Sample ID/Location	Matrix	Date/Time Sampled	Time Lab ID	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000
Sample Matrix:	L = Liquid;	S = Solid;	A = Air																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								

Sample Matrix: L = Liquid; S = Solid; A = Air

Relinquished by: Robert L. Searcy
Received by: Robert L. Searcy

Organization: ARCADIS
Organization: Force Majeur

Date 6/20/03
Date 6/20/07

Time 16:20

Time 16:20

Seal Intact?	
Yes	No
	N/A

Relinquished by: _____

Organization:

Date: _____

Time

Seal Intact?

Read by: _____
 Date: _____

Organization:

Date: _____

Time

Yes	No	N/A

Deviations/Remarks:

RAF 7/203

☐ In Person

☐ Common Carrier

☐ Lab Courier

☐ Other

SPECIFY

SPECIES

AG 05-059



ARCADIS GERAGHTY & MILLER

Laboratory Task Order No./P.O. No.:

CHAIN-OF-CUSTODY RECORD

Page of

Project Number/Name MT000803,0001

Project Location	Livingston NM Pure Inc
------------------	------------------------

Laboratory Trace

Project Manager Frank Kieffer

Sampler(s)/Affiliation Baylor Univ

[illegible]

Sample Matrix: L = Liquid; S = Solid; A = Air

Containers		Seal Intact?
Relinquished by:	Organization:	Date
Received by:	Organization:	Date
Relinquished by: <u>[Signature]</u>	Organization: <u>ARCADIS</u>	Date <u>12/10/03</u> Time <u>16:20</u>
Received by: <u>[Signature]</u>	Organization: <u>Free Press</u>	Date <u>12/10/03</u> Time <u>16:30</u>

Relinquished by: _____	Organization: _____	Date: ____/____/____	Time: ____	Seal Intact?
Received by: _____	Organization: _____	Date: ____/____/____	Time: ____	Yes No N/A

Special Instructions/Remarks:

Delivery Method: ☐ In Person☐ Common Carrier.☐ Lab Courier☐ Other:

SPECIFY

SPECIFY

AG 05-0597

Summary Report

Frank Kieffer
Arcadis Geraghty & Miller
1004 N. Big Spring St.
Suite 300
Midland, TX 79701

RECEIVED

AUG 01 2003

ARCADIS Geraghty & Miller

Report Date: July 28, 2003

Work Order: 3070111

Project Location: Lovington, NM
Project Number: MT000803.0001

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
11762	MW F 75-76	soil	2003-06-23	14:20	2003-07-01
11763	MW G 0-1	soil	2003-06-24	09:00	2003-07-01
11764	MW G 71-72	soil	2003-06-24	11:30	2003-07-01
11765	MW H 0-0.5	soil	2003-06-24	15:30	2003-07-01
11766	MW H 20-21.5	soil	2003-06-24	16:00	2003-07-01
11767	MW H 40-41	soil	2003-06-24	16:30	2003-07-01
11768	MW H 74-75	soil	2003-06-24	18:22	2003-07-01
11769	MW I 55-56	soil	2003-06-25	14:17	2003-07-01
11770	MW I 70-71	soil	2003-06-25	15:00	2003-07-01
11771	MW I 10-15	soil	2003-06-25	13:30	2003-07-01
11772	MW J 55-60	soil	2003-06-26	09:00	2003-07-01
11773	MW J 75-76	soil	2003-06-26	09:15	2003-07-01
11774	MW L 0-0.3	soil	2003-06-26	13:50	2003-07-01
11775	MW L 74-75	soil	2003-06-26	15:00	2003-07-01
11776	MW M 0-0.5	soil	2003-06-27	08:20	2003-07-01
11777	MW M 74-75	soil	2003-06-27	09:20	2003-07-01
11778	MW N 0-0.3	soil	2003-06-27	14:10	2003-07-01
11779	MW N 5-10	soil	2003-06-27	14:20	2003-07-01
11780	MW N 74-75	soil	2003-06-27	14:45	2003-07-01
11781	Trip Blank	water	2003-06-27	00:00	2003-07-01

Sample - Field Code	BTEX				TPH DRO	TPH GRO
	Benzene (mg/Kg)(mg/L)	Toluene (mg/Kg)(mg/L)	Ethylbenzene (mg/Kg)(mg/L)	Xylene (isomers) (mg/Kg)(mg/L)	DRO (mg/Kg)	GRO (mg/Kg)
11762 - MW F 75-76	<0.0100	<0.0100	<0.0100	<0.0100	<50.0	13.0
11763 - MW G 0-1	<0.0100	<0.0100	<0.0100	<0.0100	<50.0	13.7
11765 - MW H 0-0.5	<0.0100	<0.0100	<0.0100	<0.0100	<50.0	2.90
11766 - MW H 20-21.5	2.72	9.39	3.55	25.7	162	201
11767 - MW H 40-41	<0.0100	0.709	0.611	4.64	726	101
11768 - MW H 74-75	8.08	65.1	26.9	87.7	3970	793
11769 - MW I 55-56	1.08	7.34	4.62	16.1	1500	188
11770 - MW I 70-71	<0.0500	0.173	0.603	2.06	208	43.9
11771 - MW I 10-15	<0.0100	<0.0100	<0.0100	<0.0100	<50.0	15.4
11772 - MW J 55-60	<0.0100	<0.0100	<0.0100	<0.0100	<50.0	2.92
11773 - MW J 75-76	<0.0100	<0.0100	<0.0100	<0.0100	<50.0	13.0
11774 - MW L 0-0.3	<0.0100	<0.0100	<0.0100	<0.0100	<50.0	13.9

continued ...

... continued

Sample - Field Code	BTX				TPH DRO DRO	TPH GRO GRO
	Benzene (mg/Kg)(mg/L)	Toluene (mg/Kg)(mg/L)	Ethylbenzene (mg/Kg)(mg/L)	Xylene (isomers) (mg/Kg)(mg/L)		
11775 - MW L 74-75	<0.0100	<0.0100	<0.0100	<0.0100	<50.0	14.3
11776 - MW M 0-0.5	<0.0500	<0.0500	<0.0500	<0.0500	<50.0	14.8
11777 - MW M 74-75	<0.0100	<0.0100	<0.0100	<0.0100	<50.0	13.1
11778 - MW N 0-0.3	<0.0100	0.0160	<0.0100	<0.0100	<50.0	14.0
11779 - MW N 5-10	<0.0100	<0.0100	<0.0100	<0.0100	<50.0	13.3
11780 - MW N 74-75	<0.0100	<0.0100	<0.0100	<0.0100	<50.0	13.7
11781 - Trip Blank	<0.00100	0.00160	<0.00100	<0.00100		

Sample: 11762 - MW F 75-76

Param	Flag	Result	Units	RL
FOC		0.700	%	0.00
Naphthalene		<0.00594	mg/Kg	0.180
Acenaphthylene		<0.00594	mg/Kg	0.180
Acenaphthene		<0.00594	mg/Kg	0.180
Fluorene		<0.00594	mg/Kg	0.180
Phenanthrene		0.0241	mg/Kg	0.180
Anthracene		0.00594	mg/Kg	0.180
Fluoranthene		0.0356	mg/Kg	0.180
Pyrene		0.0380	mg/Kg	0.180
Benzo(a)anthracene		0.0135	mg/Kg	0.180
Chrysene		0.0208	mg/Kg	0.180
Benzo(b)fluoranthene		0.0158	mg/Kg	0.180
Benzo(k)fluoranthene		0.0116	mg/Kg	0.180
Benzo(a)pyrene		<0.00594	mg/Kg	0.180
Indeno(1,2,3-cd)pyrene		<0.00594	mg/Kg	0.180
Dibenzo(a,h)anthracene		<0.00594	mg/Kg	0.180
Benzo(g,h,i)perylene		<0.00594	mg/Kg	0.180

Sample: 11764 - MW G 71-72

Param	Flag	Result	Units	RL
FOC		0.570	%	0.00

Sample: 11766 - MW H 20-21.5

Param	Flag	Result	Units	RL
FOC		0.580	%	0.00
Naphthalene		0.422	mg/Kg	0.180
Acenaphthylene		<0.00594	mg/Kg	0.180
Acenaphthene		<0.00594	mg/Kg	0.180
Fluorene		<0.00594	mg/Kg	0.180
Phenanthrene		0.224	mg/Kg	0.180
Anthracene		<0.00594	mg/Kg	0.180
Fluoranthene		<0.00594	mg/Kg	0.180
Pyrene		<0.00594	mg/Kg	0.180
Benzo(a)anthracene		<0.00594	mg/Kg	0.180
Chrysene		<0.00594	mg/Kg	0.180

continued ...

sample 11766 continued ...

Param	Flag	Result	Units	RL
Benzo(b)fluoranthene		<0.00594	mg/Kg	0.180
Benzo(k)fluoranthene		<0.00594	mg/Kg	0.180
Benzo(a)pyrene		<0.00594	mg/Kg	0.180
Indeno(1,2,3-cd)pyrene		<0.00594	mg/Kg	0.180
Dibenzo(a,h)anthracene		<0.00594	mg/Kg	0.180
Benzo(g,h,i)perylene		<0.00594	mg/Kg	0.180

Sample: 11768 - MW H 74-75

Param	Flag	Result	Units	RL
FOC		0.750	%	0.00
Naphthalene		2.79	mg/Kg	0.180
Acenaphthylene		<0.00594	mg/Kg	0.180
Acenaphthene		<0.00594	mg/Kg	0.180
Fluorene		<0.00594	mg/Kg	0.180
Phenanthrene		1.82	mg/Kg	0.180
Anthracene		<0.00594	mg/Kg	0.180
Fluoranthene		<0.00594	mg/Kg	0.180
Pyrene		<0.00594	mg/Kg	0.180
Benzo(a)anthracene		<0.00594	mg/Kg	0.180
Chrysene		<0.00594	mg/Kg	0.180
Benzo(b)fluoranthene		<0.00594	mg/Kg	0.180
Benzo(k)fluoranthene		<0.00594	mg/Kg	0.180
Benzo(a)pyrene		<0.00594	mg/Kg	0.180
Indeno(1,2,3-cd)pyrene		<0.00594	mg/Kg	0.180
Dibenzo(a,h)anthracene		<0.00594	mg/Kg	0.180
Benzo(g,h,i)perylene		<0.00594	mg/Kg	0.180

Sample: 11769 - MW I 55-56

Param	Flag	Result	Units	RL
FOC		0.790	%	0.00
Naphthalene		<0.00594	mg/Kg	0.180
Acenaphthylene		<0.00594	mg/Kg	0.180
Acenaphthene		<0.00594	mg/Kg	0.180
Fluorene		<0.00594	mg/Kg	0.180
Phenanthrene		0.237	mg/Kg	0.180
Anthracene		0.0314	mg/Kg	0.180
Fluoranthene		<0.00594	mg/Kg	0.180
Pyrene		<0.00594	mg/Kg	0.180
Benzo(a)anthracene		<0.00594	mg/Kg	0.180
Chrysene		<0.00594	mg/Kg	0.180
Benzo(b)fluoranthene		<0.00594	mg/Kg	0.180
Benzo(k)fluoranthene		<0.00594	mg/Kg	0.180
Benzo(a)pyrene		<0.00594	mg/Kg	0.180
Indeno(1,2,3-cd)pyrene		<0.00594	mg/Kg	0.180
Dibenzo(a,h)anthracene		<0.00594	mg/Kg	0.180
Benzo(g,h,i)perylene		<0.00594	mg/Kg	0.180

Sample: 11770 - MW I 70-71

Param	Flag	Result	Units	RL
FOC		1.00	%	0.00
Naphthalene		<0.00594	mg/Kg	0.180
Acenaphthylene		<0.00594	mg/Kg	0.180
Acenaphthene		<0.00594	mg/Kg	0.180
Fluorene		<0.00594	mg/Kg	0.180
Phenanthrene		0.0446	mg/Kg	0.180
Anthracene		0.00660	mg/Kg	0.180
Fluoranthene		<0.00594	mg/Kg	0.180
Pyrene		<0.00594	mg/Kg	0.180
Benzo(a)anthracene		<0.00594	mg/Kg	0.180
Chrysene		<0.00594	mg/Kg	0.180
Benzo(b)fluoranthene		<0.00594	mg/Kg	0.180
Benzo(k)fluoranthene		<0.00594	mg/Kg	0.180
Benzo(a)pyrene		<0.00594	mg/Kg	0.180
Indeno(1,2,3-cd)pyrene		<0.00594	mg/Kg	0.180
Dibenzo(a,h)anthracene		<0.00594	mg/Kg	0.180
Benzo(g,h,i)perylene		<0.00594	mg/Kg	0.180

Sample: 11773 - MW J 75-76

Param	Flag	Result	Units	RL
FOC		0.630	%	0.00
Naphthalene		<0.00594	mg/Kg	0.180
Acenaphthylene		<0.00594	mg/Kg	0.180
Acenaphthene		<0.00594	mg/Kg	0.180
Fluorene		<0.00594	mg/Kg	0.180
Phenanthrene		<0.00594	mg/Kg	0.180
Anthracene		<0.00594	mg/Kg	0.180
Fluoranthene		<0.00594	mg/Kg	0.180
Pyrene		<0.00594	mg/Kg	0.180
Benzo(a)anthracene		<0.00594	mg/Kg	0.180
Chrysene		<0.00594	mg/Kg	0.180
Benzo(b)fluoranthene		<0.00594	mg/Kg	0.180
Benzo(k)fluoranthene		<0.00594	mg/Kg	0.180
Benzo(a)pyrene		<0.00594	mg/Kg	0.180
Indeno(1,2,3-cd)pyrene		<0.00594	mg/Kg	0.180
Dibenzo(a,h)anthracene		<0.00594	mg/Kg	0.180
Benzo(g,h,i)perylene		<0.00594	mg/Kg	0.180

Sample: 11775 - MW L 74-75

Param	Flag	Result	Units	RL
FOC		0.400	%	0.00
Naphthalene		<0.00594	mg/Kg	0.180
Acenaphthylene		<0.00594	mg/Kg	0.180
Acenaphthene		<0.00594	mg/Kg	0.180
Fluorene		<0.00594	mg/Kg	0.180
Phenanthrene		<0.00594	mg/Kg	0.180
Anthracene		<0.00594	mg/Kg	0.180
Fluoranthene		<0.00594	mg/Kg	0.180

continued ...

sample 11775 continued ...

Param	Flag	Result	Units	RL
Pyrene		<0.00594	mg/Kg	0.180
Benzo(a)anthracene		<0.00594	mg/Kg	0.180
Chrysene		<0.00594	mg/Kg	0.180
Benzo(b)fluoranthene		<0.00594	mg/Kg	0.180
Benzo(k)fluoranthene		<0.00594	mg/Kg	0.180
Benzo(a)pyrene		<0.00594	mg/Kg	0.180
Indeno(1,2,3-cd)pyrene		<0.00594	mg/Kg	0.180
Dibenzo(a,h)anthracene		<0.00594	mg/Kg	0.180
Benzo(g,h,i)perylene		<0.00594	mg/Kg	0.180

Sample: 11777 - MW M 74-75

Param	Flag	Result	Units	RL
FOC		0.430	%	0.00
Naphthalene		<0.00594	mg/Kg	0.180
Acenaphthylene		<0.00594	mg/Kg	0.180
Acenaphthene		<0.00594	mg/Kg	0.180
Fluorene		<0.00594	mg/Kg	0.180
Phenanthrene		<0.00594	mg/Kg	0.180
Anthracene		<0.00594	mg/Kg	0.180
Fluoranthene		<0.00594	mg/Kg	0.180
Pyrene		<0.00594	mg/Kg	0.180
Benzo(a)anthracene		<0.00594	mg/Kg	0.180
Chrysene		<0.00594	mg/Kg	0.180
Benzo(b)fluoranthene		<0.00594	mg/Kg	0.180
Benzo(k)fluoranthene		<0.00594	mg/Kg	0.180
Benzo(a)pyrene		<0.00594	mg/Kg	0.180
Indeno(1,2,3-cd)pyrene		<0.00594	mg/Kg	0.180
Dibenzo(a,h)anthracene		<0.00594	mg/Kg	0.180
Benzo(g,h,i)perylene		<0.00594	mg/Kg	0.180

Sample: 11780 - MW N 74-75

Param	Flag	Result	Units	RL
FOC		0.510	%	0.00
Naphthalene		<0.00594	mg/Kg	0.180
Acenaphthylene		<0.00594	mg/Kg	0.180
Acenaphthene		<0.00594	mg/Kg	0.180
Fluorene		<0.00594	mg/Kg	0.180
Phenanthrene		<0.00594	mg/Kg	0.180
Anthracene		<0.00594	mg/Kg	0.180
Fluoranthene		<0.00594	mg/Kg	0.180
Pyrene		<0.00594	mg/Kg	0.180
Benzo(a)anthracene		<0.00594	mg/Kg	0.180
Chrysene		<0.00594	mg/Kg	0.180
Benzo(b)fluoranthene		<0.00594	mg/Kg	0.180
Benzo(k)fluoranthene		<0.00594	mg/Kg	0.180
Benzo(a)pyrene		<0.00594	mg/Kg	0.180
Indeno(1,2,3-cd)pyrene		<0.00594	mg/Kg	0.180
Dibenzo(a,h)anthracene		<0.00594	mg/Kg	0.180

continued ...

Report Date: July 28, 2003
MT000803.0001

Work Order: 3070111

Page Number: 6 of 6
Lovington, NM

sample 11780 continued ...

Param	Flag	Result	Units	RL
Benzo(g,h,i)perylene		<0.00594	mg/Kg	0.180

TRACE ANALYSIS, INC.

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Analytical and Quality Control Report

Frank Kieffer
Arcadis Geraghty & Miller
1004 N. Big Spring St.
Suite 300
Midland, TX 79701

Report Date: July 28, 2003

Work Order: 3070111

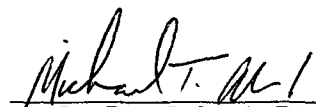
Project Location: Lovington, NM
Project Number: MT000803.0001

Enclosed are the Analytical Report and Quality Control Report for the following sample(s) submitted to TraceAnalysis, Inc.

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
11762	MW F 75-76	soil	2003-06-23	14:20	2003-07-01
11763	MW G 0-1	soil	2003-06-24	09:00	2003-07-01
11764	MW G 71-72	soil	2003-06-24	11:30	2003-07-01
11765	MW H 0-0.5	soil	2003-06-24	15:30	2003-07-01
11766	MW H 20-21.5	soil	2003-06-24	16:00	2003-07-01
11767	MW H 40-41	soil	2003-06-24	16:30	2003-07-01
11768	MW H 74-75	soil	2003-06-24	18:22	2003-07-01
11769	MW I 55-56	soil	2003-06-25	14:17	2003-07-01
11770	MW I 70-71	soil	2003-06-25	15:00	2003-07-01
11771	MW I 10-15	soil	2003-06-25	13:30	2003-07-01
11772	MW J 55-60	soil	2003-06-26	09:00	2003-07-01
11773	MW J 75-76	soil	2003-06-26	09:15	2003-07-01
11774	MW L 0-0.3	soil	2003-06-26	13:50	2003-07-01
11775	MW L 74-75	soil	2003-06-26	15:00	2003-07-01
11776	MW M 0-0.5	soil	2003-06-27	08:20	2003-07-01
11777	MW M 74-75	soil	2003-06-27	09:20	2003-07-01
11778	MW N 0-0.3	soil	2003-06-27	14:10	2003-07-01
11779	MW N 5-10	soil	2003-06-27	14:20	2003-07-01
11780	MW N 74-75	soil	2003-06-27	14:45	2003-07-01
11781	Trip Blank	water	2003-06-27	00:00	2003-07-01

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

This report consists of a total of 36 pages and shall not be reproduced except in its entirety, without written approval of TraceAnalysis, Inc.


Dr. Blair Leftwich, Director

Analytical Report

Sample: 11762 - MW F 75-76

Analysis: BTEX
QC Batch: 2658
Prep Batch: 2428

Analytical Method: S 8021B
Date Analyzed: 2003-07-01
Date Prepared: 2003-07-01

Prep Method: S 5035
Analyzed By: BS
Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.0100	mg/Kg	10	0.00100
Toluene		<0.0100	mg/Kg	10	0.00100
Ethylbenzene		<0.0100	mg/Kg	10	0.00100
Xylene (isomers)		<0.0100	mg/Kg	10	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.862	mg/Kg	10	0.100	86	58.9 - 129
4-Bromofluorobenzene (4-BFB)		0.834	mg/Kg	10	0.100	83	44.4 - 133

Sample: 11762 - MW F 75-76

Analysis: FOC
QC Batch: 2884
Prep Batch: 2608

Analytical Method: SM D2974-87
Date Analyzed: 2003-07-11
Date Prepared: 2003-07-09

Prep Method: N/A
Analyzed By: JSW
Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
FOC		0.700	%	1	0.00

Sample: 11762 - MW F 75-76

Analysis: PAH
QC Batch: 3270
Prep Batch: 2556

Analytical Method: S 8270C
Date Analyzed: 2003-07-24
Date Prepared: 2003-07-03

Prep Method: S 3510C
Analyzed By: RC
Prepared By: JH

Parameter	Flag	RL Result	Units	Dilution	RL
Naphthalene		<0.00594	mg/Kg	0.033	0.180
Acenaphthylene		<0.00594	mg/Kg	0.033	0.180
Acenaphthene		<0.00594	mg/Kg	0.033	0.180
Fluorene		<0.00594	mg/Kg	0.033	0.180
Phenanthrene		0.0241	mg/Kg	0.033	0.180
Anthracene		0.00594	mg/Kg	0.033	0.180
Fluoranthene		0.0356	mg/Kg	0.033	0.180
Pyrene		0.0380	mg/Kg	0.033	0.180
Benzo(a)anthracene		0.0135	mg/Kg	0.033	0.180
Chrysene		0.0208	mg/Kg	0.033	0.180
Benzo(b)fluoranthene		0.0158	mg/Kg	0.033	0.180
Benzo(k)fluoranthene		0.0116	mg/Kg	0.033	0.180
Benzo(a)pyrene		<0.00594	mg/Kg	0.033	0.180
Indeno(1,2,3-cd)pyrene		<0.00594	mg/Kg	0.033	0.180

continued ...

sample 11762 continued ...

Parameter	Flag	RL Result	Units	Dilution	RL
Dibenzo(a,h)anthracene		<0.00594	mg/Kg	0.033	0.180
Benzo(g,h,i)perylene		<0.00594	mg/Kg	0.033	0.180

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Nitrobenzene-d5		2.55	mg/Kg	0.033	80.0	96	27.9 - 109
2-Fluorobiphenyl		0.986	mg/Kg	0.033	80.0	37	30.8 - 106
Terphenyl-d14		1.59	mg/Kg	0.033	80.0	60	40.3 - 113

Sample: 11762 - MW F 75-76

Analysis:	TPH DRO	Analytical Method:	Mod. 8015B	Prep Method:	N/A
QC Batch:	2668	Date Analyzed:	2003-07-02	Analyzed By:	BP
Prep Batch:	2434	Date Prepared:	2003-07-02	Prepared By:	WG

Parameter	Flag	RL Result	Units	Dilution	RL
DRO		<50.0	mg/Kg	1	50.0

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		98.7	mg/Kg	1	150	66	45 - 152

Sample: 11762 - MW F 75-76

Analysis:	TPH GRO	Analytical Method:	S 8015B	Prep Method:	S 5035
QC Batch:	2719	Date Analyzed:	2003-07-03	Analyzed By:	BS
Prep Batch:	2479	Date Prepared:	2003-07-03	Prepared By:	BS

Parameter	Flag	RL Result	Units	Dilution	RL
GRO		13.0	mg/Kg	10	0.100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)	¹	1.32	mg/Kg	10	0.100	132	73 - 120
4-Bromofluorobenzene (4-BFB)		1.04	mg/Kg	10	0.100	104	78 - 120

Sample: 11763 - MW G 0-1

Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5035
QC Batch:	2658	Date Analyzed:	2003-07-01	Analyzed By:	BS
Prep Batch:	2428	Date Prepared:	2003-07-01	Prepared By:	BS

¹High surrogate recovery due to peak interference.

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.0100	mg/Kg	10	0.00100
Toluene		<0.0100	mg/Kg	10	0.00100
Ethylbenzene		<0.0100	mg/Kg	10	0.00100
Xylene (isomers)		<0.0100	mg/Kg	10	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.954	mg/Kg	10	0.100	95	58.9 - 129
4-Bromofluorobenzene (4-BFB)		0.954	mg/Kg	10	0.100	95	44.4 - 133

Sample: 11763 - MW G 0-1

Analysis: TPH DRO	Analytical Method: Mod. 8015B	Prep Method: N/A
QC Batch: 2668	Date Analyzed: 2003-07-02	Analyzed By: BP
Prep Batch: 2434	Date Prepared: 2003-07-02	Prepared By: WG

Parameter	Flag	RL Result	Units	Dilution	RL
DRO		<50.0	mg/Kg	1	50.0

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		97.5	mg/Kg	1	150	65	45 - 152

Sample: 11763 - MW G 0-1

Analysis: TPH GRO	Analytical Method: S 8015B	Prep Method: S 5035
QC Batch: 2719	Date Analyzed: 2003-07-03	Analyzed By: BS
Prep Batch: 2479	Date Prepared: 2003-07-03	Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
GRO		13.7	mg/Kg	10	0.100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)	²	1.46	mg/Kg	10	0.100	146	73 - 120
4-Bromofluorobenzene (4-BFB)		1.11	mg/Kg	10	0.100	111	78 - 120

Sample: 11764 - MW G 71-72

Analysis: FOC	Analytical Method: SM D2974-87	Prep Method: N/A
QC Batch: 2745	Date Analyzed: 2003-07-09	Analyzed By: JSW
Prep Batch: 2498	Date Prepared: 2003-07-07	Prepared By: JSW

continued ...

²High surrogate recovery due to peak interference.

sample 11764 continued ...

Parameter	Flag	RL Result	Units	Dilution	RL
Parameter	Flag	RL Result	Units	Dilution	RL
FOC		0.570	%	1	0.00

Sample: 11765 - MW H 0-0.5

Analysis: BTEX Analytical Method: S 8021B Prep Method: S 5035
QC Batch: 2658 Date Analyzed: 2003-07-01 Analyzed By: BS
Prep Batch: 2428 Date Prepared: 2003-07-01 Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.0100	mg/Kg	10	0.00100
Toluene		<0.0100	mg/Kg	10	0.00100
Ethylbenzene		<0.0100	mg/Kg	10	0.00100
Xylene (isomers)		<0.0100	mg/Kg	10	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.966	mg/Kg	10	0.100	97	58.9 - 129
4-Bromofluorobenzene (4-BFB)		0.951	mg/Kg	10	0.100	95	44.4 - 133

Sample: 11765 - MW H 0-0.5

Analysis: TPH DRO Analytical Method: Mod. 8015B Prep Method: N/A
QC Batch: 2668 Date Analyzed: 2003-07-02 Analyzed By: BP
Prep Batch: 2434 Date Prepared: 2003-07-02 Prepared By: WG

Parameter	Flag	RL Result	Units	Dilution	RL
DRO		<50.0	mg/Kg	1	50.0

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane	-	98.4	mg/Kg	1	150	66	45 - 152

Sample: 11765 - MW H 0-0.5

Analysis: TPH GRO Analytical Method: S 8015B Prep Method: S 5035
QC Batch: 2719 Date Analyzed: 2003-07-03 Analyzed By: BS
Prep Batch: 2479 Date Prepared: 2003-07-03 Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
GRO		2.90	mg/Kg	10	0.100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.870	mg/Kg	10	0.100	87	73 - 120
4-Bromofluorobenzene (4-BFB)		1.06	mg/Kg	10	0.100	106	78 - 120

Sample: 11766 - MW H 20-21.5

Analysis: BTEX
QC Batch: 2658
Prep Batch: 2428

Analytical Method: S 8021B
Date Analyzed: 2003-07-01
Date Prepared: 2003-07-01

Prep Method: S 5035
Analyzed By: BS
Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		2.72	mg/Kg	20	0.00100
Toluene	3	9.39	mg/Kg	20	0.00100
Ethylbenzene		3.55	mg/Kg	20	0.00100
Xylene (isomers)	4	25.7	mg/Kg	20	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		1.43	mg/Kg	20	0.100	72	58.9 - 129
4-Bromofluorobenzene (4-BFB)		1.89	mg/Kg	20	0.100	94	44.4 - 133

Sample: 11766 - MW H 20-21.5

Analysis: FOC
QC Batch: 2745
Prep Batch: 2498

Analytical Method: SM D2974-87
Date Analyzed: 2003-07-09
Date Prepared: 2003-07-07

Prep Method: N/A
Analyzed By: JSW
Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
FOC		0.580	%	1	0.00

Sample: 11766 - MW H 20-21.5

Analysis: PAH
QC Batch: 3270
Prep Batch: 2556

Analytical Method: S 8270C
Date Analyzed: 2003-07-24
Date Prepared: 2003-07-03

Prep Method: S 3510C
Analyzed By: RC
Prepared By: JH

Parameter	Flag	RL Result	Units	Dilution	RL
Naphthalene		0.422	mg/Kg	0.033	0.180
Acenaphthylene		<0.00594	mg/Kg	0.033	0.180
Acenaphthene		<0.00594	mg/Kg	0.033	0.180
Fluorene		<0.00594	mg/Kg	0.033	0.180
Phenanthrene		0.224	mg/Kg	0.033	0.180
Anthracene		<0.00594	mg/Kg	0.033	0.180
Fluoranthene		<0.00594	mg/Kg	0.033	0.180

continued ...

³Estimated concentration. Value greater than standard curve.

⁴Estimated concentration. Value greater than standard curve.

sample 11766 continued ...

Parameter	Flag	RL Result	Units	Dilution	RL
Pyrene		<0.00594	mg/Kg	0.033	0.180
Benzo(a)anthracene		<0.00594	mg/Kg	0.033	0.180
Chrysene		<0.00594	mg/Kg	0.033	0.180
Benzo(b)fluoranthene		<0.00594	mg/Kg	0.033	0.180
Benzo(k)fluoranthene		<0.00594	mg/Kg	0.033	0.180
Benzo(a)pyrene		<0.00594	mg/Kg	0.033	0.180
Indeno(1,2,3-cd)pyrene		<0.00594	mg/Kg	0.033	0.180
Dibenzo(a,h)anthracene		<0.00594	mg/Kg	0.033	0.180
Benzo(g,h,i)perylene		<0.00594	mg/Kg	0.033	0.180

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Nitrobenzene-d5		1.68	mg/Kg	0.033	80.0	64	27.9 - 109
2-Fluorobiphenyl		0.979	mg/Kg	0.033	80.0	37	30.8 - 106
Terphenyl-d14		1.40	mg/Kg	0.033	80.0	53	40.3 - 113

Sample: 11766 - MW H 20-21.5

Analysis:	TPH DRO	Analytical Method:	Mod. 8015B	Prep Method:	N/A
QC Batch:	2668	Date Analyzed:	2003-07-02	Analyzed By:	BP
Prep Batch:	2434	Date Prepared:	2003-07-02	Prepared By:	WG

Parameter	Flag	RL Result	Units	Dilution	RL
DRO		162	mg/Kg	1	50.0

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		100	mg/Kg	1	150	67	45 - 152

Sample: 11766 - MW H 20-21.5

Analysis:	TPH GRO	Analytical Method:	S 8015B	Prep Method:	S 5035
QC Batch:	2719	Date Analyzed:	2003-07-03	Analyzed By:	BS
Prep Batch:	2479	Date Prepared:	2003-07-03	Prepared By:	BS

Parameter	Flag	RL Result	Units	Dilution	RL
GRO		201	mg/Kg	10	0.100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)	⁵	27.9	mg/Kg	10	0.100	2790	73 - 120
4-Bromofluorobenzene (4-BFB)	⁶	9.56	mg/Kg	10	0.100	956	78 - 120

⁵High surrogate recovery due to peak interference.

⁶High surrogate recovery due to peak interference.

Sample: 11767 - MW H 40-41

Analysis: BTEX	Analytical Method: S 8021B	Prep Method: S 5035
QC Batch: 2658	Date Analyzed: 2003-07-01	Analyzed By: BS
Prep Batch: 2428	Date Prepared: 2003-07-01	Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.0100	mg/Kg	10	0.00100
Toluene		0.709	mg/Kg	10	0.00100
Ethylbenzene		0.611	mg/Kg	10	0.00100
Xylene (isomers)	7	4.64	mg/Kg	10	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.850	mg/Kg	10	0.100	85	58.9 - 129
4-Bromofluorobenzene (4-BFB)	8	0.410	mg/Kg	10	0.100	41	44.4 - 133

Sample: 11767 - MW H 40-41

Analysis: TPH DRO	Analytical Method: Mod. 8015B	Prep Method: N/A
QC Batch: 2668	Date Analyzed: 2003-07-02	Analyzed By: BP
Prep Batch: 2434	Date Prepared: 2003-07-02	Prepared By: WG

Parameter	Flag	RL Result	Units	Dilution	RL
DRO		726	mg/Kg	1	50.0

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane	112		mg/Kg	1	150	75	45 - 152

Sample: 11767 - MW H 40-41

Analysis: TPH GRO	Analytical Method: S 8015B	Prep Method: S 5035
QC Batch: 2719	Date Analyzed: 2003-07-03	Analyzed By: BS
Prep Batch: 2479	Date Prepared: 2003-07-03	Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
GRO		101	mg/Kg	10	0.100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)	9	1.36	mg/Kg	10	0.100	136	73 - 120
4-Bromofluorobenzene (4-BFB)	10	4.76	mg/Kg	10	0.100	476	78 - 120

Sample: 11768 - MW H 74-75

⁷Estimated concentration. Value greater than standard curve.

⁸Low surrogate recovery due to matrix interference. ICV, CCV show the method to be in control.

⁹High surrogate recovery due to peak interference.

¹⁰High surrogate recovery due to peak interference.

Analysis: BTEX
QC Batch: 2658
Prep Batch: 2428

Analytical Method: S 8021B
Date Analyzed: 2003-07-01
Date Prepared: 2003-07-01

Prep Method: S 5035
Analyzed By: BS
Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		8.08	mg/Kg	50	0.00100
Toluene	11	65.1	mg/Kg	50	0.00100
Ethylbenzene	12	26.9	mg/Kg	50	0.00100
Xylene (isomers)	13	87.7	mg/Kg	50	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)	14	2.37	mg/Kg	50	0.100	47	58.9 - 129
4-Bromofluorobenzene (4-BFB)		4.85	mg/Kg	50	0.100	97	44.4 - 133

Sample: 11768 - MW H 74-75

Analysis: FOC
QC Batch: 2745
Prep Batch: 2498

Analytical Method: SM D2974-87
Date Analyzed: 2003-07-09
Date Prepared: 2003-07-07

Prep Method: N/A
Analyzed By: JSW
Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
FOC		0.750	%	1	0.00

Sample: 11768 - MW H 74-75

Analysis: PAH
QC Batch: 3270
Prep Batch: 2556

Analytical Method: S 8270C
Date Analyzed: 2003-07-24
Date Prepared: 2003-07-03

Prep Method: S 3510C
Analyzed By: RC
Prepared By: JH

Parameter	Flag	RL Result	Units	Dilution	RL
Naphthalene		2.79	mg/Kg	0.033	0.180
Acenaphthylene		<0.00594	mg/Kg	0.033	0.180
Acenaphthene		<0.00594	mg/Kg	0.033	0.180
Fluorene		<0.00594	mg/Kg	0.033	0.180
Phenanthrene		1.82	mg/Kg	0.033	0.180
Anthracene		<0.00594	mg/Kg	0.033	0.180
Fluoranthene		<0.00594	mg/Kg	0.033	0.180
Pyrene		<0.00594	mg/Kg	0.033	0.180
Benzo(a)anthracene		<0.00594	mg/Kg	0.033	0.180
Chrysene		<0.00594	mg/Kg	0.033	0.180
Benzo(b)fluoranthene		<0.00594	mg/Kg	0.033	0.180
Benzo(k)fluoranthene		<0.00594	mg/Kg	0.033	0.180
Benzo(a)pyrene		<0.00594	mg/Kg	0.033	0.180
Indeno(1,2,3-cd)pyrene		<0.00594	mg/Kg	0.033	0.180

continued ...

¹¹Estimated concentration. Value greater than standard curve.

¹²Estimated concentration. Value greater than standard curve.

¹³Estimated concentration. Value greater than standard curve.

¹⁴Low surrogate recovery due to matrix interference. ICV, CCV show the method to be in control.

sample 11768 continued ...

Parameter	Flag	RL Result	Units	Dilution	RL
Dibenzo(a,h)anthracene		<0.00594	mg/Kg	0.033	0.180
Benzo(g,h,i)perylene		<0.00594	mg/Kg	0.033	0.180

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Nitrobenzene-d5		2.82	mg/Kg	0.033	80.0	107	27.9 - 109
2-Fluorobiphenyl		0.938	mg/Kg	0.033	80.0	36	30.8 - 106
Terphenyl-d14		1.71	mg/Kg	0.033	80.0	65	40.3 - 113

Sample: 11768 - MW H 74-75

Analysis:	TPH DRO	Analytical Method:	Mod. 8015B	Prep Method:	N/A
QC Batch:	2702	Date Analyzed:	2003-07-04	Analyzed By:	BP
Prep Batch:	2460	Date Prepared:	2003-07-03	Prepared By:	WG

Parameter	Flag	RL Result	Units	Dilution	RL
DRO		3970	mg/Kg	20	50.0

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane	¹⁵	118	mg/Kg	20	7.50	79	45 - 152

Sample: 11768 - MW H 74-75

Analysis:	TPH GRO	Analytical Method:	S 8015B	Prep Method:	S 5035
QC Batch:	2719	Date Analyzed:	2003-07-03	Analyzed By:	BS
Prep Batch:	2479	Date Prepared:	2003-07-03	Prepared By:	BS

Parameter	Flag	RL Result	Units	Dilution	RL
GRO		793	mg/Kg	50	0.100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)-	¹⁶	22.9	mg/Kg	50	0.100	458	73 - 120
4-Bromofluorobenzene (4-BFB)	¹⁷	35.2	mg/Kg	50	0.100	704	78 - 120

Sample: 11769 - MW I 55-56

Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5035
QC Batch:	2658	Date Analyzed:	2003-07-01	Analyzed By:	BS
Prep Batch:	2428	Date Prepared:	2003-07-01	Prepared By:	BS

¹⁵Changed spike amount from 150 to 7.5 due to post prep dilution.

¹⁶High surrogate recovery due to peak interference.

¹⁷High surrogate recovery due to peak interference.

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		1.08	mg/Kg	20	0.00100
Toluene		7.34	mg/Kg	20	0.00100
Ethylbenzene		4.62	mg/Kg	20	0.00100
Xylene (isomers)	18	16.1	mg/Kg	20	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)	19	0.640	mg/Kg	20	0.0500	64	58.9 - 129
4-Bromofluorobenzene (4-BFB)	20	1.03	mg/Kg	20	0.0500	103	44.4 - 133

Sample: 11769 - MW I 55-56

Analysis:	FOC	Analytical Method:	SM D2974-87	Prep Method:	N/A
QC Batch:	2745	Date Analyzed:	2003-07-09	Analyzed By:	JSW
Prep Batch:	2498	Date Prepared:	2003-07-07	Prepared By:	JSW

Parameter	Flag	RL Result	Units	Dilution	RL
FOC		0.790	%	1	0.00

Sample: 11769 - MW I 55-56

Analysis:	PAH	Analytical Method:	S 8270C	Prep Method:	S 3510C
QC Batch:	3270	Date Analyzed:	2003-07-24	Analyzed By:	RC
Prep Batch:	2556	Date Prepared:	2003-07-03	Prepared By:	JH

Parameter	Flag	RL Result	Units	Dilution	RL
Naphthalene		<0.00594	mg/Kg	0.033	0.180
Acenaphthylene		<0.00594	mg/Kg	0.033	0.180
Acenaphthene		<0.00594	mg/Kg	0.033	0.180
Fluorene		<0.00594	mg/Kg	0.033	0.180
Phenanthrene		0.237	mg/Kg	0.033	0.180
Anthracene		0.0314	mg/Kg	0.033	0.180
Fluoranthene		<0.00594	mg/Kg	0.033	0.180
Pyrene		<0.00594	mg/Kg	0.033	0.180
Benzo(a)anthracene		<0.00594	mg/Kg	0.033	0.180
Chrysene		<0.00594	mg/Kg	0.033	0.180
Benzo(b)fluoranthene		<0.00594	mg/Kg	0.033	0.180
Benzo(k)fluoranthene		<0.00594	mg/Kg	0.033	0.180
Benzo(a)pyrene		<0.00594	mg/Kg	0.033	0.180
Indeno(1,2,3-cd)pyrene		<0.00594	mg/Kg	0.033	0.180
Dibenzo(a,h)anthracene		<0.00594	mg/Kg	0.033	0.180
Benzo(g,h,i)perylene		<0.00594	mg/Kg	0.033	0.180

¹⁸Estimated concentration. Value greater than standard curve.

¹⁹Changed spike amount from 0.1 to 0.05 due to dilution.

²⁰Changed spike amount from 0.1 to 0.05 due to dilution.

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Nitrobenzene-d5		1.31	mg/Kg	0.033	80.0	50	27.9 - 109
2-Fluorobiphenyl		0.906	mg/Kg	0.033	80.0	34	30.8 - 106
Terphenyl-d14		1.35	mg/Kg	0.033	80.0	51	40.3 - 113

Sample: 11769 - MW I 55-56

Analysis: TPH DRO Analytical Method: Mod. 8015B Prep Method: N/A
QC Batch: 2668 Date Analyzed: 2003-07-02 Analyzed By: BP
Prep Batch: 2434 Date Prepared: 2003-07-02 Prepared By: WG

Parameter	Flag	RL Result	Units	Dilution	RL
DRO		1500	mg/Kg	1	50.0

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		139	mg/Kg	1	150	93	45 - 152

Sample: 11769 - MW I 55-56

Analysis: TPH GRO Analytical Method: S 8015B Prep Method: S 5035
QC Batch: 2719 Date Analyzed: 2003-07-03 Analyzed By: BS
Prep Batch: 2479 Date Prepared: 2003-07-03 Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
GRO		188	mg/Kg	10	0.100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)	²¹	0.00	mg/Kg	10	0.100	0	73 - 120
4-Bromofluorobenzene (4-BFB)	²²	8.07	mg/Kg	10	0.100	807	78 - 120

Sample: 11770 - MW I 70-71

Analysis: BTEX Analytical Method: S 8021B Prep Method: S 5035
QC Batch: 2658 Date Analyzed: 2003-07-01 Analyzed By: BS
Prep Batch: 2428 Date Prepared: 2003-07-01 Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.0500	mg/Kg	50	0.00100
Toluene		0.173	mg/Kg	50	0.00100
Ethylbenzene		0.603	mg/Kg	50	0.00100
Xylene (isomers)		2.06	mg/Kg	50	0.00100

²¹Low surrogate recovery due to matrix interference. ICV, CCV show the method to be in control.

²²High surrogate recovery due to peak interference.

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)	²³	0.751	mg/Kg	50	0.0200	75	58.9 - 129
4-Bromofluorobenzene (4-BFB)	²⁴	1.97	mg/Kg	50	0.0200	197	44.4 - 133

Sample: 11770 - MW I 70-71

Analysis:	FOC	Analytical Method:	SM D2974-87	Prep Method:	N/A
QC Batch:	2884	Date Analyzed:	2003-07-11	Analyzed By:	JSW
Prep Batch:	2608	Date Prepared:	2003-07-09	Prepared By:	JSW

Parameter	Flag	RL Result	Units	Dilution	RL
FOC		1.00	%	1	0.00

Sample: 11770 - MW I 70-71

Analysis:	PAH	Analytical Method:	S 8270C	Prep Method:	S 3510C
QC Batch:	3270	Date Analyzed:	2003-07-24	Analyzed By:	RC
Prep Batch:	2556	Date Prepared:	2003-07-03	Prepared By:	JH

Parameter	Flag	RL Result	Units	Dilution	RL
Naphthalene		<0.00594	mg/Kg	0.033	0.180
Acenaphthylene		<0.00594	mg/Kg	0.033	0.180
Acenaphthene		<0.00594	mg/Kg	0.033	0.180
Fluorene		<0.00594	mg/Kg	0.033	0.180
Phenanthrene		0.0446	mg/Kg	0.033	0.180
Anthracene		0.00660	mg/Kg	0.033	0.180
Fluoranthene		<0.00594	mg/Kg	0.033	0.180
Pyrene		<0.00594	mg/Kg	0.033	0.180
Benzo(a)anthracene		<0.00594	mg/Kg	0.033	0.180
Chrysene		<0.00594	mg/Kg	0.033	0.180
Benzo(b)fluoranthene		<0.00594	mg/Kg	0.033	0.180
Benzo(k)fluoranthene		<0.00594	mg/Kg	0.033	0.180
Benzo(a)pyrene		<0.00594	mg/Kg	0.033	0.180
Indeno(1,2,3-cd)pyrene		<0.00594	mg/Kg	0.033	0.180
Dibenzo(a,h)anthracene		<0.00594	mg/Kg	0.033	0.180
Benzo(g,h,i)perylene		<0.00594	mg/Kg	0.033	0.180

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Nitrobenzene-d5		1.08	mg/Kg	0.033	80.0	41	27.9 - 109
2-Fluorobiphenyl	²⁵	0.779	mg/Kg	0.033	80.0	30	30.8 - 106
Terphenyl-d14		1.39	mg/Kg	0.033	80.0	53	40.3 - 113

Sample: 11770 - MW I 70-71

²³Changed spike amount from 0.1 to 0.02 due to dilution.

²⁴High surrogate recovery due to peak interference.

²⁵Low surrogate recovery due matrix interference. Other surrogates show extraction occurred properly.

Analysis: TPH DRO
QC Batch: 2668
Prep Batch: 2434

Analytical Method: Mod. 8015B
Date Analyzed: 2003-07-02
Date Prepared: 2003-07-02

Prep Method: N/A
Analyzed By: BP
Prepared By: WG

Parameter	Flag	RL Result	Units	Dilution	RL
DRO		208	mg/Kg	1	50.0

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		115	mg/Kg	1	150	76	45 - 152

Sample: 11770 - MW I 70-71

Analysis: TPH GRO
QC Batch: 2719
Prep Batch: 2479

Analytical Method: S 8015B
Date Analyzed: 2003-07-03
Date Prepared: 2003-07-03

Prep Method: S 5035
Analyzed By: BS
Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
GRO		43.9	mg/Kg	10	0.100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.868	mg/Kg	10	0.100	87	73 - 120
4-Bromofluorobenzene (4-BFB)	26	1.67	mg/Kg	10	0.100	167	78 - 120

Sample: 11771 - MW I 10-15

Analysis: BTEX
QC Batch: 2658
Prep Batch: 2428

Analytical Method: S 8021B
Date Analyzed: 2003-07-01
Date Prepared: 2003-07-01

Prep Method: S 5035
Analyzed By: BS
Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.0100	mg/Kg	10	0.00100
Toluene		<0.0100	mg/Kg	10	0.00100
Ethylbenzene		<0.0100	mg/Kg	10	0.00100
Xylene (isomers)		<0.0100	mg/Kg	10	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.986	mg/Kg	10	0.100	99	58.9 - 129
4-Bromofluorobenzene (4-BFB)		0.971	mg/Kg	10	0.100	97	44.4 - 133

Sample: 11771 - MW I 10-15

Analysis: TPH DRO
QC Batch: 2668
Prep Batch: 2434

Analytical Method: Mod. 8015B
Date Analyzed: 2003-07-02
Date Prepared: 2003-07-02

Prep Method: N/A
Analyzed By: BP
Prepared By: WG

²⁶High surrogate recovery due to peak interference.

Parameter	Flag	RL Result	Units	Dilution	RL
DRO		<50.0	mg/Kg	1	50.0

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		117	mg/Kg	1	150	78	45 - 152

Sample: 11771 - MW I 10-15

Analysis: TPH GRO
QC Batch: 2719
Prep Batch: 2479

Analytical Method: S 8015B
Date Analyzed: 2003-07-03
Date Prepared: 2003-07-03

Prep Method: S 5035
Analyzed By: BS
Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
GRO		15.4	mg/Kg	10	0.100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)	²⁷	1.52	mg/Kg	10	0.100	152	73 - 120
4-Bromofluorobenzene (4-BFB)	²⁸	1.27	mg/Kg	10	0.100	127	78 - 120

Sample: 11772 - MW J 55-60

Analysis: BTEX
QC Batch: 2658
Prep Batch: 2428

Analytical Method: S 8021B
Date Analyzed: 2003-07-01
Date Prepared: 2003-07-01

Prep Method: S 5035
Analyzed By: BS
Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.0100	mg/Kg	10	0.00100
Toluene		<0.0100	mg/Kg	10	0.00100
Ethylbenzene		<0.0100	mg/Kg	10	0.00100
Xylene (isomers)		<0.0100	mg/Kg	10	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.908	mg/Kg	10	0.100	91	58.9 - 129
4-Bromofluorobenzene (4-BFB)		0.900	mg/Kg	10	0.100	90	44.4 - 133

Sample: 11772 - MW J 55-60

Analysis: TPH DRO
QC Batch: 2668
Prep Batch: 2434

Analytical Method: Mod. 8015B
Date Analyzed: 2003-07-02
Date Prepared: 2003-07-02

Prep Method: N/A
Analyzed By: BP
Prepared By: WG

²⁷High surrogate recovery due to peak interference.

²⁸High surrogate recovery due to peak interference.

Parameter	Flag	RL Result	Units	Dilution	RL
DRO		<50.0	mg/Kg	1	50.0

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		113	mg/Kg	1	150	75	45 - 152

Sample: 11772 - MW J 55-60

Analysis: TPH GRO
QC Batch: 2719
Prep Batch: 2479

Analytical Method: S 8015B
Date Analyzed: 2003-07-03
Date Prepared: 2003-07-03

Prep Method: S 5035
Analyzed By: BS
Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
GRO		2.92	mg/Kg	10	0.100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)	²⁹	0.704	mg/Kg	10	0.100	70	73 - 120
4-Bromofluorobenzene (4-BFB)		0.900	mg/Kg	10	0.100	90	78 - 120

Sample: 11773 - MW J 75-76

Analysis: BTEX
QC Batch: 2658
Prep Batch: 2428

Analytical Method: S 8021B
Date Analyzed: 2003-07-01
Date Prepared: 2003-07-01

Prep Method: S 5035
Analyzed By: BS
Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.0100	mg/Kg	10	0.00100
Toluene		<0.0100	mg/Kg	10	0.00100
Ethylbenzene		<0.0100	mg/Kg	10	0.00100
Xylene (isomers)		<0.0100	mg/Kg	10	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.851	mg/Kg	10	0.100	85	58.9 - 129
4-Bromofluorobenzene (4-BFB)		0.812	mg/Kg	10	0.100	81	44.4 - 133

Sample: 11773 - MW J 75-76

Analysis: FOC
QC Batch: 2884
Prep Batch: 2608

Analytical Method: SM D2974-87
Date Analyzed: 2003-07-11
Date Prepared: 2003-07-09

Prep Method: N/A
Analyzed By: JSW
Prepared By: JSW

continued ...

²⁹Low surrogate recovery due to matrix interference. ICV, CCV show the method to be in control.

sample 11773 continued ...

Parameter	Flag	RL Result	Units	Dilution	RL
Parameter	Flag	RL Result	Units	Dilution	RL
FOC		0.630	%	1	0.00

Sample: 11773 - MW J 75-76

Analysis: PAH	Analytical Method: S 8270C	Prep Method: S 3510C
QC Batch: 3270	Date Analyzed: 2003-07-24	Analyzed By: RC
Prep Batch: 2556	Date Prepared: 2003-07-03	Prepared By: JH

Parameter	Flag	RL Result	Units	Dilution	RL
Naphthalene		<0.00594	mg/Kg	0.033	0.180
Acenaphthylene		<0.00594	mg/Kg	0.033	0.180
Acenaphthene		<0.00594	mg/Kg	0.033	0.180
Fluorene		<0.00594	mg/Kg	0.033	0.180
Phenanthrene		<0.00594	mg/Kg	0.033	0.180
Anthracene		<0.00594	mg/Kg	0.033	0.180
Fluoranthene		<0.00594	mg/Kg	0.033	0.180
Pyrene		<0.00594	mg/Kg	0.033	0.180
Benzo(a)anthracene		<0.00594	mg/Kg	0.033	0.180
Chrysene		<0.00594	mg/Kg	0.033	0.180
Benzo(b)fluoranthene		<0.00594	mg/Kg	0.033	0.180
Benzo(k)fluoranthene		<0.00594	mg/Kg	0.033	0.180
Benzo(a)pyrene		<0.00594	mg/Kg	0.033	0.180
Indeno(1,2,3-cd)pyrene		<0.00594	mg/Kg	0.033	0.180
Dibenzo(a,h)anthracene		<0.00594	mg/Kg	0.033	0.180
Benzo(g,h,i)perylene		<0.00594	mg/Kg	0.033	0.180

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Nitrobenzene-d5		1.35	mg/Kg	0.033	80.0	51	27.9 - 109
2-Fluorobiphenyl		0.972	mg/Kg	0.033	80.0	37	30.8 - 106
Terphenyl-d14		1.64	mg/Kg	0.033	80.0	62	40.3 - 113

Sample: 11773 - MW J 75-76

Analysis: TPH DRO	Analytical Method: Mod. 8015B	Prep Method: N/A
QC Batch: 2668	Date Analyzed: 2003-07-02	Analyzed By: BP
Prep Batch: 2434	Date Prepared: 2003-07-02	Prepared By: WG

Parameter	Flag	RL Result	Units	Dilution	RL
DRO		<50.0	mg/Kg	1	50.0

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		110	mg/Kg	1	150	73	45 - 152

Sample: 11773 - MW J 75-76

Analysis: TPH GRO Analytical Method: S 8015B Prep Method: S 5035
QC Batch: 2719 Date Analyzed: 2003-07-03 Analyzed By: BS
Prep Batch: 2479 Date Prepared: 2003-07-03 Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
GRO		13.0	mg/Kg	10	0.100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		1.19	mg/Kg	10	0.100	119	73 - 120
4-Bromofluorobenzene (4-BFB)		0.863	mg/Kg	10	0.100	86	78 - 120

Sample: 11774 - MW L 0-0.3

Analysis: BTEX Analytical Method: S 8021B Prep Method: S 5035
QC Batch: 2658 Date Analyzed: 2003-07-01 Analyzed By: BS
Prep Batch: 2428 Date Prepared: 2003-07-01 Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.0100	mg/Kg	10	0.00100
Toluene		<0.0100	mg/Kg	10	0.00100
Ethylbenzene		<0.0100	mg/Kg	10	0.00100
Xylene (isomers)		<0.0100	mg/Kg	10	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.964	mg/Kg	10	0.100	96	58.9 - 129
4-Bromofluorobenzene (4-BFB)		0.927	mg/Kg	10	0.100	93	44.4 - 133

Sample: 11774 - MW L 0-0.3

Analysis: TPH DRO Analytical Method: Mod. 8015B Prep Method: N/A
QC Batch: 2668 Date Analyzed: 2003-07-02 Analyzed By: BP
Prep Batch: 2434 Date Prepared: 2003-07-02 Prepared By: WG

Parameter	Flag	RL Result	Units	Dilution	RL
DRO		<50.0	mg/Kg	1	50.0

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		105	mg/Kg	1	150	70	45 - 152

Sample: 11774 - MW L 0-0.3

Analysis: TPH GRO	Analytical Method: S 8015B	Prep Method: S 5035
QC Batch: 2719	Date Analyzed: 2003-07-03	Analyzed By: BS
Prep Batch: 2479	Date Prepared: 2003-07-03	Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
GRO		13.9	mg/Kg	10	0.100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)	³⁰	1.41	mg/Kg	10	0.100	141	73 - 120
4-Bromofluorobenzene (4-BFB)		1.06	mg/Kg	10	0.100	106	78 - 120

Sample: 11775 - MW L 74-75

Analysis: BTEX	Analytical Method: S 8021B	Prep Method: S 5035
QC Batch: 2658	Date Analyzed: 2003-07-01	Analyzed By: BS
Prep Batch: 2428	Date Prepared: 2003-07-01	Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.0100	mg/Kg	10	0.00100
Toluene		<0.0100	mg/Kg	10	0.00100
Ethylbenzene		<0.0100	mg/Kg	10	0.00100
Xylene (isomers)		<0.0100	mg/Kg	10	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.907	mg/Kg	10	0.100	91	58.9 - 129
4-Bromofluorobenzene (4-BFB)		0.929	mg/Kg	10	0.100	93	44.4 - 133

Sample: 11775 - MW L 74-75

Analysis: FOC	Analytical Method: SM D2974-87	Prep Method: N/A
QC Batch: 2745	Date Analyzed: 2003-07-09	Analyzed By: JSW
Prep Batch: 2498	Date Prepared: 2003-07-07	Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
FOC		0.400	%	1	0.00

Sample: 11775 - MW L 74-75

Analysis: PAH	Analytical Method: S 8270C	Prep Method: S 3510C
QC Batch: 3270	Date Analyzed: 2003-07-24	Analyzed By: RC
Prep Batch: 2556	Date Prepared: 2003-07-03	Prepared By: JH

³⁰High surrogate recovery due to peak interference.

Parameter	Flag	RL Result	Units	Dilution	RL
Naphthalene		<0.00594	mg/Kg	0.033	0.180
Acenaphthylene		<0.00594	mg/Kg	0.033	0.180
Acenaphthene		<0.00594	mg/Kg	0.033	0.180
Fluorene		<0.00594	mg/Kg	0.033	0.180
Phenanthrene		<0.00594	mg/Kg	0.033	0.180
Anthracene		<0.00594	mg/Kg	0.033	0.180
Fluoranthene		<0.00594	mg/Kg	0.033	0.180
Pyrene		<0.00594	mg/Kg	0.033	0.180
Benzo(a)anthracene		<0.00594	mg/Kg	0.033	0.180
Chrysene		<0.00594	mg/Kg	0.033	0.180
Benzo(b)fluoranthene		<0.00594	mg/Kg	0.033	0.180
Benzo(k)fluoranthene		<0.00594	mg/Kg	0.033	0.180
Benzo(a)pyrene		<0.00594	mg/Kg	0.033	0.180
Indeno(1,2,3-cd)pyrene		<0.00594	mg/Kg	0.033	0.180
Dibenzo(a,h)anthracene		<0.00594	mg/Kg	0.033	0.180
Benzo(g,h,i)perylene		<0.00594	mg/Kg	0.033	0.180

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Nitrobenzene-d5		1.23	mg/Kg	0.033	80.0	47	27.9 - 109
2-Fluorobiphenyl		0.880	mg/Kg	0.033	80.0	33	30.8 - 106
Terphenyl-d14		1.38	mg/Kg	0.033	80.0	52	40.3 - 113

Sample: 11775 - MW L 74-75

Analysis: TPH DRO
QC Batch: 2668
Prep Batch: 2434

Analytical Method: Mod. 8015B
Date Analyzed: 2003-07-02
Date Prepared: 2003-07-02

Prep Method: N/A
Analyzed By: BP
Prepared By: WG

Parameter	Flag	RL Result	Units	Dilution	RL
DRO		<50.0	mg/Kg	1	50.0

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		107	mg/Kg	1	150	71	45 - 152

Sample: 11775 - MW L 74-75

Analysis: TPH GRO
QC Batch: 2719
Prep Batch: 2479

Analytical Method: S 8015B
Date Analyzed: 2003-07-03
Date Prepared: 2003-07-03

Prep Method: S 5035
Analyzed By: BS
Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
GRO		14.3	mg/Kg	10	0.100

continued ...

sample continued ...

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)	³¹	1.41	mg/Kg	10	0.100	141	73 - 120
4-Bromofluorobenzene (4-BFB)		1.06	mg/Kg	10	0.100	106	78 - 120

Sample: 11776 - MW M 0-0.5

Analysis: BTEX	Analytical Method: S 8021B	Prep Method: S 5035
QC Batch: 2658	Date Analyzed: 2003-07-01	Analyzed By: BS
Prep Batch: 2428	Date Prepared: 2003-07-01	Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.0500	mg/Kg	50	0.00100
Toluene		<0.0500	mg/Kg	50	0.00100
Ethylbenzene		<0.0500	mg/Kg	50	0.00100
Xylene (isomers)		<0.0500	mg/Kg	50	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)	³²	0.784	mg/Kg	50	0.0200	78	58.9 - 129
4-Bromofluorobenzene (4-BFB)	³³	0.917	mg/Kg	50	0.0200	92	44.4 - 133

Sample: 11776 - MW M 0-0.5

Analysis: TPH DRO	Analytical Method: Mod. 8015B	Prep Method: N/A
QC Batch: 2668	Date Analyzed: 2003-07-02	Analyzed By: BP
Prep Batch: 2434	Date Prepared: 2003-07-02	Prepared By: WG

Parameter	Flag	RL Result	Units	Dilution	RL
DRO		<50.0	mg/Kg	1	50.0

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		109	mg/Kg	1	150	73	45 - 152

Sample: 11776 - MW M 0-0.5

Analysis: TPH GRO	Analytical Method: S 8015B	Prep Method: S 5035
QC Batch: 2719	Date Analyzed: 2003-07-03	Analyzed By: BS
Prep Batch: 2479	Date Prepared: 2003-07-03	Prepared By: BS

³¹High surrogate recovery due to peak interference.

³²Changed spike amount from 0.1 to 0.02 due to dilution.

³³Changed spike amount from 0.1 to 0.02 due to dilution.

Parameter	Flag	RL Result	Units	Dilution	RL
GRO		14.8	mg/Kg	10	0.100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)	³⁴	1.54	mg/Kg	10	0.100	154	73 - 120
4-Bromofluorobenzene (4-BFB)		1.09	mg/Kg	10	0.100	109	78 - 120

Sample: 11777 - MW M 74-75

Analysis: BTEX Analytical Method: S 8021B Prep Method: S 5035
QC Batch: 2658 Date Analyzed: 2003-07-01 Analyzed By: BS
Prep Batch: 2428 Date Prepared: 2003-07-01 Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.0100	mg/Kg	10	0.00100
Toluene		<0.0100	mg/Kg	10	0.00100
Ethylbenzene		<0.0100	mg/Kg	10	0.00100
Xylene (isomers)		<0.0100	mg/Kg	10	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.883	mg/Kg	10	0.100	88	58.9 - 129
4-Bromofluorobenzene (4-BFB)		0.873	mg/Kg	10	0.100	87	44.4 - 133

Sample: 11777 - MW M 74-75

Analysis: FOC Analytical Method: SM D2974-87 Prep Method: N/A
QC Batch: 2745 Date Analyzed: 2003-07-09 Analyzed By: JSW
Prep Batch: 2498 Date Prepared: 2003-07-07 Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
FOC		0.430	%	1	0.00

Sample: 11777 - MW M 74-75

Analysis: PAH Analytical Method: S 8270C Prep Method: S 3510C
QC Batch: 3270 Date Analyzed: 2003-07-24 Analyzed By: RC
Prep Batch: 2556 Date Prepared: 2003-07-03 Prepared By: JH

Parameter	Flag	RL Result	Units	Dilution	RL
Naphthalene		<0.00594	mg/Kg	0.033	0.180
Acenaphthylene		<0.00594	mg/Kg	0.033	0.180
Acenaphthene		<0.00594	mg/Kg	0.033	0.180
Fluorene		<0.00594	mg/Kg	0.033	0.180

continued ...

³⁴High surrogate recovery due to peak interference.

sample 11777 continued ...

Parameter	Flag	RL Result	Units	Dilution	RL
Phenanthrene		<0.00594	mg/Kg	0.033	0.180
Anthracene		<0.00594	mg/Kg	0.033	0.180
Fluoranthene		<0.00594	mg/Kg	0.033	0.180
Pyrene		<0.00594	mg/Kg	0.033	0.180
Benzo(a)anthracene		<0.00594	mg/Kg	0.033	0.180
Chrysene		<0.00594	mg/Kg	0.033	0.180
Benzo(b)fluoranthene		<0.00594	mg/Kg	0.033	0.180
Benzo(k)fluoranthene		<0.00594	mg/Kg	0.033	0.180
Benzo(a)pyrene		<0.00594	mg/Kg	0.033	0.180
Indeno(1,2,3-cd)pyrene		<0.00594	mg/Kg	0.033	0.180
Dibenzo(a,h)anthracene		<0.00594	mg/Kg	0.033	0.180
Benzo(g,h,i)perylene		<0.00594	mg/Kg	0.033	0.180

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Nitrobenzene-d5		1.27	mg/Kg	0.033	80.0	48	27.9 - 109
2-Fluorobiphenyl		0.916	mg/Kg	0.033	80.0	35	30.8 - 106
Terphenyl-d14		1.49	mg/Kg	0.033	80.0	56	40.3 - 113

Sample: 11777 - MW M 74-75

Analysis:	TPH DRO	Analytical Method:	Mod. 8015B	Prep Method:	N/A
QC Batch:	2668	Date Analyzed:	2003-07-02	Analyzed By:	BP
Prep Batch:	2434	Date Prepared:	2003-07-02	Prepared By:	WG

Parameter	Flag	RL Result	Units	Dilution	RL
DRO		<50.0	mg/Kg	1	50.0

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		109	mg/Kg	1	150	72	45 - 152

Sample: 11777 - MW M 74-75

Analysis:	TPH GRO	Analytical Method:	S 8015B	Prep Method:	S 5035
QC Batch:	2719	Date Analyzed:	2003-07-03	Analyzed By:	BS
Prep Batch:	2479	Date Prepared:	2003-07-03	Prepared By:	BS

Parameter	Flag	RL Result	Units	Dilution	RL
GRO		13.1	mg/Kg	10	0.100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)	³⁵	1.32	mg/Kg	10	0.100	132	73 - 120
4-Bromofluorobenzene (4-BFB)		1.02	mg/Kg	10	0.100	102	78 - 120

³⁵High surrogate recovery due to peak interference.

Sample: 11778 - MW N 0-0.3

Analysis: BTEX
QC Batch: 2658
Prep Batch: 2428

Analytical Method: S 8021B
Date Analyzed: 2003-07-01
Date Prepared: 2003-07-01

Prep Method: S 5035
Analyzed By: BS
Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.0100	mg/Kg	10	0.00100
Toluene		0.0160	mg/Kg	10	0.00100
Ethylbenzene		<0.0100	mg/Kg	10	0.00100
Xylene (isomers)		<0.0100	mg/Kg	10	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.995	mg/Kg	10	0.100	100	58.9 - 129
4-Bromofluorobenzene (4-BFB)		0.864	mg/Kg	10	0.100	86	44.4 - 133

Sample: 11778 - MW N 0-0.3

Analysis: TPH DRO
QC Batch: 2668
Prep Batch: 2434

Analytical Method: Mod. 8015B
Date Analyzed: 2003-07-02
Date Prepared: 2003-07-02

Prep Method: N/A
Analyzed By: BP
Prepared By: WG

Parameter	Flag	RL Result	Units	Dilution	RL
DRO		<50.0	mg/Kg	1	50.0

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane	³⁶	10.0	mg/Kg	1	150	7	45 - 152

Sample: 11778 - MW N 0-0.3

Analysis: TPH GRO
QC Batch: 2719
Prep Batch: 2479

Analytical Method: S 8015B
Date Analyzed: 2003-07-03
Date Prepared: 2003-07-03

Prep Method: S 5035
Analyzed By: BS
Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
GRO		14.0	mg/Kg	10	0.100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)	³⁷	1.46	mg/Kg	10	0.100	146	73 - 120
4-Bromofluorobenzene (4-BFB)		1.08	mg/Kg	10	0.100	108	78 - 120

Sample: 11779 - MW N 5-10

³⁶Surrogate recovery out of range due to prep error. QC show the process within control.

³⁷High surrogate recovery due to peak interference.

Analysis: BTEX
QC Batch: 2658
Prep Batch: 2428

Analytical Method: S 8021B
Date Analyzed: 2003-07-01
Date Prepared: 2003-07-01

Prep Method: S 5035
Analyzed By: BS
Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.0100	mg/Kg	10	0.00100
Toluene		<0.0100	mg/Kg	10	0.00100
Ethylbenzene		<0.0100	mg/Kg	10	0.00100
Xylene (isomers)		<0.0100	mg/Kg	10	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.946	mg/Kg	10	0.100	95	58.9 - 129
4-Bromofluorobenzene (4-BFB)		0.920	mg/Kg	10	0.100	92	44.4 - 133

Sample: 11779 - MW N 5-10

Analysis: TPH DRO
QC Batch: 2668
Prep Batch: 2434

Analytical Method: Mod. 8015B
Date Analyzed: 2003-07-02
Date Prepared: 2003-07-02

Prep Method: N/A
Analyzed By: BP
Prepared By: WG

Parameter	Flag	RL Result	Units	Dilution	RL
DRO		<50.0	mg/Kg	1	50.0

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		103	mg/Kg	1	150	69	45 - 152

Sample: 11779 - MW N 5-10

Analysis: TPH GRO
QC Batch: 2719
Prep Batch: 2479

Analytical Method: S 8015B
Date Analyzed: 2003-07-03
Date Prepared: 2003-07-03

Prep Method: S 5035
Analyzed By: BS
Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
GRO		13.3	mg/Kg	10	0.100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)	³⁸	1.38	mg/Kg	10	0.100	138	73 - 120
4-Bromofluorobenzene (4-BFB)		1.03	mg/Kg	10	0.100	103	78 - 120

Sample: 11780 - MW N 74-75

Analysis: BTEX
QC Batch: 2658
Prep Batch: 2428

Analytical Method: S 8021B
Date Analyzed: 2003-07-01
Date Prepared: 2003-07-01

Prep Method: S 5035
Analyzed By: BS
Prepared By: BS

³⁸High surrogate recovery due to peak interference.

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.0100	mg/Kg	10	0.00100
Toluene		<0.0100	mg/Kg	10	0.00100
Ethylbenzene		<0.0100	mg/Kg	10	0.00100
Xylene (isomers)		<0.0100	mg/Kg	10	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.881	mg/Kg	10	0.100	88	58.9 - 129
4-Bromofluorobenzene (4-BFB)		0.871	mg/Kg	10	0.100	87	44.4 - 133

Sample: 11780 - MW N 74-75

Analysis:	FOC	Analytical Method:	SM D2974-87	Prep Method:	N/A
QC Batch:	2745	Date Analyzed:	2003-07-09	Analyzed By:	JSW
Prep Batch:	2498	Date Prepared:	2003-07-07	Prepared By:	JSW

Parameter	Flag	RL Result	Units	Dilution	RL
FOC		0.510	%	1	0.00

Sample: 11780 - MW N 74-75

Analysis:	PAH	Analytical Method:	S 8270C	Prep Method:	S 3510C
QC Batch:	3270	Date Analyzed:	2003-07-24	Analyzed By:	RC
Prep Batch:	2556	Date Prepared:	2003-07-03	Prepared By:	JH

Parameter	Flag	RL Result	Units	Dilution	RL
Naphthalene		<0.00594	mg/Kg	0.033	0.180
Acenaphthylene		<0.00594	mg/Kg	0.033	0.180
Acenaphthene		<0.00594	mg/Kg	0.033	0.180
Fluorene		<0.00594	mg/Kg	0.033	0.180
Phenanthrene		<0.00594	mg/Kg	0.033	0.180
Anthracene		<0.00594	mg/Kg	0.033	0.180
Fluoranthene		<0.00594	mg/Kg	0.033	0.180
Pyrene		<0.00594	mg/Kg	0.033	0.180
Benzo(a)anthracene		<0.00594	mg/Kg	0.033	0.180
Chrysene		<0.00594	mg/Kg	0.033	0.180
Benzo(b)fluoranthene		<0.00594	mg/Kg	0.033	0.180
Benzo(k)fluoranthene		<0.00594	mg/Kg	0.033	0.180
Benzo(a)pyrene		<0.00594	mg/Kg	0.033	0.180
Indeno(1,2,3-cd)pyrene		<0.00594	mg/Kg	0.033	0.180
Dibenzo(a,h)anthracene		<0.00594	mg/Kg	0.033	0.180
Benzo(g,h,i)perylene		<0.00594	mg/Kg	0.033	0.180

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Nitrobenzene-d5		1.24	mg/Kg	0.033	80.0	47	27.9 - 109
2-Fluorobiphenyl		0.860	mg/Kg	0.033	80.0	32	30.8 - 106
Terphenyl-d14		1.25	mg/Kg	0.033	80.0	47	40.3 - 113

Sample: 11780 - MW N 74-75

Analysis: TPH DRO	Analytical Method: Mod. 8015B	Prep Method: N/A
QC Batch: 2668	Date Analyzed: 2003-07-02	Analyzed By: BP
Prep Batch: 2434	Date Prepared: 2003-07-02	Prepared By: WG

Parameter	Flag	RL Result	Units	Dilution	RL
DRO		<50.0	mg/Kg	1	50.0

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		110	mg/Kg	1	150	74	45 - 152

Sample: 11780 - MW N 74-75

Analysis: TPH GRO	Analytical Method: S 8015B	Prep Method: S 5035
QC Batch: 2719	Date Analyzed: 2003-07-03	Analyzed By: BS
Prep Batch: 2479	Date Prepared: 2003-07-03	Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
GRO		13.7	mg/Kg	10	0.100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)	³⁹	1.40	mg/Kg	10	0.100	140	73 - 120
4-Bromofluorobenzene (4-BFB)		1.03	mg/Kg	10	0.100	103	78 - 120

Sample: 11781 - Trip Blank

Analysis: BTEX	Analytical Method: S 8021B	Prep Method: S 5030B
QC Batch: 2706	Date Analyzed: 2003-07-03	Analyzed By: MT
Prep Batch: 2466	Date Prepared: 2003-07-03	Prepared By: MT

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00100	mg/L	1	0.00100
Toluene		0.00160	mg/L	1	0.00100
Ethylbenzene		<0.00100	mg/L	1	0.00100
Xylene (isomers)		<0.00100	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)	⁴⁰	0.0719	mg/L	1	0.100	72	78.7 - 110
4-Bromofluorobenzene (4-BFB)	⁴¹	0.0732	mg/L	1	0.100	73	77.8 - 110

Method Blank (1) QC Batch: 2658

³⁹High surrogate recovery due to peak interference.

⁴⁰Low surrogate recovery due to matrix interference. ICV, CCV show the method to be in control.

⁴¹Low surrogate recovery due to matrix interference. ICV, CCV show the method to be in control.

Parameter	Flag	Result	Units	RL
Benzene		<0.0100	mg/Kg	0.001
Toluene		<0.0100	mg/Kg	0.001
Ethylbenzene		<0.0100	mg/Kg	0.001
Xylene (isomers)		<0.0100	mg/Kg	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		1.03	mg/Kg	10	0.100	103	58.9 - 129
4-Bromofluorobenzene (4-BFB)		0.949	mg/Kg	10	0.100	95	44.4 - 133

Method Blank (1) QC Batch: 2668

Parameter	Flag	Result	Units	RL
DRO		<50.0	mg/Kg	50

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		106	mg/Kg	1	150	70	45 - 152

Method Blank (1) QC Batch: 2702

Parameter	Flag	Result	Units	RL
DRO		<50.0	mg/Kg	50

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		117	mg/Kg	1	150	78	45 - 152

Method Blank (1) QC Batch: 2706

Parameter	Flag	Result	Units	RL
Benzene		<0.00100	mg/L	0.001
Toluene		<0.00100	mg/L	0.001
Ethylbenzene		<0.00100	mg/L	0.001
Xylene (isomers)		<0.00100	mg/L	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.104	mg/L	1	0.100	104	78.7 - 110
4-Bromofluorobenzene (4-BFB)		0.0913	mg/L	1	0.100	91	77.8 - 110

Method Blank (1) QC Batch: 2719

Parameter	Flag	Result	Units	RL
GRO		<1.00	mg/Kg	0.1

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		1.05	mg/Kg	10	0.100	105	73 - 120
4-Bromofluorobenzene (4-BFB)		1.02	mg/Kg	10	0.100	102	78 - 120

Method Blank (1) QC Batch: 3270

Parameter	Flag	Result	Units	RL
Naphthalene		<0.00594	mg/Kg	0.18
Acenaphthylene		<0.00594	mg/Kg	0.18
Acenaphthene		<0.00594	mg/Kg	0.18
Fluorene		<0.00594	mg/Kg	0.18
Phenanthrene		<0.00594	mg/Kg	0.18
Anthracene		<0.00594	mg/Kg	0.18
Fluoranthene		<0.00594	mg/Kg	0.18
Pyrene		<0.00594	mg/Kg	0.18
Benzo(a)anthracene		<0.00594	mg/Kg	0.18
Chrysene		<0.00594	mg/Kg	0.18
Benzo(b)fluoranthene		<0.00594	mg/Kg	0.18
Benzo(k)fluoranthene		<0.00594	mg/Kg	0.18
Benzo(a)pyrene		<0.00594	mg/Kg	0.18
Indeno(1,2,3-cd)pyrene		<0.00594	mg/Kg	0.18
Dibenzo(a,h)anthracene		<0.00594	mg/Kg	0.18
Benzo(g,h,i)perylene		<0.00594	mg/Kg	0.18

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Nitrobenzene-d5		1.83	mg/Kg	0.033	80.0	70	27.9 - 109
2-Fluorobiphenyl		1.41	mg/Kg	0.033	80.0	53	30.8 - 106
Terphenyl-d14		1.89	mg/Kg	0.033	80.0	72	40.3 - 113

Duplicate (1) QC Batch: 2745

Param	Duplicate Result	Sample Result	Units	Dilution	RPD	RPD Limit
FOC	0.520	0.510	%	1	2	24

Duplicate (1) QC Batch: 2884

Param	Duplicate Result	Sample Result	Units	Dilution	RPD	RPD Limit
FOC	0.600	0.630	%	1	5	24

Laboratory Control Spike (LCS-1) QC Batch: 2658

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Benzene	0.946	0.922	mg/Kg	10	0.100	<0.00131	95	2	83.4 - 112	35
Toluene	0.961	0.948	mg/Kg	10	0.100	<0.00365	96	1	82.6 - 112	36
Ethylbenzene	0.933	0.925	mg/Kg	10	0.100	<0.00492	93	1	80.3 - 114	40
Xylene (isomers)	2.85	2.82	mg/Kg	10	0.300	<0.00314	95	1	78.9 - 114	39

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.987	1.04	mg/Kg	10	0.100	99	104	74.7 - 114
4-Bromofluorobenzene (4-BFB)	1.02	1.04	mg/Kg	10	0.100	102	104	76.2 - 110

Laboratory Control Spike (LCS-1) QC Batch: 2668

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
DRO	289	282	mg/Kg	1	250	<21.1	116	2	68 - 126	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
n-Triacontane	114	113	mg/Kg	1	150	76	76	33 - 144

Laboratory Control Spike (LCS-1) QC Batch: 2702

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
DRO	258	300	mg/Kg	1	250	<21.1	103	15	68 - 126	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
n-Triacontane	110	123	mg/Kg	1	150	73	82	33 - 144

Laboratory Control Spike (LCS-1) QC Batch: 2706

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Benzene	0.0901	0.0883	mg/L	1	0.100	<0.000410	90	2	80.5 - 113	20
Toluene	0.0910	0.0910	mg/L	1	0.100	<0.000760	91	0	81.2 - 112	20
Ethylbenzene	0.0891	0.0885	mg/L	1	0.100	<0.00120	89	1	82.2 - 112	20
Xylene (isomers)	0.272	0.270	mg/L	1	0.300	<0.00121	91	1	80.6 - 112	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.0977	0.101	mg/L	1	0.100	98	101	78.7 - 110
4-Bromofluorobenzene (4-BFB)	0.0973	0.100	mg/L	1	0.100	97	100	77.8 - 110

Laboratory Control Spike (LCS-1) QC Batch: 2719

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
GRO	8.45	8.50	mg/Kg	10	1.00	<0.381	84	0	76.3 - 125	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	1.06	1.04	mg/Kg	10	0.100	106	104	73.7 - 114
4-Bromofluorobenzene (4-BFB)	1.12	1.09	mg/Kg	10	0.100	112	109	76.2 - 110

Laboratory Control Spike (LCS-1) QC Batch: 3270

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Naphthalene	33.0	33.1	mg/Kg	1	80.0	<0.0476	41	0	11.2 - 103	20
Acenaphthylene	41.6	40.9	mg/Kg	1	80.0	<0.0408	52	2	27.5 - 110	20
Acenaphthene	41.2	40.9	mg/Kg	1	80.0	<0.0473	52	1	24.3 - 108	20
Fluorene	34.6	34.6	mg/Kg	1	80.0	<0.0630	43	0	28.8 - 109	20
Phenanthrene	47.7	47.5	mg/Kg	1	80.0	<0.0432	60	0	37.4 - 110	20
Anthracene	47.5	46.6	mg/Kg	1	80.0	<0.0489	59	2	33.9 - 102	20
Fluoranthene	50.4	49.8	mg/Kg	1	80.0	<0.0550	63	1	41.9 - 108	20
Pyrene	46.1	47.5	mg/Kg	1	80.0	<0.0939	58	3	43.6 - 120	20
Benzo(a)anthracene	51.6	51.2	mg/Kg	1	80.0	<0.104	64	1	47.2 - 106	20
Chrysene	58.4	58.6	mg/Kg	1	80.0	<0.124	73	0	38 - 91.5	20
Benzo(b)fluoranthene	41.5	41.9	mg/Kg	1	80.0	<0.177	52	1	28.2 - 109	20
Benzo(k)fluoranthene	43.4	42.3	mg/Kg	1	80.0	<0.107	54	2	43.7 - 121	20
Benzo(a)pyrene	56.9	56.9	mg/Kg	1	80.0	<0.140	71	0	41.9 - 114	20
Indeno(1,2,3-cd)pyrene	52.0	52.1	mg/Kg	1	80.0	<0.159	65	0	36.6 - 129	20
Dibenzo(a,h)anthracene	53.2	52.7	mg/Kg	1	80.0	<0.173	66	1	25.3 - 102	20
Benzo(g,h,i)perylene	52.6	53.3	mg/Kg	1	80.0	<0.146	66	1	33.8 - 147	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Nitrobenzene-d5	44.1	43.9	mg/Kg	1	80.0	55	55	0 - 128
2-Fluorobiphenyl	36.6	35.6	mg/Kg	1	80.0	46	44	14.7 - 122
Terphenyl-d14	56.1	56.2	mg/Kg	1	80.0	70	70	35 - 141

Matrix Spike (MS-1) QC Batch: 2658

Param	MS Result	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Benzene	0.910	0.878	mg/Kg	10	0.100	<0.00131	91	4	58 - 107	22
Toluene	0.899	0.862	mg/Kg	10	0.100	<0.00365	90	4	59 - 110	20
Ethylbenzene	0.874	0.846	mg/Kg	10	0.100	<0.00492	87	3	58.4 - 113	15
Xylene (isomers)	2.68	2.59	mg/Kg	10	0.300	<0.00314	89	3	54.3 - 114	19

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

⁴²High surrogate recovery due to prep.

Surrogate	MS Result	MSD Result	Units	Dil.	Spike Amount	MS Rec.	MSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.942	0.926	mg/Kg	10	0.1	94	93	50.6 - 114
4-Bromofluorobenzene (4-BFB)	0.927	0.913	mg/Kg	10	0.1	93	91	52 - 110

Matrix Spike (MS-1) QC Batch: 2668

Param	MS Result	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
DRO ⁴³	270	323	mg/Kg	1	250	<21.1	108	18	65 - 114	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	MS Result	MSD Result	Units	Dil.	Spike Amount	MS Rec.	MSD Rec.	Rec. Limit
n-Triacontane	99.5	108	mg/Kg	1	150	66	72	33 - 144

Matrix Spike (MS-1) QC Batch: 2719

Param	MS Result	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
GRO	20.4	18.1	mg/Kg	10	1.00	12.9597	74	12	32.9 - 152	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	MS Result	MSD Result	Units	Dil.	Spike Amount	MS Rec.	MSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	⁴⁴ 1.61	⁴⁵ 1.61	mg/Kg	10	0.1	161	161	50.6 - 114
4-Bromofluorobenzene (4-BFB)	⁴⁶ 1.08	1.08	mg/Kg	10	0.1	108	108	52 - 110

Matrix Spike (MS-1) QC Batch: 3270

Param	MS Result	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Naphthalene	39.6	39.7	mg/Kg	1	80.0	<0.0476	50	0	29.1 - 82.6	20
Acenaphthylene	42.0	42.1	mg/Kg	1	80.0	<0.0408	52	0	19.6 - 94	20
Acenaphthene	42.0	42.4	mg/Kg	1	80.0	<0.0473	52	1	24.7 - 89.4	20
Fluorene	33.3	33.6	mg/Kg	1	80.0	<0.0630	42	1	25.9 - 94.5	20
Phenanthrene	45.9	46.2	mg/Kg	1	80.0	<0.0432	57	1	32.8 - 85	20
Anthracene	42.5	42.6	mg/Kg	1	80.0	<0.0489	53	0	28.7 - 89.1	20
Fluoranthene	50.0	49.9	mg/Kg	1	80.0	<0.0550	62	0	23.7 - 98.5	20
Pyrene	44.1	44.6	mg/Kg	1	80.0	<0.0939	55	1	18 - 97.6	20
Benzo(a)anthracene	47.6	48.0	mg/Kg	1	80.0	<0.104	60	1	31.4 - 90.1	20
Chrysene	55.6	56.3	mg/Kg	1	80.0	<0.124	70	1	24.1 - 82.6	20
Benzo(b)fluoranthene	40.9	40.5	mg/Kg	1	80.0	<0.177	51	1	23.3 - 90.8	20
Benzo(k)fluoranthene	41.3	41.4	mg/Kg	1	80.0	<0.107	52	0	15 - 99	20
Benzo(a)pyrene	51.4	52.1	mg/Kg	1	80.0	<0.140	64	1	28.8 - 86.7	20
Indeno(1,2,3-cd)pyrene	49.9	51.0	mg/Kg	1	80.0	<0.159	62	2	21.8 - 99.1	20

continued ...

⁴³MS recovery within range and RPD within limits.

⁴⁴High surrogate recovery due to peak interference.

⁴⁵High surrogate recovery due to peak interference.

⁴⁶Low surrogate recovery due to prep. LCS, LCSD show the method to be in control.

matrix spikes continued ...

Param	MS Result	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Dibenzo(a,h)anthracene	51.6	52.4	mg/Kg	1	80.0	<0.173	64	2	18.5 - 77.4	20
Benzo(g,h,i)perylene	49.8	50.7	mg/Kg	1	80.0	<0.146	62	2	24.1 - 90.8	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	MS Result	MSD Result	Units	Dil.	Spike Amount	MS Rec.	MSD Rec.	Rec. Limit
Nitrobenzene-d5	55.6	69.5	mg/Kg	1	80	70	87	22.8 - 95.4
2-Fluorobiphenyl	37.7	38.1	mg/Kg	1	80	47	48	14.7 - 98.8
Terphenyl-d14	50.4	50.5	mg/Kg	1	80	63	63	20.1 - 101

Standard (ICV-1) QC Batch: 2658

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0897	90	85 - 115	2003-07-01
Toluene		mg/L	0.100	0.0919	92	85 - 115	2003-07-01
Ethylbenzene		mg/L	0.100	0.0902	90	85 - 115	2003-07-01
Xylene (isomers)		mg/L	0.300	0.277	92	85 - 115	2003-07-01

Standard (CCV-1) QC Batch: 2658

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0938	94	85 - 115	2003-07-01
Toluene		mg/L	0.100	0.0986	99	85 - 115	2003-07-01
Ethylbenzene		mg/L	0.100	0.0960	96	85 - 115	2003-07-01
Xylene (isomers)		mg/L	0.300	0.286	95	85 - 115	2003-07-01

Standard (CCV-2) QC Batch: 2658

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0958	96	85 - 115	2003-07-01
Toluene		mg/L	0.100	0.0972	97	85 - 115	2003-07-01
Ethylbenzene		mg/L	0.100	0.0949	95	85 - 115	2003-07-01
Xylene (isomers)		mg/L	0.300	0.290	97	85 - 115	2003-07-01

Standard (ICV-1) QC Batch: 2668

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
DRO		mg/Kg	250	299	120	75 - 125	2003-07-02

Standard (CCV-1) QC Batch: 2668

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
DRO		mg/Kg	250	287	115	75 - 125	2003-07-02

Standard (CCV-2) QC Batch: 2668

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
DRO		mg/Kg	250	312	125	75 - 125	2003-07-02

Standard (CCV-3) QC Batch: 2668

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
DRO		mg/Kg	250	309	124	75 - 125	2003-07-02

Standard (ICV-1) QC Batch: 2702

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
DRO		mg/Kg	250	259	104	75 - 125	2003-07-04

Standard (CCV-1) QC Batch: 2702

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
DRO		mg/Kg	250	298	119	75 - 125	2003-07-04

Standard (ICV-1) QC Batch: 2706

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0922	92	85 - 115	2003-07-03
Toluene		mg/L	0.100	0.0935	94	85 - 115	2003-07-03
Ethylbenzene		mg/L	0.100	0.0906	91	85 - 115	2003-07-03
Xylene (isomers)		mg/L	0.300	0.279	93	85 - 115	2003-07-03

Standard (CCV-1) QC Batch: 2706

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0890	89	85 - 115	2003-07-03
Toluene		mg/L	0.100	0.0909	91	85 - 115	2003-07-03

continued ...

standard continued ...

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Ethylbenzene		mg/L	0.100	0.0906	91	85 - 115	2003-07-03
Xylene (isomers)		mg/L	0.300	0.274	91	85 - 115	2003-07-03

Standard (ICV-1) QC Batch: 2719

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
GRO		mg/L	1.00	0.973	97	85 - 115	2003-07-03

Standard (CCV-1) QC Batch: 2719

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
GRO		mg/L	1.00	0.921	92	85 - 115	2003-07-03

Standard (CCV-2) QC Batch: 2719

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
GRO		mg/L	1.00	0.862	86	85 - 115	2003-07-03

Standard (CCV-1) QC Batch: 3270

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Naphthalene		mg/Kg	60.0	55.7	93	80 - 120	2003-07-24
Acenaphthylene		mg/Kg	60.0	49.9	83	80 - 120	2003-07-24
Acenaphthene		mg/Kg	60.0	57.0	95	80 - 120	2003-07-24
Fluorene		mg/Kg	60.0	51.0	85	80 - 120	2003-07-24
Phenanthrene		mg/Kg	60.0	55.7	93	80 - 120	2003-07-24
Anthracene		mg/Kg	60.0	54.9	92	80 - 120	2003-07-24
Fluoranthene		mg/Kg	60.0	55.5	92	80 - 120	2003-07-24
Pyrene		mg/Kg	60.0	51.7	86	80 - 120	2003-07-24
Benzo(a)anthracene		mg/Kg	60.0	61.3	102	80 - 120	2003-07-24
Chrysene		mg/Kg	60.0	57.3	96	80 - 120	2003-07-24
Benzo(b)fluoranthene		mg/Kg	60.0	58.6	98	80 - 120	2003-07-24
Benzo(k)fluoranthene		mg/Kg	60.0	53.7	90	80 - 120	2003-07-24
Benzo(a)pyrene		mg/Kg	60.0	63.8	106	80 - 120	2003-07-24
Indeno(1,2,3-cd)pyrene		mg/Kg	60.0	55.7	93	80 - 120	2003-07-24
Dibenzo(a,h)anthracene		mg/Kg	60.0	53.5	89	80 - 120	2003-07-24
Benzo(g,h,i)perylene		mg/Kg	60.0	54.6	91	80 - 120	2003-07-24

Report Date: July 28, 2003
MT000803.0001

Work Order: 3070111

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Lovington, NM

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limit
Nitrobenzene-d5		63.9	mg/Kg	1	60.0	106	80 - 120
2-Fluorobiphenyl		50.0	mg/Kg	1	60.0	83	80 - 120
Terphenyl-d14		54.8	mg/Kg	1	60.0	91	80 - 120

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ANALYTICAL RESULTS FOR
ARCADIS GERAGHTY & MILLER
Attention: Frank Keifer
1004 N. Big Spring St.
Midland, TX 79701

July 08, 2003
Receiving Date: 07/01/2003
Sample Type: Soil
Project No: MT000803.0001
Project Location: Pure Resources
Lovington, NM

Work Order: 3070111
Prep Date: 07/03/2003
Analysis Date: 07/03/2003
Sampling Date: 06/23-27/2003
Sample Condition: I & C
Sample Received by: VH
Project Name: NA

TA#: 11762 - MWF 75-76
TA#: 11766 - MWH 20-21.5
TA#: 11768 - MWH 74-75
TA#: 11769 - MWI 55-56
TA#: 11770 - MWI 70-71

TA#: 11773 - MWJ 75-76
TA#: 11775 - MWL 74-75
TA#: 11777 - MWM 74-75
TA#: 11780 - MWN 74-75

FINGERPRINTS

Samples were extracted with pentane and analyzed by GC, FID, capillary column and direct injection. (Graphs included)

- 11762 - No significant peaks shown, C6-C35.
- 11766 - Peaks indicate fresh crude oil with no significant aging.
- 11768 - Peaks indicate fresh crude oil with some aging as evidenced by lower concentration of light organic compounds, C6-C12.
- 11769 - Peaks indicate fresh crude oil with some aging. Size of hydrocarbon hump C8-C28 is due to high concentration of hydrocarbons and lack of dilution.
- 11770 - Peaks indicate aged crude oil, due to lack of light hydrocarbons, C6-C12.
- 11773 - No significant peaks shown, C6-C35.
- 11775 - No significant peaks shown, C6-C35.
- 11777 - No significant peaks shown, C6-C35.
- 11780 - No significant peaks shown, C6-C35.

CHEMIST: BP



Director, Dr. Blair Leftwich

7-8-03

DATE

Software Version : 6.1.2.0.1:D19
 Operator : Turbochrom
 Sample Number : 019
 AutoSampler : BUILT-IN
 Instrument Name : TPH2
 Instrument Serial # : None
 Delay Time : 0.00 min
 Sampling Rate : 25.0000 pts/s
 Volume Injected : 1.000000 ul
 Sample Amount : 1.0000
 Data Acquisition Time : 10/10/01 10:22:15 PM

Date : 10/23/01 9:40:55 AM
 Sample Name : Fresh Crude Oil
 Study : QC14735
 Rack/Vial : 0/19
 Channel : A
 A/D mV Range : 1000
 End Time : 4.54 min
 Area Reject : 0.000000
 Dilution Factor : 400.00
 Cycle : 19

Raw Data File : D:\Data\TPH2\KWT2A019-20011015-103045.raw <Modified>

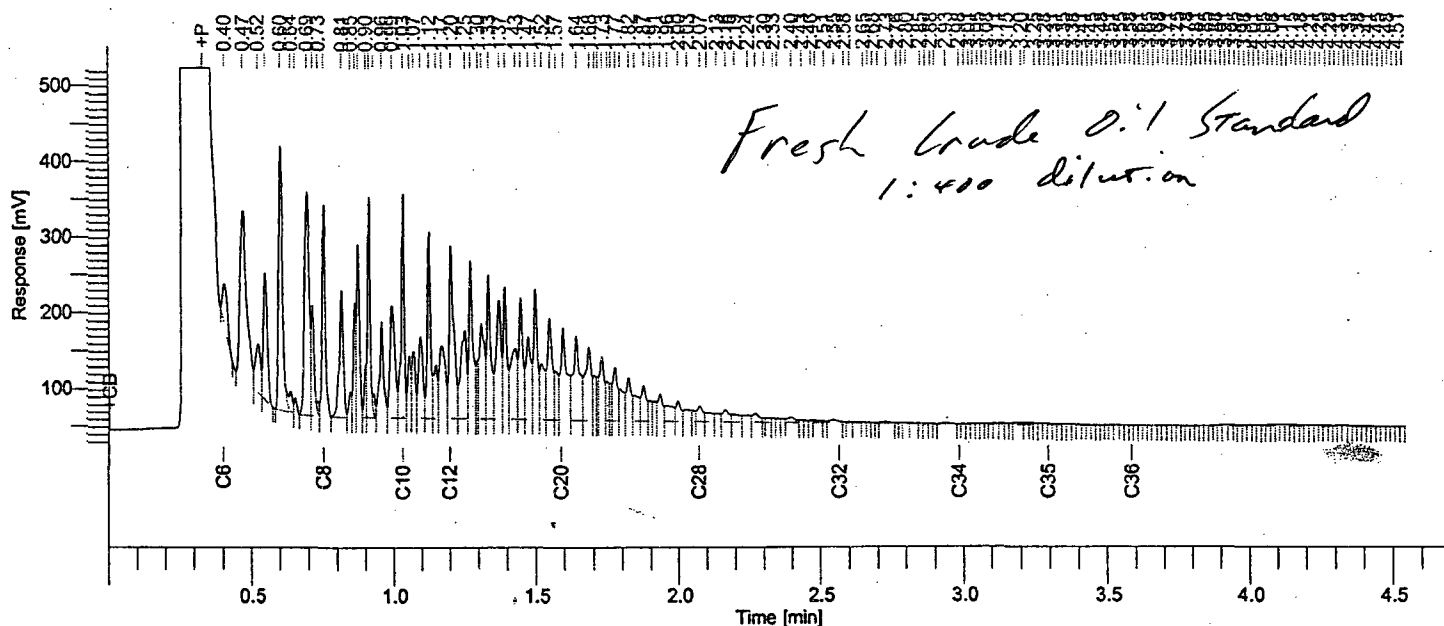
Result File : D:\Data\TPH2\KWT2A019-20011015-103048.rst

Inst Method : D:\Methods\TPH2EXTSUR from D:\Data\TPH2\KWT2A019-20011015-103048.rst

Proc Method : D:\Methods\TPH2EXTSUR.mth from D:\Data\TPH2\KWT2A019-20011015-103048.rst

Calib Method : D:\Methods\TPH2EXTSUR.mth from D:\Data\TPH2\KWT2A019-20011015-103048.rst

Sequence File : D:\Sequence\KWT2A.seq



Analytical Method: TX1005

Reporting Units: mg/Kg

Matrix: soil

Component Name	Adjusted Amount	Raw Amount	Area [μV s]
TPH AS GASOLINE	475537.0	1188.8	4462405.81
TPH AS DIESEL	367389.7	918.5	2976773.19
C30=	6422.6	16.1	40919.37
			7480098.37

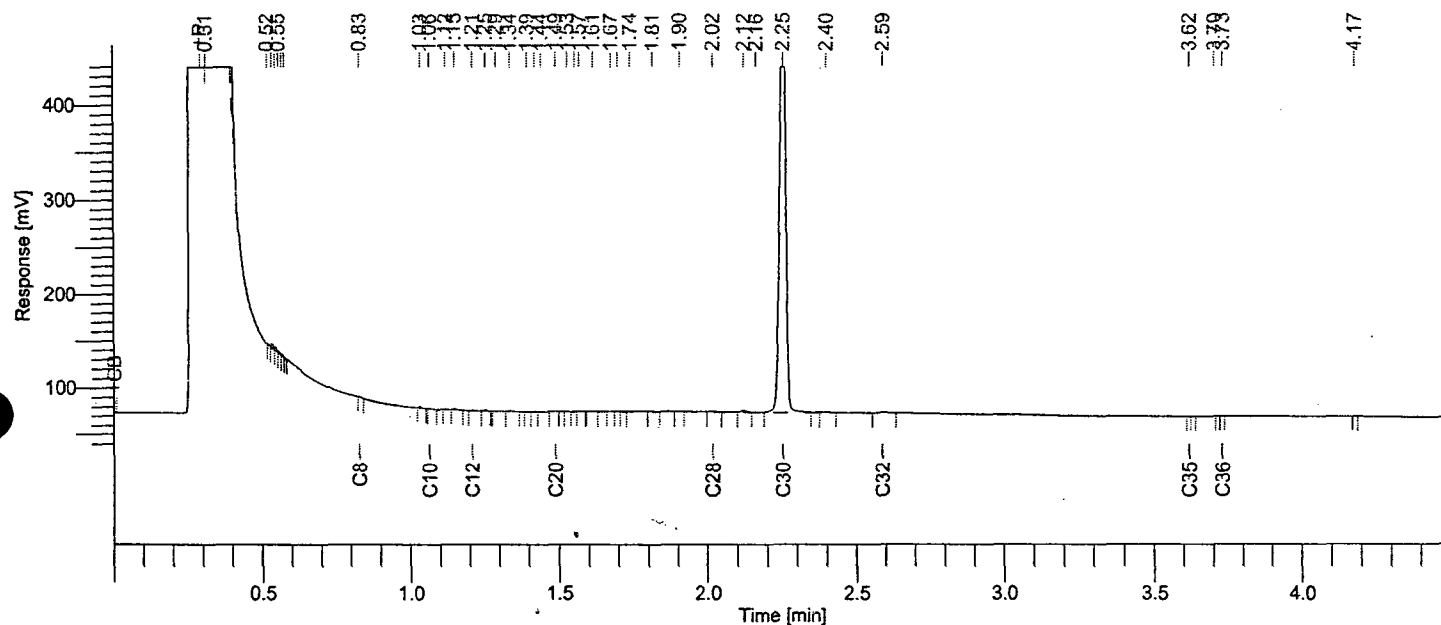
Report stored in ASCII file: D:\Data\TPH2\KWT2A019-20011015-103048.TX0

Software Version : 6.1.2.0.1:D19
 Operator : Turbochrom
 Sample Number : 007
 AutoSampler : BUILT-IN
 Instrument Name : TPH1
 Instrument Serial # : None
 Delay Time : 0.00 min
 Sampling Rate : 12.5000 pts/s
 Volume Injected : 1.000000 ul
 Sample Amount : 1.0000
 Data Acquisition Time : 7/2/03 3:39:19 PM

Date : 7/3/03 1:48:54 PM
 Sample Name : 11762
 Study : 2668
 Rack/Vial : 0/7
 Channel : A
 A/D mV Range : 1000
 End Time : 4.50 min
 Area Reject : 0.000000
 Dilution Factor : 1.00
 Cycle : 7

Raw Data File : D:\Data\TPH1\HAT1A007.raw <Modified>
 Result File : D:\Data\TPH1\HAT1A007.rst
 Inst Method : D:\Methods\TPH1DRO from D:\Data\TPH1\HAT1A007.rst
 Proc Method : D:\Methods\TPH1DRO.mth
 Calib Method : D:\Methods\TPH1DRO.mth
 Sequence File : D:\Sequence\HAT1A.seq

11762
 No 1.1 ut.m



TX1005

Analytical Method: TX1005
 Reporting Units: mg/Kg
 Matrix: soil

Component Name	Adjusted Amount	Raw Amount	Area [μV s]
Diesel	3.7	3.7	25344.29
Surrogate	98.7	98.7	673384.41
			698728.71

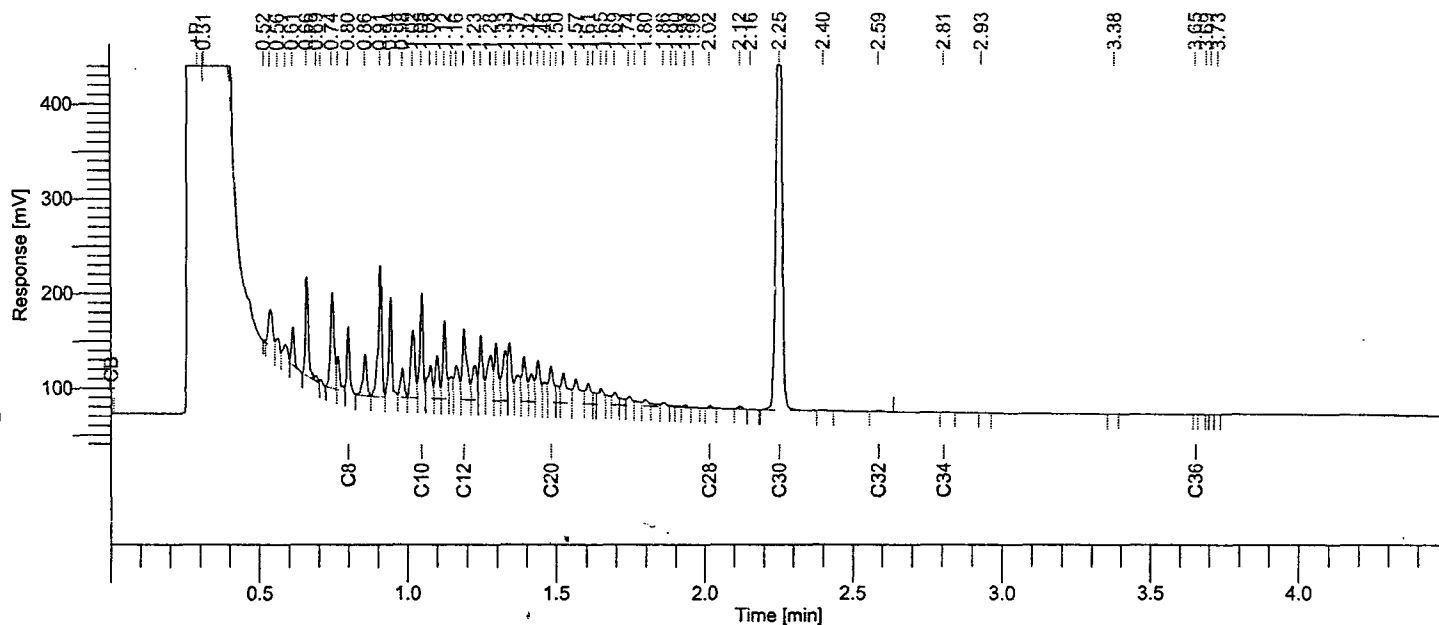
Report stored in ASCII file: D:\Data\TPH1\HAT1A007.TX0

Software Version : 6.1.2.0.1:D19
 Operator : Turbochrom
 Sample Number : 013
 AutoSampler : BUILT-IN
 Instrument Name : TPH1
 Instrument Serial # : None
 Delay Time : 0.00 min
 Sampling Rate : 12.5000 pts/s
 Volume Injected : 1.000000 ul
 Sample Amount : 1.0000
 Data Acquisition Time : 7/2/03 4:51:43 PM

Date : 7/3/03 1:49:08 PM
 Sample Name : 11766
 Study : 2668
 Rack/Vial : 0/13
 Channel : A
 A/D mV Range : 1000
 End Time : 4.50 min
 Area Reject : 0.000000
 Dilution Factor : 1.00
 Cycle : 13

Raw Data File : D:\Data\TPH1\HAT1A013.raw <Modified>
 Result File : D:\Data\TPH1\HAT1A013.rst
 Inst Method : D:\Methods\TPH1DRO from D:\Data\TPH1\HAT1A013.rst
 Proc Method : D:\Methods\TPH1DRO.mth
 Calib Method : D:\Methods\TPH1DRO.mth
 Sequence File : D:\Sequence\HAT1A.seq

11766
 No Dilution



TX1005

Analytical Method: TX1005
 Reporting Units: mg/Kg
 Matrix: soil

Component Name	Adjusted Amount	Raw Amount	Area [μV s]
Diesel	162.5	162.5	1105456.93
Surrogate	100.1	100.1	683179.24
			1788636.17

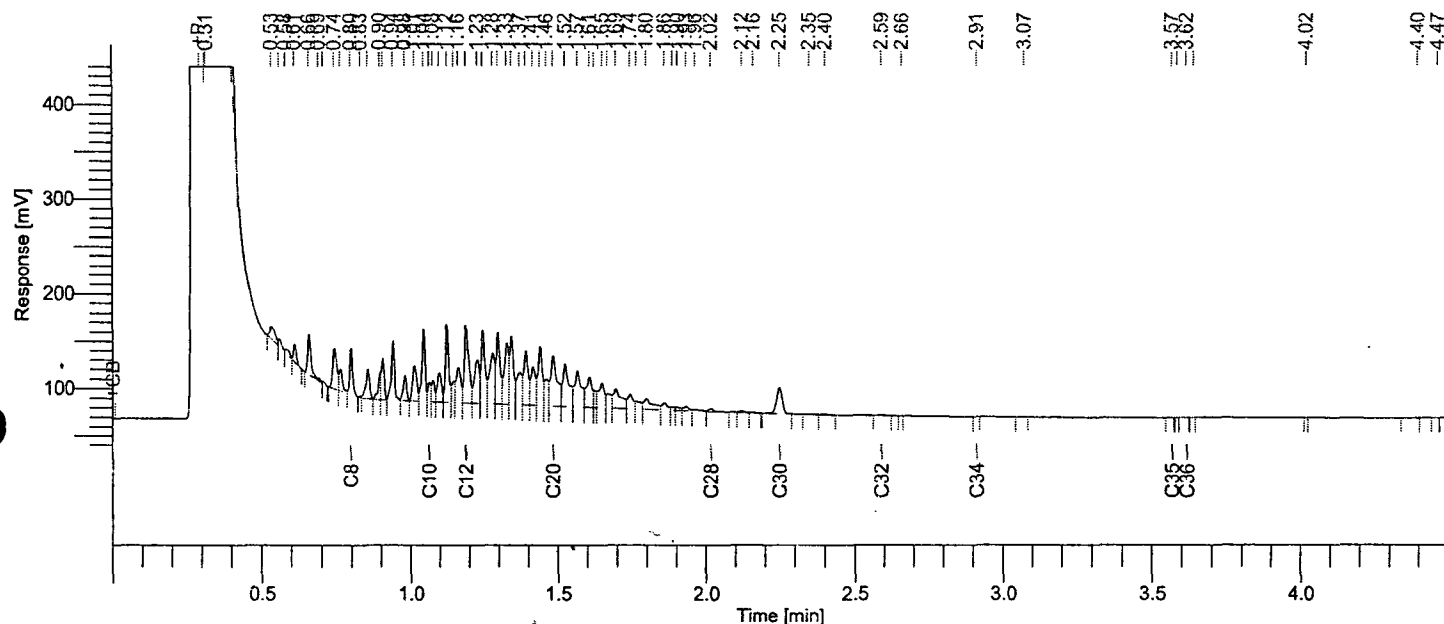
Report stored in ASCII file: D:\Data\TPH1\HAT1A013.TX0

Software Version : 6.1.2.0.1:D19
 Operator : Turbochrom
 Sample Number : 050
 AutoSampler : BUILT-IN
 Instrument Name : TPH1
 Instrument Serial # : None
 Delay Time : 0.00 min
 Sampling Rate : 12.5000 pts/s
 Volume Injected : 1.000000 ul
 Sample Amount : 1.0000
 Data Acquisition Time : 7/4/03 9:55:43 PM

Date : 7/7/03 1:47:32 AM
 Sample Name : 11768
 Study : 2702
 Rack/Vial : 0/50
 Channel : A
 A/D mV Range : 1000
 End Time : 4.50 min
 Area Reject : 0.000000
 Dilution Factor : 20.00
 Cycle : 50

Raw Data File : D:\Data\TPH1\HCT1A050.raw <Modified>
 Result File : D:\Data\TPH1\HCT1A050.rst
 Inst Method : d:\methods\tph1dro from D:\Data\TPH1\HCT1A050.rst
 Proc Method : d:\methods\tph1dro.mth
 Calib Method : d:\methods\tph1dro.mth
 Sequence File : D:\Sequence\HCT1A.seq

11768
 1:20 dilution



TX1005

Analytical Method: TX1005
 Reporting Units: mg/Kg
 Matrix: soil

Component Name	Adjusted Amount	Raw Amount	Area [μV s]
Diesel	3974.7	198.7	1349236.06
Surrogate	117.6	5.9	40315.38
			1389551.44

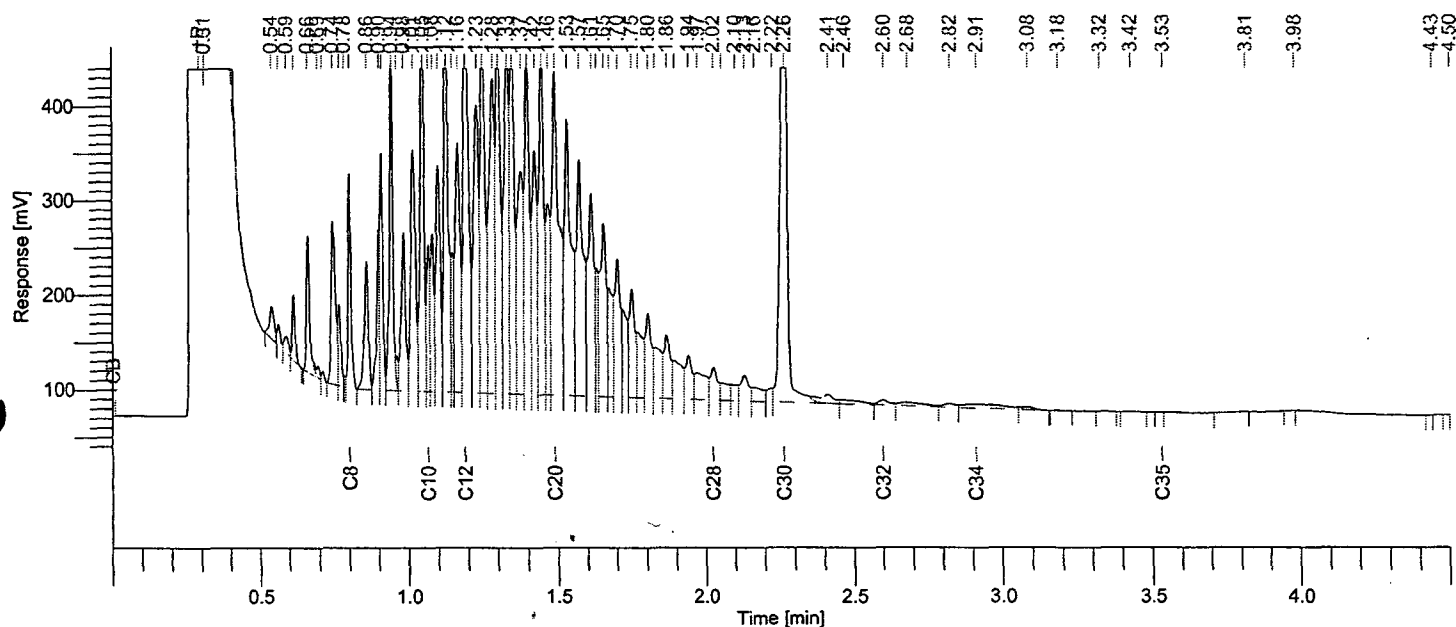
Report stored in ASCII file: D:\Data\TPH1\HCT1A050.TX0

Software Version : 6.1.2.0.1:D19
 Operator : Turbochrom
 Sample Number : 018
 AutoSampler : BUILT-IN
 Instrument Name : TPH1
 Instrument Serial # : None
 Delay Time : 0.00 min
 Sampling Rate : 12.5000 pts/s
 Volume Injected : 1.000000 ul
 Sample Amount : 1.0000
 Data Acquisition Time : 7/2/03 5:53:32 PM

Date : 7/3/03 1:49:19 PM
 Sample Name : 11769
 Study : 2668
 Rack/Vial : 0/18
 Channel : A
 A/D mV Range : 1000
 End Time : 4.50 min
 Area Reject : 0.000000
 Dilution Factor : 1.00
 Cycle : 18

Raw Data File : D:\Data\TPH1\HAT1A018.raw <Modified>
 Result File : D:\Data\TPH1\HAT1A018.rst
 Inst Method : D:\Methods\TPH1DRO from D:\Data\TPH1\HAT1A018.rst
 Proc Method : D:\Methods\TPH1DRO.mth
 Calib Method : D:\Methods\TPH1DRO.mth
 Sequence File : D:\Sequence\HAT1A.seq

11769
 No Dilution



TX1005

Analytical Method: TX1005
 Reporting Units: mg/Kg
 Matrix: soil

Component Name	Adjusted Amount	Raw Amount	Area [μV s]
Diesel	1502.4	1502.4	9519027.29
Surrogate	139.1	139.1	947181.84
			10466209.13

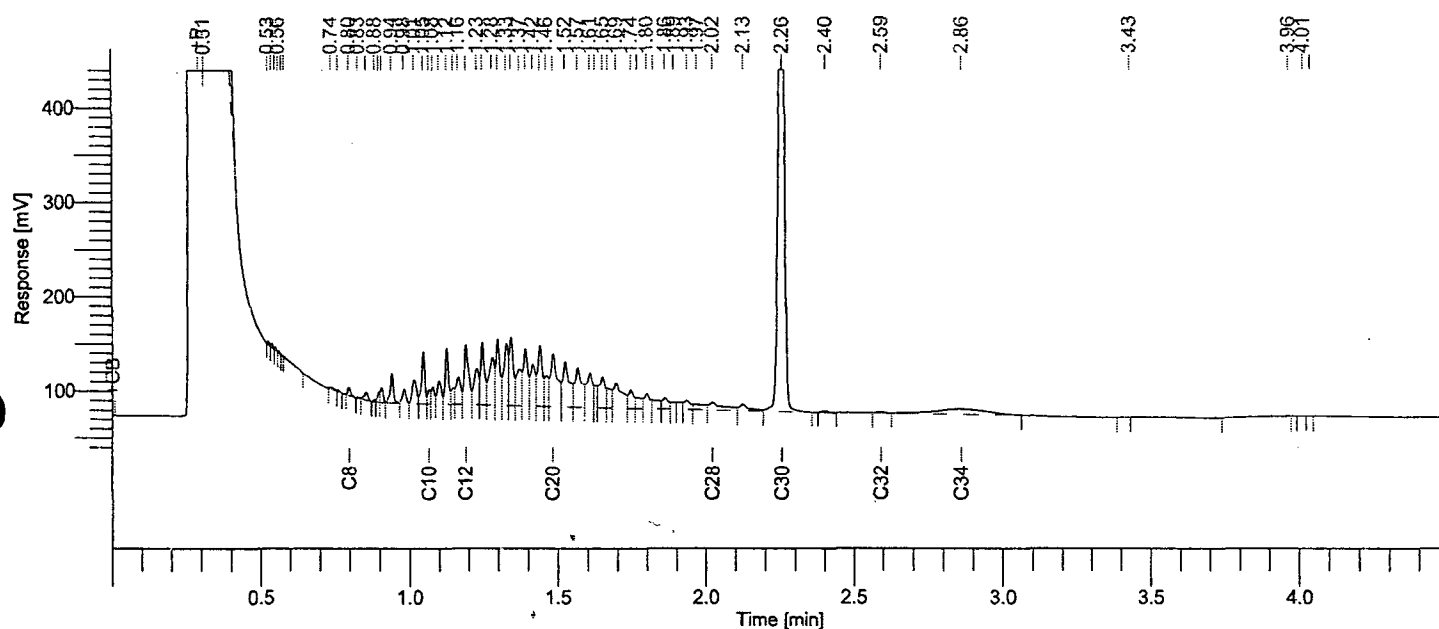
Report stored in ASCII file: D:\Data\TPH1\HAT1A018.TX0

Software Version : 6.1.2.0.1:D19
 Operator : Turbochrom
 Sample Number : 019
 AutoSampler : BUILT-IN
 Instrument Name : TPH1
 Instrument Serial # : None
 Delay Time : 0.00 min
 Sampling Rate : 12.5000 pts/s
 Volume Injected : 1.000000 ul
 Sample Amount : 1.0000
 Data Acquisition Time : 7/2/03 6:04:21 PM

Date : 7/2/03 1:49:21 PM
 Sample Name : 11770
 Study : 2668
 Rack/Vial : 0/19
 Channel : A
 A/D mV Range : 1000
 End Time : 4.50 min
 Area Reject : 0.000000
 Dilution Factor : 1.00
 Cycle : 19

Raw Data File : D:\Data\TPH1\HAT1A019.raw <Modified>
 Result File : D:\Data\TPH1\HAT1A019.rst
 Inst Method : D:\Methods\TPH1DRO from D:\Data\TPH1\HAT1A019.rst
 Proc Method : D:\Methods\TPH1DRO.mth
 Calib Method : D:\Methods\TPH1DRO.mth
 Sequence File : D:\Sequence\HAT1A.seq

11770
 No dilution



TX1005

Analytical Method: TX1005
 Reporting Units: mg/Kg
 Matrix: soil

Component Name	Adjusted Amount	Raw Amount	Area [μV s]
Diesel	207.8	207.8	1409938.48
Surrogate	114.8	114.8	782551.91
			2192490.39

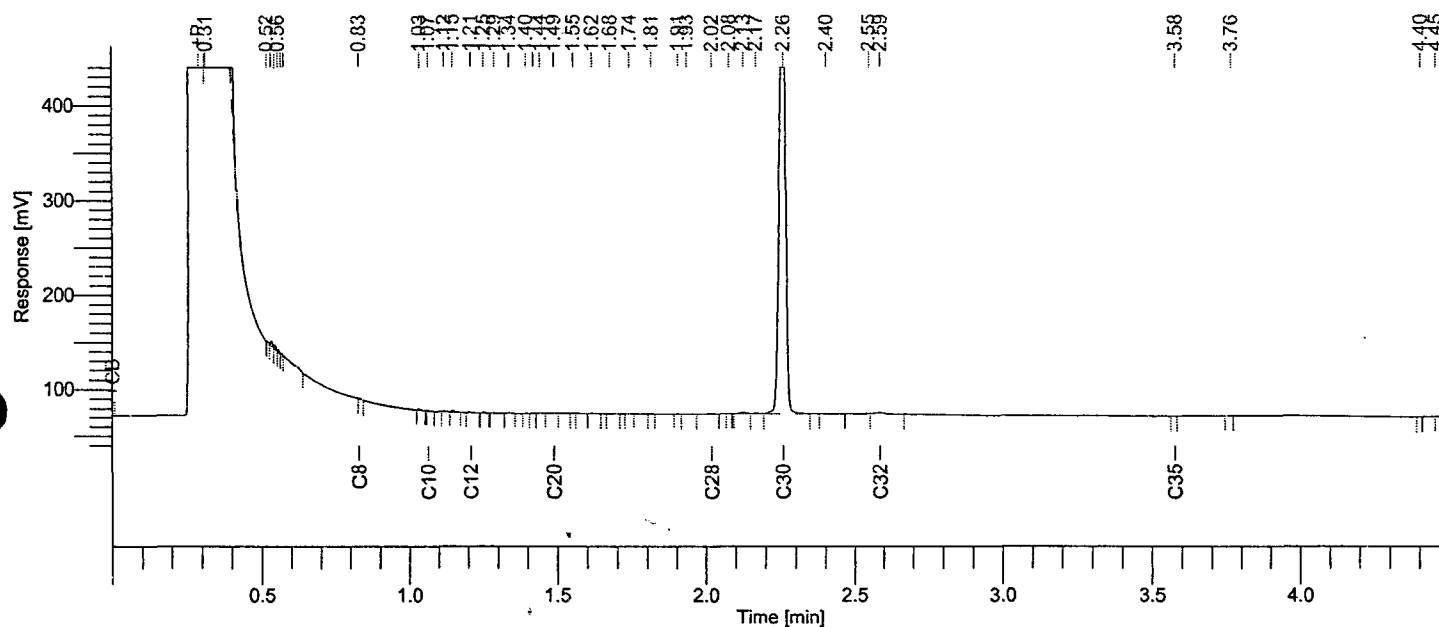
Report stored in ASCII file: D:\Data\TPH1\HAT1A019.TX0

Software Version : 6.1.2.0.1:D19
 Operator : Turbochrom
 Sample Number : 022
 AutoSampler : BUILT-IN
 Instrument Name : TPH1
 Instrument Serial # : None
 Delay Time : 0.00 min
 Sampling Rate : 12.5000 pts/s
 Volume Injected : 1.000000 ul
 Sample Amount : 1.0000
 Data Acquisition Time : 7/2/03 6:43:11 PM

Date : 7/3/03 1:49:28 PM
 Sample Name : 11773
 Study : 2668
 Rack/Vial : 0/22
 Channel : A
 A/D mV Range : 1000
 End Time : 4.50 min
 Area Reject : 0.000000
 Dilution Factor : 1.00
 Cycle : 22

Raw Data File : D:\Data\TPH1\HAT1A022.raw <Modified>
 Result File : D:\Data\TPH1\HAT1A022.rst
 Inst Method : D:\Methods\TPH1DRO from D:\Data\TPH1\HAT1A022.rst
 Proc Method : D:\Methods\TPH1DRO.mth
 Calib Method : D:\Methods\TPH1DRO.mth
 Sequence File : D:\Sequence\HAT1A.seq

11773
 No Distortion



TX1005

Analytical Method: TX1005
 Reporting Units: mg/Kg
 Matrix: soil

Component Name	Adjusted Amount	Raw Amount	Area [μ V s]
Diesel	1.9	1.9	13163.92
Surrogate	109.7	109.7	747840.22
			761004.14

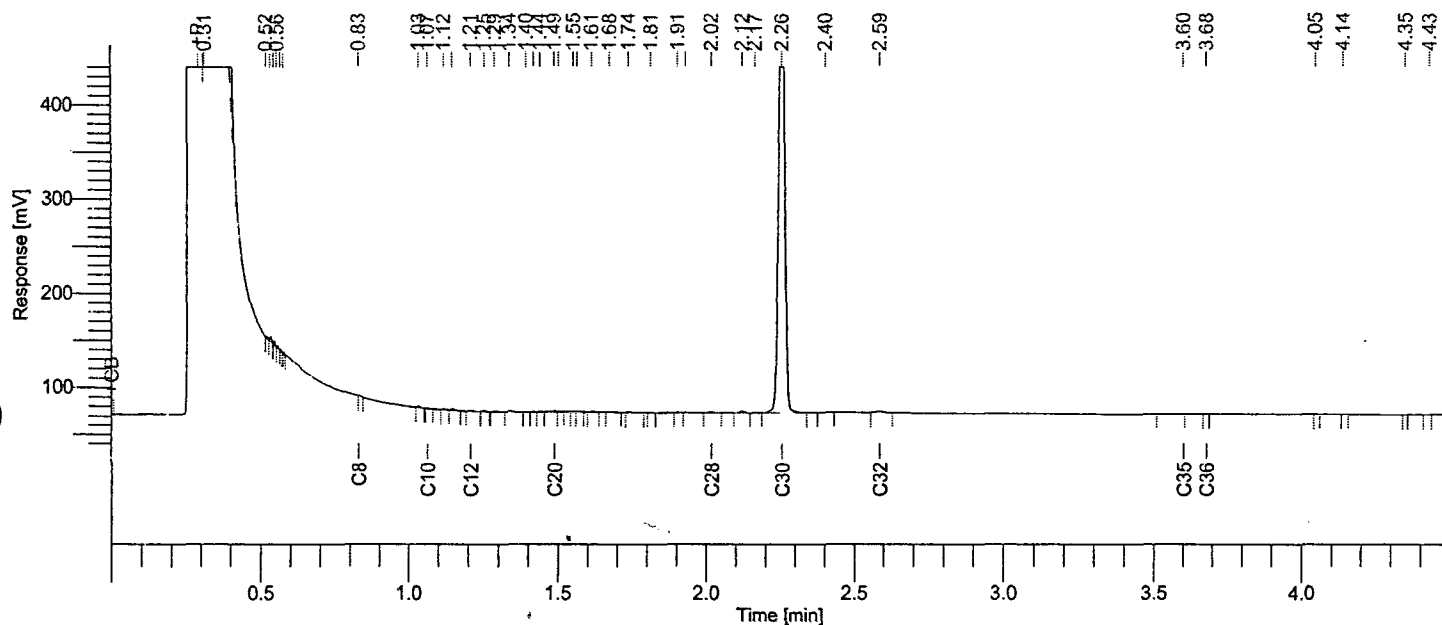
Report stored in ASCII file: D:\Data\TPH1\HAT1A022.TX0

Software Version : 6.1.2.0.1:D19
 Operator : Turbochrom
 Sample Number : 024
 AutoSampler : BUILT-IN
 Instrument Name : TPH1
 Instrument Serial # : None
 Delay Time : 0.00 min
 Sampling Rate : 12.5000 pts/s
 Volume Injected : 1.000000 ul
 Sample Amount : 1.0000
 Data Acquisition Time : 7/2/03 7:09:12 PM

Date : 7/3/03 1:49:32 PM
 Sample Name : 11775
 Study : 2668
 Rack/Vial : 0/24
 Channel : A
 A/D mV Range : 1000
 End Time : 4.50 min
 Area Reject : 0.000000
 Dilution Factor : 1.00
 Cycle : 24

Raw Data File : D:\Data\TPH1\HAT1A024.raw <Modified>
 Result File : D:\Data\TPH1\HAT1A024.rst
 Inst Method : D:\Methods\TPH1DRO from D:\Data\TPH1\HAT1A024.rst
 Proc Method : D:\Methods\TPH1DRO.mth
 Calib Method : D:\Methods\TPH1DRO.mth
 Sequence File : D:\Sequence\HAT1A.seq

11775
 No Dilution



TX1005

Analytical Method: TX1005
 Reporting Units: mg/Kg
 Matrix: soil

Component Name	Adjusted Amount	Raw Amount	Area [μV s]
Diesel	3.2	3.2	22056.99
Surrogate	106.6	106.6	727054.64
			749111.63

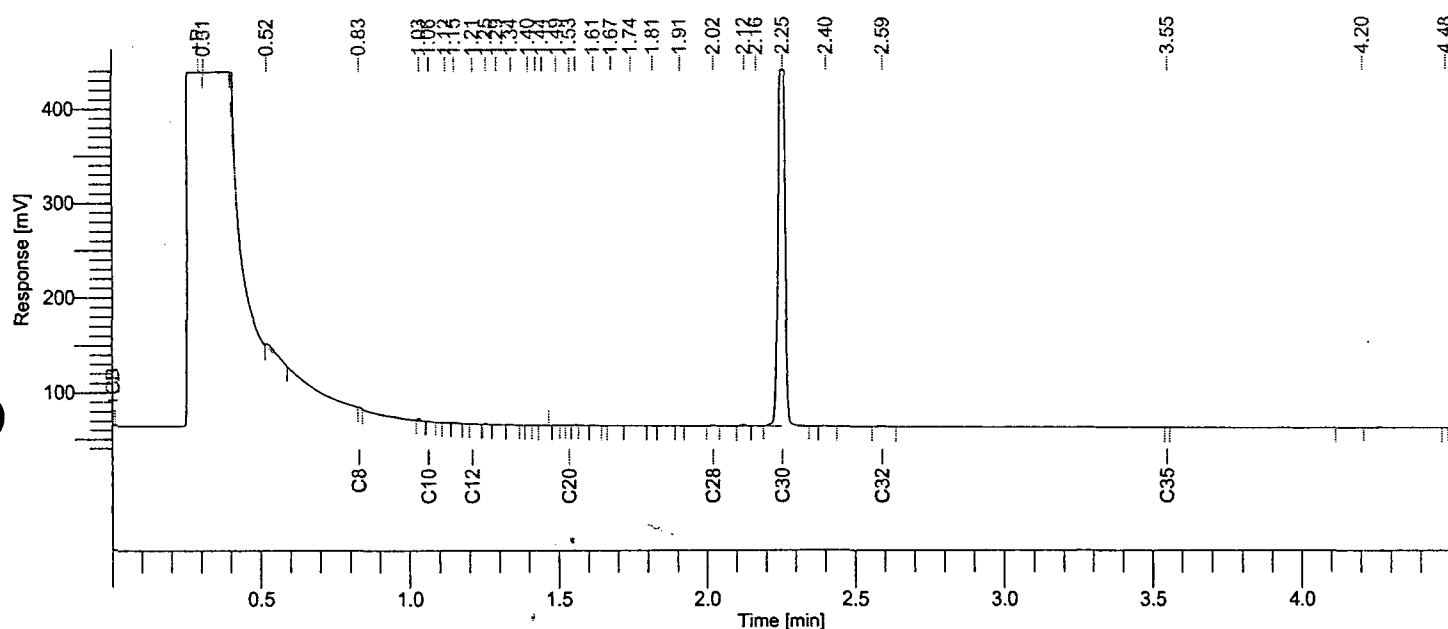
Report stored in ASCII file: D:\Data\TPH1\HAT1A024.TX0

Software Version : 6.1.2.0.1:D19
 Operator : Turbochrom
 Sample Number : 026
 AutoSampler : BUILT-IN
 Instrument Name : TPH1
 Instrument Serial # : None
 Delay Time : 0.00 min
 Sampling Rate : 12.5000 pts/s
 Volume Injected : 1.000000 ul
 Sample Amount : 1.0000
 Data Acquisition Time : 7/3/03 1:36:42 AM

Date : 7/3/03 1:49:36 PM
 Sample Name : 11777
 Study : 2668
 Rack/Vial : 0/26
 Channel : A
 A/D mV Range : 1000
 End Time : 4.50 min
 Area Reject : 0.000000
 Dilution Factor : 1.00
 Cycle : 26

Raw Data File : D:\Data\TPH1\HAT1A026.raw <Modified>
 Result File : D:\Data\TPH1\HAT1A026.rst
 Inst Method : D:\Methods\TPH1DRO from D:\Data\TPH1\HAT1A026.rst
 Proc Method : D:\Methods\TPH1DRO.mth
 Calib Method : D:\Methods\TPH1DRO.mth
 Sequence File : D:\Sequence\HAT1A.seq

11777
 No Dilution



TX1005

Analytical Method: TX1005
 Reporting Units: mg/Kg
 Matrix: soil

Component Name	Adjusted Amount	Raw Amount	Area [μ V s]
Diesel	1.4	1.4	9406.45
Surrogate	108.6	108.6	740389.20
			749795.66

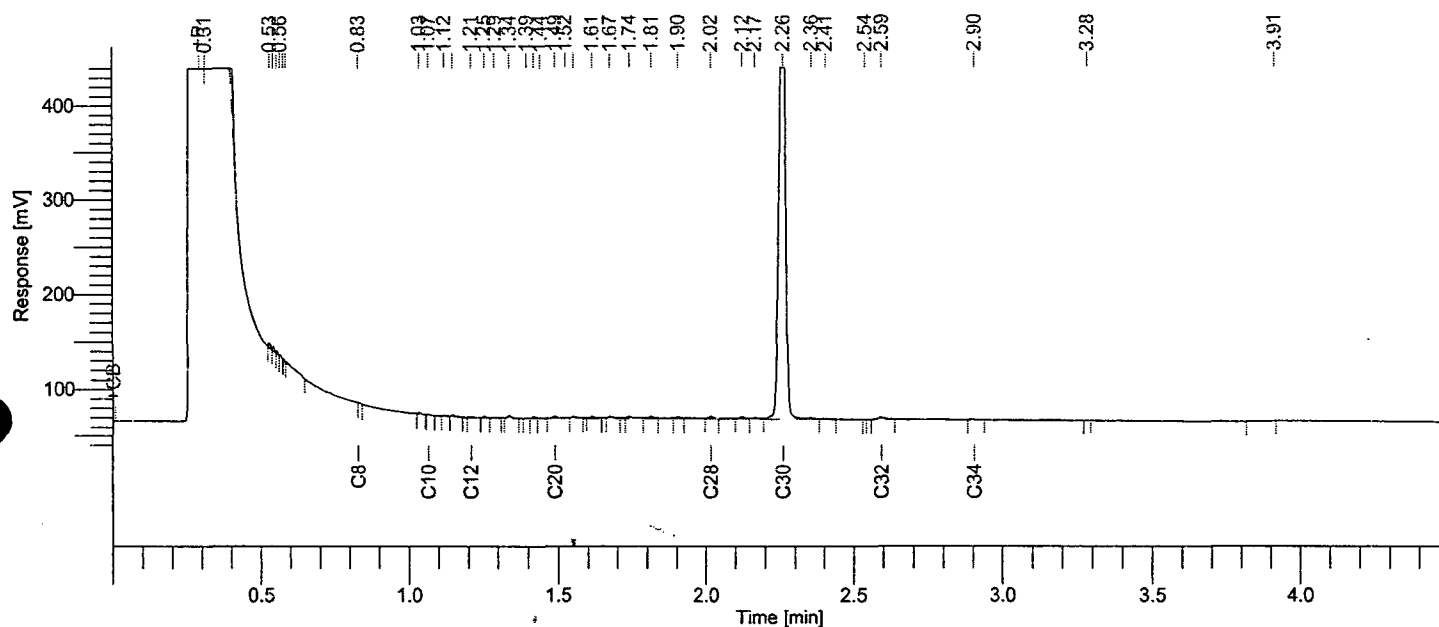
Report stored in ASCII file: D:\Data\TPH1\HAT1A026.TX0

Software Version : 6.1.2.0.1:D19
 Operator : Turbochrom
 Sample Number : 031
 AutoSampler : BUILT-IN
 Instrument Name : TPH1
 Instrument Serial # : None
 Delay Time : 0.00 min
 Sampling Rate : 12.5000 pts/s
 Volume Injected : 1.000000 ul
 Sample Amount : 1.0000
 Data Acquisition Time : 7/3/03 2:40:31 AM

Date : 7/3/03 1:49:47 PM
 Sample Name : 11780
 Study : 2668
 Rack/Vial : 0/31
 Channel : A
 A/D mV Range : 1000
 End Time : 4.50 min
 Area Reject : 0.000000
 Dilution Factor : 1.00
 Cycle : 31

Raw Data File : D:\Data\TPH1\HAT1A031.raw <Modified>
 Result File : D:\Data\TPH1\HAT1A031.rst
 Inst Method : D:\Methods\TPH1DRO from D:\Data\TPH1\HAT1A031.rst
 Proc Method : D:\Methods\TPH1DRO.mth
 Calib Method : D:\Methods\TPH1DRO.mth
 Sequence File : D:\Sequence\HAT1A.seq

11780
no dilution



TX1005

Analytical Method: TX1005
 Reporting Units: mg/Kg
 Matrix: soil

Component Name	Adjusted Amount	Raw Amount	Area [μV s]
Diesel	4.5	4.5	30889.41
Surrogate	110.3	110.3	752146.65
			783036.06

Report stored in ASCII file: D:\Data\TPH1\HAT1A031.TX0

11/62-81



Laboratory Task Order No./P.O. No.

CHAIN-OF-CUSTODY RECORD

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30710111

Project Number/Name MT000803.001

Project Location PURE RESOURCES - LIVINGSTON

Laboratory TRACE

Project Manager KIEFFER

Sampler(s)/Affiliation LANG

ANALYSIS / METHOD / SIZE			
ATK, GLO, PRO	PHH	PHH	PHH

Sample ID/Location	Matrix	Date Sampled	TIME
--------------------	--------	--------------	------

Sample ID/Location	Matrix	Date Sampled	TIME	ATK, GLO, PRO	PHH	PHH	PHH	Remarks	Total
MWF 75-76	Soil	6-23-03	1420	X	X	X	X	11762	1
MWG 0-1		6-24-03	900	X				11763	1
70-78		6-24-03	1130	X				11764	1
MW H 0-0.5		6-24-03	1530	X				11765	1
20-21.5		6-24-03	1600	X	X	X	X	11766	1
40-41		6-24-03	1630	X				11767	1
74-75		6-24-03	1822	X	X	X	X	11768	1
MW I 55-56		6-25-03	1417	X	X	X	X	11769	1
70-71		6-25-03	1500	X	X	X	X	11770	1
10-15		6-25-03	1330	X				11771	1

Sample Matrix: L = Liquid; S = Solid; A = Air

Relinquished by: [Signature] Organization: ARCADIS Date: 6/30/03 Time: 1630 Seal Intact? Yes No N/A

Received by: [Signature] Organization: [Signature] Date: 6/30/03 Time: 5:00 Seal Intact? Yes No N/A

Relinquished by: [Signature] Organization: ARCADIS Date: 6/30/03 Time: 5:55 Seal Intact? Yes No N/A

Received by: [Signature] Organization: ARCADIS Date: 7/1/03 Time: 13:52 Seal Intact? Yes No N/A

Special Instructions/Remarks:

Delivery Method: ☐ In Person ☐ Common Carrier ☐ Lab Courier ☐ Other

Specify: 4th NA 1200/1200 7/1/03

SPECIFY AG 05-1201



Laboratory Task Order No./P.O. No. _____

CHAIN-OF-CUSTODY RECORD

Page _____ of _____

Project Number/Name MT000 803.0001Project Location PURE RESOURCES - LOUNGTOWNLaboratory TRACEProject Manager KIEFFERSampler(s)/Affiliation LANG

ANALYSIS / METHOD / SIZE

Sample ID/Location	Matrix	Date Sampled	TIME	ANALYSIS / METHOD / SIZE			Remarks	Total
				BTEX, GROHED	PAH	Fingerprint		
MW-J 55-60	S	6-26-03	900	X			11772	1
75-76		6-26-03	915	X	X		11773	1
MW-L 0-0.3		6-26-03	1350	X			11774	1
14-75		6-26-03	1500	X	X		11775	1
MW-M 0-0.5		6-27-03	820	X			11776	1
74-75		6-27-03	920	X	X		11777	1
MW-N 0-0.3		6-27-03	1410	X			11778	1
5-10		6-27-03	1420	X			11779	1
74-75	S	6-27-03	1445	X	X		11780	1
Trip BLANK	L			X			11781	2
Total No. of Bottles/Containers								21

Sample Matrix: L = Liquid; S = Solid; A = Air

Relinquished by: <u>[Signature]</u>	Organization: <u>AOCADIS</u>	Date: <u>6/30/03</u>	Time: <u>1630</u>	Seal Intact? Yes No N/A
Received by: <u>[Signature]</u>	Organization: <u></u>	Date: <u>6/30/03</u>	Time: <u>6:00</u>	
Relinquished by: <u>[Signature]</u>	Organization: <u>TRACE Analysis</u>	Date: <u>6/30/03</u>	Time: <u>5:55</u>	Seal Intact? Yes No N/A
Received by: <u>[Signature]</u>	Organization: <u></u>	Date: <u>7/1/03</u>	Time: <u>13:52</u>	

Special Instructions/Remarks: _____

Delivery Method: ☐ In Person☐ Common Carrier GLI 106/1304/139☐ Lab Courier☐ Other



CHAIN-OF-CUSTODY RECORD

Laboratory Task Order No./P.O. No. _____

Project Number/Name MT000803.0001
 Project Location PURE RESOURCES - LOVINGTON
 Laboratory TRACE
 Project Manager KIEFFER
 Sampler(s)/Affiliation LANG

ANALYSIS / METHOD / SIZE			Total
Sample ID/Location	Matrix	Date/Time Sampled	
MWF 75-76	Soil	6-23-03 1420	1
MWG 0-1	Soil	6-24-03 900	1
71-72	Soil	6-24-03 1130	1
MNH 0-0.5	Soil	6-24-03 1530	1
20-21.5	Soil	6-24-03 1600	1
40-41	Soil	6-24-03 1630	1
74-75	Soil	6-24-03 1822	1
MWI 55-56	Soil	6-25-03 1417	1
70-71	Soil	6-25-03 1500	1
10-15	Soil	6-25-03 1330	1
Total No. of Bottles/Containers			

Relinquished by: [Signature] Date: 6/30/03 Time: 1630 Seal Intact? Yes No N/A
 Received by: [Signature] Date: 6/30/03 Time: 5:00 Seal Intact? Yes No N/A
 Relinquished by: _____ Date: _____ Time: _____ Seal Intact? Yes No N/A
 Received by: _____ Date: _____ Time: _____ Seal Intact? Yes No N/A

Special Instructions/Remarks: _____

Delivery Method: ☐ In Person ☐ Common Carrier ☐ Lab Courier ☐ Other _____



Laboratory Task Order No./P.O. No. _____

CHAIN-OF-CUSTODY RECORD

Page 2 of 2Project Number/Name MT000 803.0001Project Location PURE RESOURCES - COUNSTONLaboratory TRACEProject Manager KIEFFERSampler(s)/Affiliation LANG

ANALYSIS / METHOD / SIZE

Sample ID/Location	Matrix	Date/Time		Matrix	TIME	Remarks	Total
		Date	Time				
MW-J 55-60	S	6-26-03	900	X			1
75-96		6-26-03	915	X			1
MW-L 0-0.5		6-26-03	1350	X			1
74-75		6-26-03	1500	X			1
MW-M 0-0.5		6-27-03	820	X			1
74-95		6-27-03	920	X			1
MW-N 0-0.5		6-27-03	1410	X			1
75-10		6-27-03	1420	X			1
74-75	S	6-27-03	1445	X			1
Trip BLANK	L			X			2

Sample Matrix: L = Liquid; S = Solid; A = Air

Total No. of Bottles/
Containers 21

Relinquished by: <u>[Signature]</u>	Organization: <u>ACADIS</u>	Date: <u>6/30/03</u>	Time: <u>1630</u>	Seal Intact? <u>Yes</u>
Received by: <u>[Signature]</u>	Organization: <u>[Signature]</u>	Date: <u>6/30/03</u>	Time: <u>5:00</u>	Seal Intact? <u>Yes</u>
Relinquished by: _____	Organization: _____	Date: _____	Time: _____	Seal Intact? _____
Received by: _____	Organization: _____	Date: _____	Time: _____	Seal Intact? _____

Special Instructions/Remarks: _____

Delivery Method: ☐ In Person☐ Common Carrier☐ Lab Courier☐ Other

SPECIFY

SPECIFY

AG 05-12/01

APPENDIX D

ARCADIS

Appendix D

Groundwater Laboratory Reports

Summary Report

Frank Kieffer
Arcadis Geraghty & Miller
1004 N. Big Spring St.
Suite 300
Midland, TX 79701

Report Date: July 11, 2003

Work Order: 3062721

Project Location: Lovington
Project Number: MT000803.0001.4

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
11531	MW-G	water	2003-06-26	10:45	2003-06-27
11532	MW-F	water	2003-06-26	13:55	2003-06-27

Sample - Field Code	Benzene	Toluene	BTEX Ethylbenzene	Xylene (isomers)	TPH DRO DRO	TPH GRO GRO
	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
11531 - MW-G	<0.00500	<0.00500	<0.00500	<0.00500	<5.00	<0.500
11532 - MW-F	<0.00500	<0.00500	<0.00500	<0.00500	<5.00	<0.500

Sample: 11531 - MW-G

Param	Flag	Result	Units	RL
Hydroxide Alkalinity		<1.00	mg/L as CaCo3	1.00
Carbonate Alkalinity		<1.00	mg/L as CaCo3	1.00
Bicarbonate Alkalinity		154	mg/L as CaCo3	4.00
Total Alkalinity		154	mg/L as CaCo3	4.00
Dissolved Calcium		68.3	mg/L	0.500
Dissolved Potassium		2.13	mg/L	0.500
Dissolved Magnesium		10.3	mg/L	0.500
Dissolved Sodium		39.2	mg/L	0.500
Specific Conductance		619	µMHOS/cm	0.00
Dissolved Iron		<0.0500	mg/L	0.0500
Total Iron		2.34	mg/L	0.0500
Chloride		48.7	mg/L	0.500
Fluoride		1.55	mg/L	0.200
Sulfate		45.5	mg/L	0.500
Nitrite-N		<0.0100	mg/L	0.0100
Nitrate-N		3.05	mg/L	0.200
pH	1	7.50	s.u.	0.00
Total Dissolved Solids		404.0	mg/L	10.00
Total Organic Carbon		1.03	mg/L	1.00

¹received out of holding time

Sample: 11532 - MW-F

Param	Flag	Result	Units	RL
Hydroxide Alkalinity		<1.00	mg/L as CaCo3	1.00
Carbonate Alkalinity		<1.00	mg/L as CaCo3	1.00
Bicarbonate Alkalinity		158	mg/L as CaCo3	4.00
Total Alkalinity		158	mg/L as CaCo3	4.00
Dissolved Calcium		78.0	mg/L	0.500
Dissolved Potassium		2.17	mg/L	0.500
Dissolved Magnesium		11.3	mg/L	0.500
Dissolved Sodium		42.2	mg/L	0.500
Specific Conductance		689	μMHOS/cm	0.00
Dissolved Iron		<0.0500	mg/L	0.0500
Total Iron		4.63	mg/L	0.0500
Chloride		61.4	mg/L	0.500
Fluoride		1.61	mg/L	0.200
Sulfate		59.9	mg/L	0.500
Nitrite-N		<0.0100	mg/L	0.0100
Nitrate-N		2.95	mg/L	0.200
pH	2	7.50	s.u.	0.00
Total Dissolved Solids		420.0	mg/L	10.00
Total Organic Carbon		34.9	mg/L	1.00

²received out of holding time

Cation-Anion Balance Sheet

DATE: 7/11/2003

Sample #	Calcium ppm	Magnesium ppm	Sodium ppm	Potassium ppm	Alkalinity ppm	Sulfate ppm	Chloride ppm	Nitrate ppm	Fluoride ppm	TDS ppm	EC μMHOs/cm
11531	68.3	10.3	39.2	2.13	154.00	45.5	48.7	3.05	1.55	404	619
11532	78	11.3	42.2	2.17	158.00	59.9	61.4	2.95	1.61	420	689

Sample #	Calcium in meq/L	Magnesium in meq/L	Sodium in meq/L	Potassium in meq/L	Alkalinity in meq/L	Sulfate in meq/L	Chloride in meq/L	Nitrate in meq/L	Fluoride in meq/L	Total Cations in meq/L	Total Anions in meq/L	Percentage Error
11531	3.41	0.85	1.71	0.05	3.08	0.95	1.37	0.2177395	0.081592	6.02	5.70	5.37685721
11532	3.89	0.93	1.84	0.06	3.16	1.25	1.73	0.2106005	0.0847504	6.71	6.43	4.239822204

EC/Cation	EC/Anion
601.54424	570.04685
671.32856	643.45629

TDS/EC	TDS/Cat	TDS/Anion
0.65	0.67	0.71
0.61	0.63	0.65

range 557.1 to 680.9
range 620.1 to 757.9
needs to be 0.55-0.77
needs to be 0.55-0.77

TRACE ANALYSIS, INC.

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Analytical and Quality Control Report

Frank Kieffer
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1004 N. Big Spring St.
Suite 300
Midland, TX 79701

Report Date: July 11, 2003

Work Order: 3062721

Project Location: Lovington
Project Number: MT000803.0001.4

Enclosed are the Analytical Report and Quality Control Report for the following sample(s) submitted to TraceAnalysis, Inc.

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
11531	MW-G	water	2003-06-26	10:45	2003-06-27
11532	MW-F	water	2003-06-26	13:55	2003-06-27

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

This report consists of a total of 19 pages and shall not be reproduced except in its entirety, without written approval of TraceAnalysis, Inc.


Dr. Blair Leftwich, Director

Analytical Report

Sample: 11531 - MW-G

Analysis:	Alkalinity	Analytical Method:	SM 2320B	Prep Method:	N/A
QC Batch:	2649	Date Analyzed:	2003-07-01	Analyzed By:	RS
Prep Batch:	2418	Date Prepared:	2003-07-01	Prepared By:	RS

Parameter	Flag	RL Result	Units	Dilution	RL
Hydroxide Alkalinity		<1.00	mg/L as CaCo3	1	1.00
Carbonate Alkalinity		<1.00	mg/L as CaCo3	1	1.00
Bicarbonate Alkalinity		154	mg/L as CaCo3	1	4.00
Total Alkalinity		154	mg/L as CaCo3	1	4.00

Sample: 11531 - MW-G

Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	2767	Date Analyzed:	2003-07-07	Analyzed By:	
Prep Batch:	2514	Date Prepared:	2003-07-07	Prepared By:	

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00500	mg/L	5	0.00100
Toluene		<0.00500	mg/L	5	0.00100
Ethylbenzene		<0.00500	mg/L	5	0.00100
Xylene (isomers)		<0.00500	mg/L	5	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)	¹	0.379	mg/L	5	0.100	76	78.7 - 110
4-Bromofluorobenzene (4-BFB)	²	0.376	mg/L	5	0.100	75	77.8 - 110

Sample: 11531 - MW-G

Analysis:	Cations	Analytical Method:	S 6010B	Prep Method:	S 3005A
QC Batch:	2830	Date Analyzed:	2003-07-02	Analyzed By:	BC
Prep Batch:	2376	Date Prepared:	2003-07-01	Prepared By:	TP

Parameter	Flag	RL Result	Units	Dilution	RL
Dissolved Calcium		68.3	mg/L	1	0.500
Dissolved Potassium		2.13	mg/L	1	0.500
Dissolved Magnesium		10.3	mg/L	1	0.500
Dissolved Sodium		39.2	mg/L	1	0.500

Sample: 11531 - MW-G

Analysis:	Conductivity	Analytical Method:	SM 2510B	Prep Method:	N/A
QC Batch:	2586	Date Analyzed:	2003-06-30	Analyzed By:	JSW
Prep Batch:	2352	Date Prepared:	2003-06-30	Prepared By:	JSW

¹Low surrogate recovery due to prep. ICV/CCV show the method to be in control.

²Low surrogate recovery due to prep. ICV/CCV show the method to be in control.

Parameter	Flag	RL Result	Units	Dilution	RL
Specific Conductance		619	μ MHOS/cm	1	0.00

Sample: 11531 - MW-G

Analysis: Fe, Dissolved Analytical Method: S 6010B Prep Method: S 3005A
QC Batch: 2840 Date Analyzed: 2003-07-07 Analyzed By: RR
Prep Batch: 2303 Date Prepared: 2003-06-27 Prepared By: TP

Parameter	Flag	RL Result	Units	Dilution	RL
Dissolved Iron		<0.0500	mg/L	1	0.0500

Sample: 11531 - MW-G

Analysis: Fe, Total Analytical Method: S 6010B Prep Method: S 3010A
QC Batch: 2693 Date Analyzed: 2003-07-03 Analyzed By: RR
Prep Batch: 2379 Date Prepared: 2003-06-30 Prepared By: TP

Parameter	Flag	RL Result	Units	Dilution	RL
Total Iron		2.34	mg/L	1	0.0500

Sample: 11531 - MW-G

Analysis: Ion Chromatography Analytical Method: E 300.0 Prep Method: N/A
QC Batch: 2577 Date Analyzed: 2003-06-30 Analyzed By: JSW
Prep Batch: 2344 Date Prepared: 2003-06-27 Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Chloride		48.7	mg/L	5	0.500
Fluoride		1.55	mg/L	5	0.200
Sulfate		45.5	mg/L	5	0.500

Sample: 11531 - MW-G

Analysis: NO2 (Spec) Analytical Method: SM 4500-NO2 B Prep Method: N/A
QC Batch: 2567 Date Analyzed: 2003-06-28 Analyzed By: JSW
Prep Batch: 2335 Date Prepared: 2003-06-28 Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Nitrite-N		<0.0100	mg/L	1	0.0100

Sample: 11531 - MW-G

Analysis: NO3 (IC) Analytical Method: E 300.0 Prep Method: N/A
QC Batch: 2577 Date Analyzed: 2003-06-30 Analyzed By: JSW

Prep Batch: 2344

Date Prepared: 2003-06-27

Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Nitrate-N		3.05	mg/L	5	0.200

Sample: 11531 - MW-G

Analysis: pH Analytical Method: SM 4500-H+ Prep Method: N/A
QC Batch: 2555 Date Analyzed: 2003-06-27 Analyzed By: JSW
Prep Batch: 2327 Date Prepared: 2003-06-27 Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
pH	3	7.50	s.u.	1	0.00

Sample: 11531 - MW-G

Analysis: TDS Analytical Method: SM 2540C Prep Method: N/A
QC Batch: 2710 Date Analyzed: 2003-07-07 Analyzed By: JSW
Prep Batch: 2470 Date Prepared: 2003-07-03 Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Total Dissolved Solids		404.0	mg/L	1	10.00

Sample: 11531 - MW-G

Analysis: TOC Analytical Method: E 415.1 Prep Method: N/A
QC Batch: 2728 Date Analyzed: 2003-07-06 Analyzed By: RC
Prep Batch: 2486 Date Prepared: 2003-07-06 Prepared By: RC

Parameter	Flag	RL Result	Units	Dilution	RL
Total Organic Carbon		1.03	mg/L	1	1.00

Sample: 11531 - MW-G

Analysis: TPH DRO Analytical Method: Mod. 8015B Prep Method: N/A
QC Batch: 2670 Date Analyzed: 2003-07-03 Analyzed By: BP
Prep Batch: 2436 Date Prepared: 2003-07-02 Prepared By: WG

Parameter	Flag	RL Result	Units	Dilution	RL
DRO		<5.00	mg/L	0.1	50.0

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		13.6	mg/L	0.1	150	91	44 - 123

³received out of holding time

Sample: 11531 - MW-G

Analysis: TPH GRO
QC Batch: 2771
Prep Batch: 2514

Analytical Method: S 8015B
Date Analyzed: 2003-07-07
Date Prepared: 2003-07-07

Prep Method: S 5030B
Analyzed By:
Prepared By:

Parameter	Flag	RL Result	Units	Dilution	RL
GRO		<0.500	mg/L	5	0.100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.413	mg/L	5	0.100	83	73 - 120
4-Bromofluorobenzene (4-BFB)		0.449	mg/L	5	0.100	90	78 - 120

Sample: 11532 - MW-F

Analysis: Alkalinity
QC Batch: 2649
Prep Batch: 2418

Analytical Method: SM 2320B
Date Analyzed: 2003-07-01
Date Prepared: 2003-07-01

Prep Method: N/A
Analyzed By: RS
Prepared By: RS

Parameter	Flag	RL Result	Units	Dilution	RL
Hydroxide Alkalinity		<1.00	mg/L as CaCo3	1	1.00
Carbonate Alkalinity		<1.00	mg/L as CaCo3	1	1.00
Bicarbonate Alkalinity		158	mg/L as CaCo3	1	4.00
Total Alkalinity		158	mg/L as CaCo3	1	4.00

Sample: 11532 - MW-F

Analysis: BTEX
QC Batch: 2767
Prep Batch: 2514

Analytical Method: S 8021B
Date Analyzed: 2003-07-07
Date Prepared: 2003-07-07

Prep Method: S 5030B
Analyzed By:
Prepared By:

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00500	mg/L	5	0.00100
Toluene		<0.00500	mg/L	5	0.00100
Ethylbenzene		<0.00500	mg/L	5	0.00100
Xylene (isomers)		<0.00500	mg/L	5	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.416	mg/L	5	0.100	83	78.7 - 110
4-Bromofluorobenzene (4-BFB)		0.440	mg/L	5	0.100	88	77.8 - 110

Sample: 11532 - MW-F

Analysis: Cations
QC Batch: 2830
Prep Batch: 2376

Analytical Method: S 6010B
Date Analyzed: 2003-07-02
Date Prepared: 2003-07-01

Prep Method: S 3005A
Analyzed By: BC
Prepared By: TP

Parameter	Flag	RL Result	Units	Dilution	RL
Dissolved Calcium		78.0	mg/L	1	0.500
Dissolved Potassium		2.17	mg/L	1	0.500
Dissolved Magnesium		11.3	mg/L	1	0.500
Dissolved Sodium		42.2	mg/L	1	0.500

Sample: 11532 - MW-F

Analysis: Conductivity	Analytical Method: SM 2510B	Prep Method: N/A
QC Batch: 2586	Date Analyzed: 2003-06-30	Analyzed By: JSW
Prep Batch: 2352	Date Prepared: 2003-06-30	Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Specific Conductance		689	μMHOS/cm	1	0.00

Sample: 11532 - MW-F

Analysis: Fe, Dissolved	Analytical Method: S 6010B	Prep Method: S 3005A
QC Batch: 2840	Date Analyzed: 2003-07-07	Analyzed By: RR
Prep Batch: 2303	Date Prepared: 2003-06-27	Prepared By: TP

Parameter	Flag	RL Result	Units	Dilution	RL
Dissolved Iron		<0.0500	mg/L	1	0.0500

Sample: 11532 - MW-F

Analysis: Fe, Total	Analytical Method: S 6010B	Prep Method: S 3010A
QC Batch: 2693	Date Analyzed: 2003-07-03	Analyzed By: RR
Prep Batch: 2379	Date Prepared: 2003-06-30	Prepared By: TP

Parameter	Flag	RL Result	Units	Dilution	RL
Total Iron		4.63	mg/L	1	0.0500

Sample: 11532 - MW-F

Analysis: Ion Chromatography	Analytical Method: E 300.0	Prep Method: N/A
QC Batch: 2577	Date Analyzed: 2003-06-30	Analyzed By: JSW
Prep Batch: 2344	Date Prepared: 2003-06-27	Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Chloride		61.4	mg/L	5	0.500
Fluoride		1.61	mg/L	5	0.200
Sulfate		59.9	mg/L	5	0.500

Sample: 11532 - MW-F

Analysis: NO2 (Spec)	Analytical Method: SM 4500-NO2 B	Prep Method: N/A
QC Batch: 2567	Date Analyzed: 2003-06-28	Analyzed By: JSW
Prep Batch: 2335	Date Prepared: 2003-06-28	Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Nitrite-N		<0.0100	mg/L	1	0.0100

Sample: 11532 - MW-F

Analysis: NO3 (IC)	Analytical Method: E 300.0	Prep Method: N/A
QC Batch: 2577	Date Analyzed: 2003-06-30	Analyzed By: JSW
Prep Batch: 2344	Date Prepared: 2003-06-27	Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Nitrate-N		2.95	mg/L	5	0.200

Sample: 11532 - MW-F

Analysis: pH	Analytical Method: SM 4500-H+	Prep Method: N/A
QC Batch: 2555	Date Analyzed: 2003-06-27	Analyzed By: JSW
Prep Batch: 2327	Date Prepared: 2003-06-27	Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
pH	⁴	7.50	s.u.	1	0.00

Sample: 11532 - MW-F

Analysis: TDS	Analytical Method: SM 2540C	Prep Method: N/A
QC Batch: 2710	Date Analyzed: 2003-07-07	Analyzed By: JSW
Prep Batch: 2470	Date Prepared: 2003-07-03	Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Total Dissolved Solids		420.0	mg/L	1	10.00

Sample: 11532 - MW-F

Analysis: TOC	Analytical Method: E 415.1	Prep Method: N/A
QC Batch: 2728	Date Analyzed: 2003-07-06	Analyzed By: RC
Prep Batch: 2486	Date Prepared: 2003-07-06	Prepared By: RC

Parameter	Flag	RL Result	Units	Dilution	RL
Total Organic Carbon		34.9	mg/L	1	1.00

⁴received out of holding time

Sample: 11532 - MW-F

Analysis: TPH DRO
QC Batch: 2670
Prep Batch: 2436

Analytical Method: Mod. 8015B
Date Analyzed: 2003-07-03
Date Prepared: 2003-07-02

Prep Method: N/A
Analyzed By: BP
Prepared By: WG

Parameter	Flag	RL Result	Units	Dilution	RL
DRO		<5.00	mg/L	0.1	50.0

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		11.7	mg/L	0.1	150	78	44 - 123

Sample: 11532 - MW-F

Analysis: TPH GRO
QC Batch: 2771
Prep Batch: 2514

Analytical Method: S 8015B
Date Analyzed: 2003-07-07
Date Prepared: 2003-07-07

Prep Method: S 5030B
Analyzed By:
Prepared By:

Parameter	Flag	RL Result	Units	Dilution	RL
GRO		<0.500	mg/L	5	0.100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.453	mg/L	5	0.100	91	73 - 120
4-Bromofluorobenzene (4-BFB)		0.524	mg/L	5	0.100	105	78 - 120

Method Blank (1) QC Batch: 2567

Parameter	Flag	Result	Units	RL
Nitrite-N		<0.0100	mg/L	0.01

Method Blank (1) QC Batch: 2577

Parameter	Flag	Result	Units	RL
Nitrate-N		<0.200	mg/L	0.2

Method Blank (1) QC Batch: 2577

Parameter	Flag	Result	Units	RL
Chloride		<0.500	mg/L	0.5
Fluoride		<0.200	mg/L	0.2
Sulfate		<0.500	mg/L	0.5

Method Blank (1) QC Batch: 2586

Parameter	Flag	Result	Units	RL
Specific Conductance		5.87	μ MHOS/cm	

Method Blank (1) QC Batch: 2649

Parameter	Flag	Result	Units	RL
Hydroxide Alkalinity		<1.00	mg/L as CaCo3	1
Carbonate Alkalinity		<1.00	mg/L as CaCo3	1
Bicarbonate Alkalinity		<4.00	mg/L as CaCo3	4
Total Alkalinity		<4.00	mg/L as CaCo3	4

Method Blank (1) QC Batch: 2670

Parameter	Flag	Result	Units	RL
DRO		<5.00	mg/L	50

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		11.5	mg/L	0.1	150	77	44 - 123

Method Blank (1) QC Batch: 2693

Parameter	Flag	Result	Units	RL
Total Iron		<0.0500	mg/L	0.05

Method Blank (1) QC Batch: 2710

Parameter	Flag	Result	Units	RL
Total Dissolved Solids		<10.00	mg/L	10

Method Blank (1) QC Batch: 2728

Parameter	Flag	Result	Units	RL
Total Organic Carbon		<1.00	mg/L	1

Method Blank (1) QC Batch: 2767

Parameter	Flag	Result	Units	RL
Benzene		<0.00100	mg/L	0.001

continued ...

method blank continued ...

Parameter	Flag	Result	Units	RL
Toluene		<0.00100	mg/L	0.001
Ethylbenzene		<0.00100	mg/L	0.001
Xylene (isomers)		<0.00100	mg/L	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0919	mg/L	1	0.100	92	78.7 - 110
4-Bromofluorobenzene (4-BFB)		0.0859	mg/L	1	0.100	86	77.8 - 110

Method Blank (1) QC Batch: 2771

Parameter	Flag	Result	Units	RL
GRO		<0.100	mg/L	0.1

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0997	mg/L	1	0.100	100	73 - 120
4-Bromofluorobenzene (4-BFB)		0.102	mg/L	1	0.100	102	78 - 120

Method Blank (1) QC Batch: 2830

Parameter	Flag	Result	Units	RL
Dissolved Calcium		<0.500	mg/L	0.5
Dissolved Potassium		<0.500	mg/L	0.5
Dissolved Magnesium		<0.500	mg/L	0.5
Dissolved Sodium		<0.500	mg/L	0.5

Method Blank (1) QC Batch: 2840

Parameter	Flag	Result	Units	RL
Dissolved Iron		<0.0500	mg/L	0.05

Duplicate (1) QC Batch: 2555

Param	Duplicate Result	Sample Result	Units	Dilution	RPD	RPD Limit
pH ⁵	7.50	7.50	s.u.	1	0	0

Duplicate (1) QC Batch: 2586

⁵received out of holding time

Param	Duplicate Result	Sample Result	Units	Dilution	RPD	RPD Limit
Specific Conductance	627	620	μ MHOS/cm	1	1	2.9

Duplicate (1) QC Batch: 2649

Param	Duplicate Result	Sample Result	Units	Dilution	RPD	RPD Limit
Hydroxide Alkalinity	<1.00	<1.00	mg/L as CaCo3	1	0	5.81
Carbonate Alkalinity	<1.00	<1.00	mg/L as CaCo3	1	0	5.81
Bicarbonate Alkalinity	186	190	mg/L as CaCo3	1	2	5.81
Total Alkalinity	186	190	mg/L as CaCo3	1	2	5.81

Duplicate (1) QC Batch: 2710

Param	Duplicate Result	Sample Result	Units	Dilution	RPD	RPD Limit
Total Dissolved Solids	1044	978.0	mg/L	2	6	9.41

Laboratory Control Spike (LCS-1) QC Batch: 2567

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Nitrite-N	0.0823	0.0825	mg/L	1	0.0800	<0.000820	103	0	95 - 106	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spike (LCS-1) QC Batch: 2577

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Nitrate-N	2.35	2.34	mg/L	1	2.50	<0.126	94	0	90 - 110	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spike (LCS-1) QC Batch: 2577

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Chloride	12.7	12.8	mg/L	1	12.5	<1.49	102	1	90 - 110	20
Fluoride	2.34	2.34	mg/L	1	2.50	<0.0153	94	0	90 - 110	20
Sulfate	11.8	11.9	mg/L	1	12.5	<0.171	94	1	90 - 110	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spike (LCS-1) QC Batch: 2670

continued ...

control spikes continued ...

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
DRO	29.5	29.9	mg/L	0.1	250	<0.230	118	1	86 - 120	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
n-Triacontane	12.0	11.8	mg/L	0.1	150	80	79	44 - 123

Laboratory Control Spike (LCS-1) QC Batch: 2693

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Total Iron	0.502	0.506	mg/L	1	0.500	<0.00220	100	1	85 - 115	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spike (LCS-1) QC Batch: 2728

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Total Organic Carbon	4.67	4.60	mg/L	1	5.00	<0.843	93	2	78 - 120	13

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spike (LCS-1) QC Batch: 2767

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Benzene	0.0864	0.0878	mg/L	1	0.100	<0.000410	86	2	80.5 - 113	20
Toluene	0.0882	0.0889	mg/L	1	0.100	<0.000760	88	1	81.2 - 112	20
Ethylbenzene	0.0875	0.0861	mg/L	1	0.100	<0.00120	88	2	82.2 - 112	20
Xylene (isomers)	0.264	0.266	mg/L	1	0.300	<0.00121	88	1	80.6 - 112	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.0994	0.0962	mg/L	1	0.100	99	96	78.7 - 110
4-Bromofluorobenzene (4-BFB)	0.101	0.0978	mg/L	1	0.100	101	98	77.8 - 110

Laboratory Control Spike (LCS-1) QC Batch: 2771

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
GRO	0.835	0.845	mg/L	1	1.00	<0.0261	84	1	78.1 - 124	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.111	0.111	mg/L	1	0.100	111	111	73 - 120
4-Bromofluorobenzene (4-BFB)	0.114	0.112	mg/L	1	0.100	114	112	78 - 120

Laboratory Control Spike (LCS-1) QC Batch: 2830

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Dissolved Calcium	96.8	99.2	mg/L	1	100	<0.183	97	2	85 - 115	20
Dissolved Potassium	105	111	mg/L	1	100	<0.135	105	6	85 - 115	20
Dissolved Magnesium	96.1	105	mg/L	1	100	<0.183	96	9	85 - 115	20
Dissolved Sodium	100	104	mg/L	1	100	<0.105	100	4	85 - 115	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spike (LCS-1) QC Batch: 2840

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Dissolved Iron	0.486	0.489	mg/L	1	0.500	<0.00220	97	1	80 - 120	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) QC Batch: 2567

Param	MS Result	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Nitrite-N	0.0594	0.0585	mg/L	1	0.0800	<0.000820	74	2	65.9 - 119	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) QC Batch: 2577

Param	MS Result	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Nitrate-N	26.9	26.9	mg/L	10	2.50	3.4	94	0	62.2 - 121	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) QC Batch: 2577

Param	MS Result	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Chloride	446	446	mg/L	10	12.5	356	72	0	32.7 - 136	20
Fluoride	24.5	24.5	mg/L	10	2.50	<0.153	98	0	30.1 - 187	20
Sulfate	200	203	mg/L	10	12.5	88.8	89	1	69.9 - 114	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) QC Batch: 2693

Param	MS Result	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Total Iron	0.519	0.532	mg/L	1	0.500	0.016	101	2	75 - 125	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) QC Batch: 2728

Param	MS Result	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Total Organic Carbon	4.76	4.60	mg/L	1	5.00	<0.843	95	3	85 - 115	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) QC Batch: 2830

Param	MS Result	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Dissolved Calcium	118	131	mg/L	1	100	24.7	93	10	75 - 125	20
Dissolved Potassium	94.5	100	mg/L	1	100	4.74	90	6	75 - 125	20
Dissolved Magnesium	112	105	mg/L	1	100	10.9	101	6	75 - 125	20
Dissolved Sodium ⁶⁷	400	418	mg/L	1	100	264	136	4	75 - 125	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) QC Batch: 2840

Param	MS Result	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Dissolved Iron	0.473	0.474	mg/L	1	0.500	<0.00220	95	0	75 - 125	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Standard (ICV-1) QC Batch: 2555

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
pH		s.u.	7.00	7.00	100	98 - 102	2003-06-27

Standard (CCV-1) QC Batch: 2555

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
pH		s.u.	7.00	7.10	101	98 - 102	2003-06-27

Standard (ICV-1) QC Batch: 2567

⁶ms recovery out of range due to matrix effect/dilution factor

⁷ms recovery out of range due to matrix effect/dilution factor

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Nitrite-N		mg/L	0.0800	0.0821	103	85 - 115	2003-06-28

Standard (CCV-1) QC Batch: 2567

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Nitrite-N		mg/L	0.0800	0.0815	102	85 - 115	2003-06-28

Standard (ICV-1) QC Batch: 2577

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Nitrate-N		mg/L	2.50	2.47	99	90 - 110	2003-06-30

Standard (ICV-1) QC Batch: 2577

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Chloride		mg/L	12.5	13.1	105	90 - 110	2003-06-30
Fluoride		mg/L	2.50	2.53	101	90 - 110	2003-06-30
Sulfate		mg/L	12.5	12.4	99	90 - 110	2003-06-30

Standard (CCV-1) QC Batch: 2577

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Nitrate-N		mg/L	2.50	2.35	94	90 - 110	2003-06-30

Standard (CCV-1) QC Batch: 2577

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Chloride		mg/L	12.5	12.8	102	90 - 110	2003-06-30
Fluoride		mg/L	2.50	2.40	96	90 - 110	2003-06-30
Sulfate		mg/L	12.5	12.0	96	90 - 110	2003-06-30

Standard (ICV-1) QC Batch: 2586

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Specific Conductance		μMHOS/cm	1410	1430	101	90 - 110	2003-06-30

Standard (CCV-1) QC Batch: 2586

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Specific Conductance		μ MHOS/cm	1410	1420	100	90 - 110	2003-06-30

Standard (ICV-1) QC Batch: 2649

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Hydroxide Alkalinity		mg/L as CaCo3	0.00	<1.00		0 - 200	2003-07-01
Carbonate Alkalinity		mg/L as CaCo3	0.00	<1.00		0 - 200	2003-07-01
Bicarbonate Alkalinity		mg/L as CaCo3	0.00	<4.00		0 - 200	2003-07-01
Total Alkalinity		mg/L as CaCo3	250	240	96	90 - 110	2003-07-01

Standard (CCV-1) QC Batch: 2649

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Hydroxide Alkalinity		mg/L as CaCo3	0.00	<1.00		0 - 200	2003-07-01
Carbonate Alkalinity		mg/L as CaCo3	0.00	<1.00		0 - 200	2003-07-01
Bicarbonate Alkalinity		mg/L as CaCo3	0.00	<4.00		0 - 200	2003-07-01
Total Alkalinity		mg/L as CaCo3	250	242	97	90 - 110	2003-07-01

Standard (ICV-1) QC Batch: 2670

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
DRO		mg/L	250	299	120	75 - 125	2003-07-03

Standard (CCV-1) QC Batch: 2670

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
DRO		mg/L	250	299	119	75 - 125	2003-07-03

Standard (ICV-1) QC Batch: 2693

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Iron		mg/L	1.00	0.998	100	90 - 110	2003-07-03

Standard (CCV-1) QC Batch: 2693

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Iron		mg/L	1.00	1.06	106	90 - 110	2003-07-03

Standard (ICV-1) QC Batch: 2710

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Dissolved Solids		mg/L	1000	980.0	98	90 - 110	2003-07-07

Standard (CCV-1) QC Batch: 2710

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Dissolved Solids		mg/L	1000	953.0	95	90 - 110	2003-07-07

Standard (ICV-1) QC Batch: 2728

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Organic Carbon		mg/L	5.00	4.70	94	85 - 115	2003-07-06

Standard (CCV-1) QC Batch: 2728

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Organic Carbon		mg/L	5.00	4.93	99	85 - 115	2003-07-06

Standard (ICV-1) QC Batch: 2767

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0857	86	85 - 115	2003-07-07
Toluene		mg/L	0.100	0.0875	88	85 - 115	2003-07-07
Ethylbenzene	8	mg/L	0.100	0.0841	84	85 - 115	2003-07-07
Xylene (isomers)		mg/L	0.300	0.258	86	85 - 115	2003-07-07

Standard (CCV-1) QC Batch: 2767

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0856	86	85 - 115	2003-07-07
Toluene		mg/L	0.100	0.0869	87	85 - 115	2003-07-07

continued ...

⁸Ethylbenzene outside normal limits in ICV. Average of ICV components within acceptable range.

standard continued ...

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Ethylbenzene		mg/L	0.100	0.0848	85	85 - 115	2003-07-07
Xylene (isomers)		mg/L	0.300	0.258	86	85 - 115	2003-07-07

Standard (ICV-1) QC Batch: 2771

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
GRO		mg/L	1.00	0.877	88	85 - 115	2003-07-07

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limit
Trifluorotoluene (TFT)		0.117	mg/L	1	0.100	117	73 - 120
4-Bromofluorobenzene (4-BFB)		0.119	mg/L	1	0.100	119	78 - 120

Standard (CCV-1) QC Batch: 2771

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
GRO		mg/L	1.00	0.881	88	85 - 115	2003-07-07

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limit
Trifluorotoluene (TFT)		0.103	mg/L	1	0.100	103	73 - 120
4-Bromofluorobenzene (4-BFB)		0.106	mg/L	1	0.100	106	78 - 120

Standard (ICV-1) QC Batch: 2830

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Dissolved Calcium		mg/L	25.0	24.1	96	90 - 110	2003-07-02
Dissolved Potassium		mg/L	25.0	25.1	100	90 - 110	2003-07-02
Dissolved Magnesium		mg/L	25.0	24.6	98	90 - 110	2003-07-02
Dissolved Sodium		mg/L	25.0	23.8	95	90 - 110	2003-07-02

Standard (CCV-1) QC Batch: 2830

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Dissolved Calcium		mg/L	25.0	24.3	97	90 - 110	2003-07-02
Dissolved Potassium		mg/L	25.0	24.6	98	90 - 110	2003-07-02
Dissolved Magnesium		mg/L	25.0	24.6	98	90 - 110	2003-07-02
Dissolved Sodium		mg/L	25.0	25.1	100	90 - 110	2003-07-02

Standard (ICV-1) QC Batch: 2840

Report Date: July 11, 2003
MT000803.0001.4

Work Order: 3062721

Page Number: 19 of 19
Lovington

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Dissolved Iron		mg/L	1.00	0.988	99	90 - 110	2003-07-07

Standard (CCV-1) QC Batch: 2840

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Dissolved Iron		mg/L	1.00	1.00	100	90 - 110	2003-07-07



Project Number/Name 117 000 803 000/1.4

Project Location	Livingston
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Laboratory Trace

Project Manager Frank Kiefer

Samplers(s)/Affiliation *RM/Preddis*

[illegible]

Sample Matrix: L = Liquid; S = Solid; A = Air

Total No. of Bottles/ Containers	24
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Relinquished by: <u>1. Megan McMoran</u>	Organization: <u>Acad12</u>	Date: <u>12/26/03</u>	Time: <u>1630</u>	Seal Intact?
				Seal Intact?

Received by: Pick Organization: Peace Analysis Date: 6/33/03 Time: 10:49 Yes No N/A

Relinquished by: _____ Organization: _____ Date ____/____/____ Time ____ Seal Intact? _____

Received by: _____ Date: ____/____/____ Time: _____
Organization: _____ Yes, No N/A

Special Instructions/Remarks:

Delivery Method: ☐ In Person

☐ Common Carrier Greyhound ☐ Lab Courier,☐ Other

SPECIFY

Summary Report

Frank Kieffer
Arcadis Geraghty & Miller
1004 N. Big Spring St.
Suite 300
Midland, TX 79701

Report Date: July 24, 2003

Work Order: 3063012

Project Location: Lovington, NM
Project Number: MT000803.0001

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
11665	MW-E	water	2003-06-27	09:00	2003-06-28
11666	MW-D	water	2003-06-27	13:15	2003-06-28

Sample: 11665 - MW-E

Param	Flag	Result	Units	RL
Hydroxide Alkalinity		<1.00	mg/L as CaCo3	1.00
Carbonate Alkalinity		<1.00	mg/L as CaCo3	1.00
Bicarbonate Alkalinity		190	mg/L as CaCo3	4.00
Total Alkalinity		190	mg/L as CaCo3	4.00
Bromide		<1.00	mg/L	0.200
Dissolved Calcium		44.8	mg/L	0.500
Dissolved Potassium		2.92	mg/L	0.500
Dissolved Magnesium		6.99	mg/L	0.500
Dissolved Sodium		63.1	mg/L	0.500
Specific Conductance		620	µMHOS/cm	0.00
Chloride		29.8	mg/L	0.500
Fluoride		1.75	mg/L	0.200
Sulfate		56.1	mg/L	0.500
Nitrite-N		<0.0100	mg/L	0.0100
Nitrate-N		2.47	mg/L	0.200
pH	1	7.40	s.u.	0.00
Total Dissolved Solids		392.0	mg/L	10.00

Sample: 11666 - MW-D

Param	Flag	Result	Units	RL
Hydroxide Alkalinity		<1.00	mg/L as CaCo3	1.00
Carbonate Alkalinity		<1.00	mg/L as CaCo3	1.00
Bicarbonate Alkalinity		264	mg/L as CaCo3	4.00

continued ...

¹received out of holding time

sample 11666 continued ...

Param	Flag	Result	Units	RL
Total Alkalinity		264	mg/L as CaCo3	4.00
Bromide		1.27	mg/L	0.200
Dissolved Calcium		203	mg/L	0.500
Dissolved Potassium		2.81	mg/L	0.500
Dissolved Magnesium		29.9	mg/L	0.500
Dissolved Sodium		76.0	mg/L	0.500
Specific Conductance		1750	μ MHOS/cm	0.00
Chloride		356	mg/L	0.500
Fluoride		<1.00	mg/L	0.200
Sulfate		88.5	mg/L	0.500
Nitrite-N		0.0533	mg/L	0.0100
Nitrate-N		2.54	mg/L	0.200
pH	2	7.20	s.u.	0.00
Total Dissolved Solids		1144	mg/L	10.00

²received out of holding time

Cation-Anion Balance Sheet

DATE: 7/24/2003

Sample #	Calcium ppm	Magnesium ppm	Sodium ppm	Potassium ppm	Alkalinity ppm	Sulfate ppm	Chloride ppm	Nitrate ppm	Fluoride ppm	Bromide ppm	TDS ppm	EC µMHOs/cm
11665	44.8	6.99	63.1	2.92	190	56.1	29.8	2.47	1.75	0	392	620
11666	203	29.9	76	2.81	264	88.5	356	2.54	0	1.27	1144	1750

Sample #	Calcium in meq/L	Magnesium in meq/L	Sodium in meq/L	Potassium in meq/L	Alkalinity in meq/L	Sulfate in meq/L	Chloride in meq/L	Nitrate in meq/L	Fluoride in meq/L	Bromide in meq/L	Cations In meq/L	Anions In meq/L	Percentage Error
11665	2.24	0.58	2.74	0.07	3.80	1.17	0.84	0.1763333	0.09212	0	5.63	6.08	7.633517445
11666	10.13	2.46	3.31	0.07	5.28	1.84	10.04	0.1813306	0	0.03175	15.97	17.35	8.276282411

EC/Cation	EC/Anion
11665 563.02707	607.71133
11666 1596.80508	1734.66606

TDS/EC	TDS/Cat	TDS/Anion
0.63	0.70	needs to be 0.55-0.77
0.65	0.72	needs to be 0.55-0.77

range 558 to 682
range 1575 to 1925

TRACE ANALYSIS, INC.

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Analytical and Quality Control Report

Frank Kieffer
Arcadis Geraghty & Miller
1004 N. Big Spring St.
Suite 300
Midland, TX 79701

Report Date: July 24, 2003

Work Order: 3063012

Project Location: Lovington, NM
Project Number: MT000803.0001

Enclosed are the Analytical Report and Quality Control Report for the following sample(s) submitted to TraceAnalysis, Inc.

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
11665	MW-E	water	2003-06-27	09:00	2003-06-28
11666	MW-D	water	2003-06-27	13:15	2003-06-28

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

This report consists of a total of 14 pages and shall not be reproduced except in its entirety, without written approval of TraceAnalysis, Inc.


Dr. Blair Leftwich, Director

Analytical Report

Sample: 11665 - MW-E

Analysis: Alkalinity
QC Batch: 2649
Prep Batch: 2418

Analytical Method: SM 2320B
Date Analyzed: 2003-07-01
Date Prepared: 2003-07-01

Prep Method: N/A
Analyzed By: RS
Prepared By: RS

Parameter	Flag	RL Result	Units	Dilution	RL
Hydroxide Alkalinity		<1.00	mg/L as CaCo3	1	1.00
Carbonate Alkalinity		<1.00	mg/L as CaCo3	1	1.00
Bicarbonate Alkalinity		190	mg/L as CaCo3	1	4.00
Total Alkalinity		190	mg/L as CaCo3	1	4.00

Sample: 11665 - MW-E

Analysis: Bromide (IC)
QC Batch: 2577
Prep Batch: 2344

Analytical Method: E 300.0
Date Analyzed: 2003-06-30
Date Prepared: 2003-06-27

Prep Method: N/A
Analyzed By: JSW
Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Bromide		<1.00	mg/L	5	0.200

Sample: 11665 - MW-E

Analysis: Cations
QC Batch: 2901
Prep Batch: 2377

Analytical Method: S 6010B
Date Analyzed: 2003-07-03
Date Prepared: 2003-07-01

Prep Method: S 3005A
Analyzed By: BC
Prepared By: TP

Parameter	Flag	RL Result	Units	Dilution	RL
Dissolved Calcium		44.8	mg/L	1	0.500
Dissolved Potassium		2.92	mg/L	1	0.500
Dissolved Magnesium		6.99	mg/L	1	0.500
Dissolved Sodium		63.1	mg/L	1	0.500

Sample: 11665 - MW-E

Analysis: Conductivity
QC Batch: 2586
Prep Batch: 2352

Analytical Method: SM 2510B
Date Analyzed: 2003-06-30
Date Prepared: 2003-06-30

Prep Method: N/A
Analyzed By: JSW
Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Specific Conductance		620	μ MHOS/cm	1	0.00

Sample: 11665 - MW-E

Analysis: Ion Chromatography
QC Batch: 2577
Prep Batch: 2344

Analytical Method: E 300.0
Date Analyzed: 2003-06-30
Date Prepared: 2003-06-27

Prep Method: N/A
Analyzed By: JSW
Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Chloride		29.8	mg/L	5	0.500
Fluoride		1.75	mg/L	5	0.200
Sulfate		56.1	mg/L	5	0.500

Sample: 11665 - MW-E

Analysis: NO2 (Spec)
QC Batch: 2567
Prep Batch: 2335

Analytical Method: SM 4500-NO2 B
Date Analyzed: 2003-06-28
Date Prepared: 2003-06-28

Prep Method: N/A
Analyzed By: JSW
Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Nitrite-N		<0.0100	mg/L	1	0.0100

Sample: 11665 - MW-E

Analysis: NO3 (IC)
QC Batch: 2577
Prep Batch: 2344

Analytical Method: E 300.0
Date Analyzed: 2003-06-30
Date Prepared: 2003-06-27

Prep Method: N/A
Analyzed By: JSW
Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Nitrate-N		2.47	mg/L	5	0.200

Sample: 11665 - MW-E

Analysis: pH
QC Batch: 2615
Prep Batch: 2383

Analytical Method: SM 4500-H+
Date Analyzed: 2003-06-30
Date Prepared: 2003-06-30

Prep Method: N/A
Analyzed By: JSW
Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
pH	1	7.40	s.u.	1	0.00

Sample: 11665 - MW-E

Analysis: TDS
QC Batch: 2710
Prep Batch: 2470

Analytical Method: SM 2540C
Date Analyzed: 2003-07-07
Date Prepared: 2003-07-03

Prep Method: N/A
Analyzed By: JSW
Prepared By: JSW

¹received out of holding time

Parameter	Flag	RL Result	Units	Dilution	RL
Total Dissolved Solids		392.0	mg/L	1	10.00

Sample: 11666 - MW-D

Analysis: Alkalinity Analytical Method: SM 2320B Prep Method: N/A
QC Batch: 2649 Date Analyzed: 2003-07-01 Analyzed By: RS
Prep Batch: 2418 Date Prepared: 2003-07-01 Prepared By: RS

Parameter	Flag	RL Result	Units	Dilution	RL
Hydroxide Alkalinity		<1.00	mg/L as CaCo3	1	1.00
Carbonate Alkalinity		<1.00	mg/L as CaCo3	1	1.00
Bicarbonate Alkalinity		264	mg/L as CaCo3	1	4.00
Total Alkalinity		264	mg/L as CaCo3	1	4.00

Sample: 11666 - MW-D

Analysis: Bromide (IC) Analytical Method: E 300.0 Prep Method: N/A
QC Batch: 2577 Date Analyzed: 2003-06-30 Analyzed By: JSW
Prep Batch: 2344 Date Prepared: 2003-06-27 Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Bromide		1.27	mg/L	5	0.200

Sample: 11666 - MW-D

Analysis: Cations Analytical Method: S 6010B Prep Method: S 3005A
QC Batch: 2901 Date Analyzed: 2003-07-03 Analyzed By: BC
Prep Batch: 2377 Date Prepared: 2003-07-01 Prepared By: TP

Parameter	Flag	RL Result	Units	Dilution	RL
Dissolved Calcium		203	mg/L	1	0.500
Dissolved Potassium		2.81	mg/L	1	0.500
Dissolved Magnesium		29.9	mg/L	1	0.500
Dissolved Sodium		76.0	mg/L	1	0.500

Sample: 11666 - MW-D

Analysis: Conductivity Analytical Method: SM 2510B Prep Method: N/A
QC Batch: 2586 Date Analyzed: 2003-06-30 Analyzed By: JSW
Prep Batch: 2352 Date Prepared: 2003-06-30 Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Specific Conductance		1750	μMHOS/cm	1	0.00

Sample: 11666 - MW-D

Analysis: Ion Chromatography
QC Batch: 2577
Prep Batch: 2344

Analytical Method: E 300.0
Date Analyzed: 2003-06-30
Date Prepared: 2003-06-27

Prep Method: N/A
Analyzed By: JSW
Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Chloride		356	mg/L	10	0.500
Fluoride		<1.00	mg/L	5	0.200
Sulfate		88.5	mg/L	5	0.500

Sample: 11666 - MW-D

Analysis: NO2 (Spec)
QC Batch: 2567
Prep Batch: 2335

Analytical Method: SM 4500-NO2 B
Date Analyzed: 2003-06-28
Date Prepared: 2003-06-28

Prep Method: N/A
Analyzed By: JSW
Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Nitrite-N		0.0533	mg/L	1	0.0100

Sample: 11666 - MW-D

Analysis: NO3 (IC)
QC Batch: 2577
Prep Batch: 2344

Analytical Method: E 300.0
Date Analyzed: 2003-06-30
Date Prepared: 2003-06-27

Prep Method: N/A
Analyzed By: JSW
Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Nitrate-N		2.54	mg/L	5	0.200

Sample: 11666 - MW-D

Analysis: pH
QC Batch: 2613
Prep Batch: 2384

Analytical Method: SM 4500-H+
Date Analyzed: 2003-06-30
Date Prepared: 2003-06-30

Prep Method: N/A
Analyzed By: JSW
Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
pH	2	7.20	s.u.	1	0.00

Sample: 11666 - MW-D

Analysis: TDS
QC Batch: 2710
Prep Batch: 2470

Analytical Method: SM 2540C
Date Analyzed: 2003-07-07
Date Prepared: 2003-07-03

Prep Method: N/A
Analyzed By: JSW
Prepared By: JSW

²received out of holding time

Parameter	Flag	RL Result	Units	Dilution	RL
Total Dissolved Solids		1144	mg/L	2	10.00

Method Blank (1) QC Batch: 2567

Parameter	Flag	Result	Units	RL
Nitrite-N		<0.0100	mg/L	0.01

Method Blank (1) QC Batch: 2577

Parameter	Flag	Result	Units	RL
Bromide		<0.200	mg/L	0.2

Method Blank (1) QC Batch: 2577

Parameter	Flag	Result	Units	RL
Nitrate-N		<0.200	mg/L	0.2

Method Blank (1) QC Batch: 2577

Parameter	Flag	Result	Units	RL
Chloride		<0.500	mg/L	0.5
Fluoride		<0.200	mg/L	0.2
Sulfate		<0.500	mg/L	0.5

Method Blank (1) QC Batch: 2586

Parameter	Flag	Result	Units	RL
Specific Conductance		5.87	μ MHOS/cm	

Method Blank (1) QC Batch: 2649

continued ...

method blank continued ...

Parameter	Flag	Result	Units	RL
Parameter	Flag	Result	Units	RL
Hydroxide Alkalinity		<1.00	mg/L as CaCo3	1
Carbonate Alkalinity		<1.00	mg/L as CaCo3	1
Bicarbonate Alkalinity		<4.00	mg/L as CaCo3	4
Total Alkalinity		<4.00	mg/L as CaCo3	4

Method Blank (1) QC Batch: 2710

Parameter	Flag	Result	Units	RL
Total Dissolved Solids		<10.00	mg/L	10

Method Blank (1) QC Batch: 2901

Parameter	Flag	Result	Units	RL
Dissolved Calcium		<0.500	mg/L	0.5
Dissolved Potassium		<0.500	mg/L	0.5
Dissolved Magnesium		<0.500	mg/L	0.5
Dissolved Sodium		<0.500	mg/L	0.5

Duplicate (1) QC Batch: 2586

Param	Duplicate Result	Sample Result	Units	Dilution	RPD	RPD Limit
Specific Conductance	627	620	μMHOS/cm	1	1	2.9

Duplicate (1) QC Batch: 2613

Param	Duplicate Result	Sample Result	Units	Dilution	RPD	RPD Limit
pH ³	7.20	7.20	s.u.	1	0	0

Duplicate (1) QC Batch: 2615

continued ...

³received out of holding time

<i>duplicate continued ...</i>						
Param	Duplicate Result	Sample Result	Units	Dilution	RPD	RPD Limit
Param	Duplicate Result	Sample Result	Units	Dilution	RPD	RPD Limit
pH	4 7.50	7.40	s.u.	1	1	0

Duplicate (1) QC Batch: 2649

Param	Duplicate Result	Sample Result	Units	Dilution	RPD	RPD Limit
Hydroxide Alkalinity	<1.00	<1.00	mg/L as CaCo3	1	0	5.81
Carbonate Alkalinity	<1.00	<1.00	mg/L as CaCo3	1	0	5.81
Bicarbonate Alkalinity	186	190	mg/L as CaCo3	1	2	5.81
Total Alkalinity	186	190	mg/L as CaCo3	1	2	5.81

Duplicate (1) QC Batch: 2710

Param	Duplicate Result	Sample Result	Units	Dilution	RPD	RPD Limit
Total Dissolved Solids	1044	978.0	mg/L	2	6	9.41

Laboratory Control Spike (LCS-1) QC Batch: 2567

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Nitrite-N	0.0823	0.0825	mg/L	1	0.0800	<0.000820	103	0	95 - 106	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spike (LCS-1) QC Batch: 2577

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Bromide	2.47	2.46	mg/L	1	2.50	<0.0800	99	0	90 - 110	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spike (LCS-1) QC Batch: 2577

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Nitrate-N	2.35	2.34	mg/L	1	2.50	<0.126	94	0	90 - 110	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spike (LCS-1) QC Batch: 2577

⁴received out of holding time

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Chloride	12.7	12.8	mg/L	1	12.5	<1.49	102	1	90 - 110	20
Fluoride	2.34	2.34	mg/L	1	2.50	<0.0153	94	0	90 - 110	20
Sulfate	11.8	11.9	mg/L	1	12.5	<0.171	94	1	90 - 110	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spike (LCS-1) QC Batch: 2901

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Dissolved Calcium	94.0	94.7	mg/L	1	100	<0.183	94	1	85 - 115	20
Dissolved Potassium	90.1	91.0	mg/L	1	100	<0.135	90	1	85 - 115	20
Dissolved Magnesium	92.2	88.6	mg/L	1	100	<0.183	92	4	85 - 115	20
Dissolved Sodium	101	96.5	mg/L	1	100	<0.105	101	4	85 - 115	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) QC Batch: 2567

Param	MS Result	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Nitrite-N	0.0594	0.0585	mg/L	1	0.0800	<0.000820	74	2	65.9 - 119	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) QC Batch: 2577

Param	MS Result	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Bromide	26.3	27.1	mg/L	10	2.50	1.42	100	3	65.1 - 129	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) QC Batch: 2577

Param	MS Result	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Nitrate-N	26.9	26.9	mg/L	10	2.50	3.4	94	0	62.2 - 121	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) QC Batch: 2577

Param	MS Result	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Chloride	446	446	mg/L	10	12.5	356	72	0	32.7 - 136	20
Fluoride	24.5	24.5	mg/L	10	2.50	<0.153	98	0	30.1 - 187	20
Sulfate	200	203	mg/L	10	12.5	88.8	89	1	69.9 - 114	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) QC Batch: 2901

Param	MS Result	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Dissolved Calcium	128	134	mg/L	1	100	46.7	81	4	75 - 125	20
Dissolved Potassium	⁵ 125	128	mg/L	1	100	2.16	123	2	75 - 125	20
Dissolved Magnesium	⁶⁷ 76.8	65.9	mg/L	1	100	19.2	58	15	75 - 125	20
Dissolved Sodium	120	136	mg/L	1	100	34.4	86	12	75 - 125	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Standard (ICV-1) QC Batch: 2567

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Nitrite-N		mg/L	0.0800	0.0821	103	85 - 115	2003-06-28

Standard (CCV-1) QC Batch: 2567

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Nitrite-N		mg/L	0.0800	0.0815	102	85 - 115	2003-06-28

Standard (ICV-1) QC Batch: 2577

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Bromide		mg/L	2.50	2.58	103	90 - 110	2003-06-30

Standard (ICV-1) QC Batch: 2577

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Nitrate-N		mg/L	2.50	2.47	99	90 - 110	2003-06-30

Standard (ICV-1) QC Batch: 2577

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Chloride		mg/L	12.5	13.1	105	90 - 110	2003-06-30
Fluoride		mg/L	2.50	2.53	101	90 - 110	2003-06-30
Sulfate		mg/L	12.5	12.4	99	90 - 110	2003-06-30

⁵ms recovery out of range due to matrix effect/dilution factor, use lcs/lcsd

⁶ms recovery out of range due to matrix effect/dilution factor, use lcs/lcsd

⁷ms recovery out of range due to matrix effect/dilution factor, use lcs/lcsd

Standard (CCV-1) QC Batch: 2577

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Bromide		mg/L	2.50	2.44	98	90 - 110	2003-06-30

Standard (CCV-1) QC Batch: 2577

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Nitrate-N		mg/L	2.50	2.35	94	90 - 110	2003-06-30

Standard (CCV-1) QC Batch: 2577

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Chloride		mg/L	12.5	12.8	102	90 - 110	2003-06-30
Fluoride		mg/L	2.50	2.40	96	90 - 110	2003-06-30
Sulfate		mg/L	12.5	12.0	96	90 - 110	2003-06-30

Standard (ICV-1) QC Batch: 2586

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Specific Conductance		μ MHOS/cm	1410	1430	101	90 - 110	2003-06-30

Standard (CCV-1) QC Batch: 2586

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Specific Conductance		μ MHOS/cm	1410	1420	100	90 - 110	2003-06-30

Standard (ICV-1) QC Batch: 2613

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
pH		s.u.	7.00	7.10	101	98 - 102	2003-06-30

Standard (CCV-1) QC Batch: 2613

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
pH		s.u.	7.00	7.10	101	98 - 102	2003-06-30

Standard (ICV-1) QC Batch: 2615

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
pH		s.u.	7.00	7.00	100	98 - 102	2003-06-30

Standard (CCV-1) QC Batch: 2615

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
pH		s.u.	7.00	7.00	100	98 - 102	2003-06-30

Standard (ICV-1) QC Batch: 2649

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Hydroxide Alkalinity		mg/L as CaCo3	0.00	<1.00		0 - 200	2003-07-01
Carbonate Alkalinity		mg/L as CaCo3	0.00	<1.00		0 - 200	2003-07-01
Bicarbonate Alkalinity		mg/L as CaCo3	0.00	<4.00		0 - 200	2003-07-01
Total Alkalinity		mg/L as CaCo3	250	240	96	90 - 110	2003-07-01

Standard (CCV-1) QC Batch: 2649

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Hydroxide Alkalinity		mg/L as CaCo3	0.00	<1.00		0 - 200	2003-07-01
Carbonate Alkalinity		mg/L as CaCo3	0.00	<1.00		0 - 200	2003-07-01
Bicarbonate Alkalinity		mg/L as CaCo3	0.00	<4.00		0 - 200	2003-07-01
Total Alkalinity		mg/L as CaCo3	250	242	97	90 - 110	2003-07-01

Standard (ICV-1) QC Batch: 2710

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Dissolved Solids		mg/L	1000	980.0	98	90 - 110	2003-07-07

Standard (CCV-1) QC Batch: 2710

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Dissolved Solids		mg/L	1000	953.0	95	90 - 110	2003-07-07

Standard (CCV-1) QC Batch: 2901

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Dissolved Calcium		mg/L	25.0	23.9	96	90 - 110	2003-07-03
Dissolved Potassium		mg/L	25.0	24.3	97	90 - 110	2003-07-03
Dissolved Magnesium		mg/L	25.0	24.1	96	90 - 110	2003-07-03
Dissolved Sodium		mg/L	25.0	24.2	97	90 - 110	2003-07-03

Standard (CCV-2) QC Batch: 2901

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Dissolved Calcium		mg/L	25.0	23.9	96	90 - 110	2003-07-03
Dissolved Potassium		mg/L	25.0	24.3	97	90 - 110	2003-07-03
Dissolved Magnesium		mg/L	25.0	24.1	96	90 - 110	2003-07-03
Dissolved Sodium		mg/L	25.0	24.2	97	90 - 110	2003-07-03

Summary Report

Frank Kieffer
Arcadis Geraghty & Miller
1004 N. Big Spring St.
Suite 300
Midland, TX 79701

Report Date: July 24, 2003

Work Order: 3070312

Project Location: Lovington, NM
Project Number: MT000803.0001

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
12027	MW-A	water	2003-07-02	11:30	2003-07-02
12028	MW-B	water	2003-07-02	12:50	2003-07-02
12029	MW-H	water	2003-07-02	12:10	2003-07-02
12030	Trip Blank	water	2003-07-02	00:00	2003-07-02

Sample - Field Code	Benzene	Toluene	BTEX Ethylbenzene	Xylene (isomers)	TPH DRO DRO	TPH GRO GRO
	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
12027 - MW-A	1.64	0.233	0.0314	0.0722	<5.00	2.30
12028 - MW-B	0.287	0.0264	0.00510	0.0133	<5.00	0.879
12029 - MW-H	0.0682	0.0366	0.00190	0.00580	<5.00	0.707
12030 - Trip Blank	<0.00100	<0.00100	<0.00100	<0.00100		

Sample: 12027 - MW-A

Param	Flag	Result	Units	RL
Hydroxide Alkalinity		<1.00	mg/L as CaCo3	1.00
Carbonate Alkalinity		<1.00	mg/L as CaCo3	1.00
Bicarbonate Alkalinity		254	mg/L as CaCo3	4.00
Total Alkalinity		254	mg/L as CaCo3	4.00
Dissolved Calcium		95.1	mg/L	0.500
Dissolved Potassium		2.35	mg/L	0.500
Dissolved Magnesium		15.3	mg/L	0.500
Dissolved Sodium		26.3	mg/L	0.500
Specific Conductance		759	µMHOS/cm	0.00
Dissolved Iron		<0.0500	mg/L	0.0500
Total Iron		1.69	mg/L	0.0500
Chloride		61.7	mg/L	0.500
Fluoride		1.39	mg/L	0.200
Sulfate		28.5	mg/L	0.500
Nitrite-N		0.0229	mg/L	0.0100
Nitrate-N		3.14	mg/L	0.200
Naphthalene		<0.000200	mg/L	0.200
Acenaphthylene		<0.000200	mg/L	0.200

continued ...

sample 12027 continued ...

Param	Flag	Result	Units	RL
Acenaphthene		<0.000200	mg/L	0.200
Fluorene		<0.000200	mg/L	0.200
Phenanthrene		<0.000200	mg/L	0.200
Anthracene		<0.000200	mg/L	0.200
Fluoranthene		<0.000200	mg/L	0.200
Pyrene		<0.000200	mg/L	0.200
Benzo(a)anthracene		<0.000200	mg/L	0.200
Chrysene		<0.000200	mg/L	0.200
Benzo(b)fluoranthene		<0.000200	mg/L	0.200
Benzo(k)fluoranthene		<0.000200	mg/L	0.200
Benzo(a)pyrene		<0.000200	mg/L	0.200
Indeno(1,2,3-cd)pyrene		<0.000200	mg/L	0.200
Dibenzo(a,h)anthracene		<0.000200	mg/L	0.200
Benzo(g,h,i)perylene		<0.000200	mg/L	0.200
pH	1	7.30	s.u.	0.00
Total Dissolved Solids		488.0	mg/L	10.00
Total Organic Carbon		4.77	mg/L	1.00

Sample: 12028 - MW-B

Param	Flag	Result	Units	RL
Hydroxide Alkalinity		<1.00	mg/L as CaCo3	1.00
Carbonate Alkalinity		<1.00	mg/L as CaCo3	1.00
Bicarbonate Alkalinity		210	mg/L as CaCo3	4.00
Total Alkalinity		210	mg/L as CaCo3	4.00
Dissolved Calcium		74.2	mg/L	0.500
Dissolved Potassium		5.37	mg/L	0.500
Dissolved Magnesium		11.1	mg/L	0.500
Dissolved Sodium		21.6	mg/L	0.500
Specific Conductance		653	µMHOS/cm	0.00
Dissolved Iron		<0.0500	mg/L	0.0500
Total Iron		0.875	mg/L	0.0500
Chloride		53.3	mg/L	0.500
Fluoride		1.56	mg/L	0.200
Sulfate		33.1	mg/L	0.500
Nitrite-N		<0.0100	mg/L	0.0100
Nitrate-N		3.33	mg/L	0.200
pH	2	7.40	s.u.	0.00
Total Dissolved Solids		386.0	mg/L	10.00
Total Organic Carbon		5.34	mg/L	1.00

Sample: 12029 - MW-H

Param	Flag	Result	Units	RL
Hydroxide Alkalinity		<1.00	mg/L as CaCo3	1.00
Carbonate Alkalinity		<1.00	mg/L as CaCo3	1.00
Bicarbonate Alkalinity		222	mg/L as CaCo3	4.00
Total Alkalinity		222	mg/L as CaCo3	4.00

continued ...

¹received out of holding time

²received out of holding time

sample 12029 continued ...

Param	Flag	Result	Units	RL
Dissolved Calcium		63.4	mg/L	0.500
Dissolved Potassium		2.46	mg/L	0.500
Dissolved Magnesium		11.9	mg/L	0.500
Dissolved Sodium		31.5	mg/L	0.500
Specific Conductance		614	μMHOS/cm	0.00
Dissolved Iron		<0.0500	mg/L	0.0500
Total Iron		0.707	mg/L	0.0500
Chloride		35.2	mg/L	0.500
Fluoride		1.64	mg/L	0.200
Sulfate		40.1	mg/L	0.500
Nitrite-N		0.0243	mg/L	0.0100
Nitrate-N		3.35	mg/L	0.200
Naphthalene		<0.000200	mg/L	0.200
Acenaphthylene		<0.000200	mg/L	0.200
Acenaphthene		<0.000200	mg/L	0.200
Fluorene		<0.000200	mg/L	0.200
Phenanthrene		<0.000200	mg/L	0.200
Anthracene		<0.000200	mg/L	0.200
Fluoranthene		<0.000200	mg/L	0.200
Pyrene		<0.000200	mg/L	0.200
Benzo(a)anthracene		<0.000200	mg/L	0.200
Chrysene		<0.000200	mg/L	0.200
Benzo(b)fluoranthene		<0.000200	mg/L	0.200
Benzo(k)fluoranthene		<0.000200	mg/L	0.200
Benzo(a)pyrene		<0.000200	mg/L	0.200
Indeno(1,2,3-cd)pyrene		<0.000200	mg/L	0.200
Dibenzo(a,h)anthracene		<0.000200	mg/L	0.200
Benzo(g,h,i)perylene		<0.000200	mg/L	0.200
pH	3	7.50	s.u.	0.00
Total Dissolved Solids		392.0	mg/L	10.00
Total Organic Carbon		1.94	mg/L	1.00

³received out of holding time

Cation-Anion Balance Sheet

DATE: 7/24/2003 *MS*

Sample #	Calcium ppm	Magnesium ppm	Sodium ppm	Potassium ppm	Alkalinity ppm	Sulfate ppm	Chloride ppm	Nitrate ppm	Fluoride ppm	Bromide ppm	TDS ppm	EC µMHOs/cm
12027	95.1	15.3	26.3	2.35	254	28.5	61.7	3.14	1.39		488	759
12028	74.2	11.1	21.6	5.37	210	33.1	53.3	3.33	1.56		386	653
12029	63.4	11.9	31.5	2.46	222	40.1	35.2	3.35	1.64		392	614

Sample #	Calcium in meq/L	Magnesium in meq/L	Sodium in meq/L	Potassium in meq/L	Alkalinity in meq/L	Sulfate in meq/L	Chloride in meq/L	Nitrate in meq/L	Fluoride in meq/L	Bromide in meq/L	Cations in meq/L	Anions in meq/L	Percentage Error
12027	4.75	1.26	1.14	0.06	5.08	0.59	1.74	0.2241646	0.0731696	0	7.21	7.71	6.736901391
12028	3.70	0.91	0.94	0.14	4.20	0.69	1.50	0.2377287	0.0821184	0	5.69	6.71	16.438108
12029	3.16	0.98	1.37	0.06	4.44	0.83	0.99	0.2391565	0.0863296	0	5.58	6.59	16.71846263

EC/Cation	EC/Anion
12027	720.869
12028	569.29636
12029	557.60878

TDS/EC	TDS/Cat	TDS/Anion
0.64	0.68	0.63
0.59	0.68	0.58
0.64	0.70	0.59

range 683.1 to 834.9
range 587.7 to 718.3
range 552.6 to 675.4

needs to be 0.55-0.77
needs to be 0.55-0.77
needs to be 0.55-0.77

Samples 12028 and 12029 were reanalyzed and the cation/anion percentage error was still greater than 10%.



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Analytical and Quality Control Report

Frank Kieffer
Arcadis Geraghty & Miller
1004 N. Big Spring St.
Suite 300
Midland, TX 79701

Report Date: July 24, 2003

Work Order: 3070312

Project Location: Lovington, NM
Project Number: MT000803.0001

Enclosed are the Analytical Report and Quality Control Report for the following sample(s) submitted to TraceAnalysis, Inc.

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
12027	MW-A	water	2003-07-02	11:30	2003-07-02
12028	MW-B	water	2003-07-02	12:50	2003-07-02
12029	MW-H	water	2003-07-02	12:10	2003-07-02
12030	Trip Blank	water	2003-07-02	00:00	2003-07-02

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

This report consists of a total of 28 pages and shall not be reproduced except in its entirety, without written approval of TraceAnalysis, Inc.


Dr. Blair Leftwich, Director

Analytical Report

Sample: 12027 - MW-A

Analysis: Alkalinity Analytical Method: SM 2320B Prep Method: N/A
QC Batch: 2778 Date Analyzed: 2003-07-08 Analyzed By: RS
Prep Batch: 2517 Date Prepared: 2003-07-08 Prepared By: RS

Parameter	Flag	RL Result	Units	Dilution	RL
Hydroxide Alkalinity		<1.00	mg/L as CaCo3	1	1.00
Carbonate Alkalinity		<1.00	mg/L as CaCo3	1	1.00
Bicarbonate Alkalinity		254	mg/L as CaCo3	1	4.00
Total Alkalinity		254	mg/L as CaCo3	1	4.00

Sample: 12027 - MW-A

Analysis: BTEX Analytical Method: S 8021B Prep Method: S 5030B
QC Batch: 2880 Date Analyzed: 2003-07-10 Analyzed By: BS
Prep Batch: 2603 Date Prepared: 2003-07-10 Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		1.64	mg/L	20	0.00100
Toluene		0.233	mg/L	20	0.00100
Ethylbenzene		0.0314	mg/L	20	0.00100
Xylene (isomers)		0.0722	mg/L	20	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		2.54	mg/L	20	0.100	127	61 - 127
4-Bromofluorobenzene (4-BFB)		2.46	mg/L	20	0.100	123	72.6 - 130

Sample: 12027 - MW-A

Analysis: Cations Analytical Method: S 6010B Prep Method: S 3005A
QC Batch: 3135 Date Analyzed: 2003-07-17 Analyzed By: BC
Prep Batch: 2527 Date Prepared: 2003-07-08 Prepared By: TP

Parameter	Flag	RL Result	Units	Dilution	RL
Dissolved Calcium		95.1	mg/L	1	0.500
Dissolved Potassium		2.35	mg/L	1	0.500
Dissolved Magnesium		15.3	mg/L	1	0.500
Dissolved Sodium		26.3	mg/L	1	0.500

Sample: 12027 - MW-A

Analysis: Conductivity Analytical Method: SM 2510B Prep Method: N/A
QC Batch: 2708 Date Analyzed: 2003-07-03 Analyzed By: JSW
Prep Batch: 2468 Date Prepared: 2003-07-03 Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Specific Conductance		759	μ MHOS/cm	1	0.00

Sample: 12027 - MW-A

Analysis: Fe, Dissolved Analytical Method: S 6010B Prep Method: S 3005A
QC Batch: 2951 Date Analyzed: 2003-07-13 Analyzed By: RR
Prep Batch: 2519 Date Prepared: 2003-07-08 Prepared By: TP

Parameter	Flag	RL Result	Units	Dilution	RL
Dissolved Iron		<0.0500	mg/L	1	0.0500

Sample: 12027 - MW-A

Analysis: Fe, Total Analytical Method: S 6010B Prep Method: S 3010A
QC Batch: 3199 Date Analyzed: 2003-07-13 Analyzed By: RR
Prep Batch: 2531 Date Prepared: 2003-07-08 Prepared By: TP

Parameter	Flag	RL Result	Units	Dilution	RL
Total Iron		1.69	mg/L	1	0.0500

Sample: 12027 - MW-A

Analysis: Ion Chromatography Analytical Method: E 300.0 Prep Method: N/A
QC Batch: 2734 Date Analyzed: 2003-07-07 Analyzed By: JSW
Prep Batch: 2489 Date Prepared: 2003-07-03 Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Chloride		61.7	mg/L	5	0.500
Fluoride		1.39	mg/L	5	0.200
Sulfate		28.5	mg/L	5	0.500

Sample: 12027 - MW-A

Analysis: NO2 (Spec) Analytical Method: SM 4500-NO2 B Prep Method: N/A
QC Batch: 2687 Date Analyzed: 2003-07-03 Analyzed By: JSW
Prep Batch: 2453 Date Prepared: 2003-07-03 Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Nitrite-N		0.0229	mg/L	1	0.0100

Sample: 12027 - MW-A

Analysis: NO3 (IC)
QC Batch: 2734
Prep Batch: 2489

Analytical Method: E 300.0
Date Analyzed: 2003-07-07
Date Prepared: 2003-07-03

Prep Method: N/A
Analyzed By: JSW
Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Nitrate-N		3.14	mg/L	5	0.200

Sample: 12027 - MW-A

Analysis: PAH
QC Batch: 2969
Prep Batch: 2557

Analytical Method: S 8270C
Date Analyzed: 2003-07-15
Date Prepared: 2003-07-09

Prep Method: S 3510C
Analyzed By: RC
Prepared By: JH

Parameter	Flag	RL Result	Units	Dilution	RL
Naphthalene		<0.000200	mg/L	0.001	0.200
Acenaphthylene		<0.000200	mg/L	0.001	0.200
Acenaphthene		<0.000200	mg/L	0.001	0.200
Fluorene		<0.000200	mg/L	0.001	0.200
Phenanthrene		<0.000200	mg/L	0.001	0.200
Anthracene		<0.000200	mg/L	0.001	0.200
Fluoranthene		<0.000200	mg/L	0.001	0.200
Pyrene		<0.000200	mg/L	0.001	0.200
Benzo(a)anthracene		<0.000200	mg/L	0.001	0.200
Chrysene		<0.000200	mg/L	0.001	0.200
Benzo(b)fluoranthene		<0.000200	mg/L	0.001	0.200
Benzo(k)fluoranthene		<0.000200	mg/L	0.001	0.200
Benzo(a)pyrene		<0.000200	mg/L	0.001	0.200
Indeno(1,2,3-cd)pyrene		<0.000200	mg/L	0.001	0.200
Dibenzo(a,h)anthracene		<0.000200	mg/L	0.001	0.200
Benzo(g,h,i)perylene		<0.000200	mg/L	0.001	0.200

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Nitrobenzene-d5	1	0.0137	mg/L	0.001	80.0	17	21 - 145
2-Fluorobiphenyl	2	0.0181	mg/L	0.001	80.0	23	25 - 145
Terphenyl-d14	3	0.0539	mg/L	0.001	80.0	67	26 - 127

Sample: 12027 - MW-A

Analysis: pH
QC Batch: 2705
Prep Batch: 2461

Analytical Method: SM 4500-H+
Date Analyzed: 2003-07-03
Date Prepared: 2003-07-03

Prep Method: N/A
Analyzed By: RS
Prepared By: RS

¹Surrogate percent recovery out of limits due to bad stock. New surrogate stock is now being used. CCV and LCS/LCSD spiked compounds show that the process is in control.

²Surrogate percent recovery out of limits due to bad stock. New surrogate stock is now being used. CCV and LCS/LCSD spiked compounds show that the process is in control.

³Surrogate percent recovery out of limits due to bad stock. New surrogate stock is now being used. CCV and LCS/LCSD spiked compounds show that the process is in control.

Parameter	Flag	RL Result	Units	Dilution	RL
pH	4	7.30	s.u.	1	0.00

Sample: 12027 - MW-A

Analysis:	TDS	Analytical Method:	SM 2540C	Prep Method:	N/A
QC Batch:	2709	Date Analyzed:	2003-07-07	Analyzed By:	JSW
Prep Batch:	2469	Date Prepared:	2003-07-03	Prepared By:	JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Total Dissolved Solids		488.0	mg/L	1	10.00

Sample: 12027 - MW-A

Analysis:	TOC	Analytical Method:	E 415.1	Prep Method:	N/A
QC Batch:	3079	Date Analyzed:	2003-07-16	Analyzed By:	RC
Prep Batch:	2780	Date Prepared:	2003-07-16	Prepared By:	RC

Parameter	Flag	RL Result	Units	Dilution	RL
Total Organic Carbon		4.77	mg/L	1	1.00

Sample: 12027 - MW-A

Analysis:	TPH DRO	Analytical Method:	Mod. 8015B	Prep Method:	N/A
QC Batch:	2701	Date Analyzed:	2003-07-04	Analyzed By:	BP
Prep Batch:	2459	Date Prepared:	2003-07-03	Prepared By:	WG

Parameter	Flag	RL Result	Units	Dilution	RL
DRO		<5.00	mg/L	0.1	50.0

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		10.3	mg/L	0.1	150	69	44 - 123

Sample: 12027 - MW-A

Analysis:	TPH GRO	Analytical Method:	S 8015B	Prep Method:	S 5030B
QC Batch:	2806	Date Analyzed:	2003-07-08	Analyzed By:	BS
Prep Batch:	2538	Date Prepared:	2003-07-08	Prepared By:	BS

Parameter	Flag	RL Result	Units	Dilution	RL
GRO		2.30	mg/L	1	0.100

⁴received out of holding time

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)	⁵	0.122	mg/L	1	0.100	122	73 - 120
4-Bromofluorobenzene (4-BFB)	⁶	0.125	mg/L	1	0.100	125	78 - 120

Sample: 12028 - MW-B

Analysis: Alkalinity Analytical Method: SM 2320B Prep Method: N/A
QC Batch: 2778 Date Analyzed: 2003-07-08 Analyzed By: RS
Prep Batch: 2517 Date Prepared: 2003-07-08 Prepared By: RS

Parameter	Flag	RL Result	Units	Dilution	RL
Hydroxide Alkalinity		<1.00	mg/L as CaCo3	1	1.00
Carbonate Alkalinity		<1.00	mg/L as CaCo3	1	1.00
Bicarbonate Alkalinity		210	mg/L as CaCo3	1	4.00
Total Alkalinity		210	mg/L as CaCo3	1	4.00

Sample: 12028 - MW-B

Analysis: BTEX Analytical Method: S 8021B Prep Method: S 5030B
QC Batch: 2805 Date Analyzed: 2003-07-08 Analyzed By: BS
Prep Batch: 2538 Date Prepared: 2003-07-08 Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		0.287	mg/L	1	0.00100
Toluene		0.0264	mg/L	1	0.00100
Ethylbenzene		0.00510	mg/L	1	0.00100
Xylene (isomers)		0.0133	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)	⁷	0.118	mg/L	1	0.100	118	78.7 - 110
4-Bromofluorobenzene (4-BFB)	⁸	0.114	mg/L	1	0.100	114	77.8 - 110

Sample: 12028 - MW-B

Analysis: Cations Analytical Method: S 6010B Prep Method: S 3005A
QC Batch: 3135 Date Analyzed: 2003-07-17 Analyzed By: BC
Prep Batch: 2527 Date Prepared: 2003-07-08 Prepared By: TP

Parameter	Flag	RL Result	Units	Dilution	RL
Dissolved Calcium		74.2	mg/L	1	0.500
Dissolved Potassium		5.37	mg/L	1	0.500
Dissolved Magnesium		11.1	mg/L	1	0.500

continued ...

⁵High surrogate recovery due to peak interference.

⁶High surrogate recovery due to peak interference.

⁷High surrogate recovery due to peak interference.

⁸High surrogate recovery due to peak interference.

sample 12028 continued ...

Parameter	Flag	RL Result	Units	Dilution	RL
Dissolved Sodium		21.6	mg/L	1	0.500

Sample: 12028 - MW-B

Analysis:	Conductivity	Analytical Method:	SM 2510B	Prep Method:	N/A
QC Batch:	2708	Date Analyzed:	2003-07-03	Analyzed By:	JSW
Prep Batch:	2468	Date Prepared:	2003-07-03	Prepared By:	JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Specific Conductance		653	μ MHOS/cm	1	0.00

Sample: 12028 - MW-B

Analysis:	Fe, Dissolved	Analytical Method:	S 6010B	Prep Method:	S 3005A
QC Batch:	2951	Date Analyzed:	2003-07-13	Analyzed By:	RR
Prep Batch:	2519	Date Prepared:	2003-07-08	Prepared By:	TP

Parameter	Flag	RL Result	Units	Dilution	RL
Dissolved Iron		<0.0500	mg/L	1	0.0500

Sample: 12028 - MW-B

Analysis:	Fe, Total	Analytical Method:	S 6010B	Prep Method:	S 3010A
QC Batch:	3199	Date Analyzed:	2003-07-13	Analyzed By:	RR
Prep Batch:	2531	Date Prepared:	2003-07-08	Prepared By:	TP

Parameter	Flag	RL Result	Units	Dilution	RL
Total Iron		0.875	mg/L	1	0.0500

Sample: 12028 - MW-B

Analysis:	Ion Chromatography	Analytical Method:	E 300.0	Prep Method:	N/A
QC Batch:	2734	Date Analyzed:	2003-07-07	Analyzed By:	JSW
Prep Batch:	2489	Date Prepared:	2003-07-03	Prepared By:	JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Chloride		53.3	mg/L	5	0.500
Fluoride		1.56	mg/L	5	0.200
Sulfate		33.1	mg/L	5	0.500

Sample: 12028 - MW-B

Analysis:	NO2 (Spec)	Analytical Method:	SM 4500-NO2 B	Prep Method:	N/A
QC Batch:	2687	Date Analyzed:	2003-07-03	Analyzed By:	JSW
Prep Batch:	2453	Date Prepared:	2003-07-03	Prepared By:	JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Nitrite-N		<0.0100	mg/L	1	0.0100

Sample: 12028 - MW-B

Analysis:	NO3 (IC)	Analytical Method:	E 300.0	Prep Method:	N/A
QC Batch:	2734	Date Analyzed:	2003-07-07	Analyzed By:	JSW
Prep Batch:	2489	Date Prepared:	2003-07-03	Prepared By:	JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Nitrate-N		3.33	mg/L	5	0.200

Sample: 12028 - MW-B

Analysis:	pH	Analytical Method:	SM 4500-H+	Prep Method:	N/A
QC Batch:	2705	Date Analyzed:	2003-07-03	Analyzed By:	RS
Prep Batch:	2461	Date Prepared:	2003-07-03	Prepared By:	RS

Parameter	Flag	RL Result	Units	Dilution	RL
pH	⁹	7.40	s.u.	1	0.00

Sample: 12028 - MW-B

Analysis:	TDS	Analytical Method:	SM 2540C	Prep Method:	N/A
QC Batch:	2709	Date Analyzed:	2003-07-07	Analyzed By:	JSW
Prep Batch:	2469	Date Prepared:	2003-07-03	Prepared By:	JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Total Dissolved Solids		386.0	mg/L	1	10.00

Sample: 12028 - MW-B

Analysis:	TOC	Analytical Method:	E 415.1	Prep Method:	N/A
QC Batch:	3079	Date Analyzed:	2003-07-16	Analyzed By:	RC
Prep Batch:	2780	Date Prepared:	2003-07-16	Prepared By:	RC

continued ...

⁹received out of holding time

sample 12028 continued ...

Parameter	Flag	RL Result	Units	Dilution	RL
Parameter	Flag	RL Result	Units	Dilution	RL
Total Organic Carbon		5.34	mg/L	1	1.00

Sample: 12028 - MW-B

Analysis: TPH DRO Analytical Method: Mod. 8015B Prep Method: N/A
QC Batch: 2701 Date Analyzed: 2003-07-04 Analyzed By: BP
Prep Batch: 2459 Date Prepared: 2003-07-03 Prepared By: WG

Parameter	Flag	RL Result	Units	Dilution	RL
DRO		<5.00	mg/L	0.1	50.0

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		11.1	mg/L	0.1	150	74	44 - 123

Sample: 12028 - MW-B

Analysis: TPH GRO Analytical Method: S 8015B Prep Method: S 5030B
QC Batch: 2806 Date Analyzed: 2003-07-08 Analyzed By: BS
Prep Batch: 2538 Date Prepared: 2003-07-08 Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
GRO		0.879	mg/L	1	0.100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.105	mg/L	1	0.100	105	73 - 120
4-Bromofluorobenzene (4-BFB)		0.109	mg/L	1	0.100	109	78 - 120

Sample: 12029 - MW-H

Analysis: Alkalinity Analytical Method: SM 2320B Prep Method: N/A
QC Batch: 2778 Date Analyzed: 2003-07-08 Analyzed By: RS
Prep Batch: 2517 Date Prepared: 2003-07-08 Prepared By: RS

Parameter	Flag	RL Result	Units	Dilution	RL
Hydroxide Alkalinity		<1.00	mg/L as CaCo3	1	1.00
Carbonate Alkalinity		<1.00	mg/L as CaCo3	1	1.00
Bicarbonate Alkalinity		222	mg/L as CaCo3	1	4.00
Total Alkalinity		222	mg/L as CaCo3	1	4.00

Sample: 12029 - MW-H

Analysis: BTEX
QC Batch: 2805
Prep Batch: 2538

Analytical Method: S 8021B
Date Analyzed: 2003-07-08
Date Prepared: 2003-07-08

Prep Method: S 5030B
Analyzed By: BS
Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		0.0682	mg/L	1	0.00100
Toluene		0.0366	mg/L	1	0.00100
Ethylbenzene		0.00190	mg/L	1	0.00100
Xylene (isomers)		0.00580	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)	¹⁰	0.117	mg/L	1	0.100	117	78.7 - 110
4-Bromofluorobenzene (4-BFB)	¹¹	0.114	mg/L	1	0.100	114	77.8 - 110

Sample: 12029 - MW-H

Analysis: Cations
QC Batch: 3135
Prep Batch: 2527

Analytical Method: S 6010B
Date Analyzed: 2003-07-17
Date Prepared: 2003-07-08

Prep Method: S 3005A
Analyzed By: BC
Prepared By: TP

Parameter	Flag	RL Result	Units	Dilution	RL
Dissolved Calcium		63.4	mg/L	1	0.500
Dissolved Potassium		2.46	mg/L	1	0.500
Dissolved Magnesium		11.9	mg/L	1	0.500
Dissolved Sodium		31.5	mg/L	1	0.500

Sample: 12029 - MW-H

Analysis: Conductivity
QC Batch: 2708
Prep Batch: 2468

Analytical Method: SM 2510B
Date Analyzed: 2003-07-03
Date Prepared: 2003-07-03

Prep Method: N/A
Analyzed By: JSW
Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Specific Conductance		614	μ MHOS/cm	1	0.00

Sample: 12029 - MW-H

Analysis: Fe, Dissolved
QC Batch: 2951
Prep Batch: 2519

Analytical Method: S 6010B
Date Analyzed: 2003-07-13
Date Prepared: 2003-07-08

Prep Method: S 3005A
Analyzed By: RR
Prepared By: TP

¹⁰High surrogate recovery due to peak interference.

¹¹High surrogate recovery due to peak interference.

Parameter	Flag	RL Result	Units	Dilution	RL
Dissolved Iron		<0.0500	mg/L	1	0.0500

Sample: 12029 - MW-H

Analysis:	Fe, Total	Analytical Method:	S 6010B	Prep Method:	S 3010A
QC Batch:	3199	Date Analyzed:	2003-07-13	Analyzed By:	RR
Prep Batch:	2531	Date Prepared:	2003-07-08	Prepared By:	TP

Parameter	Flag	RL Result	Units	Dilution	RL
Total Iron		0.707	mg/L	1	0.0500

Sample: 12029 - MW-H

Analysis:	Ion Chromatography	Analytical Method:	E 300.0	Prep Method:	N/A
QC Batch:	2734	Date Analyzed:	2003-07-07	Analyzed By:	JSW
Prep Batch:	2489	Date Prepared:	2003-07-03	Prepared By:	JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Chloride		35.2	mg/L	5	0.500
Fluoride		1.64	mg/L	5	0.200
Sulfate		40.1	mg/L	5	0.500

Sample: 12029 - MW-H

Analysis:	NO2 (Spec)	Analytical Method:	SM 4500-NO2 B	Prep Method:	N/A
QC Batch:	2687	Date Analyzed:	2003-07-03	Analyzed By:	JSW
Prep Batch:	2453	Date Prepared:	2003-07-03	Prepared By:	JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Nitrite-N		0.0243	mg/L	1	0.0100

Sample: 12029 - MW-H

Analysis:	NO3 (IC)	Analytical Method:	E 300.0	Prep Method:	N/A
QC Batch:	2734	Date Analyzed:	2003-07-07	Analyzed By:	JSW
Prep Batch:	2489	Date Prepared:	2003-07-03	Prepared By:	JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Nitrate-N		3.35	mg/L	5	0.200

Sample: 12029 - MW-H

Analysis: PAH
QC Batch: 2969
Prep Batch: 2557

Analytical Method: S 8270C
Date Analyzed: 2003-07-15
Date Prepared: 2003-07-09

Prep Method: S 3510C
Analyzed By: RC
Prepared By: JH

Parameter	Flag	RL Result	Units	Dilution	RL
Naphthalene		<0.000200	mg/L	0.001	0.200
Acenaphthylene		<0.000200	mg/L	0.001	0.200
Acenaphthene		<0.000200	mg/L	0.001	0.200
Fluorene		<0.000200	mg/L	0.001	0.200
Phenanthrene		<0.000200	mg/L	0.001	0.200
Anthracene		<0.000200	mg/L	0.001	0.200
Fluoranthene		<0.000200	mg/L	0.001	0.200
Pyrene		<0.000200	mg/L	0.001	0.200
Benzo(a)anthracene		<0.000200	mg/L	0.001	0.200
Chrysene		<0.000200	mg/L	0.001	0.200
Benzo(b)fluoranthene		<0.000200	mg/L	0.001	0.200
Benzo(k)fluoranthene		<0.000200	mg/L	0.001	0.200
Benzo(a)pyrene		<0.000200	mg/L	0.001	0.200
Indeno(1,2,3-cd)pyrene		<0.000200	mg/L	0.001	0.200
Dibenzo(a,h)anthracene		<0.000200	mg/L	0.001	0.200
Benzo(g,h,i)perylene		<0.000200	mg/L	0.001	0.200

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Nitrobenzene-d5	¹²	0.0136	mg/L	0.001	80.0	17	21 - 145
2-Fluorobiphenyl	¹³	0.0178	mg/L	0.001	80.0	22	25 - 145
Terphenyl-d14	¹⁴	0.0582	mg/L	0.001	80.0	73	26 - 127

Sample: 12029 - MW-H

Analysis: pH
QC Batch: 2705
Prep Batch: 2461

Analytical Method: SM 4500-H+
Date Analyzed: 2003-07-03
Date Prepared: 2003-07-03

Prep Method: N/A
Analyzed By: RS
Prepared By: RS

Parameter	Flag	RL Result	Units	Dilution	RL
pH	¹⁵	7.50	s.u.	1	0.00

Sample: 12029 - MW-H

Analysis: TDS
QC Batch: 2709
Prep Batch: 2469

Analytical Method: SM 2540C
Date Analyzed: 2003-07-07
Date Prepared: 2003-07-03

Prep Method: N/A
Analyzed By: JSW
Prepared By: JSW

¹²Surrogate percent recovery out of limits due to bad stock. New surrogate stock is now being used. CCV and LCS/LCSD spiked compounds show that the process is in control.

¹³Surrogate percent recovery out of limits due to bad stock. New surrogate stock is now being used. CCV and LCS/LCSD spiked compounds show that the process is in control.

¹⁴Surrogate percent recovery out of limits due to bad stock. New surrogate stock is now being used. CCV and LCS/LCSD spiked compounds show that the process is in control.

¹⁵received out of holding time

Parameter	Flag	RL Result	Units	Dilution	RL
Total Dissolved Solids		392.0	mg/L	1	10.00

Sample: 12029 - MW-H

Analysis: TOC	Analytical Method: E 415.1	Prep Method: N/A
QC Batch: 3079	Date Analyzed: 2003-07-16	Analyzed By: RC
Prep Batch: 2780	Date Prepared: 2003-07-16	Prepared By: RC

Parameter	Flag	RL Result	Units	Dilution	RL
Total Organic Carbon		1.94	mg/L	1	1.00

Sample: 12029 - MW-H

Analysis: TPH DRO	Analytical Method: Mod. 8015B	Prep Method: N/A
QC Batch: 2701	Date Analyzed: 2003-07-04	Analyzed By: BP
Prep Batch: 2459	Date Prepared: 2003-07-03	Prepared By: WG

Parameter	Flag	RL Result	Units	Dilution	RL
DRO		<5.00	mg/L	0.1	50.0

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		10.4	mg/L	0.1	150	69	44 - 123

Sample: 12029 - MW-H

Analysis: TPH GRO	Analytical Method: S 8015B	Prep Method: S 5030B
QC Batch: 2806	Date Analyzed: 2003-07-08	Analyzed By: BS
Prep Batch: 2538	Date Prepared: 2003-07-08	Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
GRO		0.707	mg/L	1	0.100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.107	mg/L	1	0.100	107	73 - 120
4-Bromofluorobenzene (4-BFB)		0.106	mg/L	1	0.100	106	78 - 120

Sample: 12030 - Trip Blank

Analysis: BTEX	Analytical Method: S 8021B	Prep Method: S 5030B
QC Batch: 2880	Date Analyzed: 2003-07-10	Analyzed By: BS
Prep Batch: 2603	Date Prepared: 2003-07-10	Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00100	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		<0.00100	mg/L	1	0.00100
Xylene (isomers)		<0.00100	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)	¹⁶	0.128	mg/L	1	0.100	128	61 - 127
4-Bromofluorobenzene (4-BFB)		0.125	mg/L	1	0.100	125	72.6 - 130

Method Blank (1) QC Batch: 2687

Parameter	Flag	Result	Units	RL
Nitrite-N		<0.0100	mg/L	0.01

Method Blank (1) QC Batch: 2701

Parameter	Flag	Result	Units	RL
DRO		<5.00	mg/L	50

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		11.3	mg/L	0.1	150	75	44 - 123

Method Blank (1) QC Batch: 2708

Parameter	Flag	Result	Units	RL
Specific Conductance		8.28	μMHOS/cm	

Method Blank (1) QC Batch: 2709

Parameter	Flag	Result	Units	RL
Total Dissolved Solids		<10.00	mg/L	10

Method Blank (1) QC Batch: 2734

Parameter	Flag	Result	Units	RL
Nitrate-N		<0.200	mg/L	0.2

¹⁶High surrogate recovery due to prep. ICV, CCV show the method to be in control.

Method Blank (1) QC Batch: 2734

Parameter	Flag	Result	Units	RL
Chloride		<0.500	mg/L	0.5
Fluoride		<0.200	mg/L	0.2
Sulfate		<0.500	mg/L	0.5

Method Blank (1) QC Batch: 2778

Parameter	Flag	Result	Units	RL
Hydroxide Alkalinity		<1.00	mg/L as CaCo3	1
Carbonate Alkalinity		<1.00	mg/L as CaCo3	1
Bicarbonate Alkalinity		<4.00	mg/L as CaCo3	4
Total Alkalinity		<4.00	mg/L as CaCo3	4

Method Blank (1) QC Batch: 2805

Parameter	Flag	Result	Units	RL
Benzene		<0.00100	mg/L	0.001
Toluene		<0.00100	mg/L	0.001
Ethylbenzene		<0.00100	mg/L	0.001
Xylene (isomers)		<0.00100	mg/L	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0844	mg/L	1	0.100	84	78.7 - 110
4-Bromofluorobenzene (4-BFB)	17	0.0724	mg/L	1	0.100	72	77.8 - 110

Method Blank (1) QC Batch: 2806

Parameter	Flag	Result	Units	RL
GRO		<0.100	mg/L	0.1

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)	18	0.0697	mg/L	1	0.100	70	73 - 120
4-Bromofluorobenzene (4-BFB)	19	0.0669	mg/L	1	0.100	67	78 - 120

Method Blank (1) QC Batch: 2880

¹⁷Low surrogate recovery due to prep. ICV, CCV show the method to be in control.
¹⁸Low surrogate recovery due to prep. ICV, CCV show the method to be in control.
¹⁹Low surrogate recovery due to prep. ICV, CCV show the method to be in control.

Parameter	Flag	Result	Units	RL
Benzene		<0.00100	mg/L	0.001
Toluene		<0.00100	mg/L	0.001
Ethylbenzene		<0.00100	mg/L	0.001
Xylene (isomers)		<0.00100	mg/L	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.108	mg/L	1	0.100	108	61 - 127
4-Bromofluorobenzene (4-BFB)		0.106	mg/L	1	0.100	106	72.6 - 130

Method Blank (1) QC Batch: 2951

Parameter	Flag	Result	Units	RL
Dissolved Iron		<0.0500	mg/L	0.05

Method Blank (1) QC Batch: 2969

Parameter	Flag	Result	Units	RL
Naphthalene		<0.000200	mg/L	0.2
Acenaphthylene		<0.000200	mg/L	0.2
Acenaphthene		<0.000200	mg/L	0.2
Fluorene		<0.000200	mg/L	0.2
Phenanthrene		<0.000200	mg/L	0.2
Anthracene		<0.000200	mg/L	0.2
Fluoranthene		<0.000200	mg/L	0.2
Pyrene		<0.000200	mg/L	0.2
Benzo(a)anthracene		<0.000200	mg/L	0.2
Chrysene		<0.000200	mg/L	0.2
Benzo(b)fluoranthene		<0.000200	mg/L	0.2
Benzo(k)fluoranthene		<0.000200	mg/L	0.2
Benzo(a)pyrene		<0.000200	mg/L	0.2
Indeno(1,2,3-cd)pyrene		<0.000200	mg/L	0.2
Dibenzo(a,h)anthracene		<0.000200	mg/L	0.2
Benzo(g,h,i)perylene		<0.000200	mg/L	0.2

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Nitrobenzene-d5	²⁰	0.00247	mg/L	0.001	80.0	3	21 - 145
2-Fluorobiphenyl	²¹	0.00434	mg/L	0.001	80.0	5	25 - 145
Terphenyl-d14	²²	0.00347	mg/L	0.001	80.0	4	26 - 127

²⁰Surrogate percent recovery out of limits due to bad stock. New surrogate stock is now being used. CCV and LCS/LCSD spiked compounds show that the process is in control.

²¹Surrogate percent recovery out of limits due to bad stock. New surrogate stock is now being used. CCV and LCS/LCSD spiked compounds show that the process is in control.

²²Surrogate percent recovery out of limits due to bad stock. New surrogate stock is now being used. CCV and LCS/LCSD spiked compounds show that the process is in control.

Method Blank (1) QC Batch: 3079

Parameter	Flag	Result	Units	RL
Total Organic Carbon		<1.00	mg/L	1

Method Blank (1) QC Batch: 3135

Parameter	Flag	Result	Units	RL
Dissolved Calcium		<0.500	mg/L	0.5
Dissolved Potassium		<0.500	mg/L	0.5
Dissolved Magnesium		<0.500	mg/L	0.5
Dissolved Sodium		<0.500	mg/L	0.5

Method Blank (1) QC Batch: 3199

Parameter	Flag	Result	Units	RL
Total Iron		<0.0500	mg/L	0.05

Duplicate (1) QC Batch: 2705

Param	Duplicate Result	Sample Result	Units	Dilution	RPD	RPD Limit
pH ²³	7.50	7.50	s.u.	1	0	0

Duplicate (1) QC Batch: 2708

Param	Duplicate Result	Sample Result	Units	Dilution	RPD	RPD Limit
Specific Conductance	621	614	μMHOS/cm	1	1	2.9

Duplicate (1) QC Batch: 2709

Param	Duplicate Result	Sample Result	Units	Dilution	RPD	RPD Limit
Total Dissolved Solids	381.0	392.0	mg/L	1	3	9.41

Duplicate (1) QC Batch: 2778

continued ...

²³received out of holding time

<i>duplicate continued ...</i>						
Param	Duplicate Result	Sample Result	Units	Dilution	RPD	RPD Limit
Param	Duplicate Result	Sample Result	Units	Dilution	RPD	RPD Limit
Hydroxide Alkalinity	<1.00	<1.00	mg/L as CaCo3	1	0	5.81
Carbonate Alkalinity	<1.00	<1.00	mg/L as CaCo3	1	0	5.81
Bicarbonate Alkalinity	218	222	mg/L as CaCo3	1	2	5.81
Total Alkalinity	218	222	mg/L as CaCo3	1	2	5.81

Laboratory Control Spike (LCS-1) QC Batch: 2687

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Nitrite-N	0.0822	0.0816	mg/L	1	0.0800	<0.000820	103	1	95 - 106	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spike (LCS-1) QC Batch: 2701

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
DRO	28.1	28.5	mg/L	0.1	250	<0.230	112	1	86 - 120	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
n-Triacontane	11.6	11.4	mg/L	0.1	150	77	76	44 - 123

Laboratory Control Spike (LCS-1) QC Batch: 2734

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Nitrate-N	2.45	2.47	mg/L	1	2.50	<0.126	98	1	90 - 110	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spike (LCS-1) QC Batch: 2734

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Chloride	12.7	12.6	mg/L	1	12.5	<1.49	102	1	90 - 110	20
Fluoride	2.53	2.59	mg/L	1	2.50	<0.0153	101	2	90 - 110	20
Sulfate	11.6	11.7	mg/L	1	12.5	<0.171	93	1	90 - 110	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spike (LCS-1) QC Batch: 2805

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Benzene	0.101	0.0959	mg/L	1	0.100	<0.000410	101	5	80.5 - 113	20
Toluene	0.100	0.0955	mg/L	1	0.100	<0.000760	100	5	81.2 - 112	20
Ethylbenzene	0.100	0.0962	mg/L	1	0.100	<0.00120	100	4	82.2 - 112	20
Xylene (isomers)	0.302	0.287	mg/L	1	0.300	<0.00121	101	5	80.6 - 112	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	²⁴ 0.106	0.116	mg/L	1	0.100	106	116	78.7 - 110
4-Bromofluorobenzene (4-BFB)	²⁵ 0.107	0.113	mg/L	1	0.100	107	113	77.8 - 110

Laboratory Control Spike (LCS-1) QC Batch: 2806

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
GRO	0.842	0.924	mg/L	1	1.00	<0.0261	84	9	78.1 - 124	20
GRO	0.842	0.924	mg/L	1	1.00	<0.0261	84	9	78.1 - 124	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.0924	0.0989	mg/L	1	0.100	92	99	73 - 120
Trifluorotoluene (TFT)	0.0924	0.0989	mg/L	1	0.100	92	99	73 - 120
4-Bromofluorobenzene (4-BFB)	0.0911	0.0924	mg/L	1	0.100	91	92	78 - 120
4-Bromofluorobenzene (4-BFB)	0.0911	0.0924	mg/L	1	0.100	91	92	78 - 120

Laboratory Control Spike (LCS-1) QC Batch: 2880

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Benzene	0.105	0.114	mg/L	1	0.100	<0.000350	105	8	77.7 - 115	20
Benzene	0.105	0.114	mg/L	1	0.100	<0.000350	105	8	77.7 - 115	20
Toluene	0.108	0.119	mg/L	1	0.100	<0.000550	108	10	76.5 - 114	20
Toluene	0.108	0.119	mg/L	1	0.100	<0.000550	108	10	76.5 - 114	20
Ethylbenzene	0.112	0.126	mg/L	1	0.100	<0.000690	112	12	78.7 - 112	20
Ethylbenzene	0.112	0.126	mg/L	1	0.100	<0.000690	112	12	78.7 - 112	20
Xylene (isomers)	0.330	0.371	mg/L	1	0.300	<0.000610	110	12	66.3 - 123	20
Xylene (isomers)	0.330	0.371	mg/L	1	0.300	<0.000610	110	12	66.3 - 123	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.106	0.105	mg/L	1	0.100	106	105	61 - 127
Trifluorotoluene (TFT)	0.106	0.105	mg/L	1	0.100	106	105	61 - 127
4-Bromofluorobenzene (4-BFB)	0.113	0.114	mg/L	1	0.100	113	114	72.6 - 130
4-Bromofluorobenzene (4-BFB)	0.113	0.114	mg/L	1	0.100	113	114	72.6 - 130

²⁴High surrogate recovery due to prep. ICV, CCV show the method to be in control.

²⁵High surrogate recovery due to prep. ICV, CCV show the method to be in control.

Laboratory Control Spike (LCS-1) QC Batch: 2951

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Dissolved Iron	0.550	0.547	mg/L	1	0.500	<0.00220	110	0	80 - 120	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spike (LCS-1) QC Batch: 2969

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Naphthalene	44.7	44.0	mg/L	1	80.0	<0.0445	56	2	21.4 - 134	20
Acenaphthylene	59.0	58.8	mg/L	1	80.0	<0.0383	74	0	42.1 - 135	20
Acenaphthene	52.8	51.8	mg/L	1	80.0	<0.0421	66	2	41 - 133	20
Fluorene	60.5	60.0	mg/L	1	80.0	<0.0655	76	1	49.3 - 133	20
Phenanthrene	49.9	50.4	mg/L	1	80.0	<0.0383	62	1	54.4 - 135	20
Anthracene	42.6	43.5	mg/L	1	80.0	<0.0468	53	2	42.2 - 130	20
Fluoranthene	55.1	55.0	mg/L	1	80.0	<0.0550	69	0	44.4 - 146	20
Pyrene	77.6	81.4	mg/L	1	80.0	<0.0904	97	5	52.8 - 137	20
Benzo(a)anthracene	54.8	57.3	mg/L	1	80.0	<0.0993	68	4	59 - 134	20
Chrysene	61.2	62.5	mg/L	1	80.0	<0.121	76	2	49.6 - 107	20
Benzo(b)fluoranthene	64.3	69.4	mg/L	1	80.0	<0.171	80	8	43.2 - 134	20
Benzo(k)fluoranthene	86.8	81.6	mg/L	1	80.0	<0.0951	108	6	55.2 - 145	20
Benzo(a)pyrene	77.6	79.3	mg/L	1	80.0	<0.135	97	2	63.9 - 138	20
Indeno(1,2,3-cd)pyrene	56.4	55.2	mg/L	1	80.0	<0.176	70	2	64.6 - 145	20
Dibenzo(a,h)anthracene	67.0	63.9	mg/L	1	80.0	<0.184	84	5	48.6 - 142	20
Benzo(g,h,i)perylene	67.4	67.6	mg/L	1	80.0	<0.134	84	0	71.5 - 146	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate		LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Nitrobenzene-d5	2627	3.26	3.25	mg/L	1	80.0	4	4	20 - 146
2-Fluorobiphenyl	2829	4.89	5.00	mg/L	1	80.0	6	6	25.3 - 146
Terphenyl-d14	3031	3.29	3.40	mg/L	1	80.0	4	4	26 - 127

Laboratory Control Spike (LCS-1) QC Batch: 3079

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Total Organic Carbon	5.01	5.12	mg/L	1	5.00	<0.843	100	2	78 - 120	13

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

²⁶Surrogate percent recovery out of limits due to bad stock. New surrogate stock is now being used. CCV and LCS/LCSD spiked compounds show that the process is in control.

²⁷Surrogate percent recovery out of limits due to bad stock. New surrogate stock is now being used. CCV and LCS/LCSD spiked compounds show that the process is in control.

²⁸Surrogate percent recovery out of limits due to bad stock. New surrogate stock is now being used. CCV and LCS/LCSD spiked compounds show that the process is in control.

²⁹Surrogate percent recovery out of limits due to bad stock. New surrogate stock is now being used. CCV and LCS/LCSD spiked compounds show that the process is in control.

³⁰Surrogate percent recovery out of limits due to bad stock. New surrogate stock is now being used. CCV and LCS/LCSD spiked compounds show that the process is in control.

³¹Surrogate percent recovery out of limits due to bad stock. New surrogate stock is now being used. CCV and LCS/LCSD spiked compounds show that the process is in control.

Laboratory Control Spike (LCS-1) QC Batch: 3135

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Dissolved Calcium	97.7	96.7	mg/L	1	100	<0.183	98	1	85 - 115	20
Dissolved Potassium	96.1	96.3	mg/L	1	100	<0.135	96	0	85 - 115	20
Dissolved Magnesium	96.2	95.1	mg/L	1	100	<0.183	96	1	85 - 115	20
Dissolved Sodium	92.6	93.3	mg/L	1	100	<0.105	93	1	85 - 115	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spike (LCS-1) QC Batch: 3199

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Total Iron	0.494	0.500	mg/L	1	0.500	<0.00220	99	1	85 - 115	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) QC Batch: 2687

Param	MS Result	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Nitrite-N	0.0836	0.0842	mg/L	1	0.0800	<0.000820	104	1	65.9 - 119	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) QC Batch: 2734

Param	MS Result	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Nitrate-N ³²	15.0	15.1	mg/L	5	2.50	3.35	93	1	62.2 - 121	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) QC Batch: 2734

Param	MS Result	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Chloride ³³	93.0	92.7	mg/L	5	12.5	35.2	92	0	32.7 - 136	20
Chloride ³⁴	93.0	92.7	mg/L	5	12.5	35.2	92	0	32.7 - 136	20
Fluoride ³⁵	13.6	13.5	mg/L	5	2.50	1.64	96	1	30.1 - 187	20
Sulfate ³⁶	92.2	93.5	mg/L	5	12.5	40.1	83	1	69.9 - 114	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) QC Batch: 2951

³²Julie Winters must enter a comment.

³³Julie Winters must enter a comment.

³⁴Julie Winters must enter a comment.

³⁵Julie Winters must enter a comment.

³⁶Julie Winters must enter a comment.

Param	MS Result	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Dissolved Iron	0.553	0.539	mg/L	1	0.500	<0.00220	111	2	75 - 125	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) QC Batch: 3079

Param	MS Result	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Total Organic Carbon	5.82	5.82	mg/L	1	5.00	1.02	96	0	85 - 115	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) QC Batch: 3135

Param	MS Result	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Dissolved Calcium	³⁷³⁸ 164	174	mg/L	1	100	108	56	6	75 - 125	20
Dissolved Potassium	100	110	mg/L	1	100	2.71	97	10	75 - 125	20
Dissolved Magnesium	96.1	101	mg/L	1	100	17.7	78	5	75 - 125	20
Dissolved Sodium	112	119	mg/L	1	100	35.1	77	6	75 - 125	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) QC Batch: 3199

Param	MS Result	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Total Iron	3.10	3.11	mg/L	1	0.500	2.65	90	0	75 - 125	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Standard (ICV-1) QC Batch: 2687

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Nitrite-N		mg/L	0.0800	0.0828	104	85 - 115	2003-07-03

Standard (CCV-1) QC Batch: 2687

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Nitrite-N		mg/L	0.0800	0.0836	104	85 - 115	2003-07-03

Standard (ICV-1) QC Batch: 2701

³⁷ms recovery out of range due to matrix effect
³⁸ms recovery out of range due to matrix effect

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
DRO		mg/L	250	291	116	75 - 125	2003-07-04

Standard (CCV-1) QC Batch: 2701

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
DRO		mg/L	250	276	110	75 - 125	2003-07-04

Standard (ICV-1) QC Batch: 2705

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
pH		s.u.	7.00	7.00	100	98 - 102	2003-07-03

Standard (CCV-1) QC Batch: 2705

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
pH		s.u.	7.00	7.00	100	98 - 102	2003-07-03

Standard (ICV-1) QC Batch: 2708

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Specific Conductance		μ MHOS/cm	1410	1430	101	90 - 110	2003-07-03

Standard (CCV-1) QC Batch: 2708

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Specific Conductance		μ MHOS/cm	1410	1430	101	90 - 110	2003-07-03

Standard (ICV-1) QC Batch: 2709

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Dissolved Solids		mg/L	1000	953.0	95	90 - 110	2003-07-07

Standard (CCV-1) QC Batch: 2709

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Dissolved Solids		mg/L	1000	995.0	100	90 - 110	2003-07-07

Standard (ICV-1) QC Batch: 2734

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Nitrate-N		mg/L	2.50	2.48	99	90 - 110	2003-07-07

Standard (ICV-1) QC Batch: 2734

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Chloride		mg/L	12.5	12.7	102	90 - 110	2003-07-07
Fluoride		mg/L	2.50	2.62	105	90 - 110	2003-07-07
Sulfate		mg/L	12.5	12.2	98	90 - 110	2003-07-07

Standard (CCV-1) QC Batch: 2734

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Nitrate-N		mg/L	2.50	2.45	98	90 - 110	2003-07-07

Standard (CCV-1) QC Batch: 2734

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Chloride		mg/L	12.5	12.6	101	90 - 110	2003-07-07
Fluoride		mg/L	2.50	2.62	105	90 - 110	2003-07-07
Sulfate		mg/L	12.5	11.7	94	90 - 110	2003-07-07

Standard (ICV-1) QC Batch: 2778

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Hydroxide Alkalinity		mg/L as CaCo3	0.00	<1.00		0 - 200	2003-07-08
Carbonate Alkalinity		mg/L as CaCo3	0.00	<1.00		0 - 200	2003-07-08
Bicarbonate Alkalinity		mg/L as CaCo3	0.00	<4.00		0 - 200	2003-07-08
Total Alkalinity		mg/L as CaCo3	250	236	94	90 - 110	2003-07-08

Standard (CCV-1) QC Batch: 2778

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Hydroxide Alkalinity		mg/L as CaCo3	0.00	<1.00		0 - 200	2003-07-08
Carbonate Alkalinity		mg/L as CaCo3	0.00	<1.00		0 - 200	2003-07-08
Bicarbonate Alkalinity		mg/L as CaCo3	0.00	<4.00		0 - 200	2003-07-08
Total Alkalinity		mg/L as CaCo3	250	238	95	90 - 110	2003-07-08

Standard (ICV-1) QC Batch: 2805

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0939	94	85 - 115	2003-07-08
Toluene		mg/L	0.100	0.0943	94	85 - 115	2003-07-08
Ethylbenzene		mg/L	0.100	0.0971	97	85 - 115	2003-07-08
Xylene (isomers)		mg/L	0.300	0.287	96	85 - 115	2003-07-08

Standard (CCV-1) QC Batch: 2805

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0981	98	85 - 115	2003-07-08
Toluene		mg/L	0.100	0.0977	98	85 - 115	2003-07-08
Ethylbenzene		mg/L	0.100	0.0988	99	85 - 115	2003-07-08
Xylene (isomers)		mg/L	0.300	0.298	99	85 - 115	2003-07-08

Standard (ICV-1) QC Batch: 2806

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
GRO		mg/L	1.00	0.978	98	85 - 115	2003-07-08

Standard (CCV-1) QC Batch: 2806

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
GRO		mg/L	1.00	0.967	97	85 - 115	2003-07-08

Standard (ICV-1) QC Batch: 2880

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.112	112	85 - 115	2003-07-10
Toluene		mg/L	0.100	0.115	115	85 - 115	2003-07-10

continued ...

standard continued ...

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Ethylbenzene	³⁹	mg/L	0.100	0.119	119	85 - 115	2003-07-10
Xylene (isomers)	⁴⁰	mg/L	0.300	0.351	117	85 - 115	2003-07-10

Standard (CCV-1) QC Batch: 2880

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.108	108	85 - 115	2003-07-10
Toluene		mg/L	0.100	0.110	110	85 - 115	2003-07-10
Ethylbenzene		mg/L	0.100	0.114	114	85 - 115	2003-07-10
Xylene (isomers)		mg/L	0.300	0.338	113	85 - 115	2003-07-10

Standard (ICV-1) QC Batch: 2951

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Dissolved Iron		mg/L	1.00	1.00	100	90 - 110	2003-07-13

Standard (CCV-1) QC Batch: 2951

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Dissolved Iron		mg/L	1.00	1.03	103	90 - 110	2003-07-13

Standard (CCV-1) QC Batch: 2969

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Naphthalene		mg/L	60.0	57.1	95	80 - 120	2003-07-15
Acenaphthylene		mg/L	60.0	58.9	98	80 - 120	2003-07-15
Acenaphthene		mg/L	60.0	59.9	100	80 - 120	2003-07-15
Fluorene		mg/L	60.0	64.4	107	80 - 120	2003-07-15
Phenanthrene		mg/L	60.0	58.6	98	80 - 120	2003-07-15
Anthracene		mg/L	60.0	58.6	98	80 - 120	2003-07-15
Fluoranthene		mg/L	60.0	62.1	104	80 - 120	2003-07-15
Pyrene		mg/L	60.0	57.3	96	80 - 120	2003-07-15
Benzo(a)anthracene		mg/L	60.0	65.2	109	80 - 120	2003-07-15
Chrysene		mg/L	60.0	53.8	90	80 - 120	2003-07-15
Benzo(b)fluoranthene		mg/L	60.0	70.4	117	80 - 120	2003-07-15
Benzo(k)fluoranthene		mg/L	60.0	61.9	103	80 - 120	2003-07-15
Benzo(a)pyrene		mg/L	60.0	69.0	115	80 - 120	2003-07-15

continued ...

³⁹ Average of ICV components within acceptable range.

⁴⁰ Average of ICV components within acceptable range.

standard continued ...

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Indeno(1,2,3-cd)pyrene		mg/L	60.0	55.4	92	80 - 120	2003-07-15
Dibenzo(a,h)anthracene		mg/L	60.0	66.6	111	80 - 120	2003-07-15
Benzo(g,h,i)perylene		mg/L	60.0	66.7	111	80 - 120	2003-07-15

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limit
Nitrobenzene-d5		50.4	mg/L	1	60.0	84	80 - 120
2-Fluorobiphenyl		64.7	mg/L	1	60.0	108	80 - 120
Terphenyl-d14		70.7	mg/L	1	60.0	118	80 - 120

Standard (CCV-2) QC Batch: 2969

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Naphthalene		mg/L	60.0	67.9	113	80 - 120	2003-07-15
Acenaphthylene		mg/L	60.0	60.4	101	80 - 120	2003-07-15
Acenaphthene		mg/L	60.0	54.6	91	80 - 120	2003-07-15
Fluorene		mg/L	60.0	66.8	111	80 - 120	2003-07-15
Phenanthrene		mg/L	60.0	63.7	106	80 - 120	2003-07-15
Anthracene		mg/L	60.0	60.5	101	80 - 120	2003-07-15
Fluoranthene		mg/L	60.0	62.3	104	80 - 120	2003-07-15
Pyrene		mg/L	60.0	62.7	104	80 - 120	2003-07-15
Benzo(a)anthracene		mg/L	60.0	61.1	102	80 - 120	2003-07-15
Chrysene		mg/L	60.0	60.4	101	80 - 120	2003-07-15
Benzo(b)fluoranthene		mg/L	60.0	69.2	115	80 - 120	2003-07-15
Benzo(k)fluoranthene		mg/L	60.0	71.8	120	80 - 120	2003-07-15
Benzo(a)pyrene		mg/L	60.0	62.1	104	80 - 120	2003-07-15
Indeno(1,2,3-cd)pyrene		mg/L	60.0	68.7	114	80 - 120	2003-07-15
Dibenzo(a,h)anthracene		mg/L	60.0	70.2	117	80 - 120	2003-07-15
Benzo(g,h,i)perylene		mg/L	60.0	65.5	109	80 - 120	2003-07-15

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limit
Nitrobenzene-d5		57.2	mg/L	1	60.0	95	80 - 120
2-Fluorobiphenyl		67.9	mg/L	1	60.0	113	80 - 120
Terphenyl-d14		62.8	mg/L	1	60.0	105	80 - 120

Standard (ICV-1) QC Batch: 3079

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Organic Carbon		mg/L	5.00	5.22	104	85 - 115	2003-07-16

Standard (CCV-1) QC Batch: 3079

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Organic Carbon		mg/L	5.00	5.35	107	85 - 115	2003-07-16

Standard (ICV-1) QC Batch: 3135

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Dissolved Calcium		mg/L	25.0	24.8	99	90 - 110	2003-07-17
Dissolved Potassium		mg/L	25.0	23.6	94	90 - 110	2003-07-17
Dissolved Magnesium		mg/L	25.0	24.2	97	90 - 110	2003-07-17
Dissolved Sodium		mg/L	25.0	24.8	99	90 - 110	2003-07-17

Standard (CCV-1) QC Batch: 3135

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Dissolved Calcium		mg/L	25.0	24.6	98	90 - 110	2003-07-17
Dissolved Potassium		mg/L	25.0	24.9	100	90 - 110	2003-07-17
Dissolved Magnesium		mg/L	25.0	23.4	94	90 - 110	2003-07-17
Dissolved Sodium		mg/L	25.0	23.8	95	90 - 110	2003-07-17

Standard (ICV-1) QC Batch: 3199

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Iron		mg/L	1.00	1.00	100	90 - 110	2003-07-13

Standard (CCV-1) QC Batch: 3199

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Iron		mg/L	1.00	1.03	103	90 - 110	2003-07-13

TRACE ANALYSIS, INC.

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ANALYTICAL RESULTS FOR
ARCADIS GERAGHTY & MILLER
Attention: Frank Keifer
1004 N. Big Spring St.
Midland, TX 79701

July 09, 2003
Receiving Date: 07/03/2003
Sample Type: Liquid
Project No: MT000803.0001
Project Location: Pure Resources
Lovington, NM

Work Order: 3070312
Prep Date: 07/07/2003
Analysis Date: 07/07/2003
Sampling Date: 07/02/2003
Sample Condition: I & C
Sample Received by: VH
Project Name: NA

RECEIVED

AUG 11 2003

ARCADIS Geraghty & Miller

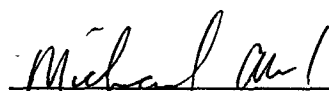
TA#: 12027 - MWA
TA#: 12029 - MWH

FINGERPRINTS

Samples were extracted with pentane and analyzed by GC, FID, capillary column and direct injection. (Graphs included)

12027 - No significant peaks present between C6-C35 for fingerprint identification.
12029 - No significant peaks present between C6-C35 for fingerprint identification.

CHEMIST: BP

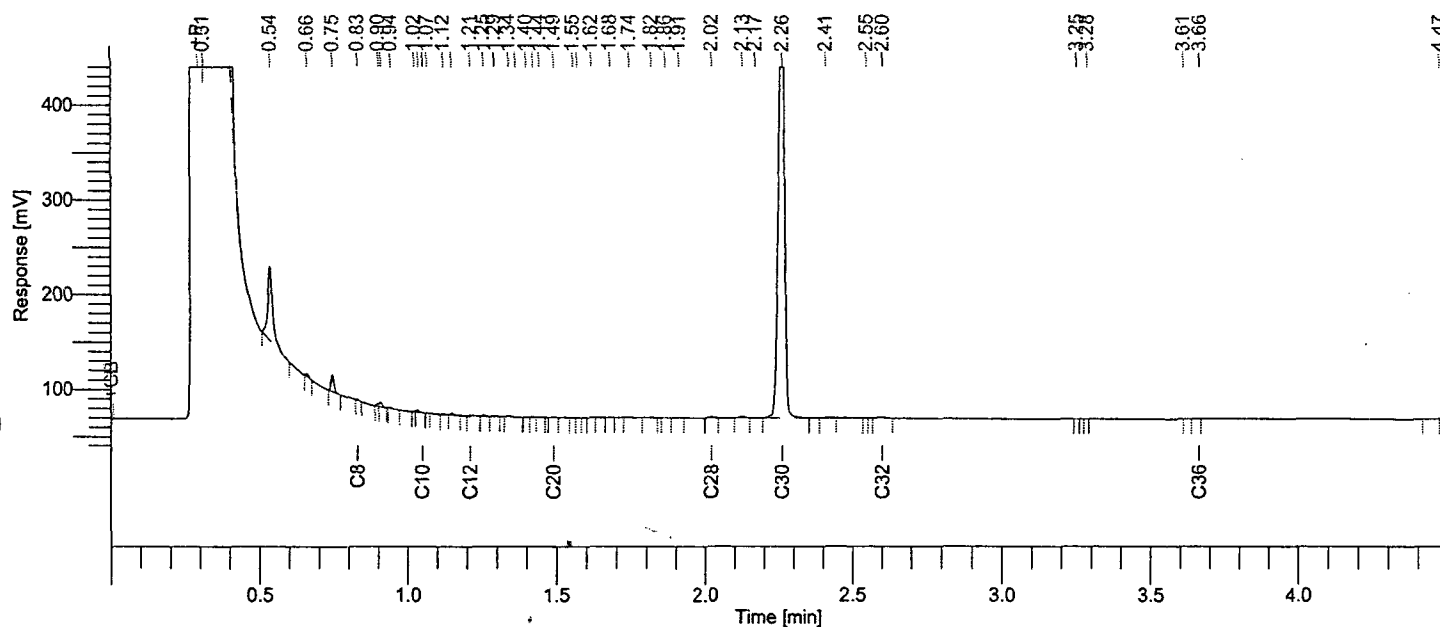

Director, Dr. Blair Leftwich

7/25/03
DATE

Software Version : 6.1.2.0.1:D19
 Operator : Turbochrom
 Sample Number : 040
 AutoSampler : BUILT-IN
 Instrument Name : TPH1
 Instrument Serial # : None
 Delay Time : 0.00 min
 Sampling Rate : 12.5000 pts/s
 Volume Injected : 1.000000 ul
 Sample Amount : 1.0000
 Data Acquisition Time : 7/4/03 7:48:20 PM

Date : 7/7/03 1:47:12 AM
 Sample Name : 12027
 Study : 2701
 Rack/Vial : 0/40
 Channel : A
 A/D mV Range : 1000
 End Time : 4.50 min
 Area Reject : 0.000000
 Dilution Factor : 0.10
 Cycle : 40

Raw Data File : D:\Data\TPH1\HCT1A040.raw <Modified>
 Result File : D:\Data\TPH1\HCT1A040.rst
 Inst Method : d:\methods\tph1dro from D:\Data\TPH1\HCT1A040.rst
 Proc Method : d:\methods\tph1dro.mth
 Calib Method : d:\methods\tph1dro.mth
 Sequence File : D:\Sequence\HCT1A.seq



TX1005

Analytical Method: TX1005
 Reporting Units: mg/L
 Matrix: water

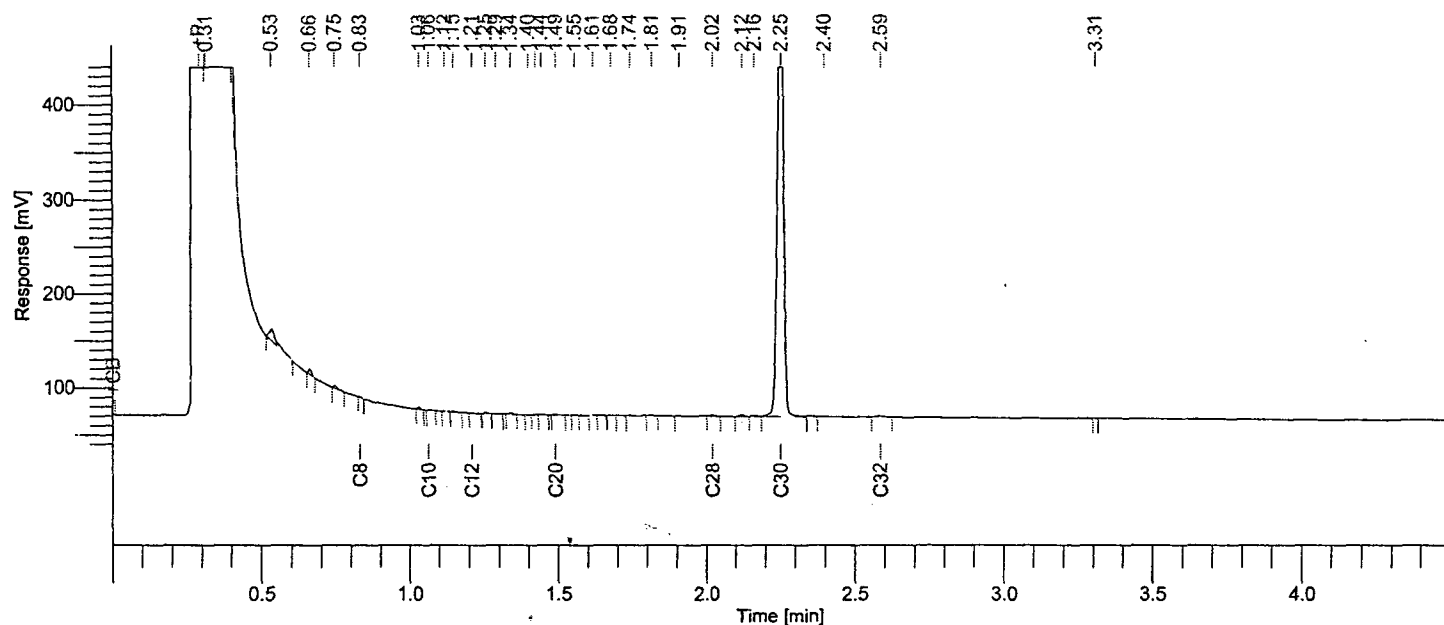
Component Name	Adjusted Amount	Raw Amount	Area [μ V s]
Diesel	0.1	1.4	9587.49
Surrogate	10.3	102.7	700536.18
			710123.68

Report stored in ASCII file: D:\Data\TPH1\HCT1A040.TX0

Software Version : 6.1.2.0.1:D19
 Operator : Turbochrom
 Sample Number : 042
 AutoSampler : BUILT-IN
 Instrument Name : TPH1
 Instrument Serial # : None
 Delay Time : 0.00 min
 Sampling Rate : 12.5000 pts/s
 Volume Injected : 1.000000 ul
 Sample Amount : 1.0000
 Data Acquisition Time : 7/4/03 8:10:11 PM

Date : 7/7/03 1:47:17 AM
 Sample Name : 12029
 Study : 2701
 Rack/Vial : 0/42
 Channel : A
 A/D mV Range : 1000
 End Time : 4.50 min
 Area Reject : 0.000000
 Dilution Factor : 0.10
 Cycle : 42

Raw Data File : D:\Data\TPH1\HCT1A042.raw <Modified>
 Result File : D:\Data\TPH1\HCT1A042.rst
 Inst Method : d:\methods\tph1dro from D:\Data\TPH1\HCT1A042.rst
 Proc Method : d:\methods\tph1dro.mth
 Calib Method : d:\methods\tph1dro.mth
 Sequence File : D:\Sequence\HCT1A.seq



TX1005

Analytical Method: TX1005
 Reporting Units: mg/L
 Matrix: water

Component Name	Adjusted Amount	Raw Amount	Area [μV s]
Diesel	0.1	1.4	9396.77
Surrogate	10.4	104.3	711478.60
			720875.36

Report stored in ASCII file: D:\Data\TPH1\HCT1A042.TX0

Report Date: July 15, 2003
MT000803.0001

Work Order: 3070112

Page Number: 1 of 1
Lovington, NM

Summary Report

Frank Kieffer
Arcadis Geraghty & Miller
1004 N. Big Spring St.
Suite 300
Midland, TX 79701

Report Date: July 15, 2003

Work Order: 3070112

RECEIVED

JUL 17 2003

Project Location: Lovington, NM
Project Number: MT000803.0001

ARCADIS Geraghty & Miller

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
11782	MW-E	water	2003-06-27	09:00	2003-07-01
11783	MW-D	water	2003-06-27	13:15	2003-07-01
11784	Trip Blank	water	2003-06-27	00:00	2003-07-01

Sample - Field Code	Benzene	Toluene	BTEX Ethylbenzene	Xylene (isomers)	TPH DRO DRO	TPH GRO GRO
	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
11782 - MW-E	<0.00100	<0.00100	<0.00100	<0.00100	<5.00	<0.100
11783 - MW-D	0.134	<0.00100	<0.00100	0.00220	<5.00	0.349
11784 - Trip Blank	<0.00100	<0.00100	<0.00100	<0.00100		<0.100

Sample: 11782 - MW-E

Param	Flag	Result	Units	RL
Dissolved Iron		<0.0500	mg/L	0.0500
Total Iron		0.611	mg/L	0.0500
Total Organic Carbon		<1.00	mg/L	1.00

Sample: 11783 - MW-D

Param	Flag	Result	Units	RL
Dissolved Iron		<0.0500	mg/L	0.0500
Total Iron		3.48	mg/L	0.0500
Total Organic Carbon		6.77	mg/L	1.00

TRACE ANALYSIS, INC.

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Analytical and Quality Control Report

Frank Kieffer
Arcadis Geraghty & Miller
1004 N. Big Spring St.
Suite 300
Midland, TX 79701

Report Date: July 15, 2003

Work Order: 3070112

Project Location: Lovington, NM
Project Number: MT000803.0001

Enclosed are the Analytical Report and Quality Control Report for the following sample(s) submitted to TraceAnalysis, Inc.

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
11782	MW-E	water	2003-06-27	09:00	2003-07-01
11783	MW-D	water	2003-06-27	13:15	2003-07-01
11784	Trip Blank	water	2003-06-27	00:00	2003-07-01

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

This report consists of a total of 10 pages and shall not be reproduced except in its entirety, without written approval of TraceAnalysis, Inc.



Dr. Blair Leftwich, Director

Analytical Report

Sample: 11782 - MW-E

Analysis: BTEX	Analytical Method: S 8021B	Prep Method: S 5030B
QC Batch: 2767	Date Analyzed: 2003-07-07	Analyzed By:
Prep Batch: 2514	Date Prepared: 2003-07-07	Prepared By:

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00100	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		<0.00100	mg/L	1	0.00100
Xylene (isomers)		<0.00100	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)	1	0.0782	mg/L	1	0.100	78	78.7 - 110
4-Bromofluorobenzene (4-BFB)	2	0.0739	mg/L	1	0.100	74	77.8 - 110

Sample: 11782 - MW-E

Analysis: Fe, Dissolved	Analytical Method: S 6010B	Prep Method: S 3005A
QC Batch: 2951	Date Analyzed: 2003-07-13	Analyzed By: RR
Prep Batch: 2519	Date Prepared: 2003-07-08	Prepared By: TP

Parameter	Flag	RL Result	Units	Dilution	RL
Dissolved Iron		<0.0500	mg/L	1	0.0500

Sample: 11782 - MW-E

Analysis: Fe, Total	Analytical Method: S 6010B	Prep Method: S 3010A
QC Batch: 2876	Date Analyzed: 2003-07-08	Analyzed By: RR
Prep Batch: 2505	Date Prepared: 2003-07-07	Prepared By: TP

Parameter	Flag	RL Result	Units	Dilution	RL
Total Iron		0.611	mg/L	1	0.0500

Sample: 11782 - MW-E

Analysis: TOC	Analytical Method: E 415.1	Prep Method: N/A
QC Batch: 2731	Date Analyzed: 2003-07-06	Analyzed By: RC
Prep Batch: 2486	Date Prepared: 2003-07-06	Prepared By: RC

Parameter	Flag	RL Result	Units	Dilution	RL
Total Organic Carbon		<1.00	mg/L	1	1.00

¹Low surrogate recovery due to prep. ICV/CCV show the method to be in control.

²Low surrogate recovery due to prep. ICV/CCV show the method to be in control.

Sample: 11782 - MW-E

Analysis:	TPH DRO	Analytical Method:	Mod. 8015B	Prep Method:	N/A
QC Batch:	2670	Date Analyzed:	2003-07-03	Analyzed By:	BP
Prep Batch:	2436	Date Prepared:	2003-07-02	Prepared By:	WG

Parameter	Flag	RL Result	Units	Dilution	RL
DRO		<5.00	mg/L	0.1	50.0

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		11.7	mg/L	0.1	150	78	44 - 123

Sample: 11782 - MW-E

Analysis:	TPH GRO	Analytical Method:	S 8015B	Prep Method:	S 5030B
QC Batch:	2771	Date Analyzed:	2003-07-07	Analyzed By:	
Prep Batch:	2514	Date Prepared:	2003-07-07	Prepared By:	

Parameter	Flag	RL Result	Units	Dilution	RL
GRO		<0.100	mg/L	1	0.100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0844	mg/L	1	0.100	84	73 - 120
4-Bromofluorobenzene (4-BFB)		0.0880	mg/L	1	0.100	88	78 - 120

Sample: 11783 - MW-D

Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	2767	Date Analyzed:	2003-07-07	Analyzed By:	
Prep Batch:	2514	Date Prepared:	2003-07-07	Prepared By:	

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		0.134	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		<0.00100	mg/L	1	0.00100
Xylene (isomers)		0.00220	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)	³	0.0771	mg/L	1	0.100	77	78.7 - 110
4-Bromofluorobenzene (4-BFB)		0.0808	mg/L	1	0.100	81	77.8 - 110

Sample: 11783 - MW-D

Analysis:	Fe, Dissolved	Analytical Method:	S 6010B	Prep Method:	S 3005A
QC Batch:	2951	Date Analyzed:	2003-07-13	Analyzed By:	RR
Prep Batch:	2519	Date Prepared:	2003-07-08	Prepared By:	TP

³Low surrogate recovery due to matrix interference. ICV/CCV show the method to be in control.

Parameter	Flag	RL Result	Units	Dilution	RL
Dissolved Iron		<0.0500	mg/L	1	0.0500

Sample: 11783 - MW-D

Analysis: Fe, Total Analytical Method: S 6010B Prep Method: S 3010A
QC Batch: 2876 Date Analyzed: 2003-07-08 Analyzed By: RR
Prep Batch: 2505 Date Prepared: 2003-07-07 Prepared By: TP

Parameter	Flag	RL Result	Units	Dilution	RL
Total Iron		3.48	mg/L	1	0.0500

Sample: 11783 - MW-D

Analysis: TOC Analytical Method: E 415.1 Prep Method: N/A
QC Batch: 2731 Date Analyzed: 2003-07-06 Analyzed By: RC
Prep Batch: 2486 Date Prepared: 2003-07-06 Prepared By: RC

Parameter	Flag	RL Result	Units	Dilution	RL
Total Organic Carbon		6.77	mg/L	1	1.00

Sample: 11783 - MW-D

Analysis: TPH DRO Analytical Method: Mod. 8015B Prep Method: N/A
QC Batch: 2670 Date Analyzed: 2003-07-03 Analyzed By: BP
Prep Batch: 2436 Date Prepared: 2003-07-02 Prepared By: WG

Parameter	Flag	RL Result	Units	Dilution	RL
DRO		<5.00	mg/L	0.1	50.0

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		10.9	mg/L	0.1	150	73	44 - 123

Sample: 11783 - MW-D

Analysis: TPH GRO Analytical Method: S 8015B Prep Method: S 5030B
QC Batch: 2771 Date Analyzed: 2003-07-07 Analyzed By:
Prep Batch: 2514 Date Prepared: 2003-07-07 Prepared By:

Parameter	Flag	RL Result	Units	Dilution	RL
GRO		0.349	mg/L	1	0.100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0841	mg/L	1	0.100	84	73 - 120

continued ...

sample continued ...

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
4-Bromofluorobenzene (4-BFB)		0.101	mg/L	1	0.100	101	78 - 120

Sample: 11784 - Trip Blank

Analysis: BTEX
QC Batch: 2767
Prep Batch: 2514

Analytical Method: S 8021B
Date Analyzed: 2003-07-07
Date Prepared: 2003-07-07

Prep Method: S 5030B
Analyzed By:
Prepared By:

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00100	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		<0.00100	mg/L	1	0.00100
Xylene (isomers)		<0.00100	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0840	mg/L	1	0.100	84	78.7 - 110
4-Bromofluorobenzene (4-BFB)		0.0817	mg/L	1	0.100	82	77.8 - 110

Sample: 11784 - Trip Blank

Analysis: TPH GRO
QC Batch: 2771
Prep Batch: 2514

Analytical Method: S 8015B
Date Analyzed: 2003-07-07
Date Prepared: 2003-07-07

Prep Method: S 5030B
Analyzed By:
Prepared By:

Parameter	Flag	RL Result	Units	Dilution	RL
GRO		<0.100	mg/L	1	0.100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0917	mg/L	1	0.100	92	73 - 120
4-Bromofluorobenzene (4-BFB)		0.0975	mg/L	1	0.100	98	78 - 120

Method Blank (1) QC Batch: 2670

Parameter	Flag	Result	Units	RL
DRO		<5.00	mg/L	50

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		11.5	mg/L	0.1	150	77	44 - 123

Method Blank (1) QC Batch: 2731

Parameter	Flag	Result	Units	RL
Total Organic Carbon		<1.00	mg/L	1

Method Blank (1) QC Batch: 2767

Parameter	Flag	Result	Units	RL
Benzene		<0.00100	mg/L	0.001
Toluene		<0.00100	mg/L	0.001
Ethylbenzene		<0.00100	mg/L	0.001
Xylene (isomers)		<0.00100	mg/L	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0919	mg/L	1	0.100	92	78.7 - 110
4-Bromofluorobenzene (4-BFB)		0.0859	mg/L	1	0.100	86	77.8 - 110

Method Blank (1) QC Batch: 2771

Parameter	Flag	Result	Units	RL
GRO		<0.100	mg/L	0.1

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0997	mg/L	1	0.100	100	73 - 120
4-Bromofluorobenzene (4-BFB)		0.102	mg/L	1	0.100	102	78 - 120

Method Blank (1) QC Batch: 2876

Parameter	Flag	Result	Units	RL
Total Iron		<0.0500	mg/L	0.05

Method Blank (1) QC Batch: 2951

Parameter	Flag	Result	Units	RL
Dissolved Iron		<0.0500	mg/L	0.05

Laboratory Control Spike (LCS-1) QC Batch: 2670

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
DRO	29.5	29.9	mg/L	0.1	250	<0.230	118	1	86 - 120	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
n-Triacontane	12.0	11.8	mg/L	0.1	150	80	79	44 - 123

Laboratory Control Spike (LCS-1) QC Batch: 2731

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Total Organic Carbon	4.75	4.81	mg/L	1	5.00	<0.843	95	1	78 - 120	13

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spike (LCS-1) QC Batch: 2767

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Benzene	0.0864	0.0878	mg/L	1	0.100	<0.000410	86	2	80.5 - 113	20
Toluene	0.0882	0.0889	mg/L	1	0.100	<0.000760	88	1	81.2 - 112	20
Ethylbenzene	0.0875	0.0861	mg/L	1	0.100	<0.00120	88	2	82.2 - 112	20
Xylene (isomers)	0.264	0.266	mg/L	1	0.300	<0.00121	88	1	80.6 - 112	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.0994	0.0962	mg/L	1	0.100	99	96	78.7 - 110
4-Bromofluorobenzene (4-BFB)	0.101	0.0978	mg/L	1	0.100	101	98	77.8 - 110

Laboratory Control Spike (LCS-1) QC Batch: 2771

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
GRO	0.835	0.845	mg/L	1	1.00	<0.0261	84	1	78.1 - 124	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.111	0.111	mg/L	1	0.100	111	111	73 - 120
4-Bromofluorobenzene (4-BFB)	0.114	0.112	mg/L	1	0.100	114	112	78 - 120

Laboratory Control Spike (LCS-1) QC Batch: 2876

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Total Iron	0.498	0.491	mg/L	1	0.500	<0.00220	100	1	85 - 115	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spike (LCS-1) QC Batch: 2951

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Dissolved Iron	0.550	0.547	mg/L	1	0.500	<0.00220	110	0	80 - 120	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) QC Batch: 2731

Param	MS Result	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Total Organic Carbon ⁴⁵	81.0	80.9	mg/L	1	5.00	71.8	184	0	85 - 115	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) QC Batch: 2876

Param	MS Result	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Total Iron	0.567	0.535	mg/L	1	0.500	0.137	86	6	75 - 125	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) QC Batch: 2951

Param	MS Result	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Dissolved Iron	0.553	0.539	mg/L	1	0.500	<0.00220	111	2	75 - 125	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Standard (ICV-1) QC Batch: 2670

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
DRO		mg/L	250	299	120	75 - 125	2003-07-03

Standard (CCV-1) QC Batch: 2670

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
DRO		mg/L	250	299	119	75 - 125	2003-07-03

Standard (ICV-1) QC Batch: 2731

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Organic Carbon		mg/L	5.00	4.91	98	85 - 115	2003-07-06

⁴Sample spike recovery out of limits due to sample matrix.

⁵Sample spike recovery out of limits due to sample matrix.

Standard (CCV-1) QC Batch: 2731

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Organic Carbon		mg/L	5.00	5.70	114	85 - 115	2003-07-06

Standard (ICV-1) QC Batch: 2767

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0857	86	85 - 115	2003-07-07
Toluene		mg/L	0.100	0.0875	88	85 - 115	2003-07-07
Ethylbenzene	6	mg/L	0.100	0.0841	84	85 - 115	2003-07-07
Xylene (isomers)		mg/L	0.300	0.258	86	85 - 115	2003-07-07

Standard (CCV-1) QC Batch: 2767

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0856	86	85 - 115	2003-07-07
Toluene		mg/L	0.100	0.0869	87	85 - 115	2003-07-07
Ethylbenzene		mg/L	0.100	0.0848	85	85 - 115	2003-07-07
Xylene (isomers)		mg/L	0.300	0.258	86	85 - 115	2003-07-07

Standard (ICV-1) QC Batch: 2771

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
GRO		mg/L	1.00	0.877	88	85 - 115	2003-07-07

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limit
Trifluorotoluene (TFT)		0.117	mg/L	1	0.100	117	73 - 120
4-Bromofluorobenzene (4-BFB)		0.119	mg/L	1	0.100	119	78 - 120

Standard (CCV-1) QC Batch: 2771

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
GRO		mg/L	1.00	0.881	88	85 - 115	2003-07-07

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limit
Trifluorotoluene (TFT)		0.103	mg/L	1	0.100	103	73 - 120
4-Bromofluorobenzene (4-BFB)		0.106	mg/L	1	0.100	106	78 - 120

Standard (ICV-1) QC Batch: 2876

⁶Ethylbenzene outside normal limits in ICV. Average of ICV components within acceptable range.

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Iron		mg/L	1.00	0.988	99	90 - 110	2003-07-08

Standard (CCV-1) QC Batch: 2876

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Iron		mg/L	1.00	1.01	101	90 - 110	2003-07-08

Standard (ICV-1) QC Batch: 2951

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Dissolved Iron		mg/L	1.00	1.00	100	90 - 110	2003-07-13

Standard (CCV-1) QC Batch: 2951

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Dissolved Iron		mg/L	1.00	1.03	103	90 - 110	2003-07-13

3072112

ARCADIS GERAGHTY & MILLER

Laboratory Task Order No./P.O. No.

CHAIN-OF-CUSTODY RECORD

Page

Project Number/Name MT000803.0001

Project Location PURE RESOURCES-LOVINGTON

Laboratory TRACE

Project Manager KIEFFER

Sampler(s)/Affiliation

Sample ID/Location	Date/ Time	Matrix	Sampled	Time
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[illegible]

Sample Matrix: L = Liquid; S = Solid; A = Air

Total No. of Bottles/ Containers	23
-------------------------------------	----

Relinquished by: [Signature]
Received by: James M. [Signature]

Organization: ARCADIS

Date 6/30/03

Time 1630

Seal Intact?

Belting furnished by ~~Wendy~~^{Wendy} #~~508696~~

Organization: _____

Date 6/30/03

Time 5:55

Seal Intact?

Received by: _____
Special Instructions/Remarks: _____

Delivery Method: ☐ In Person

☒ Common Carrier *by bond GLI 11/6/30/139*☐ Lab Courier☐ Other

SPECIFY

AG 05-0597

Summary Report

RECEIVED
AUG 01 2003
ARCADIS Geraghty & Miller

Frank Kieffer
Arcadis Geraghty & Miller
1004 N. Big Spring St.
Suite 300
Midland, TX 79701

Report Date: July 24, 2003

Work Order: 3070224

Project Location: Lovington, NM
Project Number: MT000803.0001

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
11979	MW M	water	2003-07-01	09:05	2003-07-02

Sample: 11979 - MW M

Param	Flag	Result	Units	RL
Naphthalene		<0.000200	mg/L	0.200
Acenaphthylene		<0.000200	mg/L	0.200
Acenaphthene		<0.000200	mg/L	0.200
Fluorene		<0.000200	mg/L	0.200
Phenanthrene		<0.000200	mg/L	0.200
Anthracene		<0.000200	mg/L	0.200
Fluoranthene		<0.000200	mg/L	0.200
Pyrene		<0.000200	mg/L	0.200
Benzo(a)anthracene		<0.000200	mg/L	0.200
Chrysene		<0.000200	mg/L	0.200
Benzo(b)fluoranthene		<0.000200	mg/L	0.200
Benzo(k)fluoranthene		<0.000200	mg/L	0.200
Benzo(a)pyrene		<0.000200	mg/L	0.200
Indeno(1,2,3-cd)pyrene		<0.000200	mg/L	0.200
Dibenzo(a,h)anthracene		<0.000200	mg/L	0.200
Benzo(g,h,i)perylene		<0.000200	mg/L	0.200

Summary Report

Frank Kieffer
Arcadis Geraghty & Miller
1004 N. Big Spring St.
Suite 300
Midland, TX 79701

Report Date: July 24, 2003

Work Order: 3070224

Project Location: Lovington, NM
Project Number: MT000803.0001

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
11976	MW C	water	2003-07-01	10:00	2003-07-02
11977	MW J	water	2003-07-01	08:15	2003-07-02
11978	MW L	water	2003-07-01	14:00	2003-07-02
11979	MW M	water	2003-07-01	09:05	2003-07-02

Sample: 11976 - MW C

Param	Flag	Result	Units	RL
Hydroxide Alkalinity		<1.00	mg/L as CaCo3	1.00
Carbonate Alkalinity		<1.00	mg/L as CaCo3	1.00
Bicarbonate Alkalinity		332	mg/L as CaCo3	4.00
Total Alkalinity		332	mg/L as CaCo3	4.00
Dissolved Calcium		108	mg/L	0.500
Dissolved Potassium		2.71	mg/L	0.500
Dissolved Magnesium		17.7	mg/L	0.500
Dissolved Sodium		35.1	mg/L	0.500
Specific Conductance		784	μMHOS/cm	0.00
Dissolved Iron		<0.0500	mg/L	0.0500
Total Iron		0.352	mg/L	0.0500
Chloride		29.0	mg/L	0.500
Fluoride		1.30	mg/L	0.200
Sulfate		42.2	mg/L	0.500
Nitrite-N		<0.0100	mg/L	0.0100
Nitrate-N		2.12	mg/L	0.200
pH	1	7.30	s.u.	0.00
Total Dissolved Solids		508.0	mg/L	10.00

Sample: 11977 - MW J

continued ...

¹received out of holding time

sample 11977 continued ...

Param	Flag	Result	Units	RL
Param	Flag	Result	Units	RL
Hydroxide Alkalinity		<1.00	mg/L as CaCo3	1.00
Carbonate Alkalinity		<1.00	mg/L as CaCo3	1.00
Bicarbonate Alkalinity		170	mg/L as CaCo3	4.00
Total Alkalinity		170	mg/L as CaCo3	4.00
Dissolved Calcium		72.0	mg/L	0.500
Dissolved Potassium		3.12	mg/L	0.500
Dissolved Magnesium		11.5	mg/L	0.500
Dissolved Sodium		44.7	mg/L	0.500
Specific Conductance		704	μMHOS/cm	0.00
Dissolved Iron		<0.0500	mg/L	0.0500
Total Iron		0.129	mg/L	0.0500
Chloride		64.9	mg/L	0.500
Fluoride		1.58	mg/L	0.200
Sulfate		44.6	mg/L	0.500
Nitrite-N		<0.0100	mg/L	0.0100
Nitrate-N		3.60	mg/L	0.200
pH	2	7.60	s.u.	0.00
Total Dissolved Solids		416.0	mg/L	10.00

Sample: 11978 - MW L

Param	Flag	Result	Units	RL
Hydroxide Alkalinity		<1.00	mg/L as CaCo3	1.00
Carbonate Alkalinity		<1.00	mg/L as CaCo3	1.00
Bicarbonate Alkalinity		178	mg/L as CaCo3	4.00
Total Alkalinity		178	mg/L as CaCo3	4.00
Dissolved Calcium		72.3	mg/L	0.500
Dissolved Potassium		2.75	mg/L	0.500
Dissolved Magnesium		11.5	mg/L	0.500
Dissolved Sodium		55.2	mg/L	0.500
Specific Conductance		802	μMHOS/cm	0.00
Chloride		106	mg/L	0.500
Fluoride		2.21	mg/L	0.200
Sulfate		31.2	mg/L	0.500
Nitrite-N		<0.0100	mg/L	0.0100
Nitrate-N		3.46	mg/L	0.200
pH	3	7.60	s.u.	0.00
Total Dissolved Solids		497.0	mg/L	10.00

Sample: 11979 - MW M

Param	Flag	Result	Units	RL
Hydroxide Alkalinity		<1.00	mg/L as CaCo3	1.00
Carbonate Alkalinity		<1.00	mg/L as CaCo3	1.00
Bicarbonate Alkalinity		156	mg/L as CaCo3	4.00
Total Alkalinity		156	mg/L as CaCo3	4.00

continued ...

²received out of holding time

³received out of holding time

sample 11979 continued ...

Param	Flag	Result	Units	RL
Dissolved Calcium		100	mg/L	0.500
Dissolved Potassium		3.25	mg/L	0.500
Dissolved Magnesium		16.2	mg/L	0.500
Dissolved Sodium		61.4	mg/L	0.500
Specific Conductance		1020	μ MHOS/cm	0.00
Chloride		181	mg/L	0.500
Fluoride		1.58	mg/L	0.200
Sulfate		51.5	mg/L	0.500
Nitrite-N		<0.0100	mg/L	0.0100
Nitrate-N		3.74	mg/L	0.200
pH	4	8.90	s.u.	0.00
Total Dissolved Solids		664.0	mg/L	10.00

⁴received out of holding time

Cation-Anion Balance Sheet

DATE: 7/24/03

Sample #	Calcium ppm	Magnesium ppm	Sodium ppm	Potassium ppm	Alkalinity ppm	Sulfate ppm	Chloride ppm	Nitrate ppm	Fluoride ppm	Bromide ppm	TDS ppm	EC µMHOs/cm
11976	108	17.7	35.1	2.71	332	42.2	29	2.12	1.3		508	784
11977	72	11.5	44.7	3.12	170	44.6	64.9	3.46	1.58		416	704
11978	72.3	11.5	55.2	2.75	178	31.2	106	3.46	2.21		497	802
11979	100	16.2	61.4	3.25	156	51.5	181	3.74	1.58		664	1020

Sample #	Calcium in meq/L	Magnesium in meq/L	Sodium in meq/L	Potassium in meq/L	Alkalinity in meq/L	Sulfate in meq/L	Chloride in meq/L	Nitrate in meq/L	Fluoride in meq/L	Bromide in meq/L	Cations in meq/L	Anions in meq/L	Percentage Error
11976	5.39	1.46	1.53	0.07	6.64	0.88	0.82	0.1513468	0.068432	0	8.44	8.56	1.347987469
11977	3.59	0.95	1.94	0.08	3.40	0.93	1.83	0.2470094	0.0831712	0	6.56	6.49	1.130975785
11978	3.61	0.95	2.40	0.07	3.56	0.85	2.99	0.2470094	0.1163344	0	7.03	7.56	7.369165486
11979	4.99	1.33	2.67	0.08	3.12	1.07	5.11	0.2669986	0.0831712	0	9.08	9.65	6.101578001

EC/Cation	EC/Anion
11976 844.19048	855.64728
11977 656.33946	648.95816
11978 702.565	756.31878
11979 907.7133	964.84098

TDS/EC	TDS/Cat	TDS/Anion
0.65	0.60	0.59
0.59	0.63	0.64
0.62	0.71	0.66
0.65	0.73	0.69

range 705.6 to 862.4
range 633.6 to 774.4
range 721.8 to 882.2
range 918 to 1122
needs to be 0.55-0.77
needs to be 0.55-0.77
needs to be 0.55-0.77
needs to be 0.55-0.77

TRACE ANALYSIS, INC.

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Analytical and Quality Control Report

Frank Kieffer
Arcadis Geraghty & Miller
1004 N. Big Spring St.
Suite 300
Midland, TX 79701

Report Date: July 24, 2003

Work Order: 3070224

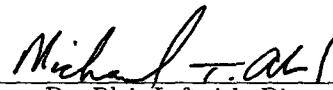
Project Location: Lovington, NM
Project Number: MT000803.0001

Enclosed are the Analytical Report and Quality Control Report for the following sample(s) submitted to TraceAnalysis, Inc.

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
11976	MW C	water	2003-07-01	10:00	2003-07-02
11977	MW J	water	2003-07-01	08:15	2003-07-02
11978	MW L	water	2003-07-01	14:00	2003-07-02
11979	MW M	water	2003-07-01	09:05	2003-07-02

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

This report consists of a total of 18 pages and shall not be reproduced except in its entirety, without written approval of TraceAnalysis, Inc.


Dr. Blair Leftwich, Director

Analytical Report

Sample: 11976 - MW C

Analysis: Alkalinity
QC Batch: 2778
Prep Batch: 2517

Analytical Method: SM 2320B
Date Analyzed: 2003-07-08
Date Prepared: 2003-07-08

Prep Method: N/A
Analyzed By: RS
Prepared By: RS

Parameter	Flag	RL Result	Units	Dilution	RL
Hydroxide Alkalinity		<1.00	mg/L as CaCo3	1	1.00
Carbonate Alkalinity		<1.00	mg/L as CaCo3	1	1.00
Bicarbonate Alkalinity		332	mg/L as CaCo3	1	4.00
Total Alkalinity		332	mg/L as CaCo3	1	4.00

Sample: 11976 - MW C

Analysis: Cations
QC Batch: 3135
Prep Batch: 2527

Analytical Method: S 6010B
Date Analyzed: 2003-07-17
Date Prepared: 2003-07-08

Prep Method: S 3005A
Analyzed By: BC
Prepared By: TP

Parameter	Flag	RL Result	Units	Dilution	RL
Dissolved Calcium		108	mg/L	1	0.500
Dissolved Potassium		2.71	mg/L	1	0.500
Dissolved Magnesium		17.7	mg/L	1	0.500
Dissolved Sodium		35.1	mg/L	1	0.500

Sample: 11976 - MW C

Analysis: Conductivity
QC Batch: 2708
Prep Batch: 2468

Analytical Method: SM 2510B
Date Analyzed: 2003-07-03
Date Prepared: 2003-07-03

Prep Method: N/A
Analyzed By: JSW
Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Specific Conductance		784	μ MHOS/cm	1	0.00

Sample: 11976 - MW C

Analysis: Fe, Dissolved
QC Batch: 2951
Prep Batch: 2519

Analytical Method: S 6010B
Date Analyzed: 2003-07-13
Date Prepared: 2003-07-08

Prep Method: S 3005A
Analyzed By: RR
Prepared By: TP

Parameter	Flag	RL Result	Units	Dilution	RL
Dissolved Iron		<0.0500	mg/L	1	0.0500

Sample: 11976 - MW C

Analysis: Fe, Total
QC Batch: 3199
Prep Batch: 2531

Analytical Method: S 6010B
Date Analyzed: 2003-07-13
Date Prepared: 2003-07-08

Prep Method: S 3010A
Analyzed By: RR
Prepared By: TP

Parameter	Flag	RL Result	Units	Dilution	RL
Total Iron		0.352	mg/L	1	0.0500

Sample: 11976 - MW C

Analysis: Ion Chromatography
QC Batch: 2734
Prep Batch: 2489

Analytical Method: E 300.0
Date Analyzed: 2003-07-07
Date Prepared: 2003-07-03

Prep Method: N/A
Analyzed By: JSW
Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Chloride		29.0	mg/L	5	0.500
Fluoride		1.30	mg/L	5	0.200
Sulfate		42.2	mg/L	5	0.500

Sample: 11976 - MW C

Analysis: NO2 (Spec)
QC Batch: 2642
Prep Batch: 2410

Analytical Method: SM 4500-NO2 B
Date Analyzed: 2003-07-02
Date Prepared: 2003-07-02

Prep Method: N/A
Analyzed By: JSW
Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Nitrite-N		<0.0100	mg/L	1	0.0100

Sample: 11976 - MW C

Analysis: NO3 (IC)
QC Batch: 2734
Prep Batch: 2489

Analytical Method: E 300.0
Date Analyzed: 2003-07-07
Date Prepared: 2003-07-03

Prep Method: N/A
Analyzed By: JSW
Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Nitrate-N		2.12	mg/L	5	0.200

Sample: 11976 - MW C

Analysis: pH
QC Batch: 2672
Prep Batch: 2438

Analytical Method: SM 4500-H+
Date Analyzed: 2003-07-02
Date Prepared: 2003-07-02

Prep Method: N/A
Analyzed By: RS
Prepared By: RS

continued ...

sample 11976 continued ...

Parameter	Flag	RL Result	Units	Dilution	RL
Parameter	Flag	RL Result	Units	Dilution	RL
pH	1	7.30	s.u.	1	0.00

Sample: 11976 - MW C

Analysis: TDS	Analytical Method: SM 2540C	Prep Method: N/A
QC Batch: 2710	Date Analyzed: 2003-07-07	Analyzed By: JSW
Prep Batch: 2470	Date Prepared: 2003-07-03	Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Total Dissolved Solids		508.0	mg/L	1	10.00

Sample: 11977 - MW J

Analysis: Alkalinity	Analytical Method: SM 2320B	Prep Method: N/A
QC Batch: 2778	Date Analyzed: 2003-07-08	Analyzed By: RS
Prep Batch: 2517	Date Prepared: 2003-07-08	Prepared By: RS

Parameter	Flag	RL Result	Units	Dilution	RL
Hydroxide Alkalinity		<1.00	mg/L as CaCo3	1	1.00
Carbonate Alkalinity		<1.00	mg/L as CaCo3	1	1.00
Bicarbonate Alkalinity		170	mg/L as CaCo3	1	4.00
Total Alkalinity		170	mg/L as CaCo3	1	4.00

Sample: 11977 - MW J

Analysis: Cations	Analytical Method: S 6010B	Prep Method: S 3005A
QC Batch: 3135	Date Analyzed: 2003-07-17	Analyzed By: BC
Prep Batch: 2527	Date Prepared: 2003-07-08	Prepared By: TP

Parameter	Flag	RL Result	Units	Dilution	RL
Dissolved Calcium		72.0	mg/L	1	0.500
Dissolved Potassium		3.12	mg/L	1	0.500
Dissolved Magnesium		11.5	mg/L	1	0.500
Dissolved Sodium		44.7	mg/L	1	0.500

Sample: 11977 - MW J

Analysis: Conductivity	Analytical Method: SM 2510B	Prep Method: N/A
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¹received out of holding time

QC Batch: 2708
Prep Batch: 2468

Date Analyzed: 2003-07-03
Date Prepared: 2003-07-03

Analyzed By: JSW
Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Specific Conductance		704	μ MHOS/cm	1	0.00

Sample: 11977 - MW J

Analysis: Fe, Dissolved
QC Batch: 2951
Prep Batch: 2519

Analytical Method: S 6010B
Date Analyzed: 2003-07-13
Date Prepared: 2003-07-08

Prep Method: S 3005A
Analyzed By: RR
Prepared By: TP

Parameter	Flag	RL Result	Units	Dilution	RL
Dissolved Iron		<0.0500	mg/L	1	0.0500

Sample: 11977 - MW J

Analysis: Fe, Total
QC Batch: 3199
Prep Batch: 2531

Analytical Method: S 6010B
Date Analyzed: 2003-07-13
Date Prepared: 2003-07-08

Prep Method: S 3010A
Analyzed By: RR
Prepared By: TP

Parameter	Flag	RL Result	Units	Dilution	RL
Total Iron		0.129	mg/L	1	0.0500

Sample: 11977 - MW J

Analysis: Ion Chromatography
QC Batch: 2734
Prep Batch: 2489

Analytical Method: E 300.0
Date Analyzed: 2003-07-07
Date Prepared: 2003-07-03

Prep Method: N/A
Analyzed By: JSW
Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Chloride		64.9	mg/L	5	0.500
Fluoride		1.58	mg/L	5	0.200
Sulfate		44.6	mg/L	5	0.500

Sample: 11977 - MW J

Analysis: NO2 (Spec)
QC Batch: 2642
Prep Batch: 2410

Analytical Method: SM 4500-NO2 B
Date Analyzed: 2003-07-02
Date Prepared: 2003-07-02

Prep Method: N/A
Analyzed By: JSW
Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Nitrite-N		<0.0100	mg/L	1	0.0100

Sample: 11977 - MW J

Analysis:	NO3 (IC)	Analytical Method:	E 300.0	Prep Method:	N/A
QC Batch:	2734	Date Analyzed:	2003-07-07	Analyzed By:	JSW
Prep Batch:	2489	Date Prepared:	2003-07-03	Prepared By:	JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Nitrate-N		3.60	mg/L	5	0.200

Sample: 11977 - MW J

Analysis:	pH	Analytical Method:	SM 4500-H+	Prep Method:	N/A
QC Batch:	2672	Date Analyzed:	2003-07-02	Analyzed By:	RS
Prep Batch:	2438	Date Prepared:	2003-07-02	Prepared By:	RS

Parameter	Flag	RL Result	Units	Dilution	RL
pH	²	7.60	s.u.	1	0.00

Sample: 11977 - MW J

Analysis:	TDS	Analytical Method:	SM 2540C	Prep Method:	N/A
QC Batch:	2709	Date Analyzed:	2003-07-07	Analyzed By:	JSW
Prep Batch:	2469	Date Prepared:	2003-07-03	Prepared By:	JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Total Dissolved Solids		416.0	mg/L	1	10.00

Sample: 11978 - MW L

Analysis:	Alkalinity	Analytical Method:	SM 2320B	Prep Method:	N/A
QC Batch:	2778	Date Analyzed:	2003-07-08	Analyzed By:	RS
Prep Batch:	2517	Date Prepared:	2003-07-08	Prepared By:	RS

Parameter	Flag	RL Result	Units	Dilution	RL
Hydroxide Alkalinity		<1.00	mg/L as CaCo3	1	1.00
Carbonate Alkalinity		<1.00	mg/L as CaCo3	1	1.00
Bicarbonate Alkalinity		178	mg/L as CaCo3	1	4.00
Total Alkalinity		178	mg/L as CaCo3	1	4.00

Sample: 11978 - MW L

Analysis:	Cations	Analytical Method:	S 6010B	Prep Method:	S 3005A
QC Batch:	3135	Date Analyzed:	2003-07-17	Analyzed By:	BC
Prep Batch:	2527	Date Prepared:	2003-07-08	Prepared By:	TP

²received out of holding time

Parameter	Flag	RL Result	Units	Dilution	RL
Dissolved Calcium		72.3	mg/L	1	0.500
Dissolved Potassium		2.75	mg/L	1	0.500
Dissolved Magnesium		11.5	mg/L	1	0.500
Dissolved Sodium		55.2	mg/L	1	0.500

Sample: 11978 - MW L

Analysis: Conductivity	Analytical Method: SM 2510B	Prep Method: N/A
QC Batch: 2708	Date Analyzed: 2003-07-03	Analyzed By: JSW
Prep Batch: 2468	Date Prepared: 2003-07-03	Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Specific Conductance		802	μMHOS/cm	1	0.00

Sample: 11978 - MW L

Analysis: Ion Chromatography	Analytical Method: E 300.0	Prep Method: N/A
QC Batch: 2734	Date Analyzed: 2003-07-07	Analyzed By: JSW
Prep Batch: 2489	Date Prepared: 2003-07-03	Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Chloride		106	mg/L	5	0.500
Fluoride		2.21	mg/L	5	0.200
Sulfate		31.2	mg/L	5	0.500

Sample: 11978 - MW L

Analysis: NO2 (Spec)	Analytical Method: SM 4500-NO2 B	Prep Method: N/A
QC Batch: 2642	Date Analyzed: 2003-07-02	Analyzed By: JSW
Prep Batch: 2410	Date Prepared: 2003-07-02	Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Nitrite-N		<0.0100	mg/L	1	0.0100

Sample: 11978 - MW L

Analysis: NO3 (IC)	Analytical Method: E 300.0	Prep Method: N/A
QC Batch: 2734	Date Analyzed: 2003-07-07	Analyzed By: JSW
Prep Batch: 2489	Date Prepared: 2003-07-03	Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Nitrate-N		3.46	mg/L	5	0.200

Sample: 11978 - MW L

Analysis:	pH	Analytical Method:	SM 4500-H+	Prep Method:	N/A
QC Batch:	2672	Date Analyzed:	2003-07-02	Analyzed By:	RS
Prep Batch:	2438	Date Prepared:	2003-07-02	Prepared By:	RS

Parameter	Flag	RL Result	Units	Dilution	RL
pH	³	7.60	s.u.	1	0.00

Sample: 11978 - MW L

Analysis:	TDS	Analytical Method:	SM 2540C	Prep Method:	N/A
QC Batch:	2709	Date Analyzed:	2003-07-07	Analyzed By:	JSW
Prep Batch:	2469	Date Prepared:	2003-07-03	Prepared By:	JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Total Dissolved Solids		497.0	mg/L	1	10.00

Sample: 11979 - MW M

Analysis:	Alkalinity	Analytical Method:	SM 2320B	Prep Method:	N/A
QC Batch:	2778	Date Analyzed:	2003-07-08	Analyzed By:	RS
Prep Batch:	2517	Date Prepared:	2003-07-08	Prepared By:	RS

Parameter	Flag	RL Result	Units	Dilution	RL
Hydroxide Alkalinity		<1.00	mg/L as CaCo3	1	1.00
Carbonate Alkalinity		<1.00	mg/L as CaCo3	1	1.00
Bicarbonate Alkalinity		156	mg/L as CaCo3	1	4.00
Total Alkalinity		156	mg/L as CaCo3	1	4.00

Sample: 11979 - MW M

Analysis:	Cations	Analytical Method:	S 6010B	Prep Method:	S 3005A
QC Batch:	3135	Date Analyzed:	2003-07-17	Analyzed By:	BC
Prep Batch:	2527	Date Prepared:	2003-07-08	Prepared By:	TP

Parameter	Flag	RL Result	Units	Dilution	RL
Dissolved Calcium		100	mg/L	1	0.500
Dissolved Potassium		3.25	mg/L	1	0.500
Dissolved Magnesium		16.2	mg/L	1	0.500
Dissolved Sodium		61.4	mg/L	1	0.500

Sample: 11979 - MW M

Analysis:	Conductivity	Analytical Method:	SM 2510B	Prep Method:	N/A
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³received out of holding time

QC Batch: 2708 Date Analyzed: 2003-07-03 Analyzed By: JSW
Prep Batch: 2468 Date Prepared: 2003-07-03 Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Specific Conductance		1020	μMHOS/cm	1	0.00

Sample: 11979 - MW M

Analysis: Ion Chromatography Analytical Method: E 300.0 Prep Method: N/A
QC Batch: 2734 Date Analyzed: 2003-07-07 Analyzed By: JSW
Prep Batch: 2489 Date Prepared: 2003-07-03 Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Chloride		181	mg/L	5	0.500
Fluoride		1.58	mg/L	5	0.200
Sulfate		51.5	mg/L	5	0.500

Sample: 11979 - MW M

Analysis: NO2 (Spec) Analytical Method: SM 4500-NO2 B Prep Method: N/A
QC Batch: 2642 Date Analyzed: 2003-07-02 Analyzed By: JSW
Prep Batch: 2410 Date Prepared: 2003-07-02 Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Nitrite-N		<0.0100	mg/L	1	0.0100

Sample: 11979 - MW M

Analysis: NO3 (IC) Analytical Method: E 300.0 Prep Method: N/A
QC Batch: 2734 Date Analyzed: 2003-07-07 Analyzed By: JSW
Prep Batch: 2489 Date Prepared: 2003-07-03 Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Nitrate-N		3.74	mg/L	5	0.200

Sample: 11979 - MW M

Analysis: pH Analytical Method: SM 4500-H+ Prep Method: N/A
QC Batch: 2672 Date Analyzed: 2003-07-02 Analyzed By: RS
Prep Batch: 2438 Date Prepared: 2003-07-02 Prepared By: RS

Parameter	Flag	RL Result	Units	Dilution	RL
pH	4	8.90	s.u.	1	0.00

⁴received out of holding time

Sample: 11979 - MW M

Analysis: TDS
QC Batch: 2709
Prep Batch: 2469

Analytical Method: SM 2540C
Date Analyzed: 2003-07-07
Date Prepared: 2003-07-03

Prep Method: N/A
Analyzed By: JSW
Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Total Dissolved Solids		664.0	mg/L	1	10.00

Method Blank (1) QC Batch: 2642

Parameter	Flag	Result	Units	RL
Nitrite-N		<0.0100	mg/L	0.01

Method Blank (1) QC Batch: 2708

Parameter	Flag	Result	Units	RL
Specific Conductance		8.28	μ MHOS/cm	

Method Blank (1) QC Batch: 2709

Parameter	Flag	Result	Units	RL
Total Dissolved Solids		<10.00	mg/L	10

Method Blank (1) QC Batch: 2710

Parameter	Flag	Result	Units	RL
Total Dissolved Solids		<10.00	mg/L	10

Method Blank (1) QC Batch: 2734

Parameter	Flag	Result	Units	RL
Nitrate-N		<0.200	mg/L	0.2

Method Blank (1) QC Batch: 2734

Parameter	Flag	Result	Units	RL
Chloride		<0.500	mg/L	0.5
Fluoride		<0.200	mg/L	0.2
Sulfate		<0.500	mg/L	0.5

Method Blank (1) QC Batch: 2778

Parameter	Flag	Result	Units	RL
Hydroxide Alkalinity		<1.00	mg/L as CaCo3	1
Carbonate Alkalinity		<1.00	mg/L as CaCo3	1
Bicarbonate Alkalinity		<4.00	mg/L as CaCo3	4
Total Alkalinity		<4.00	mg/L as CaCo3	4

Method Blank (1) QC Batch: 2951

Parameter	Flag	Result	Units	RL
Dissolved Iron		<0.0500	mg/L	0.05

Method Blank (1) QC Batch: 3135

Parameter	Flag	Result	Units	RL
Dissolved Calcium		<0.500	mg/L	0.5
Dissolved Potassium		<0.500	mg/L	0.5
Dissolved Magnesium		<0.500	mg/L	0.5
Dissolved Sodium		<0.500	mg/L	0.5

Method Blank (1) QC Batch: 3199

Parameter	Flag	Result	Units	RL
Total Iron		<0.0500	mg/L	0.05

Duplicate (1) QC Batch: 2672

Param	Duplicate Result	Sample Result	Units	Dilution	RPD	RPD Limit
pH ⁵	8.80	8.80	s.u.	1	0	0

⁵received out of holding time

Duplicate (1) QC Batch: 2708

Param	Duplicate Result	Sample Result	Units	Dilution	RPD	RPD Limit
Specific Conductance	621	614	μ MHOS/cm	1	1	2.9

Duplicate (1) QC Batch: 2709

Param	Duplicate Result	Sample Result	Units	Dilution	RPD	RPD Limit
Total Dissolved Solids	381.0	392.0	mg/L	1	3	9.41

Duplicate (1) QC Batch: 2710

Param	Duplicate Result	Sample Result	Units	Dilution	RPD	RPD Limit
Total Dissolved Solids	1044	978.0	mg/L	2	6	9.41

Duplicate (1) QC Batch: 2778

Param	Duplicate Result	Sample Result	Units	Dilution	RPD	RPD Limit
Hydroxide Alkalinity	<1.00	<1.00	mg/L as CaCo3	1	0	5.81
Carbonate Alkalinity	<1.00	<1.00	mg/L as CaCo3	1	0	5.81
Bicarbonate Alkalinity	218	222	mg/L as CaCo3	1	2	5.81
Total Alkalinity	218	222	mg/L as CaCo3	1	2	5.81

Laboratory Control Spike (LCS-1) QC Batch: 2642

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Nitrite-N	0.0826	0.0816	mg/L	1	0.0800	<0.000820	103	1	95 - 106	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spike (LCS-1) QC Batch: 2734

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Nitrate-N	2.45	2.47	mg/L	1	2.50	<0.126	98	1	90 - 110	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spike (LCS-1) QC Batch: 2734

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Chloride	12.7	12.6	mg/L	1	12.5	<1.49	102	1	90 - 110	20
Fluoride	2.53	2.59	mg/L	1	2.50	<0.0153	101	2	90 - 110	20
Sulfate	11.6	11.7	mg/L	1	12.5	<0.171	93	1	90 - 110	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spike (LCS-1) QC Batch: 2951

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Dissolved Iron	0.550	0.547	mg/L	1	0.500	<0.00220	110	0	80 - 120	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spike (LCS-1) QC Batch: 3135

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Dissolved Calcium	97.7	96.7	mg/L	1	100	<0.183	98	1	85 - 115	20
Dissolved Potassium	96.1	96.3	mg/L	1	100	<0.135	96	0	85 - 115	20
Dissolved Magnesium	96.2	95.1	mg/L	1	100	<0.183	96	1	85 - 115	20
Dissolved Sodium	92.6	93.3	mg/L	1	100	<0.105	93	1	85 - 115	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spike (LCS-1) QC Batch: 3199

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Total Iron	0.494	0.500	mg/L	1	0.500	<0.00220	99	1	85 - 115	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) QC Batch: 2734

Param	MS Result	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Nitrate-N ⁶	15.0	15.1	mg/L	5	2.50	3.35	93	1	62.2 - 121	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) QC Batch: 2734

Param	MS Result	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Chloride ⁷	93.0	92.7	mg/L	5	12.5	35.2	92	0	32.7 - 136	20

continued ...

⁶Julie Winters must enter a comment.

⁷Julie Winters must enter a comment.

matrix spikes continued ...

Param		MS Result	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Chloride	⁸	93.0	92.7	mg/L	5	12.5	35.2	92	0	32.7 - 136	20
Fluoride	⁹	13.6	13.5	mg/L	5	2.50	1.64	96	1	30.1 - 187	20
Sulfate	¹⁰	92.2	93.5	mg/L	5	12.5	40.1	83	1	69.9 - 114	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) QC Batch: 2951

Param		MS Result	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Dissolved Iron		0.553	0.539	mg/L	1	0.500	<0.00220	111	2	75 - 125	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) QC Batch: 3135

Param		MS Result	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Dissolved Calcium	¹¹¹²	164	174	mg/L	1	100	108	56	6	75 - 125	20
Dissolved Potassium		100	110	mg/L	1	100	2.71	97	10	75 - 125	20
Dissolved Magnesium		96.1	101	mg/L	1	100	17.7	78	5	75 - 125	20
Dissolved Sodium		112	119	mg/L	1	100	35.1	77	6	75 - 125	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) QC Batch: 3199

Param		MS Result	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Total Iron		3.10	3.11	mg/L	1	0.500	2.65	90	0	75 - 125	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Standard (ICV-1) QC Batch: 2642

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Nitrite-N		mg/L	0.0800	0.0806	101	85 - 115	2003-07-02

Standard (CCV-1) QC Batch: 2642

⁸Julie Winters must enter a comment.

⁹Julie Winters must enter a comment.

¹⁰Julie Winters must enter a comment.

¹¹ms recovery out of range due to matrix effect

¹²ms recovery out of range due to matrix effect

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Nitrite-N		mg/L	0.0800	0.0812	102	85 - 115	2003-07-02

Standard (ICV-1) QC Batch: 2672

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
pH		s.u.	7.00	7.00	100	98 - 102	2003-07-02

Standard (CCV-1) QC Batch: 2672

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
pH		s.u.	7.00	7.00	100	98 - 102	2003-07-02

Standard (ICV-1) QC Batch: 2708

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Specific Conductance		μMHOS/cm	1410	1430	101	90 - 110	2003-07-03

Standard (CCV-1) QC Batch: 2708

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Specific Conductance		μMHOS/cm	1410	1430	101	90 - 110	2003-07-03

Standard (ICV-1) QC Batch: 2709

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Dissolved Solids		mg/L	1000	953.0	95	90 - 110	2003-07-07

Standard (CCV-1) QC Batch: 2709

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Dissolved Solids		mg/L	1000	995.0	100	90 - 110	2003-07-07

Standard (ICV-1) QC Batch: 2710

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Dissolved Solids		mg/L	1000	980.0	98	90 - 110	2003-07-07

Standard (CCV-1) QC Batch: 2710

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Dissolved Solids		mg/L	1000	953.0	95	90 - 110	2003-07-07

Standard (ICV-1) QC Batch: 2734

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Nitrate-N		mg/L	2.50	2.48	99	90 - 110	2003-07-07

Standard (ICV-1) QC Batch: 2734

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Chloride		mg/L	12.5	12.7	102	90 - 110	2003-07-07
Fluoride		mg/L	2.50	2.62	105	90 - 110	2003-07-07
Sulfate		mg/L	12.5	12.2	98	90 - 110	2003-07-07

Standard (CCV-1) QC Batch: 2734

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Nitrate-N		mg/L	2.50	2.45	98	90 - 110	2003-07-07

Standard (CCV-1) QC Batch: 2734

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Chloride		mg/L	12.5	12.6	101	90 - 110	2003-07-07
Fluoride		mg/L	2.50	2.62	105	90 - 110	2003-07-07
Sulfate		mg/L	12.5	11.7	94	90 - 110	2003-07-07

Standard (ICV-1) QC Batch: 2778

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Hydroxide Alkalinity		mg/L as CaCo3	0.00	<1.00		0 - 200	2003-07-08

continued ...

standard continued ...

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Carbonate Alkalinity		mg/L as CaCo3	0.00	<1.00		0 - 200	2003-07-08
Bicarbonate Alkalinity		mg/L as CaCo3	0.00	<4.00		0 - 200	2003-07-08
Total Alkalinity		mg/L as CaCo3	250	236	94	90 - 110	2003-07-08

Standard (CCV-1) QC Batch: 2778

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Hydroxide Alkalinity		mg/L as CaCo3	0.00	<1.00		0 - 200	2003-07-08
Carbonate Alkalinity		mg/L as CaCo3	0.00	<1.00		0 - 200	2003-07-08
Bicarbonate Alkalinity		mg/L as CaCo3	0.00	<4.00		0 - 200	2003-07-08
Total Alkalinity		mg/L as CaCo3	250	238	95	90 - 110	2003-07-08

Standard (ICV-1) QC Batch: 2951

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Dissolved Iron		mg/L	1.00	1.00	100	90 - 110	2003-07-13

Standard (CCV-1) QC Batch: 2951

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Dissolved Iron		mg/L	1.00	1.03	103	90 - 110	2003-07-13

Standard (ICV-1) QC Batch: 3135

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Dissolved Calcium		mg/L	25.0	24.8	99	90 - 110	2003-07-17
Dissolved Potassium		mg/L	25.0	23.6	94	90 - 110	2003-07-17
Dissolved Magnesium		mg/L	25.0	24.2	97	90 - 110	2003-07-17
Dissolved Sodium		mg/L	25.0	24.8	99	90 - 110	2003-07-17

Standard (CCV-1) QC Batch: 3135

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Dissolved Calcium		mg/L	25.0	24.6	98	90 - 110	2003-07-17
Dissolved Potassium		mg/L	25.0	24.9	100	90 - 110	2003-07-17
Dissolved Magnesium		mg/L	25.0	23.4	94	90 - 110	2003-07-17
Dissolved Sodium		mg/L	25.0	23.8	95	90 - 110	2003-07-17

Standard (ICV-1) QC Batch: 3199

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Iron		mg/L	1.00	1.00	100	90 - 110	2003-07-13

Standard (CCV-1) QC Batch: 3199

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Iron		mg/L	1.00	1.03	103	90 - 110	2003-07-13



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Analytical and Quality Control Report

Frank Kieffer
Arcadis Geraghty & Miller
1004 N. Big Spring St.
Suite 300
Midland, TX 79701

Report Date: July 24, 2003

Work Order: 3070224

Project Location: Lovington, NM
Project Number: MT000803.0001

Enclosed are the Analytical Report and Quality Control Report for the following sample(s) submitted to TraceAnalysis, Inc.

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
11979	MW M	water	2003-07-01	09:05	2003-07-02

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

This report consists of a total of 4 pages and shall not be reproduced except in its entirety, without written approval of TraceAnalysis, Inc.

Dr. Blair Leftwich, Director

Analytical Report

Sample: 11979 - MW M

Analysis: PAH
QC Batch: 3205
Prep Batch: 2557

Analytical Method: S 8270C
Date Analyzed: 2003-07-16
Date Prepared: 2003-07-09

Prep Method: S 3510C
Analyzed By: RC
Prepared By: JH

Parameter	Flag	RL Result	Units	Dilution	RL
Naphthalene		<0.000200	mg/L	0.001	0.200
Acenaphthylene		<0.000200	mg/L	0.001	0.200
Acenaphthene		<0.000200	mg/L	0.001	0.200
Fluorene		<0.000200	mg/L	0.001	0.200
Phenanthrene		<0.000200	mg/L	0.001	0.200
Anthracene		<0.000200	mg/L	0.001	0.200
Fluoranthene		<0.000200	mg/L	0.001	0.200
Pyrene		<0.000200	mg/L	0.001	0.200
Benzo(a)anthracene		<0.000200	mg/L	0.001	0.200
Chrysene		<0.000200	mg/L	0.001	0.200
Benzo(b)fluoranthene		<0.000200	mg/L	0.001	0.200
Benzo(k)fluoranthene		<0.000200	mg/L	0.001	0.200
Benzo(a)pyrene		<0.000200	mg/L	0.001	0.200
Indeno(1,2,3-cd)pyrene		<0.000200	mg/L	0.001	0.200
Dibenzo(a,h)anthracene		<0.000200	mg/L	0.001	0.200
Benzo(g,h,i)perylene		<0.000200	mg/L	0.001	0.200

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Nitrobenzene-d5	1	0.0135	mg/L	0.001	80.0	17	35 - 114
2-Fluorobiphenyl	2	0.0198	mg/L	0.001	80.0	25	43 - 116
Terphenyl-d14		0.0579	mg/L	0.001	80.0	72	33 - 141

Method Blank (1) QC Batch: 3205

Parameter	Flag	Result	Units	RL
Naphthalene		<0.000200	mg/L	0.2
Acenaphthylene		<0.000200	mg/L	0.2
Acenaphthene		<0.000200	mg/L	0.2
Fluorene		<0.000200	mg/L	0.2
Phenanthrene		<0.000200	mg/L	0.2
Anthracene		<0.000200	mg/L	0.2
Fluoranthene		<0.000200	mg/L	0.2
Pyrene		<0.000200	mg/L	0.2
Benzo(a)anthracene		<0.000200	mg/L	0.2
Chrysene		<0.000200	mg/L	0.2
Benzo(b)fluoranthene		<0.000200	mg/L	0.2
Benzo(k)fluoranthene		<0.000200	mg/L	0.2
Benzo(a)pyrene		<0.000200	mg/L	0.2

continued ...

¹Surrogate percent recovery out of limits due to bad stock. New surrogate stock is now being used. CCV and LCS/LCSD spiked compounds show that the process is in control.

²Surrogate percent recovery out of limits due to bad stock. New surrogate stock is now being used. CCV and LCS/LCSD spiked compounds show that the process is in control.

method blank continued ...

Parameter	Flag	Result	Units	RL
Indeno(1,2,3-cd)pyrene		<0.000200	mg/L	0.2
Dibenzo(a,h)anthracene		<0.000200	mg/L	0.2
Benzo(g,h,i)perylene		<0.000200	mg/L	0.2

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Nitrobenzene-d5	3	0.00247	mg/L	0.001	80.0	3	35 - 114
2-Fluorobiphenyl	4	0.00423	mg/L	0.001	80.0	5	43 - 116
Terphenyl-d14	5	0.00380	mg/L	0.001	80.0	5	33 - 141

Laboratory Control Spike (LCS-1) QC Batch: 3205

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Naphthalene	18.4	18.0	mg/L	1	80.0	<0.0445	23	2	16 - 96	20
Acenaphthylene	24.0	23.7	mg/L	1	80.0	<0.0383	30	1	20 - 110	20
Acenaphthene	21.6	21.6	mg/L	1	80.0	<0.0421	27	0	18 - 108	20
Fluorene	24.2	24.1	mg/L	1	80.0	<0.0655	30	0	22 - 102	20
Phenanthrene	19.3	19.3	mg/L	1	80.0	<0.0383	24	0	25 - 103	20
Anthracene	17.2	17.2	mg/L	1	80.0	<0.0468	22	0	22 - 110	20
Fluoranthene	21.0	21.0	mg/L	1	80.0	<0.0550	26	0	21 - 110	20
Pyrene	51.7	52.5	mg/L	1	80.0	<0.0904	65	2	22 - 100	20
Benzo(a)anthracene	30.4	30.3	mg/L	1	80.0	<0.0993	38	0	30 - 99	20
Chrysene	36.3	36.6	mg/L	1	80.0	<0.121	45	1	27 - 108	20
Benzo(b)fluoranthene	26.6	22.6	mg/L	1	80.0	<0.171	33	16	19 - 102	20
Benzo(k)fluoranthene	32.2	34.9	mg/L	1	80.0	<0.0951	40	8	35 - 103	20
Benzo(a)pyrene	30.5	30.5	mg/L	1	80.0	<0.135	38	0	24 - 105	20
Indeno(1,2,3-cd)pyrene	19.8	19.8	mg/L	1	80.0	<0.176	25	0	22 - 108	20
Dibenzo(a,h)anthracene	23.6	23.4	mg/L	1	80.0	<0.184	30	1	23 - 77	20
Benzo(g,h,i)perylene	24.3	24.4	mg/L	1	80.0	<0.134	30	0	19 - 119	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Nitrobenzene-d5	14.3	14.3	mg/L	1	80.0	18	18	35 - 114
2-Fluorobiphenyl	22.6	22.3	mg/L	1	80.0	28	28	43 - 116

continued ...

³Surrogate percent recovery out of limits due to bad stock. New surrogate stock is now being used. CCV and LCS/LCSD spiked compounds show that the process is in control.

⁴Surrogate percent recovery out of limits due to bad stock. New surrogate stock is now being used. CCV and LCS/LCSD spiked compounds show that the process is in control.

⁵Surrogate percent recovery out of limits due to bad stock. New surrogate stock is now being used. CCV and LCS/LCSD spiked compounds show that the process is in control.

⁶The average of the spike compounds show that the process is in control.

⁷The average of the spike compounds show that the process is in control.

⁸The average of the spike compounds show that the process is in control.

⁹Surrogate percent recovery out of limits due to bad stock. New surrogate stock is now being used. CCV and LCS/LCSD spiked compounds show that the process is in control.

¹⁰Surrogate percent recovery out of limits due to bad stock. New surrogate stock is now being used. CCV and LCS/LCSD spiked compounds show that the process is in control.

¹¹Surrogate percent recovery out of limits due to bad stock. New surrogate stock is now being used. CCV and LCS/LCSD spiked compounds show that the process is in control.

¹²Surrogate percent recovery out of limits due to bad stock. New surrogate stock is now being used. CCV and LCS/LCSD spiked compounds

control spikes continued ...

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Terphenyl-d14	57.8	60.3	mg/L	1	80.0	72	75	33 - 141

Standard (CCV-1) QC Batch: 3205

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Naphthalene		mg/L	60.0	60.1	100	80 - 120	2003-07-16
Acenaphthylene		mg/L	60.0	64.6	108	80 - 120	2003-07-16
Acenaphthene		mg/L	60.0	62.5	104	80 - 120	2003-07-16
Fluorene		mg/L	60.0	69.4	116	80 - 120	2003-07-16
Phenanthrene		mg/L	60.0	61.3	102	80 - 120	2003-07-16
Anthracene		mg/L	60.0	59.4	99	80 - 120	2003-07-16
Fluoranthene		mg/L	60.0	67.7	113	80 - 120	2003-07-16
Pyrene		mg/L	60.0	68.4	114	80 - 120	2003-07-16
Benzo(a)anthracene		mg/L	60.0	55.8	93	80 - 120	2003-07-16
Chrysene		mg/L	60.0	53.9	90	80 - 120	2003-07-16
Benzo(b)fluoranthene		mg/L	60.0	58.6	98	80 - 120	2003-07-16
Benzo(k)fluoranthene		mg/L	60.0	65.5	109	80 - 120	2003-07-16
Benzo(a)pyrene		mg/L	60.0	56.4	94	80 - 120	2003-07-16
Indeno(1,2,3-cd)pyrene		mg/L	60.0	50.3	84	80 - 120	2003-07-16
Dibenzo(a,h)anthracene		mg/L	60.0	56.6	94	80 - 120	2003-07-16
Benzo(g,h,i)perylene		mg/L	60.0	60.9	101	80 - 120	2003-07-16

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limit
Nitrobenzene-d5		54.5	mg/L	1	60.0	91	80 - 120
2-Fluorobiphenyl		67.8	mg/L	1	60.0	113	80 - 120
Terphenyl-d14		54.7	mg/L	1	60.0	91	80 - 120

show that the process is in control.

Summary Report

Frank Kieffer
Arcadis Geraghty & Miller
1004 N. Big Spring St.
Suite 300
Midland, TX 79701

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ARCADIS Geraghty & Miller

Report Date: July 24, 2003

Work Order: 3070223

Project Location: Lovington, NM
Project Number: MT000803.0001

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
11971	MW L	water	2003-07-01	14:00	2003-07-02
11972	MW M	water	2003-07-01	09:05	2003-07-02
11973	MW C	water	2003-07-01	10:00	2003-07-02
11974	MW J	water	2003-07-01	08:15	2003-07-02
11975	Trip Blank	water	2003-07-01	00:00	2003-07-02

Sample - Field Code	Benzene (mg/L)	Toluene (mg/L)	BTEX Ethylbenzene (mg/L)	Xylene (isomers) (mg/L)	TPH DRO DRO (mg/L)	TPH GRO GRO (mg/L)
11971 - MW L	<0.00100	<0.00100	<0.00100	<0.00100	<5.00	<0.100
11972 - MW M	<0.00100	<0.00100	<0.00100	<0.00100	<5.00	<0.100
11973 - MW C	2.16	0.0285	<0.0100	0.0507	<5.00	4.70
11974 - MW J	<0.00500	<0.00500	<0.00500	<0.00500	<5.00	0.668
11975 - Trip Blank	<0.00100	<0.00100	<0.00100	<0.00100		

Sample: 11971 - MW L

Param	Flag	Result	Units	RL
Dissolved Iron		<0.0500	mg/L	0.0500
Total Iron		2.65	mg/L	0.0500
Total Organic Carbon		<1.00	mg/L	1.00

Sample: 11972 - MW M

Param	Flag	Result	Units	RL
Dissolved Iron		<0.0500	mg/L	0.0500
Total Iron		0.874	mg/L	0.0500
Total Organic Carbon		<1.00	mg/L	1.00

Sample: 11973 - MW C

Report Date: July 24, 2003
MT000803.0001

Work Order: 3070223

Page Number: 2 of 2
Lovington, NM

Param	Flag	Result	Units	RL
Total Organic Carbon		3.52	mg/L	1.00

Sample: 11974 - MW J

Param	Flag	Result	Units	RL
Total Organic Carbon		4.77	mg/L	1.00



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Analytical and Quality Control Report

Frank Kieffer
Arcadis Geraghty & Miller
1004 N. Big Spring St.
Suite 300
Midland, TX 79701

Report Date: July 24, 2003

Work Order: 3070223

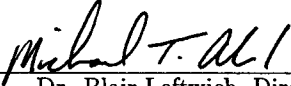
Project Location: Lovington, NM
Project Number: MT000803.0001

Enclosed are the Analytical Report and Quality Control Report for the following sample(s) submitted to TraceAnalysis, Inc.

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
11971	MW L	water	2003-07-01	14:00	2003-07-02
11972	MW M	water	2003-07-01	09:05	2003-07-02
11973	MW C	water	2003-07-01	10:00	2003-07-02
11974	MW J	water	2003-07-01	08:15	2003-07-02
11975	Trip Blank	water	2003-07-01	00:00	2003-07-02

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

This report consists of a total of 14 pages and shall not be reproduced except in its entirety, without written approval of TraceAnalysis, Inc.


Dr. Blair Leftwich, Director

Analytical Report

Sample: 11971 - MW L

Analysis: BTEX
QC Batch: 2767
Prep Batch: 2514

Analytical Method: S 8021B
Date Analyzed: 2003-07-07
Date Prepared: 2003-07-07

Prep Method: S 5030B
Analyzed By:
Prepared By:

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00100	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		<0.00100	mg/L	1	0.00100
Xylene (isomers)		<0.00100	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0826	mg/L	1	0.100	83	78.7 - 110
4-Bromofluorobenzene (4-BFB)		0.0803	mg/L	1	0.100	80	77.8 - 110

Sample: 11971 - MW L

Analysis: Fe, Dissolved
QC Batch: 2951
Prep Batch: 2519

Analytical Method: S 6010B
Date Analyzed: 2003-07-13
Date Prepared: 2003-07-08

Prep Method: S 3005A
Analyzed By: RR
Prepared By: TP

Parameter	Flag	RL Result	Units	Dilution	RL
Dissolved Iron		<0.0500	mg/L	1	0.0500

Sample: 11971 - MW L

Analysis: Fe, Total
QC Batch: 3199
Prep Batch: 2531

Analytical Method: S 6010B
Date Analyzed: 2003-07-13
Date Prepared: 2003-07-08

Prep Method: S 3010A
Analyzed By: RR
Prepared By: TP

Parameter	Flag	RL Result	Units	Dilution	RL
Total Iron		2.65	mg/L	1	0.0500

Sample: 11971 - MW L

Analysis: TOC
QC Batch: 2731
Prep Batch: 2486

Analytical Method: E 415.1
Date Analyzed: 2003-07-06
Date Prepared: 2003-07-06

Prep Method: N/A
Analyzed By: RC
Prepared By: RC

Parameter	Flag	RL Result	Units	Dilution	RL
Total Organic Carbon		<1.00	mg/L	1	1.00

Sample: 11971 - MW L

Analysis: TPH DRO
QC Batch: 2670
Prep Batch: 2436

Analytical Method: Mod. 8015B
Date Analyzed: 2003-07-03
Date Prepared: 2003-07-02

Prep Method: N/A
Analyzed By: BP
Prepared By: WG

Parameter	Flag	RL Result	Units	Dilution	RL
DRO		<5.00	mg/L	0.1	50.0

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		10.6	mg/L	0.1	150	71	44 - 123

Sample: 11971 - MW L

Analysis: TPH GRO
QC Batch: 2771
Prep Batch: 2514

Analytical Method: S 8015B
Date Analyzed: 2003-07-07
Date Prepared: 2003-07-07

Prep Method: S 5030B
Analyzed By:
Prepared By:

Parameter	Flag	RL Result	Units	Dilution	RL
GRO		<0.100	mg/L	1	0.100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0906	mg/L	1	0.100	91	73 - 120
4-Bromofluorobenzene (4-BFB)		0.0955	mg/L	1	0.100	96	78 - 120

Sample: 11972 - MW M

Analysis: BTEX
QC Batch: 2767
Prep Batch: 2514

Analytical Method: S 8021B
Date Analyzed: 2003-07-07
Date Prepared: 2003-07-07

Prep Method: S 5030B
Analyzed By:
Prepared By:

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00100	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		<0.00100	mg/L	1	0.00100
Xylene (isomers)		<0.00100	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)	¹	0.0783	mg/L	1	0.100	78	78.7 - 110
4-Bromofluorobenzene (4-BFB)	²	0.0759	mg/L	1	0.100	76	77.8 - 110

Sample: 11972 - MW M

¹Low surrogate recovery due to prep. ICV/CCV show the method to be in control.

²Low surrogate recovery due to prep. ICV/CCV show the method to be in control.

Report Date: July 24, 2003
MT000803.0001

Work Order: 3070223

Page Number: 4 of 14
Lovington, NM

Analysis: Fe, Dissolved
QC Batch: 2951
Prep Batch: 2519

Analytical Method: S 6010B
Date Analyzed: 2003-07-13
Date Prepared: 2003-07-08

Prep Method: S 3005A
Analyzed By: RR
Prepared By: TP

Parameter	Flag	RL Result	Units	Dilution	RL
Dissolved Iron		<0.0500	mg/L	1	0.0500

Sample: 11972 - MW M

Analysis: Fe, Total
QC Batch: 3199
Prep Batch: 2531

Analytical Method: S 6010B
Date Analyzed: 2003-07-13
Date Prepared: 2003-07-08

Prep Method: S 3010A
Analyzed By: RR
Prepared By: TP

Parameter	Flag	RL Result	Units	Dilution	RL
Total Iron		0.874	mg/L	1	0.0500

Sample: 11972 - MW M

Analysis: TOC
QC Batch: 2731
Prep Batch: 2486

Analytical Method: E 415.1
Date Analyzed: 2003-07-06
Date Prepared: 2003-07-06

Prep Method: N/A
Analyzed By: RC
Prepared By: RC

Parameter	Flag	RL Result	Units	Dilution	RL
Total Organic Carbon		<1.00	mg/L	1	1.00

Sample: 11972 - MW M

Analysis: TPH DRO
QC Batch: 2670
Prep Batch: 2436

Analytical Method: Mod. 8015B
Date Analyzed: 2003-07-03
Date Prepared: 2003-07-02

Prep Method: N/A
Analyzed By: BP
Prepared By: WG

Parameter	Flag	RL Result	Units	Dilution	RL
DRO		<5.00	mg/L	0.1	50.0

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		10.5	mg/L	0.1	150	70	44 - 123

Sample: 11972 - MW M

Analysis: TPH GRO
QC Batch: 2771
Prep Batch: 2514

Analytical Method: S 8015B
Date Analyzed: 2003-07-07
Date Prepared: 2003-07-07

Prep Method: S 5030B
Analyzed By:
Prepared By:

Parameter	Flag	RL Result	Units	Dilution	RL
GRO		<0.100	mg/L	1	0.100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.107	mg/L	1	0.100	107	73 - 120
4-Bromofluorobenzene (4-BFB)		0.0907	mg/L	1	0.100	91	78 - 120

Sample: 11973 - MW C

Analysis: BTEX
QC Batch: 2805
Prep Batch: 2538

Analytical Method: S 8021B
Date Analyzed: 2003-07-08
Date Prepared: 2003-07-08

Prep Method: S 5030B
Analyzed By: BS
Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		2.16	mg/L	10	0.00100
Toluene		0.0285	mg/L	10	0.00100
Ethylbenzene		<0.0100	mg/L	10	0.00100
Xylene (isomers)		0.0507	mg/L	10	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		1.08	mg/L	10	0.100	108	78.7 - 110
4-Bromofluorobenzene (4-BFB)		1.09	mg/L	10	0.100	109	77.8 - 110

Sample: 11973 - MW C

Analysis: TOC
QC Batch: 2731
Prep Batch: 2486

Analytical Method: E 415.1
Date Analyzed: 2003-07-06
Date Prepared: 2003-07-06

Prep Method: N/A
Analyzed By: RC
Prepared By: RC

Parameter	Flag	RL Result	Units	Dilution	RL
Total Organic Carbon		3.52	mg/L	1	1.00

Sample: 11973 - MW C

Analysis: TPH DRO
QC Batch: 2670
Prep Batch: 2436

Analytical Method: Mod. 8015B
Date Analyzed: 2003-07-03
Date Prepared: 2003-07-02

Prep Method: N/A
Analyzed By: BP
Prepared By: WG

Parameter	Flag	RL Result	Units	Dilution	RL
DRO		<5.00	mg/L	0.1	50.0

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		10.4	mg/L	0.1	150	69	44 - 123

Sample: 11973 - MW C

Analysis:	TPH GRO	Analytical Method:	S 8015B	Prep Method:	S 5030B
QC Batch:	2806	Date Analyzed:	2003-07-08	Analyzed By:	BS
Prep Batch:	2538	Date Prepared:	2003-07-08	Prepared By:	BS

Parameter	Flag	RL Result	Units	Dilution	RL
GRO		4.70	mg/L	10	0.100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.923	mg/L	10	0.100	92	73 - 120
4-Bromofluorobenzene (4-BFB)		1.05	mg/L	10	0.100	105	78 - 120

Sample: 11974 - MW J

Analysis:	BTEX	Analytical Method:	S 8021B	Prep Method:	S 5030B
QC Batch:	2805	Date Analyzed:	2003-07-08	Analyzed By:	BS
Prep Batch:	2538	Date Prepared:	2003-07-08	Prepared By:	BS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00500	mg/L	5	0.00100
Toluene		<0.00500	mg/L	5	0.00100
Ethylbenzene		<0.00500	mg/L	5	0.00100
Xylene (isomers)		<0.00500	mg/L	5	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)	³	0.614	mg/L	5	0.100	123	78.7 - 110
4-Bromofluorobenzene (4-BFB)	⁴	0.582	mg/L	5	0.100	116	77.8 - 110

Sample: 11974 - MW J

Analysis:	TOC	Analytical Method:	E 415.1	Prep Method:	N/A
QC Batch:	2731	Date Analyzed:	2003-07-06	Analyzed By:	RC
Prep Batch:	2486	Date Prepared:	2003-07-06	Prepared By:	RC

Parameter	Flag	RL Result	Units	Dilution	RL
Total Organic Carbon		4.77	mg/L	1	1.00

Sample: 11974 - MW J

Analysis:	TPH DRO	Analytical Method:	Mod. 8015B	Prep Method:	N/A
QC Batch:	2670	Date Analyzed:	2003-07-03	Analyzed By:	BP
Prep Batch:	2436	Date Prepared:	2003-07-02	Prepared By:	WG

³High surrogate recovery due to peak interference.

⁴High surrogate recovery due to peak interference.

Parameter	Flag	RL Result	Units	Dilution	RL
DRO		<5.00	mg/L	0.1	50.0

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		10.3	mg/L	0.1	150	69	44 - 123

Sample: 11974 - MW J

Analysis: TPH GRO
QC Batch: 2806
Prep Batch: 2538

Analytical Method: S 8015B
Date Analyzed: 2003-07-08
Date Prepared: 2003-07-08

Prep Method: S 5030B
Analyzed By: BS
Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
GRO		0.668	mg/L	5	0.100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.529	mg/L	5	0.100	106	73 - 120
4-Bromofluorobenzene (4-BFB)		0.549	mg/L	5	0.100	110	78 - 120

Sample: 11975 - Trip Blank

Analysis: BTEX
QC Batch: 2767
Prep Batch: 2514

Analytical Method: S 8021B
Date Analyzed: 2003-07-07
Date Prepared: 2003-07-07

Prep Method: S 5030B
Analyzed By:
Prepared By:

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00100	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		<0.00100	mg/L	1	0.00100
Xylene (isomers)		<0.00100	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0825	mg/L	1	0.100	82	78.7 - 110
4-Bromofluorobenzene (4-BFB)	5	0.0769	mg/L	1	0.100	77	77.8 - 110

Method Blank (1) QC Batch: 2670

Parameter	Flag	Result	Units	RL
DRO		<5.00	mg/L	50

⁵Low BFB surrogate recovery due to matrix interference. ICV/CCV show the method to be in control..

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		11.5	mg/L	0.1	150	77	44 - 123

Method Blank (1) QC Batch: 2731

Parameter	Flag	Result	Units	RL
Total Organic Carbon		<1.00	mg/L	1

Method Blank (1) QC Batch: 2767

Parameter	Flag	Result	Units	RL
Benzene		<0.00100	mg/L	0.001
Toluene		<0.00100	mg/L	0.001
Ethylbenzene		<0.00100	mg/L	0.001
Xylene (isomers)		<0.00100	mg/L	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0919	mg/L	1	0.100	92	78.7 - 110
4-Bromofluorobenzene (4-BFB)		0.0859	mg/L	1	0.100	86	77.8 - 110

Method Blank (1) QC Batch: 2771

Parameter	Flag	Result	Units	RL
GRO		<0.100	mg/L	0.1

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0997	mg/L	1	0.100	100	73 - 120
4-Bromofluorobenzene (4-BFB)		0.102	mg/L	1	0.100	102	78 - 120

Method Blank (1) QC Batch: 2805

Parameter	Flag	Result	Units	RL
Benzene		<0.00100	mg/L	0.001
Toluene		<0.00100	mg/L	0.001
Ethylbenzene		<0.00100	mg/L	0.001
Xylene (isomers)		<0.00100	mg/L	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0844	mg/L	1	0.100	84	78.7 - 110

continued ...

method blank continued ...

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
4-Bromofluorobenzene (4-BFB)	⁶	0.0724	mg/L	1	0.100	72	77.8 - 110

Method Blank (1) QC Batch: 2806

Parameter	Flag	Result	Units	RL
GRO		<0.100	mg/L	0.1

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)	⁷	0.0697	mg/L	1	0.100	70	73 - 120
4-Bromofluorobenzene (4-BFB)	⁸	0.0669	mg/L	1	0.100	67	78 - 120

Method Blank (1) QC Batch: 2951

Parameter	Flag	Result	Units	RL
Dissolved Iron		<0.0500	mg/L	0.05

Method Blank (1) QC Batch: 3199

Parameter	Flag	Result	Units	RL
Total Iron		<0.0500	mg/L	0.05

Laboratory Control Spike (LCS-1) QC Batch: 2670

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
DRO	29.5	29.9	mg/L	0.1	250	<0.230	118	1	86 - 120	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
n-Triacontane	12.0	11.8	mg/L	0.1	150	80	79	44 - 123

Laboratory Control Spike (LCS-1) QC Batch: 2731

⁶Low surrogate recovery due to prep. ICV, CCV show the method to be in control.

⁷Low surrogate recovery due to prep. ICV, CCV show the method to be in control.

⁸Low surrogate recovery due to prep. ICV, CCV show the method to be in control.

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Total Organic Carbon	4.75	4.81	mg/L	1	5.00	<0.843	95	1	78 - 120	13

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spike (LCS-1) QC Batch: 2767

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Benzene	0.0864	0.0878	mg/L	1	0.100	<0.000410	86	2	80.5 - 113	20
Toluene	0.0882	0.0889	mg/L	1	0.100	<0.000760	88	1	81.2 - 112	20
Ethylbenzene	0.0875	0.0861	mg/L	1	0.100	<0.00120	88	2	82.2 - 112	20
Xylene (isomers)	0.264	0.266	mg/L	1	0.300	<0.00121	88	1	80.6 - 112	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.0994	0.0962	mg/L	1	0.100	99	96	78.7 - 110
4-Bromofluorobenzene (4-BFB)	0.101	0.0978	mg/L	1	0.100	101	98	77.8 - 110

Laboratory Control Spike (LCS-1) QC Batch: 2771

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
GRO	0.835	0.845	mg/L	1	1.00	<0.0261	84	1	78.1 - 124	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.111	0.111	mg/L	1	0.100	111	111	73 - 120
4-Bromofluorobenzene (4-BFB)	0.114	0.112	mg/L	1	0.100	114	112	78 - 120

Laboratory Control Spike (LCS-1) QC Batch: 2805

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Benzene	0.101	0.0959	mg/L	1	0.100	<0.000410	101	5	80.5 - 113	20
Toluene	0.100	0.0955	mg/L	1	0.100	<0.000760	100	5	81.2 - 112	20
Ethylbenzene	0.100	0.0962	mg/L	1	0.100	<0.00120	100	4	82.2 - 112	20
Xylene (isomers)	0.302	0.287	mg/L	1	0.300	<0.00121	101	5	80.6 - 112	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	⁹ 0.106	0.116	mg/L	1	0.100	106	116	78.7 - 110
4-Bromofluorobenzene (4-BFB)	¹⁰ 0.107	0.113	mg/L	1	0.100	107	113	77.8 - 110

⁹High surrogate recovery due to prep. ICV, CCV show the method to be in control.

¹⁰High surrogate recovery due to prep. ICV, CCV show the method to be in control.

Laboratory Control Spike (LCS-1) QC Batch: 2806

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
GRO	0.842	0.924	mg/L	1	1.00	<0.0261	84	9	78.1 - 124	20
GRO	0.842	0.924	mg/L	1	1.00	<0.0261	84	9	78.1 - 124	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.0924	0.0989	mg/L	1	0.100	92	99	73 - 120
Trifluorotoluene (TFT)	0.0924	0.0989	mg/L	1	0.100	92	99	73 - 120
4-Bromofluorobenzene (4-BFB)	0.0911	0.0924	mg/L	1	0.100	91	92	78 - 120
4-Bromofluorobenzene (4-BFB)	0.0911	0.0924	mg/L	1	0.100	91	92	78 - 120

Laboratory Control Spike (LCS-1) QC Batch: 2951

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Dissolved Iron	0.550	0.547	mg/L	1	0.500	<0.00220	110	0	80 - 120	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spike (LCS-1) QC Batch: 3199

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Total Iron	0.494	0.500	mg/L	1	0.500	<0.00220	99	1	85 - 115	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) QC Batch: 2731

Param	MS Result	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Total Organic Carbon ¹¹¹²	81.0	80.9	mg/L	1	5.00	71.8	184	0	85 - 115	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) QC Batch: 2951

Param	MS Result	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Dissolved Iron	0.553	0.539	mg/L	1	0.500	<0.00220	111	2	75 - 125	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) QC Batch: 3199

¹¹Sample spike recovery out of limits due to sample matrix.

¹²Sample spike recovery out of limits due to sample matrix.

Param	MS Result	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Total Iron	3.10	3.11	mg/L	1	0.500	2.65	90	0	75 - 125	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Standard (ICV-1) QC Batch: 2670

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
DRO		mg/L	250	299	120	75 - 125	2003-07-03

Standard (CCV-1) QC Batch: 2670

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
DRO		mg/L	250	299	119	75 - 125	2003-07-03

Standard (ICV-1) QC Batch: 2731

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Organic Carbon		mg/L	5.00	4.91	98	85 - 115	2003-07-06

Standard (CCV-1) QC Batch: 2731

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Organic Carbon		mg/L	5.00	5.70	114	85 - 115	2003-07-06

Standard (ICV-1) QC Batch: 2767

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0857	86	85 - 115	2003-07-07
Toluene		mg/L	0.100	0.0875	88	85 - 115	2003-07-07
Ethylbenzene	¹³	mg/L	0.100	0.0841	84	85 - 115	2003-07-07
Xylene (isomers)		mg/L	0.300	0.258	86	85 - 115	2003-07-07

Standard (CCV-1) QC Batch: 2767

¹³Ethylbenzene outside normal limits in ICV. Average of ICV components within acceptable range.

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0856	86	85 - 115	2003-07-07
Toluene		mg/L	0.100	0.0869	87	85 - 115	2003-07-07
Ethylbenzene		mg/L	0.100	0.0848	85	85 - 115	2003-07-07
Xylene (isomers)		mg/L	0.300	0.258	86	85 - 115	2003-07-07

Standard (ICV-1) QC Batch: 2771

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
GRO		mg/L	1.00	0.877	88	85 - 115	2003-07-07

Standard (CCV-1) QC Batch: 2771

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
GRO		mg/L	1.00	0.881	88	85 - 115	2003-07-07

Standard (CCV-1) QC Batch: 2805

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0981	98	85 - 115	2003-07-08
Toluene		mg/L	0.100	0.0977	98	85 - 115	2003-07-08
Ethylbenzene		mg/L	0.100	0.0988	99	85 - 115	2003-07-08
Xylene (isomers)		mg/L	0.300	0.298	99	85 - 115	2003-07-08

Standard (CCV-2) QC Batch: 2805

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0963	96	85 - 115	2003-07-08
Toluene		mg/L	0.100	0.0975	98	85 - 115	2003-07-08
Ethylbenzene		mg/L	0.100	0.0966	97	85 - 115	2003-07-08
Xylene (isomers)		mg/L	0.300	0.290	97	85 - 115	2003-07-08

Standard (CCV-1) QC Batch: 2806

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
GRO		mg/L	1.00	0.967	97	85 - 115	2003-07-08

Standard (CCV-2) QC Batch: 2806

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
GRO		mg/L	1.00	0.916	92	85 - 115	2003-07-08

Standard (ICV-1) QC Batch: 2951

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Dissolved Iron		mg/L	1.00	1.00	100	90 - 110	2003-07-13

Standard (CCV-1) QC Batch: 2951

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Dissolved Iron		mg/L	1.00	1.03	103	90 - 110	2003-07-13

Standard (ICV-1) QC Batch: 3199

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Iron		mg/L	1.00	1.00	100	90 - 110	2003-07-13

Standard (CCV-1) QC Batch: 3199

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Iron		mg/L	1.00	1.03	103	90 - 110	2003-07-13

Project Number/Name
MT000803.0001.00005

Project Location

Laboratory _____ Trace _____

Project Manager
Frank Kieffer

Sampler(s)/Affiliation **ARCADIS/RM**

[illegible]

Sample Matrix: L = Liquid; S = Solid; A = Air

Relinquished by: Ronald Moray Org: OrgReceived by: _____
Requiring: _____
Oral _____

Belinquished by:	Or

Received by: Brandon Wood

Special Instructions/Remarks:

ions/Remarks: PAH

~~Hold~~ Finger print call Frank Kieber

Delivery Method: ☐ In Person

☐ Common Carrier

-

☐ Lab Courier ☐ Other

SPECIFY

SPECIES

SPECIFY *AG* AG 05-12/01

RECEIVED
AUG 01 2003
ARCADIS Geraghty & Miller

Summary Report

Frank Kieffer
Arcadis Geraghty & Miller
1004 N. Big Spring St.
Suite 300
Midland, TX 79701

Report Date: July 24, 2003

Work Order: 3070309

Project Location: Lovington, NM
Project Number: MT000803.0001

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
12016	MW-I	water	2003-07-02	10:10	2003-07-03
12017	MW-N	water	2003-07-02	13:50	2003-07-03
12018	Dup	water	2003-07-02	00:00	2003-07-03
12019	Trip Blank	water	2003-07-02	00:00	2003-07-03

Sample - Field Code	Benzene	Toluene	BTEX Ethylbenzene	Xylene (isomers)	TPH DRO DRO	TPH GRO GRO
	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
12016 - MW-I	0.0547	0.0192	0.00150	0.00160	<5.00	0.294
12017 - MW-N	2.41	<0.0500	<0.0500	<0.0500	<5.00	2.14
12018 - Dup	0.308	0.0282	0.00560	0.0143	<5.00	0.951
12019 - Trip Blank	<0.00100	<0.00100	<0.00100	<0.00100		

Sample: 12016 - MW-I

Param	Flag	Result	Units	RL
Hydroxide Alkalinity		<1.00	mg/L as CaCo3	1.00
Carbonate Alkalinity		<1.00	mg/L as CaCo3	1.00
Bicarbonate Alkalinity		284	mg/L as CaCo3	4.00
Total Alkalinity		284	mg/L as CaCo3	4.00
Dissolved Calcium		111	mg/L	0.500
Dissolved Potassium		2.79	mg/L	0.500
Dissolved Magnesium		17.0	mg/L	0.500
Dissolved Sodium		37.5	mg/L	0.500
Specific Conductance		856	µMHOS/cm	0.00
Dissolved Iron		<0.0500	mg/L	0.0500
Total Iron		4.69	mg/L	0.0500
Chloride		43.0	mg/L	0.500
Fluoride		1.35	mg/L	0.200
Sulfate		46.5	mg/L	0.500
Nitrite-N		<0.0100	mg/L	0.0100
Nitrate-N		2.79	mg/L	0.200
pH	1	7.20	s.u.	0.00

continued ...

¹received out of holding time

sample 12016 continued ...

Param	Flag	Result	Units	RL
Total Dissolved Solids		541.0	mg/L	10.00
Total Organic Carbon		71.8	mg/L	1.00

Sample: 12017 - MW-N

Param	Flag	Result	Units	RL
Hydroxide Alkalinity		<1.00	mg/L as CaCo3	1.00
Carbonate Alkalinity		<1.00	mg/L as CaCo3	1.00
Bicarbonate Alkalinity		264	mg/L as CaCo3	4.00
Total Alkalinity		264	mg/L as CaCo3	4.00
Dissolved Calcium		94.0	mg/L	0.500
Dissolved Potassium		2.40	mg/L	0.500
Dissolved Magnesium		14.9	mg/L	0.500
Dissolved Sodium		40.6	mg/L	0.500
Specific Conductance		796	μMHOS/cm	0.00
Dissolved Iron		<0.0500	mg/L	0.0500
Total Iron		0.527	mg/L	0.0500
Chloride		67.4	mg/L	0.500
Fluoride		1.61	mg/L	0.200
Sulfate		38.4	mg/L	0.500
Nitrite-N		<0.0100	mg/L	0.0100
Nitrate-N		3.09	mg/L	0.200
Naphthalene		<0.000200	mg/L	0.200
Acenaphthylene		<0.000200	mg/L	0.200
Acenaphthene		<0.000200	mg/L	0.200
Fluorene		<0.000200	mg/L	0.200
Phenanthrene		<0.000200	mg/L	0.200
Anthracene		<0.000200	mg/L	0.200
Fluoranthene		<0.000200	mg/L	0.200
Pyrene		<0.000200	mg/L	0.200
Benzo(a)anthracene		<0.000200	mg/L	0.200
Chrysene		<0.000200	mg/L	0.200
Benzo(b)fluoranthene		<0.000200	mg/L	0.200
Benzo(k)fluoranthene		<0.000200	mg/L	0.200
Benzo(a)pyrene		<0.000200	mg/L	0.200
Indeno(1,2,3-cd)pyrene		<0.000200	mg/L	0.200
Dibenzo(a,h)anthracene		<0.000200	mg/L	0.200
Benzo(g,h,i)perylene		<0.000200	mg/L	0.200
pH	2	7.10	s.u.	0.00
Total Dissolved Solids		493.0	mg/L	10.00

²received out of holding time

Cation-Anion Balance Sheet

DATE: 7/24/03

Sample #	Calcium ppm	Magnesium ppm	Sodium ppm	Potassium ppm	Alkalinity ppm	Sulfate ppm	Chloride ppm	Nitrate ppm	Fluoride ppm	Bromide ppm	TDS ppm	EC µMHOs/cm
12016	111	17	37.5	2.79	284	46.5	43	2.79	1.35		541	856
12017	94	14.9	40.6	2.4	284	38.4	67.4	3.09	1.61		493	796

Sample #	Calcium in meq/L	Magnesium in meq/L	Sodium in meq/L	Potassium in meq/L	Alkalinity in meq/L	Sulfate in meq/L	Chloride in meq/L	Nitrate in meq/L	Fluoride in meq/L	Bromide in meq/L	Cations in meq/L	Anions in meq/L	Percentage Error
12016	5.54	1.40	1.63	0.07	5.68	0.97	1.21	0.1991781	0.071064	0	8.64	8.13	6.070243782
12017	4.69	1.23	1.77	0.06	5.28	0.80	1.90	0.2205951	0.0847504	0	7.74	8.29	6.761833555

EC/Cation	EC/Anion
12016 864.04482	813.14021
12017 774.4213	828.61875

TDS/EC	TDS/Cat	TDS/Anion
0.63	0.83	0.67
0.62	0.64	0.59

range 770.4 to 941.6
range 716.4 to 875.6
needs to be 0.55-0.77
needs to be 0.55-0.77

TRACE ANALYSIS, INC.

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Analytical and Quality Control Report

Frank Kieffer
Arcadis Geraghty & Miller
1004 N. Big Spring St.
Suite 300
Midland, TX 79701

Report Date: July 24, 2003

Work Order: 3070309

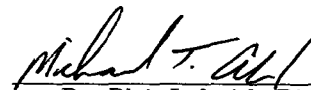
Project Location: Lovington, NM
Project Number: MT000803.0001

Enclosed are the Analytical Report and Quality Control Report for the following sample(s) submitted to TraceAnalysis, Inc.

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
12016	MW-I	water	2003-07-02	10:10	2003-07-03
12017	MW-N	water	2003-07-02	13:50	2003-07-03
12018	Dup	water	2003-07-02	00:00	2003-07-03
12019	Trip Blank	water	2003-07-02	00:00	2003-07-03

These results represent only the samples received in the laboratory. The Quality Control Report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

This report consists of a total of 25 pages and shall not be reproduced except in its entirety, without written approval of TraceAnalysis, Inc.


Dr. Blair Leftwich, Director

Analytical Report

Sample: 12016 - MW-I

Analysis: Alkalinity	Analytical Method: SM 2320B	Prep Method: N/A
QC Batch: 2778	Date Analyzed: 2003-07-08	Analyzed By: RS
Prep Batch: 2517	Date Prepared: 2003-07-08	Prepared By: RS

Parameter	Flag	RL Result	Units	Dilution	RL
Hydroxide Alkalinity		<1.00	mg/L as CaCo3	1	1.00
Carbonate Alkalinity		<1.00	mg/L as CaCo3	1	1.00
Bicarbonate Alkalinity		284	mg/L as CaCo3	1	4.00
Total Alkalinity		284	mg/L as CaCo3	1	4.00

Sample: 12016 - MW-I

Analysis: BTEX	Analytical Method: S 8021B	Prep Method: S 5030B
QC Batch: 2805	Date Analyzed: 2003-07-08	Analyzed By: BS
Prep Batch: 2538	Date Prepared: 2003-07-08	Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		0.0547	mg/L	1	0.00100
Toluene		0.0192	mg/L	1	0.00100
Ethylbenzene		0.00150	mg/L	1	0.00100
Xylene (isomers)		0.00160	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)	1	0.112	mg/L	1	0.100	112	78.7 - 110
4-Bromofluorobenzene (4-BFB)	2	0.116	mg/L	1	0.100	116	77.8 - 110

Sample: 12016 - MW-I

Analysis: Cations	Analytical Method: S 6010B	Prep Method: S 3005A
QC Batch: 3135	Date Analyzed: 2003-07-17	Analyzed By: BC
Prep Batch: 2527	Date Prepared: 2003-07-08	Prepared By: TP

Parameter	Flag	RL Result	Units	Dilution	RL
Dissolved Calcium		111	mg/L	1	0.500
Dissolved Potassium		2.79	mg/L	1	0.500
Dissolved Magnesium		17.0	mg/L	1	0.500
Dissolved Sodium		37.5	mg/L	1	0.500

Sample: 12016 - MW-I

Analysis: Conductivity	Analytical Method: SM 2510B	Prep Method: N/A
------------------------	-----------------------------	------------------

¹High surrogate recovery due to peak interference.

²High surrogate recovery due to peak interference.

Report Date: July 24, 2003
MT000803.0001

Work Order: 3070309

Page Number: 3 of 25
Lovington, NM

QC Batch: 2708
Prep Batch: 2468

Date Analyzed: 2003-07-03
Date Prepared: 2003-07-03

Analyzed By: JSW
Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Specific Conductance		856	μ MHOS/cm	1	0.00

Sample: 12016 - MW-I

Analysis: Fe, Dissolved
QC Batch: 2951
Prep Batch: 2519

Analytical Method: S 6010B
Date Analyzed: 2003-07-13
Date Prepared: 2003-07-08

Prep Method: S 3005A
Analyzed By: RR
Prepared By: TP

Parameter	Flag	RL Result	Units	Dilution	RL
Dissolved Iron		<0.0500	mg/L	1	0.0500

Sample: 12016 - MW-I

Analysis: Fe, Total
QC Batch: 3199
Prep Batch: 2531

Analytical Method: S 6010B
Date Analyzed: 2003-07-13
Date Prepared: 2003-07-08

Prep Method: S 3010A
Analyzed By: RR
Prepared By: TP

Parameter	Flag	RL Result	Units	Dilution	RL
Total Iron		4.69	mg/L	1	0.0500

Sample: 12016 - MW-I

Analysis: Ion Chromatography
QC Batch: 2734
Prep Batch: 2489

Analytical Method: E 300.0
Date Analyzed: 2003-07-07
Date Prepared: 2003-07-03

Prep Method: N/A
Analyzed By: JSW
Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Chloride		43.0	mg/L	5	0.500
Fluoride		1.35	mg/L	5	0.200
Sulfate		46.5	mg/L	5	0.500

Sample: 12016 - MW-I

Analysis: NO2 (Spec)
QC Batch: 2687
Prep Batch: 2453

Analytical Method: SM 4500-NO2 B
Date Analyzed: 2003-07-03
Date Prepared: 2003-07-03

Prep Method: N/A
Analyzed By: JSW
Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Nitrite-N		<0.0100	mg/L	1	0.0100

Sample: 12016 - MW-I

Analysis: NO3 (IC)
QC Batch: 2734
Prep Batch: 2489

Analytical Method: E 300.0
Date Analyzed: 2003-07-07
Date Prepared: 2003-07-03

Prep Method: N/A
Analyzed By: JSW
Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Nitrate-N		2.79	mg/L	5	0.200

Sample: 12016 - MW-I

Analysis: pH
QC Batch: 2705
Prep Batch: 2461

Analytical Method: SM 4500-H+
Date Analyzed: 2003-07-03
Date Prepared: 2003-07-03

Prep Method: N/A
Analyzed By: RS
Prepared By: RS

Parameter	Flag	RL Result	Units	Dilution	RL
pH	3	7.20	s.u.	1	0.00

Sample: 12016 - MW-I

Analysis: TDS
QC Batch: 2709
Prep Batch: 2469

Analytical Method: SM 2540C
Date Analyzed: 2003-07-07
Date Prepared: 2003-07-03

Prep Method: N/A
Analyzed By: JSW
Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Total Dissolved Solids		541.0	mg/L	1	10.00

Sample: 12016 - MW-I

Analysis: TOC
QC Batch: 2731
Prep Batch: 2486

Analytical Method: E 415.1
Date Analyzed: 2003-07-06
Date Prepared: 2003-07-06

Prep Method: N/A
Analyzed By: RC
Prepared By: RC

Parameter	Flag	RL Result	Units	Dilution	RL
Total Organic Carbon		71.8	mg/L	1	1.00

Sample: 12016 - MW-I

Analysis: TPH DRO
QC Batch: 2701
Prep Batch: 2459

Analytical Method: Mod. 8015B
Date Analyzed: 2003-07-04
Date Prepared: 2003-07-03

Prep Method: N/A
Analyzed By: BP
Prepared By: WG

continued ...

³received out of holding time

sample 12016 continued ...

Parameter	Flag	RL Result	Units	Dilution	RL
Parameter	Flag	RL Result	Units	Dilution	RL
DRO		<5.00	mg/L	0.1	50.0

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		11.0	mg/L	0.1	150	73	44 - 123

Sample: 12016 - MW-I

Analysis: TPH GRO Analytical Method: S 8015B Prep Method: S 5030B
QC Batch: 2806 Date Analyzed: 2003-07-08 Analyzed By: BS
Prep Batch: 2538 Date Prepared: 2003-07-08 Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
GRO		0.294	mg/L	1	0.100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.104	mg/L	1	0.100	104	73 - 120
4-Bromofluorobenzene (4-BFB)		0.110	mg/L	1	0.100	110	78 - 120

Sample: 12017 - MW-N

Analysis: Alkalinity Analytical Method: SM 2320B Prep Method: N/A
QC Batch: 2778 Date Analyzed: 2003-07-08 Analyzed By: RS
Prep Batch: 2517 Date Prepared: 2003-07-08 Prepared By: RS

Parameter	Flag	RL Result	Units	Dilution	RL
Hydroxide Alkalinity		<1.00	mg/L as CaCo3	1	1.00
Carbonate Alkalinity		<1.00	mg/L as CaCo3	1	1.00
Bicarbonate Alkalinity		264	mg/L as CaCo3	1	4.00
Total Alkalinity		264	mg/L as CaCo3	1	4.00

Sample: 12017 - MW-N

Analysis: BTEX Analytical Method: S 8021B Prep Method: S 5030B
QC Batch: 2880 Date Analyzed: 2003-07-10 Analyzed By: BS
Prep Batch: 2603 Date Prepared: 2003-07-10 Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		2.41	mg/L	50	0.00100
Toluene		<0.0500	mg/L	50	0.00100

continued ...

sample 12017 continued ...

Parameter	Flag	RL Result	Units	Dilution	RL
Ethylbenzene		<0.0500	mg/L	50	0.00100
Xylene (isomers)		<0.0500	mg/L	50	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		5.27	mg/L	50	0.100	105	61 - 127
4-Bromofluorobenzene (4-BFB)		5.21	mg/L	50	0.100	104	72.6 - 130

Sample: 12017 - MW-N

Analysis: Cations	Analytical Method: S 6010B	Prep Method: S 3005A
QC Batch: 3135	Date Analyzed: 2003-07-17	Analyzed By: BC
Prep Batch: 2527	Date Prepared: 2003-07-08	Prepared By: TP

Parameter	Flag	RL Result	Units	Dilution	RL
Dissolved Calcium		94.0	mg/L	1	0.500
Dissolved Potassium		2.40	mg/L	1	0.500
Dissolved Magnesium		14.9	mg/L	1	0.500
Dissolved Sodium		40.6	mg/L	1	0.500

Sample: 12017 - MW-N

Analysis: Conductivity	Analytical Method: SM 2510B	Prep Method: N/A
QC Batch: 2708	Date Analyzed: 2003-07-03	Analyzed By: JSW
Prep Batch: 2468	Date Prepared: 2003-07-03	Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Specific Conductance		796	μ MHOS/cm	1	0.00

Sample: 12017 - MW-N

Analysis: Fe, Dissolved	Analytical Method: S 6010B	Prep Method: S 3005A
QC Batch: 2951	Date Analyzed: 2003-07-13	Analyzed By: RR
Prep Batch: 2519	Date Prepared: 2003-07-08	Prepared By: TP

Parameter	Flag	RL Result	Units	Dilution	RL
Dissolved Iron		<0.0500	mg/L	1	0.0500

Sample: 12017 - MW-N

Analysis: Fe, Total	Analytical Method: S 6010B	Prep Method: S 3010A
QC Batch: 3199	Date Analyzed: 2003-07-13	Analyzed By: RR
Prep Batch: 2531	Date Prepared: 2003-07-08	Prepared By: TP

Parameter	Flag	RL Result	Units	Dilution	RL
Total Iron		0.527	mg/L	1	0.0500

Sample: 12017 - MW-N

Analysis: Ion Chromatography	Analytical Method: E 300.0	Prep Method: N/A
QC Batch: 2734	Date Analyzed: 2003-07-07	Analyzed By: JSW
Prep Batch: 2489	Date Prepared: 2003-07-03	Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Chloride		67.4	mg/L	5	0.500
Fluoride		1.61	mg/L	5	0.200
Sulfate		38.4	mg/L	5	0.500

Sample: 12017 - MW-N

Analysis: NO2 (Spec)	Analytical Method: SM 4500-NO2 B	Prep Method: N/A
QC Batch: 2687	Date Analyzed: 2003-07-03	Analyzed By: JSW
Prep Batch: 2453	Date Prepared: 2003-07-03	Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Nitrite-N		<0.0100	mg/L	1	0.0100

Sample: 12017 - MW-N

Analysis: NO3 (IC)	Analytical Method: E 300.0	Prep Method: N/A
QC Batch: 2734	Date Analyzed: 2003-07-07	Analyzed By: JSW
Prep Batch: 2489	Date Prepared: 2003-07-03	Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Nitrate-N		3.09	mg/L	5	0.200

Sample: 12017 - MW-N

Analysis: PAH	Analytical Method: S 8270C	Prep Method: S 3510C
QC Batch: 2969	Date Analyzed: 2003-07-15	Analyzed By: RC
Prep Batch: 2557	Date Prepared: 2003-07-09	Prepared By: JH

Parameter	Flag	RL Result	Units	Dilution	RL
Naphthalene		<0.000200	mg/L	0.001	0.200
Acenaphthylene		<0.000200	mg/L	0.001	0.200
Acenaphthene		<0.000200	mg/L	0.001	0.200
Fluorene		<0.000200	mg/L	0.001	0.200
Phenanthrene		<0.000200	mg/L	0.001	0.200

continued ...

sample 12017 continued ...

Parameter	Flag	RL Result	Units	Dilution	RL
Anthracene		<0.000200	mg/L	0.001	0.200
Fluoranthene		<0.000200	mg/L	0.001	0.200
Pyrene		<0.000200	mg/L	0.001	0.200
Benzo(a)anthracene		<0.000200	mg/L	0.001	0.200
Chrysene		<0.000200	mg/L	0.001	0.200
Benzo(b)fluoranthene		<0.000200	mg/L	0.001	0.200
Benzo(k)fluoranthene		<0.000200	mg/L	0.001	0.200
Benzo(a)pyrene		<0.000200	mg/L	0.001	0.200
Indeno(1,2,3-cd)pyrene		<0.000200	mg/L	0.001	0.200
Dibenzo(a,h)anthracene		<0.000200	mg/L	0.001	0.200
Benzo(g,h,i)perylene		<0.000200	mg/L	0.001	0.200

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Nitrobenzene-d5	4	0.0131	mg/L	0.001	80.0	16	21 - 145
2-Fluorobiphenyl	5	0.0177	mg/L	0.001	80.0	22	25 - 145
Terphenyl-d14	6	0.0470	mg/L	0.001	80.0	59	26 - 127

Sample: 12017 - MW-N

Analysis: pH	Analytical Method: SM 4500-H+	Prep Method: N/A
QC Batch: 2705	Date Analyzed: 2003-07-03	Analyzed By: RS
Prep Batch: 2461	Date Prepared: 2003-07-03	Prepared By: RS

Parameter	Flag	RL Result	Units	Dilution	RL
pH	7	7.10	s.u.	1	0.00

Sample: 12017 - MW-N

Analysis: TDS	Analytical Method: SM 2540C	Prep Method: N/A
QC Batch: 2709	Date Analyzed: 2003-07-07	Analyzed By: JSW
Prep Batch: 2469	Date Prepared: 2003-07-03	Prepared By: JSW

Parameter	Flag	RL Result	Units	Dilution	RL
Total Dissolved Solids		493.0	mg/L	1	10.00

Sample: 12017 - MW-N

Analysis: TPH DRO	Analytical Method: Mod. 8015B	Prep Method: N/A
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⁴Surrogate percent recovery out of limits due to bad stock. New surrogate stock is now being used. CCV and LCS/LCSD spiked compounds show that the process is in control.

⁵Surrogate percent recovery out of limits due to bad stock. New surrogate stock is now being used. CCV and LCS/LCSD spiked compounds show that the process is in control.

⁶Surrogate percent recovery out of limits due to bad stock. New surrogate stock is now being used. CCV and LCS/LCSD spiked compounds show that the process is in control.

⁷received out of holding time

QC Batch: 2701
Prep Batch: 2459

Date Analyzed: 2003-07-04
Date Prepared: 2003-07-03

Analyzed By: BP
Prepared By: WG

Parameter	Flag	RL Result	Units	Dilution	RL
DRO		<5.00	mg/L	0.1	50.0

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		10.9	mg/L	0.1	150	73	44 - 123

Sample: 12017 - MW-N

Analysis: TPH GRO
QC Batch: 2806
Prep Batch: 2538

Analytical Method: S 8015B
Date Analyzed: 2003-07-08
Date Prepared: 2003-07-08

Prep Method: S 5030B
Analyzed By: BS
Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
GRO		2.14	mg/L	1	0.100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)	⁸	0.144	mg/L	1	0.100	144	73 - 120
4-Bromofluorobenzene (4-BFB)	⁹	0.136	mg/L	1	0.100	136	78 - 120

Sample: 12018 - Dup

Analysis: BTEX
QC Batch: 2805
Prep Batch: 2538

Analytical Method: S 8021B
Date Analyzed: 2003-07-08
Date Prepared: 2003-07-08

Prep Method: S 5030B
Analyzed By: BS
Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		0.308	mg/L	1	0.00100
Toluene		0.0282	mg/L	1	0.00100
Ethylbenzene		0.00560	mg/L	1	0.00100
Xylene (isomers)		0.0143	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)	¹⁰	0.118	mg/L	1	0.100	118	78.7 - 110
4-Bromofluorobenzene (4-BFB)	¹¹	0.116	mg/L	1	0.100	116	77.8 - 110

Sample: 12018 - Dup

Analysis: TPH DRO
QC Batch: 2701

Analytical Method: Mod. 8015B
Date Analyzed: 2003-07-04

Prep Method: N/A
Analyzed By: BP

⁸High surrogate recovery due to peak interference.

⁹High surrogate recovery due to peak interference.

¹⁰High surrogate recovery due to peak interference.

¹¹High surrogate recovery due to peak interference.

Prep Batch: 2459

Date Prepared: 2003-07-03

Prepared By: WG

Parameter	Flag	RL Result	Units	Dilution	RL
DRO		<5.00	mg/L	0.1	50.0

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		9.70	mg/L	0.1	150	65	44 - 123

Sample: 12018 - Dup

Analysis: TPH GRO
QC Batch: 2806
Prep Batch: 2538

Analytical Method: S 8015B
Date Analyzed: 2003-07-08
Date Prepared: 2003-07-08

Prep Method: S 5030B
Analyzed By: BS
Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
GRO		0.951	mg/L	1	0.100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.105	mg/L	1	0.100	105	73 - 120
4-Bromofluorobenzene (4-BFB)		0.112	mg/L	1	0.100	112	78 - 120

Sample: 12019 - Trip Blank

Analysis: BTEX
QC Batch: 2880
Prep Batch: 2603

Analytical Method: S 8021B
Date Analyzed: 2003-07-10
Date Prepared: 2003-07-10

Prep Method: S 5030B
Analyzed By: BS
Prepared By: BS

Parameter	Flag	RL Result	Units	Dilution	RL
Benzene		<0.00100	mg/L	1	0.00100
Toluene		<0.00100	mg/L	1	0.00100
Ethylbenzene		<0.00100	mg/L	1	0.00100
Xylene (isomers)		<0.00100	mg/L	1	0.00100

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)	¹²	0.129	mg/L	1	0.100	129	61 - 127
4-Bromofluorobenzene (4-BFB)		0.127	mg/L	1	0.100	127	72.6 - 130

Method Blank (1) QC Batch: 2687

Parameter	Flag	Result	Units	RL
Nitrite-N		<0.0100	mg/L	0.01

¹²High surrogate recovery due to prep. ICv, CCV show the method to be in control.

Method Blank (1) QC Batch: 2701

Parameter	Flag	Result	Units	RL
DRO		<5.00	mg/L	50

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
n-Triacontane		11.3	mg/L	0.1	150	75	44 - 123

Method Blank (1) QC Batch: 2708

Parameter	Flag	Result	Units	RL
Specific Conductance		8.28	μ MHOS/cm	

Method Blank (1) QC Batch: 2709

Parameter	Flag	Result	Units	RL
Total Dissolved Solids		<10.00	mg/L	10

Method Blank (1) QC Batch: 2731

Parameter	Flag	Result	Units	RL
Total Organic Carbon		<1.00	mg/L	1

Method Blank (1) QC Batch: 2734

Parameter	Flag	Result	Units	RL
Nitrate-N		<0.200	mg/L	0.2

Method Blank (1) QC Batch: 2734

Parameter	Flag	Result	Units	RL
Chloride		<0.500	mg/L	0.5
Fluoride		<0.200	mg/L	0.2
Sulfate		<0.500	mg/L	0.5

Method Blank (1) QC Batch: 2778

Parameter	Flag	Result	Units	RL
Hydroxide Alkalinity		<1.00	mg/L as CaCo3	1
Carbonate Alkalinity		<1.00	mg/L as CaCo3	1
Bicarbonate Alkalinity		<4.00	mg/L as CaCo3	4
Total Alkalinity		<4.00	mg/L as CaCo3	4

Method Blank (1) QC Batch: 2805

Parameter	Flag	Result	Units	RL
Benzene		<0.00100	mg/L	0.001
Toluene		<0.00100	mg/L	0.001
Ethylbenzene		<0.00100	mg/L	0.001
Xylene (isomers)		<0.00100	mg/L	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.0844	mg/L	1	0.100	84	78.7 - 110
4-Bromofluorobenzene (4-BFB)	¹³	0.0724	mg/L	1	0.100	72	77.8 - 110

Method Blank (1) QC Batch: 2806

Parameter	Flag	Result	Units	RL
GRO		<0.100	mg/L	0.1

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)	¹⁴	0.0697	mg/L	1	0.100	70	73 - 120
4-Bromofluorobenzene (4-BFB)	¹⁵	0.0669	mg/L	1	0.100	67	78 - 120

Method Blank (1) QC Batch: 2880

Parameter	Flag	Result	Units	RL
Benzene		<0.00100	mg/L	0.001
Toluene		<0.00100	mg/L	0.001
Ethylbenzene		<0.00100	mg/L	0.001
Xylene (isomers)		<0.00100	mg/L	0.001

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Trifluorotoluene (TFT)		0.108	mg/L	1	0.100	108	61 - 127
4-Bromofluorobenzene (4-BFB)		0.106	mg/L	1	0.100	106	72.6 - 130

¹³Low surrogate recovery due to prep. ICV, CCV show the method to be in control.

¹⁴Low surrogate recovery due to prep. ICV, CCV show the method to be in control.

¹⁵Low surrogate recovery due to prep. ICV, CCV show the method to be in control.

Method Blank (1) QC Batch: 2951

Parameter	Flag	Result	Units	RL
Dissolved Iron		<0.0500	mg/L	0.05

Method Blank (1) QC Batch: 2969

Parameter	Flag	Result	Units	RL
Naphthalene		<0.000200	mg/L	0.2
Acenaphthylene		<0.000200	mg/L	0.2
Acenaphthene		<0.000200	mg/L	0.2
Fluorene		<0.000200	mg/L	0.2
Phenanthrene		<0.000200	mg/L	0.2
Anthracene		<0.000200	mg/L	0.2
Fluoranthene		<0.000200	mg/L	0.2
Pyrene		<0.000200	mg/L	0.2
Benzo(a)anthracene		<0.000200	mg/L	0.2
Chrysene		<0.000200	mg/L	0.2
Benzo(b)fluoranthene		<0.000200	mg/L	0.2
Benzo(k)fluoranthene		<0.000200	mg/L	0.2
Benzo(a)pyrene		<0.000200	mg/L	0.2
Indeno(1,2,3-cd)pyrene		<0.000200	mg/L	0.2
Dibenzo(a,h)anthracene		<0.000200	mg/L	0.2
Benzo(g,h,i)perylene		<0.000200	mg/L	0.2

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Nitrobenzene-d5	16	0.00247	mg/L	0.001	80.0	3	21 - 145
2-Fluorobiphenyl	17	0.00434	mg/L	0.001	80.0	5	25 - 145
Terphenyl-d14	18	0.00347	mg/L	0.001	80.0	4	26 - 127

Method Blank (1) QC Batch: 3135

Parameter	Flag	Result	Units	RL
Dissolved Calcium		<0.500	mg/L	0.5
Dissolved Potassium		<0.500	mg/L	0.5
Dissolved Magnesium		<0.500	mg/L	0.5
Dissolved Sodium		<0.500	mg/L	0.5

Method Blank (1) QC Batch: 3199

¹⁶Surrogate percent recovery out of limits due to bad stock. New surrogate stock is now being used. CCV and LCS/LCSD spiked compounds show that the process is in control.

¹⁷Surrogate percent recovery out of limits due to bad stock. New surrogate stock is now being used. CCV and LCS/LCSD spiked compounds show that the process is in control.

¹⁸Surrogate percent recovery out of limits due to bad stock. New surrogate stock is now being used. CCV and LCS/LCSD spiked compounds show that the process is in control.

Parameter	Flag	Result	Units	RL
Total Iron		<0.0500	mg/L	0.05

Duplicate (1) QC Batch: 2705

Param		Duplicate Result	Sample Result	Units	Dilution	RPD	RPD Limit
pH	¹⁹	7.50	7.50	s.u.	1	0	0

Duplicate (1) QC Batch: 2708

Param		Duplicate Result	Sample Result	Units	Dilution	RPD	RPD Limit
Specific Conductance		621	614	μMHOS/cm	1	1	2.9

Duplicate (1) QC Batch: 2709

Param		Duplicate Result	Sample Result	Units	Dilution	RPD	RPD Limit
Total Dissolved Solids		381.0	392.0	mg/L	1	3	9.41

Duplicate (1) QC Batch: 2778

Param		Duplicate Result	Sample Result	Units	Dilution	RPD	RPD Limit
Hydroxide Alkalinity		<1.00	<1.00	mg/L as CaCo3	1	0	5.81
Carbonate Alkalinity		<1.00	<1.00	mg/L as CaCo3	1	0	5.81
Bicarbonate Alkalinity		218	222	mg/L as CaCo3	1	2	5.81
Total Alkalinity		218	222	mg/L as CaCo3	1	2	5.81

Laboratory Control Spike (LCS-1) QC Batch: 2687

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Nitrite-N	0.0822	0.0816	mg/L	1	0.0800	<0.000820	103	1	95 - 106	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spike (LCS-1) QC Batch: 2701

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
DRO	28.1	28.5	mg/L	0.1	250	<0.230	112	1	86 - 120	20

¹⁹received out of holding time

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
n-Triacontane	11.6	11.4	mg/L	0.1	150	77	76	44 - 123

Laboratory Control Spike (LCS-1) QC Batch: 2731

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Total Organic Carbon	4.75	4.81	mg/L	1	5.00	<0.843	95	1	78 - 120	13

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spike (LCS-1) QC Batch: 2734

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Nitrate-N	2.45	2.47	mg/L	1	2.50	<0.126	98	1	90 - 110	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spike (LCS-1) QC Batch: 2734

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Chloride	12.7	12.6	mg/L	1	12.5	<1.49	102	1	90 - 110	20
Fluoride	2.53	2.59	mg/L	1	2.50	<0.0153	101	2	90 - 110	20
Sulfate	11.6	11.7	mg/L	1	12.5	<0.171	93	1	90 - 110	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spike (LCS-1) QC Batch: 2805

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Benzene	0.101	0.0959	mg/L	1	0.100	<0.000410	101	5	80.5 - 113	20
Toluene	0.100	0.0955	mg/L	1	0.100	<0.000760	100	5	81.2 - 112	20
Ethylbenzene	0.100	0.0962	mg/L	1	0.100	<0.00120	100	4	82.2 - 112	20
Xylene (isomers)	0.302	0.287	mg/L	1	0.300	<0.00121	101	5	80.6 - 112	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate		LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	²⁰	0.106	0.116	mg/L	1	0.100	106	116	78.7 - 110
4-Bromofluorobenzene (4-BFB)	²¹	0.107	0.113	mg/L	1	0.100	107	113	77.8 - 110

Laboratory Control Spike (LCS-1) QC Batch: 2806

²⁰High surrogate recovery due to prep. ICV, CCV show the method to be in control.

²¹High surrogate recovery due to prep. ICV, CCV show the method to be in control.

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
GRO	0.842	0.924	mg/L	1	1.00	<0.0261	84	9	78.1 - 124	20
GRO	0.842	0.924	mg/L	1	1.00	<0.0261	84	9	78.1 - 124	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.0924	0.0989	mg/L	1	0.100	92	99	73 - 120
Trifluorotoluene (TFT)	0.0924	0.0989	mg/L	1	0.100	92	99	73 - 120
4-Bromofluorobenzene (4-BFB)	0.0911	0.0924	mg/L	1	0.100	91	92	78 - 120
4-Bromofluorobenzene (4-BFB)	0.0911	0.0924	mg/L	1	0.100	91	92	78 - 120

Laboratory Control Spike (LCS-1) QC Batch: 2880

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Benzene	0.105	0.114	mg/L	1	0.100	<0.000350	105	8	77.7 - 115	20
Benzene	0.105	0.114	mg/L	1	0.100	<0.000350	105	8	77.7 - 115	20
Toluene	0.108	0.119	mg/L	1	0.100	<0.000550	108	10	76.5 - 114	20
Toluene	0.108	0.119	mg/L	1	0.100	<0.000550	108	10	76.5 - 114	20
Ethylbenzene	0.112	0.126	mg/L	1	0.100	<0.000690	112	12	78.7 - 112	20
Ethylbenzene	0.112	0.126	mg/L	1	0.100	<0.000690	112	12	78.7 - 112	20
Xylene (isomers)	0.330	0.371	mg/L	1	0.300	<0.000610	110	12	66.3 - 123	20
Xylene (isomers)	0.330	0.371	mg/L	1	0.300	<0.000610	110	12	66.3 - 123	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Trifluorotoluene (TFT)	0.106	0.105	mg/L	1	0.100	106	105	61 - 127
Trifluorotoluene (TFT)	0.106	0.105	mg/L	1	0.100	106	105	61 - 127
4-Bromofluorobenzene (4-BFB)	0.113	0.114	mg/L	1	0.100	113	114	72.6 - 130
4-Bromofluorobenzene (4-BFB)	0.113	0.114	mg/L	1	0.100	113	114	72.6 - 130

Laboratory Control Spike (LCS-1) QC Batch: 2951

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Dissolved Iron	0.550	0.547	mg/L	1	0.500	<0.00220	110	0	80 - 120	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spike (LCS-1) QC Batch: 2969

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Naphthalene	44.7	44.0	mg/L	1	80.0	<0.0445	56	2	21.4 - 134	20
Acenaphthylene	59.0	58.8	mg/L	1	80.0	<0.0383	74	0	42.1 - 135	20
Acenaphthene	52.8	51.8	mg/L	1	80.0	<0.0421	66	2	41 - 133	20
Fluorene	60.5	60.0	mg/L	1	80.0	<0.0655	76	1	49.3 - 133	20

continued ...

control spikes continued ...

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Phenanthrene	49.9	50.4	mg/L	1	80.0	<0.0383	62	1	54.4 - 135	20
Anthracene	42.6	43.5	mg/L	1	80.0	<0.0468	53	2	42.2 - 130	20
Fluoranthene	55.1	55.0	mg/L	1	80.0	<0.0550	69	0	44.4 - 146	20
Pyrene	77.6	81.4	mg/L	1	80.0	<0.0904	97	5	52.8 - 137	20
Benzo(a)anthracene	54.8	57.3	mg/L	1	80.0	<0.0993	68	4	59 - 134	20
Chrysene	61.2	62.5	mg/L	1	80.0	<0.121	76	2	49.6 - 107	20
Benzo(b)fluoranthene	64.3	69.4	mg/L	1	80.0	<0.171	80	8	43.2 - 134	20
Benzo(k)fluoranthene	86.8	81.6	mg/L	1	80.0	<0.0951	108	6	55.2 - 145	20
Benzo(a)pyrene	77.6	79.3	mg/L	1	80.0	<0.135	97	2	63.9 - 138	20
Indeno(1,2,3-cd)pyrene	56.4	55.2	mg/L	1	80.0	<0.176	70	2	64.6 - 145	20
Dibenzo(a,h)anthracene	67.0	63.9	mg/L	1	80.0	<0.184	84	5	48.6 - 142	20
Benzo(g,h,i)perylene	67.4	67.6	mg/L	1	80.0	<0.134	84	0	71.5 - 146	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Surrogate	LCS Result	LCSD Result	Units	Dil.	Spike Amount	LCS Rec.	LCSD Rec.	Rec. Limit
Nitrobenzene-d5 ²²²³	3.26	3.25	mg/L	1	80.0	4	4	20 - 146
2-Fluorobiphenyl ²⁴²⁵	4.89	5.00	mg/L	1	80.0	6	6	25.3 - 146
Terphenyl-d14 ²⁶²⁷	3.29	3.40	mg/L	1	80.0	4	4	26 - 127

Laboratory Control Spike (LCS-1) QC Batch: 3135

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Dissolved Calcium	97.7	96.7	mg/L	1	100	<0.183	98	1	85 - 115	20
Dissolved Potassium	96.1	96.3	mg/L	1	100	<0.135	96	0	85 - 115	20
Dissolved Magnesium	96.2	95.1	mg/L	1	100	<0.183	96	1	85 - 115	20
Dissolved Sodium	92.6	93.3	mg/L	1	100	<0.105	93	1	85 - 115	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Laboratory Control Spike (LCS-1) QC Batch: 3199

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Total Iron	0.494	0.500	mg/L	1	0.500	<0.00220	99	1	85 - 115	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) QC Batch: 2687

²²Surrogate percent recovery out of limits due to bad stock. New surrogate stock is now being used. CCV and LCS/LCSD spiked compounds show that the process is in control.

²³Surrogate percent recovery out of limits due to bad stock. New surrogate stock is now being used. CCV and LCS/LCSD spiked compounds show that the process is in control.

²⁴Surrogate percent recovery out of limits due to bad stock. New surrogate stock is now being used. CCV and LCS/LCSD spiked compounds show that the process is in control.

²⁵Surrogate percent recovery out of limits due to bad stock. New surrogate stock is now being used. CCV and LCS/LCSD spiked compounds show that the process is in control.

²⁶Surrogate percent recovery out of limits due to bad stock. New surrogate stock is now being used. CCV and LCS/LCSD spiked compounds show that the process is in control.

²⁷Surrogate percent recovery out of limits due to bad stock. New surrogate stock is now being used. CCV and LCS/LCSD spiked compounds show that the process is in control.

Param	MS Result	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Nitrite-N	0.0836	0.0842	mg/L	1	0.0800	<0.000820	104	1	65.9 - 119	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) QC Batch: 2731

Param	MS Result	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Total Organic Carbon ²⁸²⁹	81.0	80.9	mg/L	1	5.00	71.8	184	0	85 - 115	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) QC Batch: 2734

Param	MS Result	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Nitrate-N ³⁰	15.0	15.1	mg/L	5	2.50	3.35	93	1	62.2 - 121	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) QC Batch: 2734

Param	MS Result	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Chloride ³¹	93.0	92.7	mg/L	5	12.5	35.2	92	0	32.7 - 136	20
Chloride ³²	93.0	92.7	mg/L	5	12.5	35.2	92	0	32.7 - 136	20
Fluoride ³³	13.6	13.5	mg/L	5	2.50	1.64	96	1	30.1 - 187	20
Sulfate ³⁴	92.2	93.5	mg/L	5	12.5	40.1	83	1	69.9 - 114	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) QC Batch: 2951

Param	MS Result	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Dissolved Iron	0.553	0.539	mg/L	1	0.500	<0.00220	111	2	75 - 125	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) QC Batch: 3135

continued ...

²⁸Sample spike recovery out of limits due to sample matrix.

²⁹Sample spike recovery out of limits due to sample matrix.

³⁰Julie Winters must enter a comment.

³¹Julie Winters must enter a comment.

³²Julie Winters must enter a comment.

³³Julie Winters must enter a comment.

³⁴Julie Winters must enter a comment.

matrix spikes continued ...

Param	MS Result	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Param	MS Result	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Dissolved Calcium ³⁵³⁶	164	174	mg/L	1	100	108	56	6	75 - 125	20
Dissolved Potassium	100	110	mg/L	1	100	2.71	97	10	75 - 125	20
Dissolved Magnesium	96.1	101	mg/L	1	100	17.7	78	5	75 - 125	20
Dissolved Sodium	112	119	mg/L	1	100	35.1	77	6	75 - 125	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Matrix Spike (MS-1) QC Batch: 3199

Param	MS Result	MSD Result	Units	Dil.	Spike Amount	Matrix Result	Rec.	RPD	Rec. Limit	RPD Limit
Total Iron	3.10	3.11	mg/L	1	0.500	2.65	90	0	75 - 125	20

Percent recovery is based on the spike result. RPD is based on the spike and spike duplicate result.

Standard (ICV-1) QC Batch: 2687

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Nitrite-N		mg/L	0.0800	0.0828	104	85 - 115	2003-07-03

Standard (CCV-1) QC Batch: 2687

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Nitrite-N		mg/L	0.0800	0.0836	104	85 - 115	2003-07-03

Standard (ICV-1) QC Batch: 2701

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
DRO		mg/L	250	291	116	75 - 125	2003-07-04

Standard (CCV-1) QC Batch: 2701

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
DRO		mg/L	250	276	110	75 - 125	2003-07-04

Standard (ICV-1) QC Batch: 2705

³⁵ms recovery out of range due to matrix effect
³⁶ms recovery out of range due to matrix effect

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
pH		s.u.	7.00	7.00	100	98 - 102	2003-07-03

Standard (CCV-1) QC Batch: 2705

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
pH		s.u.	7.00	7.00	100	98 - 102	2003-07-03

Standard (ICV-1) QC Batch: 2708

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Specific Conductance		μ MHOS/cm	1410	1430	101	90 - 110	2003-07-03

Standard (CCV-1) QC Batch: 2708

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Specific Conductance		μ MHOS/cm	1410	1430	101	90 - 110	2003-07-03

Standard (ICV-1) QC Batch: 2709

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Dissolved Solids		mg/L	1000	953.0	95	90 - 110	2003-07-07

Standard (CCV-1) QC Batch: 2709

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Dissolved Solids		mg/L	1000	995.0	100	90 - 110	2003-07-07

Standard (ICV-1) QC Batch: 2731

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Organic Carbon		mg/L	5.00	4.91	98	85 - 115	2003-07-06

Standard (CCV-1) QC Batch: 2731

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Organic Carbon		mg/L	5.00	5.70	114	85 - 115	2003-07-06

Standard (ICV-1) QC Batch: 2734

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Nitrate-N		mg/L	2.50	2.48	99	90 - 110	2003-07-07

Standard (ICV-1) QC Batch: 2734

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Chloride		mg/L	12.5	12.7	102	90 - 110	2003-07-07
Fluoride		mg/L	2.50	2.62	105	90 - 110	2003-07-07
Sulfate		mg/L	12.5	12.2	98	90 - 110	2003-07-07

Standard (CCV-1) QC Batch: 2734

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Nitrate-N		mg/L	2.50	2.45	98	90 - 110	2003-07-07

Standard (CCV-1) QC Batch: 2734

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Chloride		mg/L	12.5	12.6	101	90 - 110	2003-07-07
Fluoride		mg/L	2.50	2.62	105	90 - 110	2003-07-07
Sulfate		mg/L	12.5	11.7	94	90 - 110	2003-07-07

Standard (ICV-1) QC Batch: 2778

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Hydroxide Alkalinity		mg/L as CaCo3	0.00	<1.00		0 - 200	2003-07-08
Carbonate Alkalinity		mg/L as CaCo3	0.00	<1.00		0 - 200	2003-07-08
Bicarbonate Alkalinity		mg/L as CaCo3	0.00	<4.00		0 - 200	2003-07-08
Total Alkalinity		mg/L as CaCo3	250	236	94	90 - 110	2003-07-08

Standard (CCV-1) QC Batch: 2778

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Hydroxide Alkalinity		mg/L as CaCo3	0.00	<1.00		0 - 200	2003-07-08
Carbonate Alkalinity		mg/L as CaCo3	0.00	<1.00		0 - 200	2003-07-08
Bicarbonate Alkalinity		mg/L as CaCo3	0.00	<4.00		0 - 200	2003-07-08
Total Alkalinity		mg/L as CaCo3	250	238	95	90 - 110	2003-07-08

Standard (ICV-1) QC Batch: 2805

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0939	94	85 - 115	2003-07-08
Toluene		mg/L	0.100	0.0943	94	85 - 115	2003-07-08
Ethylbenzene		mg/L	0.100	0.0971	97	85 - 115	2003-07-08
Xylene (isomers)		mg/L	0.300	0.287	96	85 - 115	2003-07-08

Standard (CCV-1) QC Batch: 2805

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.0981	98	85 - 115	2003-07-08
Toluene		mg/L	0.100	0.0977	98	85 - 115	2003-07-08
Ethylbenzene		mg/L	0.100	0.0988	99	85 - 115	2003-07-08
Xylene (isomers)		mg/L	0.300	0.298	99	85 - 115	2003-07-08

Standard (ICV-1) QC Batch: 2806

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
GRO		mg/L	1.00	0.978	98	85 - 115	2003-07-08

Standard (CCV-1) QC Batch: 2806

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
GRO		mg/L	1.00	0.967	97	85 - 115	2003-07-08

Standard (ICV-1) QC Batch: 2880

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.112	112	85 - 115	2003-07-10
Toluene		mg/L	0.100	0.115	115	85 - 115	2003-07-10

continued ...

standard continued ...

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Ethylbenzene	37	mg/L	0.100	0.119	119	85 - 115	2003-07-10
Xylene (isomers)	38	mg/L	0.300	0.351	117	85 - 115	2003-07-10

Standard (CCV-1) QC Batch: 2880

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Benzene		mg/L	0.100	0.108	108	85 - 115	2003-07-10
Toluene		mg/L	0.100	0.110	110	85 - 115	2003-07-10
Ethylbenzene		mg/L	0.100	0.114	114	85 - 115	2003-07-10
Xylene (isomers)		mg/L	0.300	0.338	113	85 - 115	2003-07-10

Standard (ICV-1) QC Batch: 2951

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Dissolved Iron		mg/L	1.00	1.00	100	90 - 110	2003-07-13

Standard (CCV-1) QC Batch: 2951

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Dissolved Iron		mg/L	1.00	1.03	103	90 - 110	2003-07-13

Standard (CCV-1) QC Batch: 2969

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Naphthalene		mg/L	60.0	57.1	95	80 - 120	2003-07-15
Acenaphthylene		mg/L	60.0	58.9	98	80 - 120	2003-07-15
Acenaphthene		mg/L	60.0	59.9	100	80 - 120	2003-07-15
Fluorene		mg/L	60.0	64.4	107	80 - 120	2003-07-15
Phenanthrene		mg/L	60.0	58.6	98	80 - 120	2003-07-15
Anthracene		mg/L	60.0	58.6	98	80 - 120	2003-07-15
Fluoranthene		mg/L	60.0	62.1	104	80 - 120	2003-07-15
Pyrene		mg/L	60.0	57.3	96	80 - 120	2003-07-15
Benzo(a)anthracene		mg/L	60.0	65.2	109	80 - 120	2003-07-15
Chrysene		mg/L	60.0	53.8	90	80 - 120	2003-07-15
Benzo(b)fluoranthene		mg/L	60.0	70.4	117	80 - 120	2003-07-15
Benzo(k)fluoranthene		mg/L	60.0	61.9	103	80 - 120	2003-07-15
Benzo(a)pyrene		mg/L	60.0	69.0	115	80 - 120	2003-07-15

continued ...

³⁷ Average of ICV components within acceptable range.

³⁸ Average of ICV components within acceptable range.

standard continued ...

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Indeno(1,2,3-cd)pyrene		mg/L	60.0	55.4	92	80 - 120	2003-07-15
Dibenzo(a,h)anthracene		mg/L	60.0	66.6	111	80 - 120	2003-07-15
Benzo(g,h,i)perylene		mg/L	60.0	66.7	111	80 - 120	2003-07-15

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limit
Nitrobenzene-d5		50.4	mg/L	1	60.0	84	80 - 120
2-Fluorobiphenyl		64.7	mg/L	1	60.0	108	80 - 120
Terphenyl-d14		70.7	mg/L	1	60.0	118	80 - 120

Standard (CCV-2) QC Batch: 2969

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Naphthalene		mg/L	60.0	67.9	113	80 - 120	2003-07-15
Acenaphthylene		mg/L	60.0	60.4	101	80 - 120	2003-07-15
Acenaphthene		mg/L	60.0	54.6	91	80 - 120	2003-07-15
Fluorene		mg/L	60.0	66.8	111	80 - 120	2003-07-15
Phenanthrene		mg/L	60.0	63.7	106	80 - 120	2003-07-15
Anthracene		mg/L	60.0	60.5	101	80 - 120	2003-07-15
Fluoranthene		mg/L	60.0	62.3	104	80 - 120	2003-07-15
Pyrene		mg/L	60.0	62.7	104	80 - 120	2003-07-15
Benzo(a)anthracene		mg/L	60.0	61.1	102	80 - 120	2003-07-15
Chrysene		mg/L	60.0	60.4	101	80 - 120	2003-07-15
Benzo(b)fluoranthene		mg/L	60.0	69.2	115	80 - 120	2003-07-15
Benzo(k)fluoranthene		mg/L	60.0	71.8	120	80 - 120	2003-07-15
Benzo(a)pyrene		mg/L	60.0	62.1	104	80 - 120	2003-07-15
Indeno(1,2,3-cd)pyrene		mg/L	60.0	68.7	114	80 - 120	2003-07-15
Dibenzo(a,h)anthracene		mg/L	60.0	70.2	117	80 - 120	2003-07-15
Benzo(g,h,i)perylene		mg/L	60.0	65.5	109	80 - 120	2003-07-15

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limit
Nitrobenzene-d5		57.2	mg/L	1	60.0	95	80 - 120
2-Fluorobiphenyl		67.9	mg/L	1	60.0	113	80 - 120
Terphenyl-d14		62.8	mg/L	1	60.0	105	80 - 120

Standard (ICV-1) QC Batch: 3135

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Dissolved Calcium		mg/L	25.0	24.8	99	90 - 110	2003-07-17
Dissolved Potassium		mg/L	25.0	23.6	94	90 - 110	2003-07-17
Dissolved Magnesium		mg/L	25.0	24.2	97	90 - 110	2003-07-17
Dissolved Sodium		mg/L	25.0	24.8	99	90 - 110	2003-07-17

Standard (CCV-1) QC Batch: 3135

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Dissolved Calcium		mg/L	25.0	24.6	98	90 - 110	2003-07-17
Dissolved Potassium		mg/L	25.0	24.9	100	90 - 110	2003-07-17
Dissolved Magnesium		mg/L	25.0	23.4	94	90 - 110	2003-07-17
Dissolved Sodium		mg/L	25.0	23.8	95	90 - 110	2003-07-17

Standard (ICV-1) QC Batch: 3199

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Iron		mg/L	1.00	1.00	100	90 - 110	2003-07-13

Standard (CCV-1) QC Batch: 3199

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Iron		mg/L	1.00	1.03	103	90 - 110	2003-07-13



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915•585•3443 FAX 915•585•4944

ANALYTICAL RESULTS FOR
ARCADIS GERAGHTY & MILLER
Attention: Frank Keifer
1004 N. Big Spring St.
Midland, TX 79701

July 09, 2003
Receiving Date: 07/03/2003
Sample Type: Liquid
Project No: MT000803.0001
Project Location: Pure Resources
Lovington, NM

Work Order: 3070309
Prep Date: 07/07/2003
Analysis Date: 07/07/2003
Sampling Date: 07/02/2003
Sample Condition: I & C
Sample Received by: VH
Project Name: NA

TA#: 12016 - MWI
TA#: 12017 - MWN

FINGERPRINTS

Samples were extracted with pentane and analyzed by GC, FID, capillary column and direct injection. (Graphs included)

12016 - No significant peaks present between C6-C35 for fingerprint identification.
12017 - No significant peaks present between C6-C35 for fingerprint identification.

CHEMIST: BP

Director, Dr. Blair Leftwich

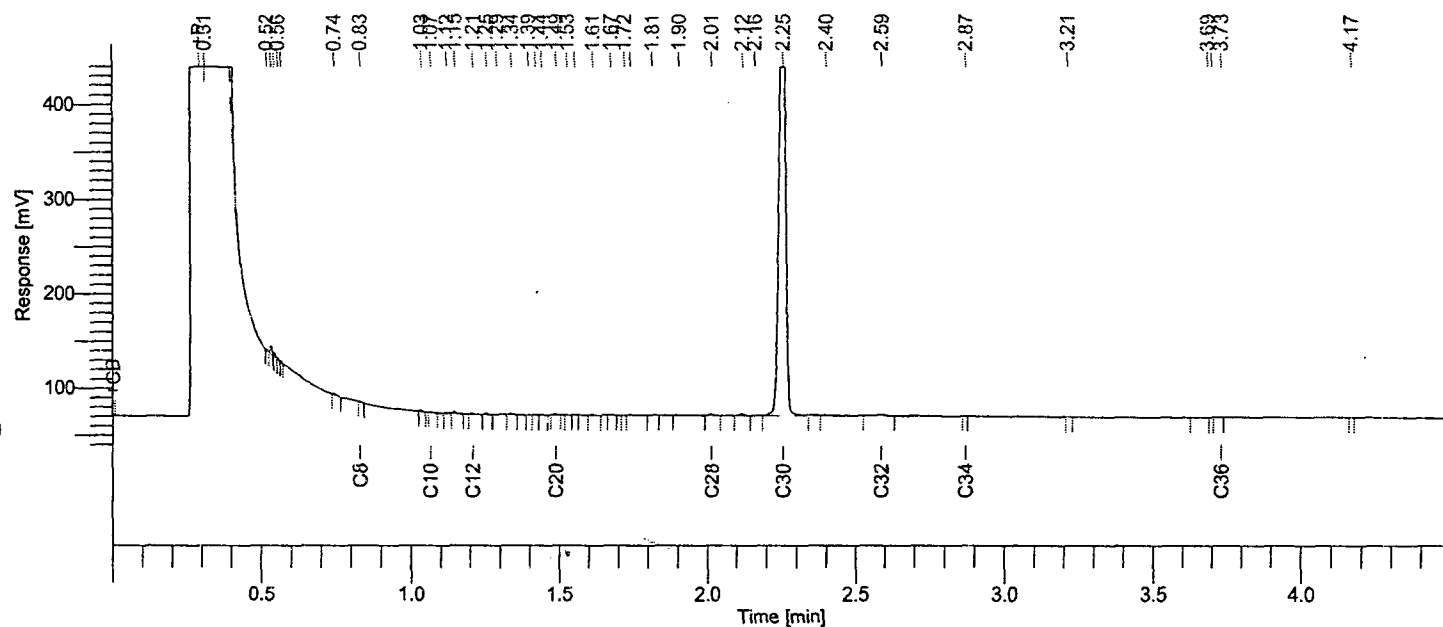
7-9-03

DATE

Software Version : 6.1.2.0.1:D19
 Operator : Turbochrom
 Sample Number : 037
 AutoSampler : BUILT-IN
 Instrument Name : TPH1
 Instrument Serial # : None
 Delay Time : 0.00 min
 Sampling Rate : 12.5000 pts/s
 Volume Injected : 1.000000 ul
 Sample Amount : 1.0000
 Data Acquisition Time : 7/4/03 7:07:30 PM

Date : 7/7/03 1:47:06 AM
 Sample Name : 12016
 Study : 2701
 Rack/Vial : 0/37
 Channel : A
 A/D mV Range : 1000
 End Time : 4.50 min
 Area Reject : 0.000000
 Dilution Factor : 0.10
 Cycle : 37

Raw Data File : D:\Data\TPH1\HCT1A037.raw <Modified>
 Result File : D:\Data\TPH1\HCT1A037.rst
 Inst Method : d:\methods\tph1dro from D:\Data\TPH1\HCT1A037.rst
 Proc Method : d:\methods\tph1dro.mth
 Calib Method : d:\methods\tph1dro.mth
 Sequence File : D:\Sequence\HCT1A.seq



TX1005

Analytical Method: TX1005
 Reporting Units: mg/L
 Matrix: water

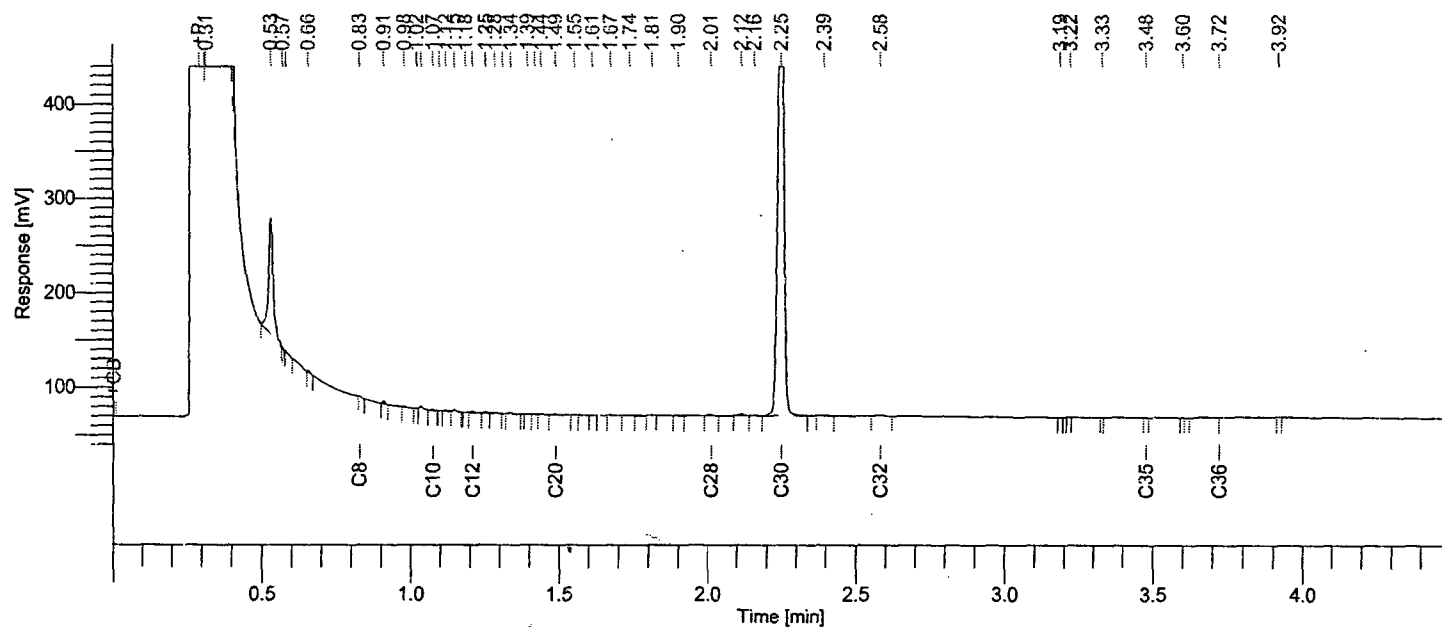
Component Name	Adjusted Amount	Raw Amount	Area [μV s]
Diesel	0.2	2.0	13659.27
Surrogate	11.0	109.6	747450.16
			761109.43

Report stored in ASCII file: D:\Data\TPH1\HCT1A037.TX0

Software Version : 6.1.2.0.1:D19
 Operator : Turbochrom
 Sample Number : 038
 AutoSampler : BUILT-IN
 Instrument Name : TPH1
 Instrument Serial # : None
 Delay Time : 0.00 min
 Sampling Rate : 12.5000 pts/s
 Volume Injected : 1.000000 ul
 Sample Amount : 1.0000
 Data Acquisition Time : 7/4/03 7:21:36 PM

Date : 7/7/03 1:47:08 AM
 Sample Name : 12017
 Study : 2701
 Rack/Vial : 0/38
 Channel : A
 A/D mV Range : 1000
 End Time : 4.50 min
 Area Reject : 0.000000
 Dilution Factor : 0.10
 Cycle : 38

Raw Data File : D:\Data\TPH1\HCT1A038.raw <Modified>
 Result File : D:\Data\TPH1\HCT1A038.rst
 Inst Method : d:\methods\tph1dro from D:\Data\TPH1\HCT1A038.rst
 Proc Method : d:\methods\tph1dro.mth
 Calib Method : d:\methods\tph1dro.mth
 Sequence File : D:\Sequence\HCT1A.seq



TX1005

Analytical Method: TX1005
 Reporting Units: mg/L
 Matrix: water

Component Name	Adjusted Amount	Raw Amount	Area [μV s]
Diesel	0.2	2.5	16913.18
Surrogate	10.9	108.6	740976.15
			757889.32

Report stored in ASCII file: D:\Data\TPH1\HCT1A038.TX0

3070309

Page 1 of 1

CHAIN-OF-CUSTODY RECORD

Order No./P.O. No. _____

Laboratory Task

ARCADE'S GERAGHTY & MILLER

ARC

Project Number/Name MT000803.0001

Project Location Pure Resources - LOVINGTON

Laboratory

Project Manager
KIEFFER

sample/qualification

[illegible]

Sample Matrix: L = Liquid: S = Solid: A = Air

Belinaviched hv:

Received by: 1. Michael D. Good
 Requisitioned by: 1. Michael D. Good

RECEIVED BY _____

Relinquished by: Wendy D. Selward Org:

Received by: William Org

Special Instructions/Remarks:	
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* NOTE - PAH - Run DRO

A-1001 11-11-11 11-11-11

we should run FTH (45)

Delivery Method: ☐ In Person ☐ Online

100