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CHARACTERIZATION REPORT: C-LINE 50602, 52102 AND 52302 RELEASES LEA COUNTY, NEW MEXICO

February 6, 2003

Prepared For

Duke Energy Field Services, LP
370 17th Street, Suite 900
Denver, CO 80202

Prepared By

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February 6, 2003

Mr. Stephen Weathers
Duke Energy Field Services, LP
370 17th Street, Suite 900
Denver, CO 80202

Re: Transmittal of Characterization Report for C-Line 50602, 52102 And 52302 Releases, Lea County New Mexico

Dear Stephen:

Attached is the characterization report for the C-Line 50602, 52102 And 52302 releases in Lea County New Mexico. The report was prepared following completion of the field activities contained in a work plan dated October 11, 2002 that was submitted to the New Mexico Oil Conservation Division (OCD) and subsequently approved by it.

The report concludes that shallow groundwater beneath the site has been impacted by a hydrocarbon release from the 50602 release site. The hydrocarbons have migrated in a dissolved phase approximately 135 feet down gradient. The high vapor pressure of the product has also resulted in hydrocarbon migration in the vapor phase both up and down groundwater gradient from the release point. The hydrocarbon vapors have not adsorbed to the soil materials.

The proposed remediation program would be completed in two phases.

Phase 1 includes three proposed activities:

1. The installation of monitor well(s) at the down gradient boundary of the plume to refine the groundwater gradient information and to provide detection-level monitoring.

2. Monitoring of the identified detection wells on a quarterly basis to ensure the plume is not expanding.

3. Active removal of the free product from well MW-1.

Phase 1 would continue until the free product is removed to the maximum extent practicable.

Phase 2 includes the following three activities:

1. Installation of a temporary soil vapor extraction system at well MW-1 and/or other wells as necessary to remove the hydrocarbons in the soil vapor. This system could be installed as part of the free product removal effort provided that it could be safely operated and assuming reasonable air emissions control costs.

2. Regular monitoring of the wells within the plume area to monitor changes in the hydrocarbon concentrations in the groundwater and the soil gas; and

3. Regular monitoring of the detection wells to monitor for unanticipated migration of dissolved phase hydrocarbons.

The monitoring proposed under items 2 and 3 above would initially occur on a quarterly basis. The monitoring frequency would be deceases after repeated testing established that plume control was effective. Monitoring would then continue for a predetermined length of time and would cease when the post-closure goals have been attained.

Thank you for the opportunity to complete this work. Do not hesitate to contact me if you have any questions or comments.

Respectfully Submitted,
REMEDIACON INCORPORATED

Michael H. Stewart

Michael H. Stewart, P.E.
Principal Engineer

MHS/tbm

enclosure

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1 INTRODUCTION

This report presents the results of the characterization activities completed at the Duke Energy Field Services, LP (DEFS) C-Line 50602, 52102 and 52302 locations. The activities were originally proposed in an October 11, 2002 work plan that was supplemented by activities described in a November 15, 2002 letter.

This report is divided into four sections. The remainder of this section presents background information and describes the program purpose and objectives. The second section summarizes the field program. The third section presents and discusses the program data. The final section provides interpretations and conclusions along with a conceptual remediation program.

1.1 Background Information

The study area is located in the southeastern quarter of the southeastern quarter of Section 31, Township 19 South, Range 37 East approximately 6.25 miles south and 1.25 miles west of the town of Monument in Lea County New Mexico. The approximate coordinates are 32 degrees 32.5 minutes north, 103 degrees 15.3 minutes east. The area surrounding the release sites is uninhabited and is used for ranching.

Figure 1 shows the surrounding topography and drainage features. The topography in the area falls gently (0.33 percent) to the northeast toward Monument Draw. Monument Draw is located approximately 2 miles to the north, and it is the nearest defined surface drainage feature in the area.

Nicholson and Clebsch[1] describe the regional subsurface setting in the following fashion:

1. The uppermost materials consist of a thin veneer of dune sand that overlies sandy Quaternary alluvial deposits. Nicholson and Clebsch show the site outside the boundaries of the Ogallala Formation; however, the Quaternary alluvial deposits and the Ogallala Formation are composed of similar materials so they probably have similar hydrologic properties.

2. Bedrock beneath the site is estimated at an elevation of 3410 feet. The site elevation is approximately 3540 feet (Figure 1) yielding an estimated unconsolidated material thickness of approximately 130 feet.

3. The regional groundwater contour map generated by Nicholson and Clebsch is inconclusive in the vicinity of the site because it is located on their boundary for the saturated unconsolidated materials and the underlying bedrock. Their map indicates that the regional groundwater flow direction for the Ogallala aquifer east of the site is

[1] Nicholson, Alexander, Jr. and Clebsch, Alfred, Jr., 1961, Geology and Ground-Water Conditions in Southern Lea County New Mexico. New Mexico State Bureau of Mines and Mineral Resources, Ground-Water Report 6, 123 pp.

to the south-southeast. Groundwater flow in the bedrock is shown with a southeasterly flow pattern.

Environmental Plus Incorporated (EPI) compiled data on the location and depth to groundwater in the nearest permitted water wells. Figure 1 shows the reported depths to water and approximate water-table elevations for these four wells.

1.2 Spring 2002 Remediation Activities

The study area includes three separate remediation locations. These locations, labeled Duke C-Line 50602, Duke C-Line 52102 and Duke C-Line 52302 are approximately shown on Figure 1. The three locations were remediated by EPI between April and June 2002. EPI submitted separate work plans for each location and completed the activities at each of the locations as summarized below:

- EPI removed affected materials at location 50602 to a depth of 18 feet below ground surface (bgs). An affected column of soils approximately 22 feet in diameter remained at the base of the 18 foot excavation All sidewall readings and the portion of the bottom beyond the contaminated soil column perimeter were measured with a photoionization detector at less than 100 ppm. A clay barrier was install from 17 to 18 feet bgs over the residual contaminated soil column with a 10-foot perimeter apron to prevent horizontal encroachment if infiltration of storm water occurs.

  EPI advanced boring BH1 beneath the origin at the 50602 location to delineate the vertical extent of hydrocarbon impacts. Ionizable constituent headspace data collected with a calibrated Photoionization Detector (PID) indicated the effects at this location extended to a depth of 51 feet bgs.

  Boring BH2 was advanced by EPI approximately 45 feet northeast of the original leak location to assess the eastward horizontal extent of hydrocarbon effects. Samples were collected at 5-foot intervals and the headspace was measured with a PID to the top of the saturated zone at a depth of 90 feet bgs. The 5 foot and 80 foot samples were less than 100 ppm. All other measurements exceeded 100 ppm with the highest reading of 1,246 ppm occurring in the 45-foot sample. Based upon these results, BH2 was converted to 2-inch diameter monitoring well MW-1 with a total depth of 94.4 feet bgs to assess ground water impact. After development, product was measured at 89.5 feet bgs with ground water at 92.8 feet bgs, (i.e., 3.3 feet of product).

- The hydrocarbon effects at location 52102 attenuated at 32 feet. A risk assessment with barrier installation was approved by the NMOCD. The affected materials were removed to a depth of 21 feet bgs. A 1-foot compacted clay barrier was installed from 21 to 22 feet bgs to overlay and isolate the residual contaminated 20 foot diameter soil column in place between 22 and 32 feet.

- EPI removed affected materials at the 52302 location to a depth of 23 feet bgs. A 1-foot compacted clay barrier was installed from 22 to 23 feet bgs over the residual contaminated soil column with a 10 foot perimeter apron to overlay and isolate the residual contaminated soil column left in place between 22 and 32 feet.

1.3 Purpose And Objectives

The original purpose of this program was to characterize the groundwater conditions and free product distribution within the study area. Specific objectives contained in the October 2002 work plan included:

1. Defining the plume boundaries associated with the 50602 location.
2. Installing a free product removal system at the 50602 location.
3. Assessing the groundwater beneath the 52102 and 52302 locations.
4. Evaluating the degree and extent of natural biodegradation processes on the hydrocarbon distribution.
5. Defining the groundwater flow direction and gradient.
6. Collecting information on the physical and chemical properties of the subsurface materials.

The additional objective of evaluating potential removal options for the free product at the 50602 C-Line location was added in the November 15, 2002 work plan addendum.

2 FIELD PROGRAM SUMMARY

The field program activities completed at this site included: 1) monitoring well installation, development and sampling; 2) well gauging; 3) physical property measurement; and 4) free product removal evaluation. Each activity is described below.

2.1 Monitoring Well Installation

Five new monitoring wells (MW-2 through MW-6) were installed by Eades Drilling of Hobbs, New Mexico under the supervision of Trident Environmental. The wells were installed between November 5 and 8, 2002. The well locations were staked and cleared for subsurface obstructions prior to the initiation of drilling. The wells were installed at the locations shown on Figure 2. Well completion information is included in Table 1.

The borings were advanced using air-rotary drilling with potable water added as necessary to facilitate advancement. All drilling and installation procedures were supervised by experienced personnel.

Cuttings samples were collected on a regular basis and screened for the presence hydrocarbons using a photoionization detector (PID). The cuttings were also used to generate representative boring logs containing lithologic, saturated material and contaminant distribution information. The PID readings are summarized in Table 2. The combined drilling logs/well completion forms are included in Appendix 1. A licensed surveyor measured the coordinates and elevation of each well to a tolerance of 1 foot for the northing and easting coordinates and 0.01 foot for elevation. Their measurements are included in Table 1.

2.2 Monitoring Well Development, Purging And Sampling,

The depth to water in each well was measured on November 15, 2002. Existing well MW-1 contained free product (discussed in more detail below). The one-week duration between the completion of well installation and the water measurement should have been sufficient to allow the water levels to equilibrate to generate a representative water table map. The five new wells did not contain any free product.

The five new wells were developed on November 14, 2002 using a submersible pump. Well MW-1 contained free product and was not sampled. Well development consisted of extracting a minimum of 10 casing volumes of water using a Grundfos Rediflo pump and continuing development until the field parameters of temperature, pH and conductivity stabilized for three casing volumes.

Purging and sampling was completed on November 15, 2002. Each well (excepting MW-1) was developed using a disposable bailer until a minimum of three casing volumes of water was removed and the field parameters temperature, pH and conductivity

stabilized. Dissolved oxygen was also measured to evaluate bioremediation. The equilibrated field parameters and dissolved oxygen are summarized in Table 3. Unfiltered samples from wells MW-2 to MW-6 were analyzed for, benzene, toluene, ethylbenzene and total xylenes (BTEX), total petroleum hydrocarbons as gasoline and total petroleum hydrocarbons as diesel. Unfiltered samples were also collected from wells MW-2, MW-4 and MW-6 and analyzed for the inorganic constituents calcium, magnesium, sodium, potassium (major cations), bicarbonate alkalinity, chlorides, sulfate (major anions), and total dissolved solids. Field filtered samples from wells MW-2, MW-4 and MW-6 were analyzed for the metals arsenic, barium cadmium, chromium, lead, mercury, selenium and silver, iron and manganese.

All samples were placed in an ice-filled chest immediately upon collection and delivered to the analytical laboratory using standard chain-of-custody protocol.

A field duplicate was collected from MW-4 to evaluated quality control. The field duplicate and a trip blank were both analyzed for BTEX.

All development and purge water was disposed of at an approved OCD facility. All cuttings generated during the drilling process were stockpiled and sampled and then disposed of in an appropriate fashion.

The depth to groundwater combined with the relatively rapid groundwater recovery prevented the use of slug tests to estimate saturated material hydraulic conductivity values. The use of the Grundfos pump prohibited the use of an electronic water measurement instrument to accurately measure the changes in depths to water during pumping.

2.3 Free Product Removal Evaluation

Two tests were completed to evaluate potential product removal systems. The first test was completed on November 18, 2002. This test consisted of placing a slurp tube approximately 1 foot below the water table. A vacuum of approximately 18 inches mercury was applied using a vacuum truck. The test was run for 2 hours and then halted because virtually no liquids were produced because of the high vacuum and limited saturated interval.

A vapor extraction test was then completed by removing the slurp pipe and connecting the vacuum directly to the top of well MW-1. An 18 inch (mercury) vacuum was applied to the system for 2 hours and the change in pressure was measured in wells MW-2 through MW-5 at the end of the test.

A product bail-down test was completed on December 17, 2002. The test was completed by bailing approximately 8 gallons of product over a 40-minute period. The product decreased from an initial thickness of 3.54 feet to a sustained value of 0.75 feet.

Recovery was periodically measured for an additional 22 minutes and then once more 4.5 hours after the completion of the test. The results are tabulated in Section 3.4 below.

3 RESULTS

This section presents and summarized the results of the field program. The information is categorized by: 1) material composition; 2) groundwater gradient and free product occurrence; 3) chemical results; and 4) product removal evaluation. Conclusions and interpretations related to the data follow in the subsequent section.

3.1 Material Composition

Examination of the boring logs in Appendix 1 indicates that the materials have a uniform composition beneath the study area. The material is generally described as a well sorted, very-fine-grained silty sand (Unified Soil Classification of SM) with clay percentages varying up to 10 percent. This material is interbedded with a moderate-to-well cemented very-fine-grained sand. This alternating sequence of uncemented and cemented materials is described as present throughout the entire lithologic interval rather than being confined to the shallower depths where caliche is generally found.

The materials are dry to a depth of approximately 79 to 80 feet where are logged as very moist. The materials are logged as saturated at 86 feet; however, the actual depth to water as measured 1-week later varied from 85.6 to 92.2 feet.

None of the boring descriptions included materials that appeared to be stained by hydrocarbon materials. Hydrocarbon odors were described in the following fashion:

- MW-2 slight hydrocarbon odor 18 to 79 feet
- MW-3 no hydrocarbon odor noted
- MW-4 slight hydrocarbon odor 19 to 32 and 39 to 65 feet
- MW-5 slight hydrocarbon odor 40 feet to total depth
- MW-6 no hydrocarbon odor noted

The hydrocarbon distribution in wells MW-2 and MW-4 is unusual because the odors occur in the middle of the boring rather that at the surface (indicative of a surface release) or the base (indicative of groundwater transport). In addition of Table 2 indicates that the PID measurements are fairly constant throughout the entire subsurface interval investigated. The cause of this distribution is described below in the conclusions section.

3.2 Groundwater Gradient And Free Product Occurrence

The water/product measurements are summarized in Table 3. Well MW-1 contained 3.15 feet of free product. The remaining wells did not contain any free product.

Figure 3 shows the water table elevations based upon the water measurements. The contours were generated using the Surfer® program with the kriging option. The groundwater elevation values for well MW-1 was corrected using the following formula (all values in feet):

$GWE_{corr} = MGWE + (PT*PD)$: where

MGWE is the actual measured groundwater elevation;
PT is the measured free-phase hydrocarbon thickness, and
PD is the free phase hydrocarbon density (assumed 0.7).

Examination of Figure 3 indicates that the groundwater flow in area investigated is generally to the east-southeast rather than north toward Monument Draw. Note that the single low point at MW-6 deflects the water table toward that well regardless of the actual flow direction.

3.3 Chemical Results

The equilibrated field parameters that were measured during well purging are summarized in Table 4. The conductivity increases toward the southeast with the sample from well MW-6 exhibiting an extremely high value of 10.1 mS/cm. The pH values were relatively constant across the study area. The dissolved oxygen values were lower at wells MW-2 and MW-4 relative to the other three wells.

The analytical results for the organic constituents are summarized on Table 5. The analytical report is included in Appendix 2. Also included on Table 5 are the New Mexico Water Quality Control Commission Ground Water Standards. The constituents that exceed these standards are highlighted (bold) on Table 5. Examination of Table 5 indicates that the constituents benzene, toluene, ethylbenzene and xylenes (BTEX) were detected in wells MW-3 and MW-4 immediately down gradient from the release area. The BTEX constituents were not detected in wells MW-2, MW-5 and MW-6. Total petroleum hydrocarbons in both the gasoline range and the diesel range were not detected at a 3 mg/l detection limit.

The inorganic constituents (ions and dissolved metals) are summarized in Table 6. The relevant New Mexico Water Quality Control Commission Ground Water Standards are also included in this table. The ion data establishes that sodium and chloride and account for the majority of the increase in salt loading. The increased salts limit the potential uses of the groundwater MW-4 and make the water in well MW-6 virtually useless for any livestock or farming activity.

Examination of the dissolved metals concentrations indicates that only iron is present at concentrations above the groundwater standards. Moreover, the highest iron concentration was measured in well MW-2 upgradient from the DEFS release. The

lowest iron concentration was measured at MW-4 where the organic consituents were present at the highest concentrations.

3.4 Product Removal Evaluation

Two tests were performed to evaluate product removal. The first test evaluated both bioslurping and soil vapor extraction. Virtually no free product and limited water were removed during the 2-hour bioslurping test. The test was only run at one vacuum (18-inches of mercury) in a small diameter well with a very limited saturated thickness so the results do not conclusively remove bioslurping as a potentail remediation mechanism.

The soil vapor extraction test involved placing an 18-inch mercury vacuum on the well head of MW-1 and measuring the response at outlying wells MW-2 through MW-5 after two hours. All of the wells had an initial measured vapor pressure of approximately 0.5 inches of water. All of the wells responded to the applied vacuum with the following measured results:

- MW-2: 0.12 inches of vacuum (0.62" vapor pressure reduction)
- MW-3: 0.30 inches of pressure (0.20" vapor pressure reduction)
- MW-4: 0.14 inches of pressure (0.36" vapor pressure reduction)
- MW-5: 0.17 inches of pressure (0.33" vapor pressure reduction)

The product baildown test involved removed approximately 8 gallons of product over a 40-minute period. This rate represents the approximate maximum production rate for hand bailing. The product thickness declined in the well from 3.54 feet to 0.75 feet. The thickness remained constant at 0.75 feet over the last 15 to 20 minutes of the test. The product recovery was then measured with the results summarized below.

Elapsed Time	Product Thickness (feet)		Elapsed Time	Product Thickness (feet)
0	0.75		9	1.91
2	1.45		12	2.05
3	2.02		13	2.15
4	1.61		16	2.38
5	1.98		18	2.42
6	1.75		22	2.5
7	1.81		270	3.41
8	1.85			

4 CONCLUSIONS AND RECOMMENDATIONS

The conclusions are categorized into sections on

- Hydrogeologic setting;
- Contaminant composition, origin and distribution; and
- Suggested remediation strategy

Recommendations for additional work then follow.

4.1 Hydrogeologic Setting

The conceptual hydrogeologic model for the area is based upon the published information as well as the site specific data. The material covered in this section includes the subsurface material composition, the material hydraulic properties and the groundwater flow direction and velocity.

The materials are a very-fine silty sand. This uniform material type is segregated into uncemented and cemented layers that alternate throughout the entire interval rather than a thick shallow caliche layer that overlies a less-indurated sequence. The clay percentages were generally described as less than 10 percent. The saturated thickness of these materials above the Triassic red beds was not measured but is estimated at approximately 40 feet based upon the published literature discussed above in Section 1.1.

The saturated materials appear to possess moderate permeability even though exact measurements were not made. This conclusion is based upon three factors. First, the materials are either part of the Ogallala Formation or are directly eroded from it. This formation is a major aquifer over much of the west-central part of the United States. Second the material is described as a very-fine grained well sorted sand. This material type generally has a moderate to high permeability, with the exact property a function of the fines present. The silts that were described in this material will decrease its permeability. Finally, two of the five wells sustained pumping rates of 0.7 gallons per minute over a 10-foot saturated thickness. This extraction rate was limited by the pump rather than the materials. The other three wells could not be purged at the maximum rate; however, they did sustain pumping rates between 0.4 and 0.6 gallons per minute. These rates all indicate that the material has a moderate permeability.

The depth to groundwater varies between 90 and 95 feet below ground surface (bgs). The water table contours shown on Figure 3 have an approximate gradient of 0.0044 depending upon the groundwater flow path chosen. Assuming a moderated hydraulic conductivity of 1.0 feet per day, the above gradient and an assumed effective porosity of 0.2, the groundwater velocity is estimated at:

Velocity $= 0.0044*1.0/0.2 = 0.022$ feet per day or 8 feet per year

A projected groundwater flow path that is based upon the water-table contours is shown on Figure 3. As previously mentioned, the single low point at MW-6 deflects the water directly toward it. There may also be a northerly flow component in this area. The groundwater flow direction will be discussed in more detail relative to chemical patterns in Section 4.2.

4.2 Contaminant Composition, Origin And Distribution

This section discusses the composition, origin and distribution of the chemical constituents in the groundwater. There is a definite difference between the distribution of the organic and inorganic constituents that directly results from their differing origins so the two types are discussed separately below.

4.2.1 Organic Constituent Composition, Origin And Distribution

The hydrocarbons are present at low concentrations over an area greater than the dissolved phased based upon the PID measurements contained in Table 2. This distribution probably originates from one of two causes (or a combination of both). The first cause would be that the background PID concentration was on the order of 0.5 to 1.5 ppm rather than 0.0 ppm. The second cause originates from a free product that possesses a high vapor pressure. The vapors from this product could readily migrate vertically and laterally through the moderately permeable void spaces within the unsaturated materials. These vapors do not adsorb to the soil matrix. This phenomena would produce the situation encountered by EPI where the soils with measurable PID readings did not have any detectable hydrocarbon compounds associated with them. Instead, the vapors "flashed" out of the soil matrix when the sample was collected.

The organic constituent distribution is best depicted by plotting the benzene concentrations that are shown on Figure 4. Benzene was selected because:

- It is the most toxic organic constituent;
- It is the most mobile organic constituent; and
- It is present at the highest concentrations

Examination of Figure 4 indicates that MW-4 has the highest benzene concentration. MW-4 is located approximately 135 feet down gradient of the release and the associated free product at MW-1. The benzene concentration is less at MW-3, and it was not detected at MW-5. This chemical distribution implies that groundwater flows in the southeasterly direction.

None of the hydrocarbon constituents were detected at well MW-6, located approximately 895 feet from the release point (MW-1) and 660 feet from MW-4. This distribution suggests that the hydrocarbon constituents have attenuated through dispersion and bioremediation between MW-4 and MW-6.

4.2.2 Inorganic Constituent Composition, Origin And Distribution

The inorganic discussion is divided into ions and metals because of their differing patterns. The ion distributions, discussed first, form a distinct pattern related to an historical release. The metals are more uniformly distributed with the exception of iron.

The distribution of conductivity measurements and select ion concentrations are shown on Figure 5. The field conductivity readings give the best indication of the ion distribution because it was measured wells MW-2 through MW-6 whereas lab analyses were only completed on wells MW-2, MW-4 and MW-6. Conductivity directly relates to the concentration of ions in the sample with higher the conductivities resulting from higher ion concentrations.

The low conductivity (0.59 mS/m) of MW-2 probably represents the background value. The readings from wells MW-3, MW-4 and MW-5 vary in a narrow range from 3.89 to 3.98 mS/m. The 0.1 mS/m reading from MW-6 is 6.6 times higher than the values at MW-3 to MW-5 and more than 17 times the value measured at well MW-2.

The analytical data from wells MW-2, MW-4 and MW-6 supports the conductivity measurements with the highest total dissolved solid concentration at MW-6 and the lowest at MW-2. The MW-4/MW-2 and MW-6/MW-2 ratios of total dissolved solid concentrations are 5.5 and 15.3 respectively. These ratios approximate the calculated conductivity ratios (6.7 and 17.6 respectively).

Examination of Table 5 indicates that the sodium and chloride are the cation and anion ions that produce the majority of the increased salt loading. These ions typically originate from the release of salt-laden produced water.

The DEFS pipeline release cannot be the source of the salts found in the study area for the following reasons:

1. The DEFS pipeline is a natural gas conveyance line. This type of line typically does not carry a sufficient volume of produced water to generate the chloride distribution found in the groundwater beneath this site.

2. The distribution of salts (highest at MW-6) is anomalous when compared to the organic distribution and groundwater flow pattern.

3. The EPI reports do not report any evidence of produced water effects along the pipeline alignment prior to excavation.

It is probable that the salts are not migrating from MW-6 northwest toward the MW-3 through MW-5 alignment. Moreover, the source may not be the affected area shown on Figure 2 because of the apparently unaffected sample that was collected down gradient

from it in well MW-2. The DEFS pipeline is within an area with a long history of petroleum production. Further evaluation of the origin and migration of the salts is beyond the scope of this project since they do not originate from DEFS operations.

4.2.3 Suggested Remediation Strategy

This section presents a conceptual program to remediate the hydrocarbons released at the 50602 site. This section includes the objectives of the remediation program, design assumptions and the conceptual design strategy.

4.2.3.1 Remediation Objectives

The objectives of the suggested remediation strategy are to:

- Remove the free product as a continuing source of the dissolved and vapor phase hydrocarbons;
- Identify the down-gradient boundary of the dissolved phase hydrocarbon plume;
- Regularly monitor the site to ensure that the dissolved-phase plume does not expand during the free-product removal remediation phase;
- Remove the soil vapor phase hydrocarbons once the free product is removed; and
- Continue monitoring after the free product is removed to verify that the dissolved phase hydrocarbon plume is either stable or contracting.

4.2.3.2 Remediation System Design Assumptions

The assumptions that the conceptual remediation plan was based upon includes:

1. The released product is a low-viscosity, high vapor pressure liquid that migrated readily to well MW-1 during the bail-down test.
2. The dissolved phase hydrocarbons from this release have migrated toward the southeast a minimum of 190 feet (MW-3) and a maximum of 790 feet (MW-6).
3. The groundwater in the immediate vicinity of the release is also impacted by a produced water release(s) from an historic source(s). The extent of this area is undefined. The water is still potentially useable for ranching purposes but is of limited use for irrigation.

4. The evidence of natural bioremediation is masked by the historic salt release; however, two indicator parameters are present. First the dissolved oxygen concentration at MW-4 of 3.59 was approximately half the apparent background concentration. Iron the second indicator parameter, is much lower at MW-4 than it is at MW-2 or MW-6, indicating that anaerobic biodegradation is present.

5. The PID measurements at borings MW-2 through MW-6 originate from gaseous hydrocarbons within the soil vapor rather than desorbing from soil particles. These soil vapors can be removed with a soil vapor extraction system.

6. The hydrocarbon vapors extend over a greater area than the dissolved phase hydrocarbons. These vapors could migrated into the groundwater producing a low-concentration dissolved phase halo around the primary plume. It is probable that any dissolved phase hydrocarbons generated in this fashion will be digested and remove through bioremediation.

7. A soil vapor extraction system

4.2.3.3 Conceptual Remediation Program Description

This section presents a remediation program at a level that is sufficient to evaluate the strategy and the general components of the plan. A more detailed plan will be prepared upon OCD concurrence with either this plan or a plan that is modified to address their comments and concerns.

The remediation program will be completed in two phases. The two phases are discussed at a conceptual level below.

The purpose of Phase 1 is to remove the free product from the water table while monitoring for evidence of an expanding dissolved-phase hydrocarbon plume. Phase 1 includes three proposed activities:

1. The installation of monitor well(s) at the down gradient boundary of the plume to refine the groundwater gradient and to provide detection-level monitoring.

2. Monitoring of the identified detection wells on a quarterly basis to ensure the plume is not expanding.

3. Active removal of the free product from well MW-1.

Phase 1 would continue until the free product is removed to the maximum extent practicable.

Phase 2 includes the following three activities:

1. Installation of a temporary soil vapor extraction system at well MW-1 and/or other wells as necessary to remove the hydrocarbons in the soil vapor. This system could be installed as part of the free product removal effort provided that it could be safely operated and assuming reasonable air emissions control costs.

2. Regular monitoring of the wells within the plume area to monitor changes in the hydrocarbon concentrations in the groundwater and the soil gas; and

3. Regular monitoring of the detection wells to monitor for unanticipated migration of dissolved phase hydrocarbons.

The monitoring proposed under items 2 and 3 above would initially occur on a quarterly basis. The monitoring frequency would be deceases after repeated testing established that plume control was effective. Monitoring would then continue for a predetermined length of time and would cease when the post-closure goals have been attained.

TABLES

Table 1 – Summary C-Line Well Completion Information

MW#	Top of Casing Elevation	Ground Elevation	Latitude	Longitude	Screen Diameter	Screened Interval	Sand Interval
1	3542.10	3539.41	N32°31'29.7"	W103°17'11.3"	2"		
2	3540.91	3537.70	N32°31'30.8"	W103°17'11.5"	2"	81-101	77-102
3	3541.41	3539.30	N32°31'27.8"	W103°17'11.2"	2"	80-100	78-102
4	3541.40	3538.51	N32°31'28.6"	W103°17'10.3"	2"	80-100	78-103
5	3541.45	3538.69	N32°31'29.4"	W103°17'9.6"	2"	80-100	78-102
6	3543.98	3540.94	N32°31'25.1"	W103°17'3.8"	2"	79-99	75-102

Table 2 – Photoionization Detector Readings For Soil Samples Collected from Borings

Depth (feet)	MW-2 (ppm)	MW-3 (ppm)	MW-4 (ppm)	MW-5 (ppm)	MW-6 (ppm)
5	4.5				
10	2.2		1.7	0.0	1.1
15	5.6				
20	3.3	1.0	1.0	2.4	2
25	7.8				
30	11.3		1.3	3.4	2.7
35	8.8				
40	6.7	1.3	3.1	4.1	2.3
45	4.4				
50			3.1	3.2	3.1
55					
60	7.8	0.6	2	3.4	2.7
70	3.4			4.8	1.7
80	2.3			5.1	
85				3.1	

Notes: Groundwater noted in all boring logs at ~ 86 feet
Actual water table subsequently measured at ~102 feet

Table 3 – Well Gauging Information

Monitor Well Identifier	Top of Casing Elevation	Depth To Water	Depth To Product	Product Thickness	Corrected Groundwater Elevation
1	3542.10	92.30	89.15	3.15	3452.01
2	3540.91	88.80			3452.11
3	3541.41	89.16			3452.25
4	3541.40	89.84			3451.56
5	3541.45	90.06			3451.39
6	3543.98	95.21			3448.77

Table 4 – Summary of C-Line Equilibrated Well Purging Data

MW#	Casing Volumes Removed	Average Pumping Rage (GPM)	Temperature °C	Conductivity mS/cm	PH	Dissolved Oxygen (ppm)
2	15.0	0.55	18.6	0.59	7.54	5.07
3	11.0	0.70	18.5	3.91	7.21	7.61
4	10.8	0.59	19.0	3.96	7.10	3.59
5	11.5	0.71	18.9	3.89	7.08	7.98
6	12.9	0.41	18.5	10.1	6.97	7.43

Table 5 - Summary of Organic Constituent Results from the November 2002 Sampling Episode at the C-Line Location

	Benzene	Toluene	Ethylbenzene	Xylenes	GRO	DRO
NM Standards	0.01	0.75	0.75	0.62		
Well #						
2	<0.001	<0.001	<0.001	<0.001	<3	<3
3	**0.017**	0.005	<0.001	<0.001	<3	<3
4	**0.114**	0.039	0.002	0.003	<3	<3
4 dup	**0.1**	0.036	0.002	0.003	<3	<3
5	<0.001	<0.001	<0.001	<0.001	<3	<3
6	<0.001	<0.001	<0.001	<0.001	<3	<3

Notes: All units mg/l
GRO: Total petroleum hydrocarbons as gasoline range organics
DRO: Total petroleum hydrocarbons as diesel range organics
NM Standards: New Mexico Water Quality Control Commission Standards
Values that exceed these standards are bolded

Table 6 - Summary of Inorganic Constituent Results from the November 2002 Sampling Episode at the C-Line Location

	Calcium	Magnesium	Potassium	Sodium	Bicarbonate	Carbonate	Chloride	Hydroxyl	Sulfate	Total Dissolved Solids
NM Standards							250		600	1000
Well #										
MW-2	53.4	16.7	5.52	52.5	162	<0.01	44.3	<0.01	111	428
MW-4	211	80.8	12.7	369	282	<0.01	904	<0.01	348	2359
MW-6	664	375	31.5	838	240	<0.01	3010	<0.01	1300	6564

	Arsenic	Barium	Cadmium	Chromium	Lead	Selenium	Silver	Iron	Manganese	Mercury
NM Standards	0.1	1	0.01	0.05	0.05	0.05	0.05	1	0.2	0.002
Well #										
MW-2	<0.008	0.683	0.004	0.015	<0.011	<0.004	<0.002	**12.6**	0.117	0.004
MW-4	<0.008	0.496	0.002	<0.002	<0.011	<0.004	<0.002	0.304	0.144	<0.002
MW-6	0.011	0.407	0.002	0.005	<0.011	<0.004	<0.002	**3.49**	0.094	<0.002

Notes: All units mg/l
NM Standards: New Mexico Water Quality Control Commission Standards
Values that exceed these standards are bolded

FIGURES

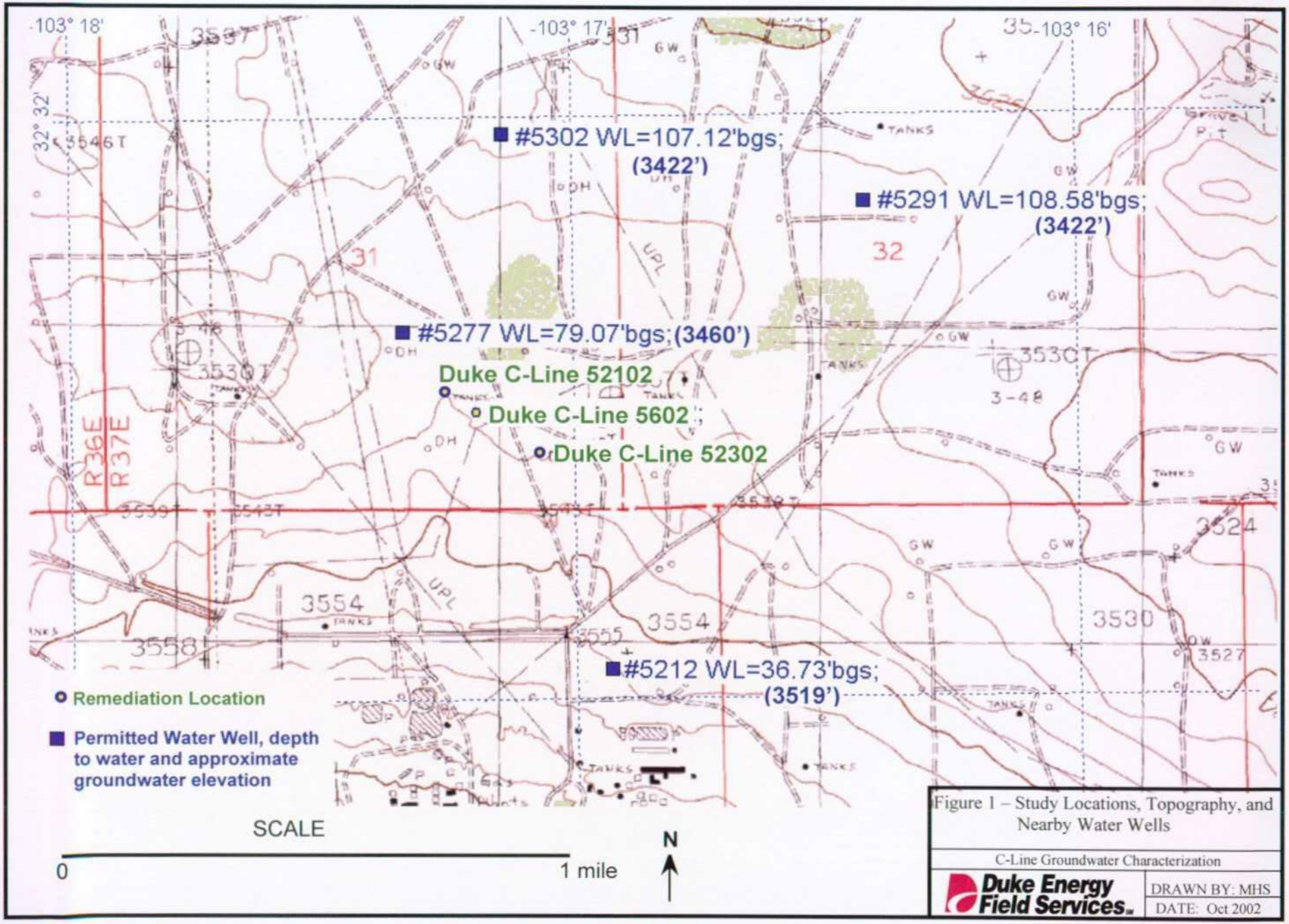


Figure 1 – Study Locations, Topography, and Nearby Water Wells

C-Line Groundwater Characterization

Duke Energy Field Services

DRAWN BY: MHS

DATE: Oct 2002

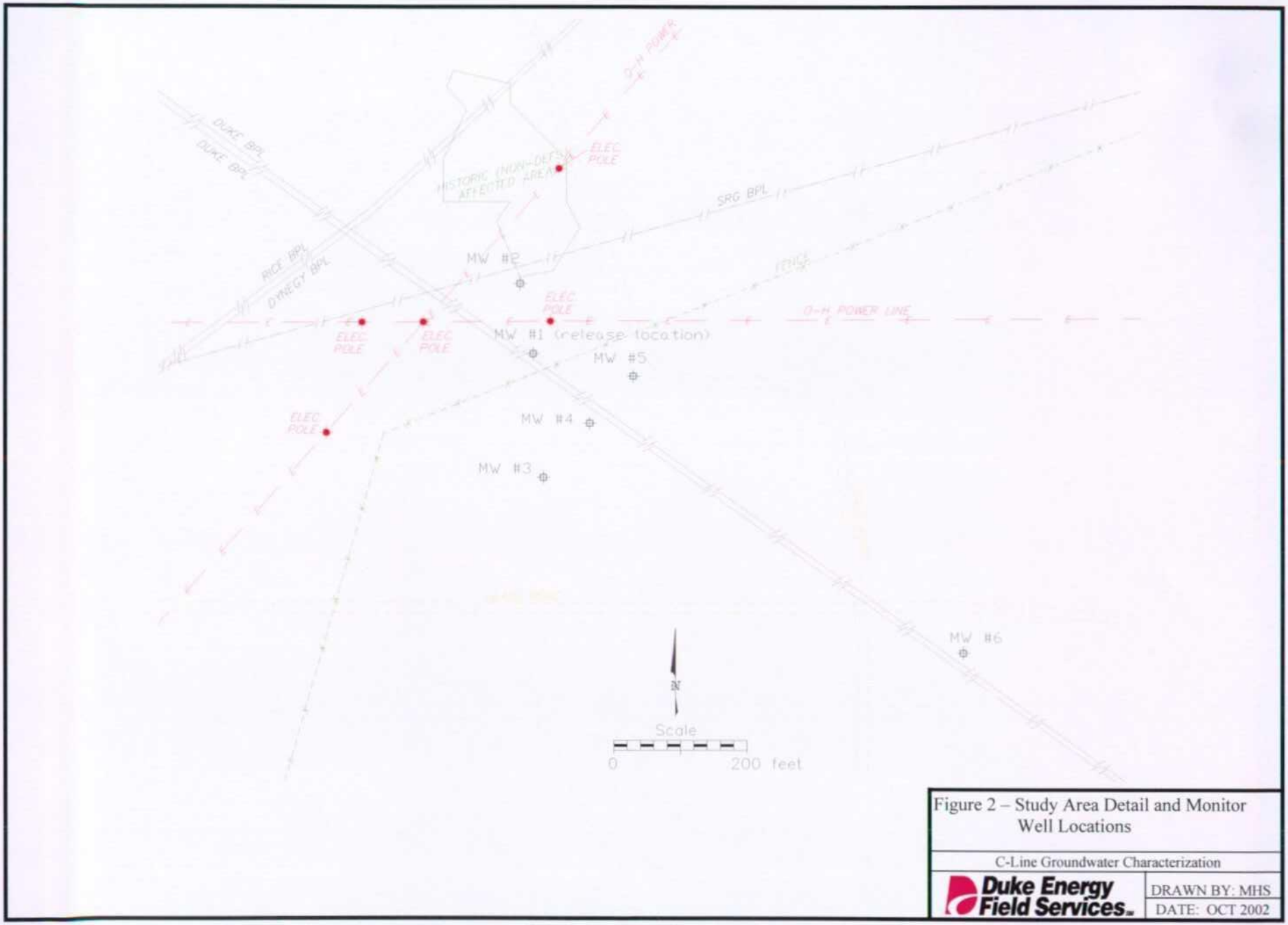


Figure 2 – Study Area Detail and Monitor Well Locations

C-Line Groundwater Characterization

Duke Energy Field Services

DRAWN BY: MHS

DATE: OCT 2002

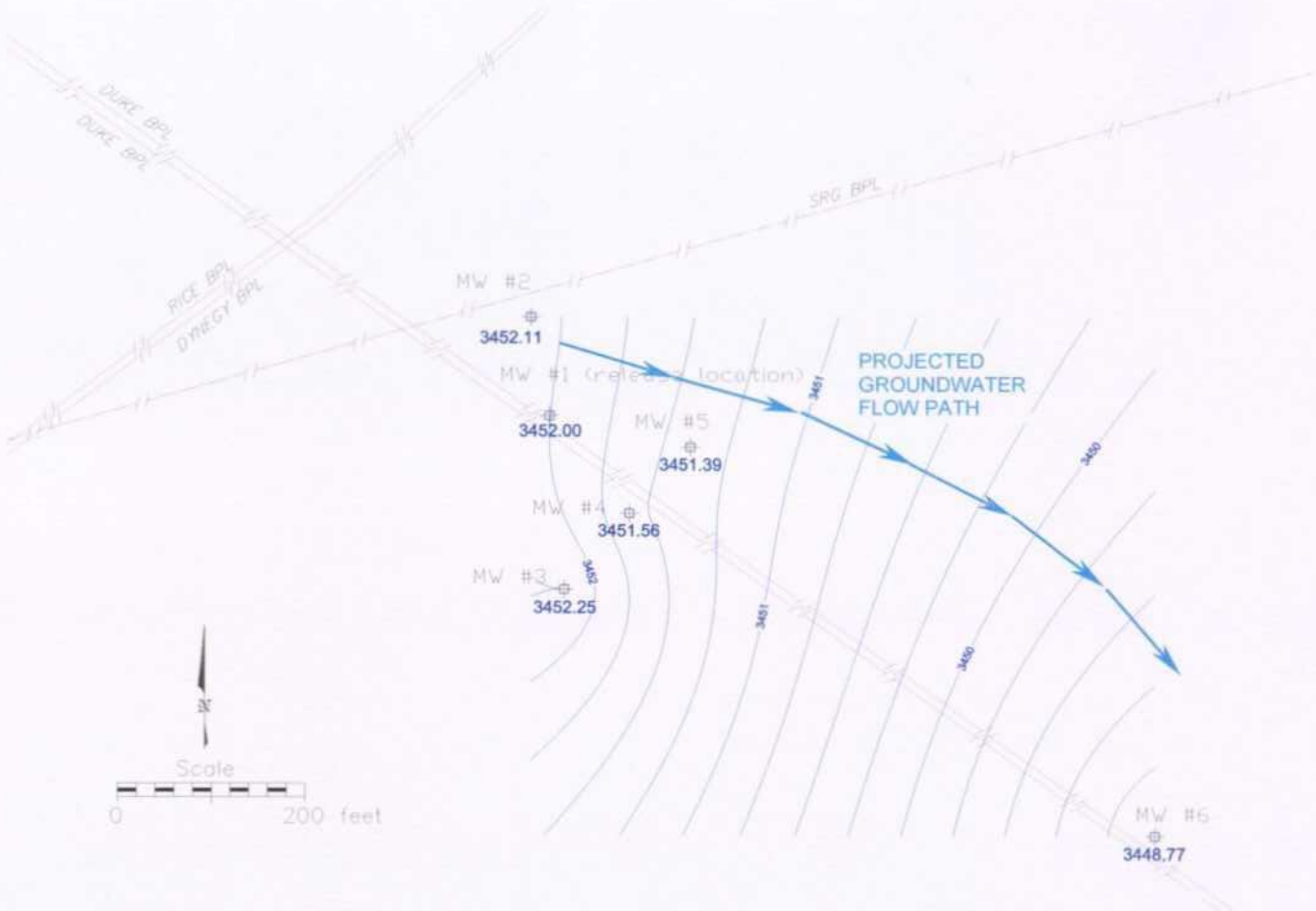


Figure 3 – November 2002 Water Table Elevations

C-Line Groundwater Characterization

Duke Energy Field Services

DRAWN BY: MHS

DATE: OCT 2002

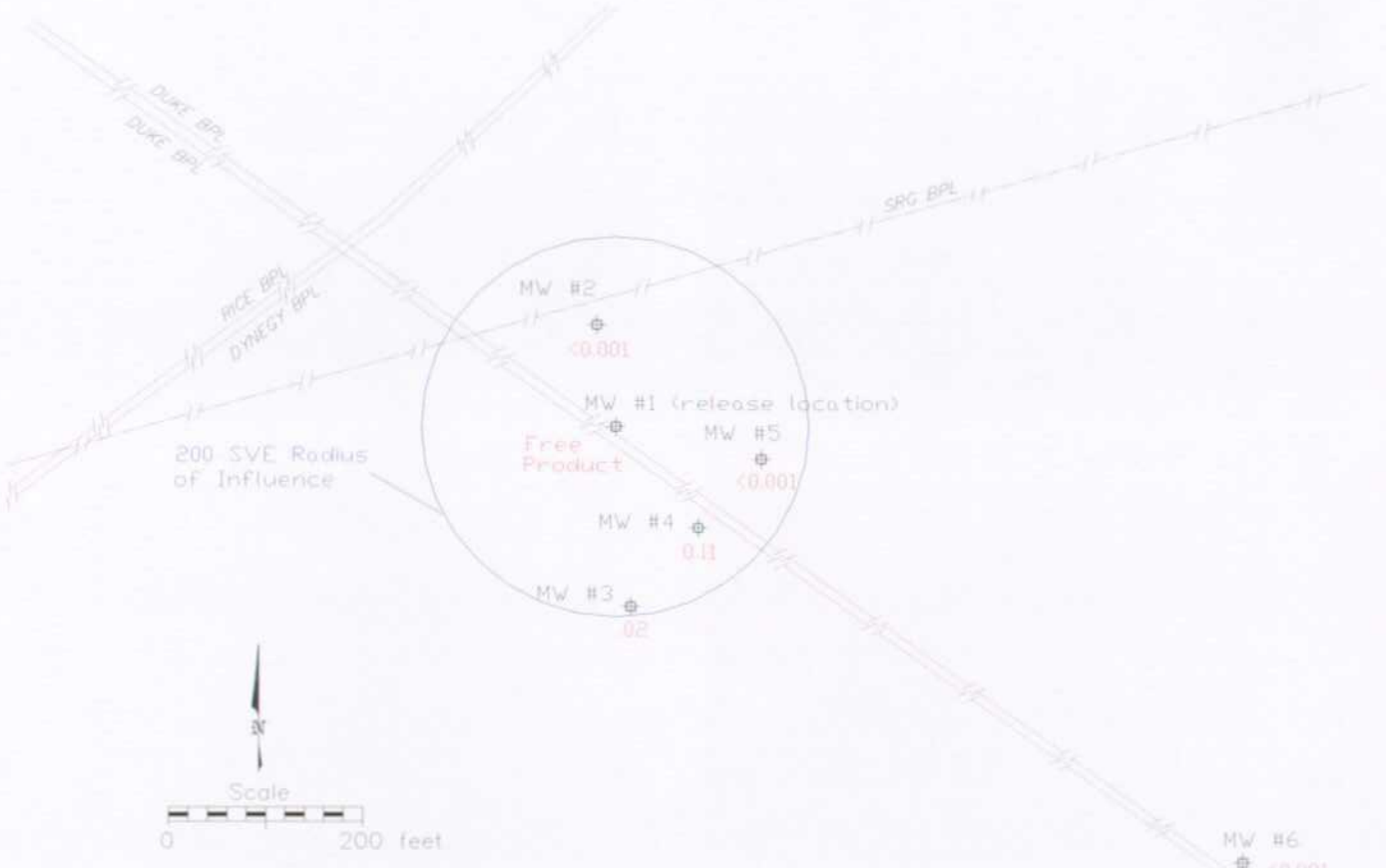


Figure 4 - Benzene Concentrations (ug/l) and 200 foot SVE Radius of Influence

C-Line Groundwater Characterization

Duke Energy Field Services

DRAWN BY: MHS

DATE: OCT 2002

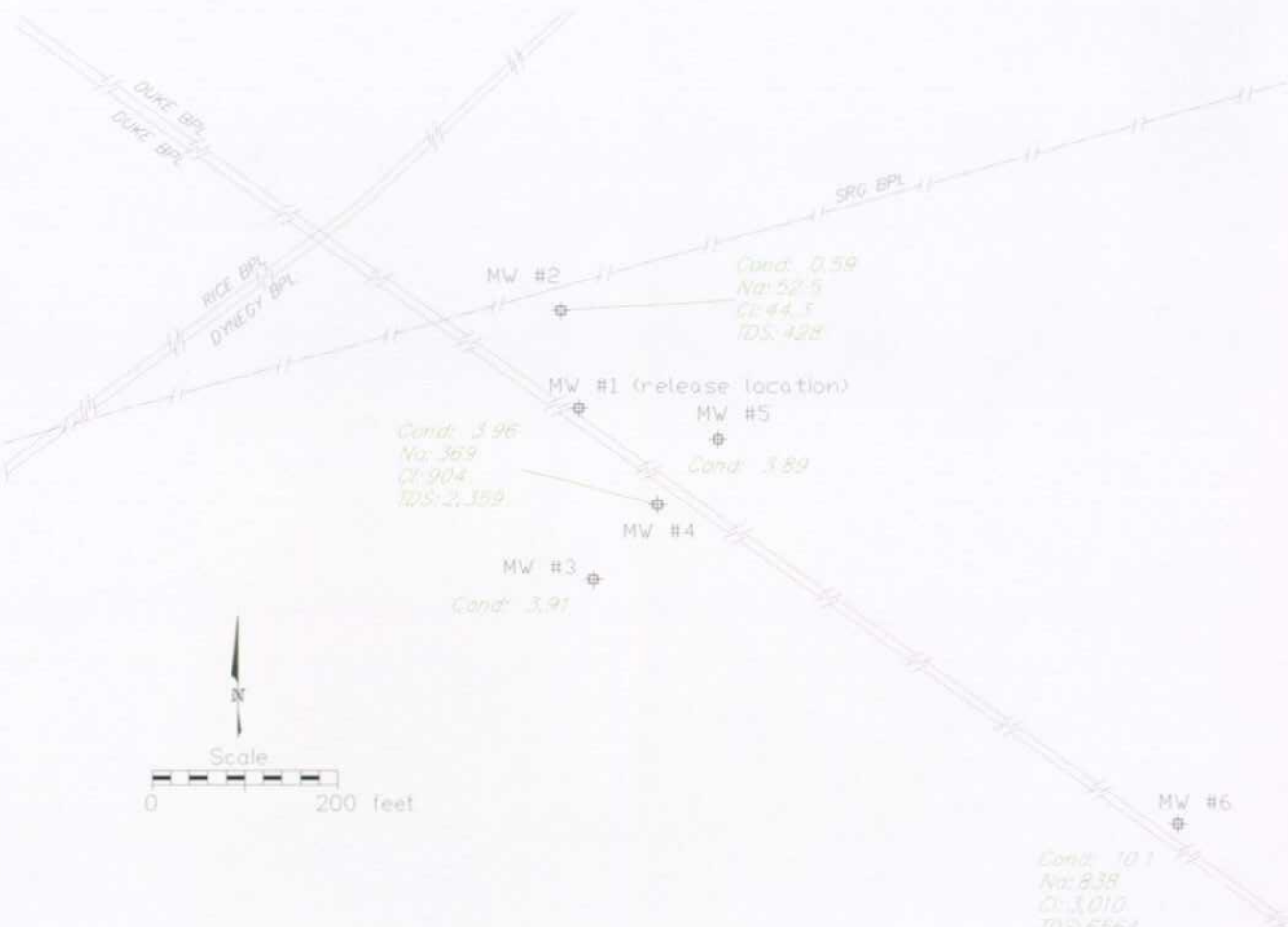


Figure 5 - Inorganic Constituent Concentrations (mg/l)

C-Line Groundwater Characterization

Duke Energy Field Services

DRAWN BY: MHS

DATE: OCT 2002

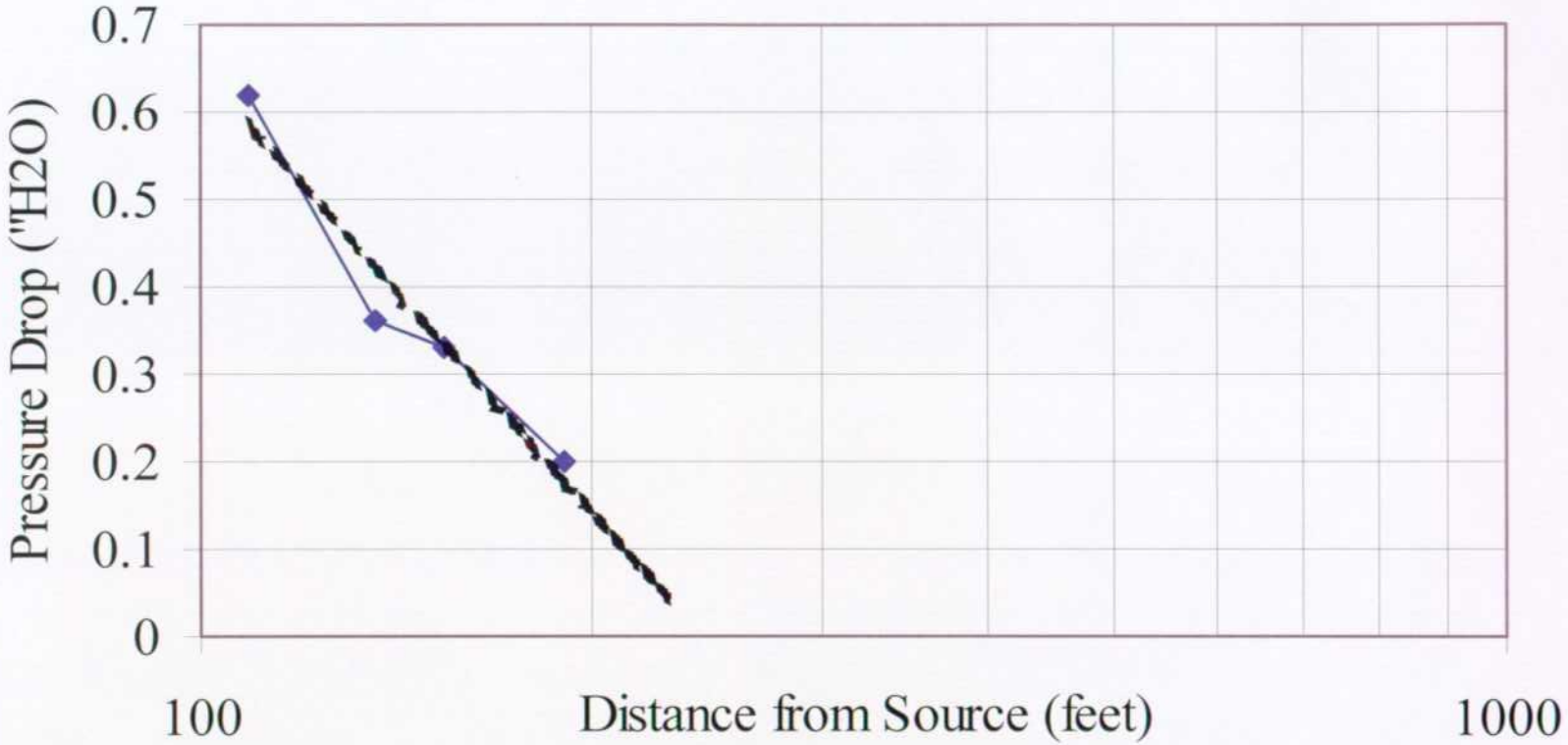


Figure 6 - Distance Verses Vacuum Results for SVE Pilot Test

C-Line Groundwater Characterization

Duke Energy Field Services

DRAWN BY: MHS

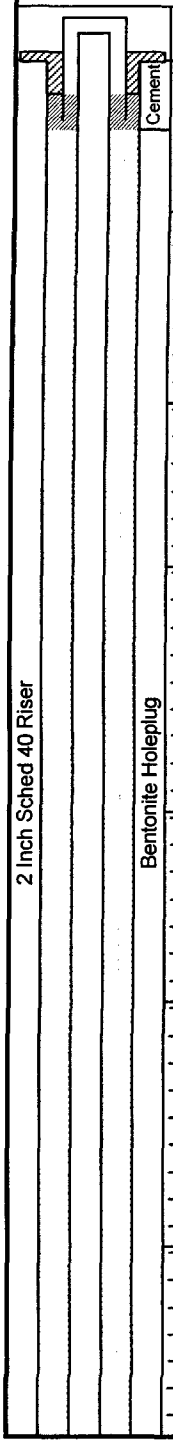
DATE: OCT 2002

APPENDIX 1
BORING LOGS AND WELL COMPLETIONS

LITHOLOGIC LOG (MONITORING WELL)

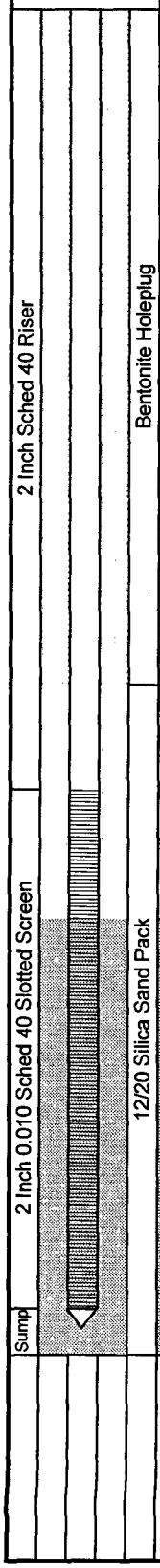
TRIDENT ENVIRONMENTAL

MONITORING WELL NO:	MW-2	TOTAL DEPTH:	102 Feet
SITE ID:	C Line	CLIENT:	Duke Energy Field Services
SURFACE ELEVATION:		COUNTY:	Lea
CONTRACTOR:	Eades Drilling	STATE:	New Mexico
DRILLING METHOD:	Air/Mud Rotary	LOCATION:	Monument, NM
START DATE:	11/5/2002	FIELD REP.:	J. Fergerson
COMPLETION DATE:	11/6/2002	FILE NAME:	
COMMENTS:			



LITH.	SAMPLE USCS	FROM	TO	TYPE	PID	DEPTH	LITHOLOGIC DESCRIPTION: LITHOLOGY, COLOR, GRAIN SIZE, SORTING, ROUNDING, CONSOL., DIST. FEATURES
	CL	4	5	Grab	4.5ppm	5	Silty Clay, lt brown-mod reddish brown, w 30% silt and tr caliche matrix, v moist, no odor.
	SM	9	10	Grab	2.2ppm	10	Silty Sand, v pale-mod orange, silt-vf grain, unconsol, w sorted, w/2% clay in matrix, interbedded w/mod-w cemented vf grain sand, moist, no odor.
	SM	14	15	Grab	5.6ppm	15	Silty Sand, mod reddish orange-lt brown, silt-vf grain, unconsol, w sorted, w/2% clay in matrix, interbedded w/mod-well cemente vf grain sand, moist, no odor.
	SM	19	20	Grab	3.3ppm	20	Silty Sand, v pale orange-lt brown, silt-vf grain, unconsol, w sorted, w/10% clay in matrix, interbedded w/mod-well cementec vf grain sand, sl hydrocarbon odor.
		24	25	Grab	7.8ppm	25	
	SM	29	30	Grab	11.3ppm	30	Silty Sand, mod reddish orange-lt brown, silt-vf grain, unconsol, w sorted, w/2% clay in matrix, interbedded w/mod-well cemente vf grain sand, sl hydrocarbon odor.
	SM	34	35	Grab	8.8ppm	35	Silty Sand, mod reddish orange-lt brown, silt-vf grain, unconsol, w sorted, w/2% clay in matrix, interbedded w/mod cemented vf grain sand, sl hydrocarbon odor.
		39	40	Grab	6.7ppm	40	
	SM	44	45	Grab	4.4ppm	45	Silty Sand, mod reddish orange-lt brown, silt-vf grain, unconsol, w sorted, w/2% clay in matrix, interbedded w/mod cemented vf grain sand, sl hydrocarbon odor.
						50	

MONITORING WELL NO: MW-2 TOTAL DEPTH: 102 Feet

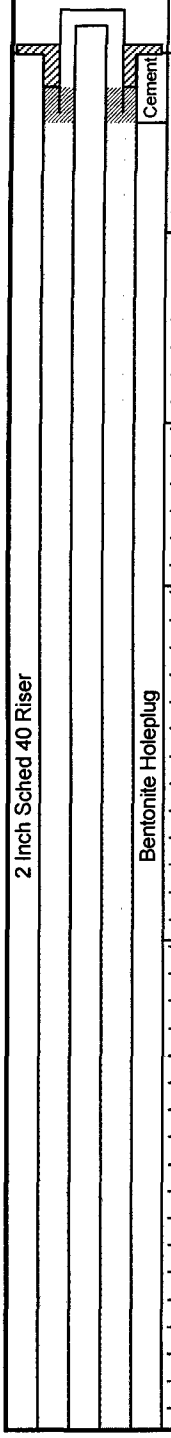


LITH.	SAMPLE USCS	FROM	TO	TYPE	PID	DEPTH	LITHOLOGIC DESCRIPTION: LITHOLOGY, COLOR, GRAIN SIZE, SORTING, ROUNDING, CONSOL., DIST. FEATURES
	SM	59	60	Grab	7.8ppm	55 60	Silty Sand, mod reddish orange-lt brown, silt-vf grain, unconsol, w sorted, w/2% clay in matrix, interbedded w/mod cemented vf grain sand, sl hydrocarbon odor.
	SM	69	70	Grab	3.4ppm	65 70 75	Silty Sand, mod reddish orange-lt brown, silt-vf grain, unconsol, w sorted, w/2% clay in matrix, interbedded w/mod cemented vf grain sand, sl hydrocarbon odor.
	SM	79	80	Grab	2.3ppm	80 85	Silty Sand, mod reddish orange-lt brown, silt-vf grain, unconsol, w sorted, w/2% clay in matrix, interbedded w/mod cemented vf grain sand, v moist, no odor. Encountered Groundwater!
	SM					90 95 100	Silty Sand, mod reddish orange-lt brown, silt-vf grain, unconsol, w sorted, w/2% clay in matrix, interbedded w/mod cemented vf grain sand, wet, no odor. TD @ 102 Feet!
						105 110	

LITHOLOGIC LOG (MONITORING WELL)

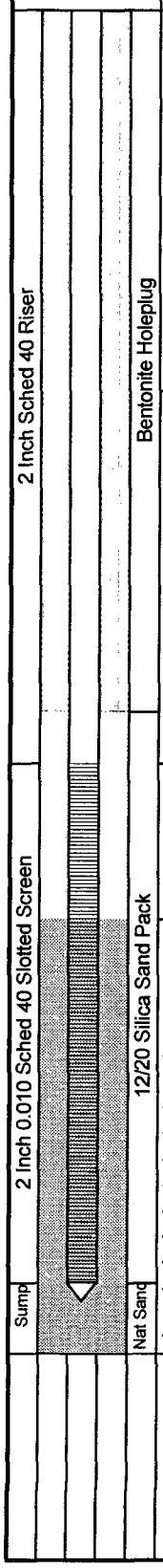
TRIDENT ENVIRONMENTAL

MONITORING WELL NO:	MW-3	TOTAL DEPTH:	102 Feet
SITE ID:	C Line	CLIENT:	Duke Energy Field Services
SURFACE ELEVATION:		COUNTY:	Lea
CONTRACTOR:	Eades Drilling	STATE:	New Mexico
DRILLING METHOD:	Air/Mud Rotary	LOCATION:	Monument, NM
START DATE:	11/8/2002	FIELD REP.:	J. Fergerson
COMPLETION DATE:	11/8/2002	FILE NAME:	
COMMENTS:			



LITH.	SAMPLE USCS	FROM	TO	TYPE	PID	DEPTH	LITHOLOGIC DESCRIPTION: LITHOLOGY, COLOR, GRAIN SIZE, SORTING, ROUNDING, CONSOL., DIST. FEATURES
	CL					5	Silty Clay, lt brown-mod reddish brown, w 30% silt and tr caliche matrix, v moist, no odor.
	SM					10	Silty Sand, v pale-mod orange, silt-vf grain, unconsol, w sorted, w/2% clay in matrix, interbedded w/mod-w cemented vf grain sand, moist, no odor.
	SM					15	Silty Sand, mod reddish orange-lt brown, silt-vf grain, unconsol, w sorted, w/2% clay in matrix, interbedded w/mod-well cemented vf grain sand, moist, no odor.
	SM	19	20	Grab	1.0ppm	20	Silty Sand, v pale orange-lt brown, silt-vf grain, unconsol, w sorted, w/10% clay in matrix, interbedded w/mod-well cemented vf grain sand, no odor.
						25	
						30	
	SM					35	Silty Sand, mod reddish orange-lt brown, silt-vf grain, unconsol, w sorted, w/2% clay in matrix, interbedded w/mod cemented vf grain sand, no odor.
	SM	39	40	Grab	1.3ppm	40	
						45	
						50	

MONITORING WELL NO: MW-3 TOTAL DEPTH: 102 Feet

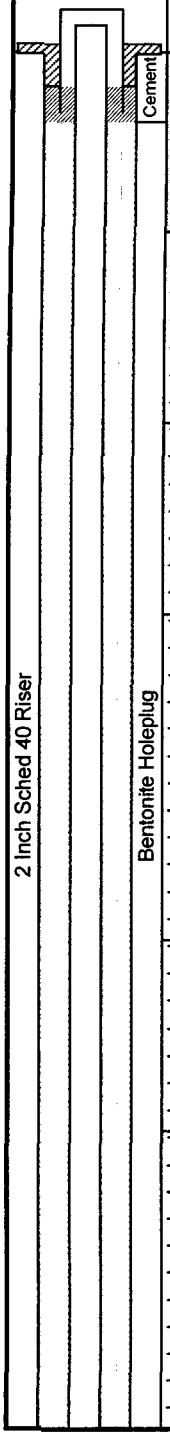


LITH.	SAMPLE USCS	FROM	TO	TYPE	PID	DEPTH	LITHOLOGIC DESCRIPTION: LITHOLOGY, COLOR, GRAIN SIZE, SORTING, ROUNDING, CONSOL., DIST. FEATURES
	SM	59	60	Grab	0.6ppm	55	Silty Sand, mod reddish orange-lt brown, silt-vf grain, unconsol, w sorted, w/2% clay in matrix, interbedded w/mod cemented vf grain sand, no odor.
						60	
						65	
	SM					70	Silty Sand, mod reddish orange-lt brown, silt-vf grain, unconsol, w sorted, w/2% clay in matrix, interbedded w/mod cemented vf grain sand, no odor.
						75	
						80	
	SM					85	Silty Sand, mod reddish orange-lt brown, silt-vf grain, unconsol, w sorted, w/2% clay in matrix, interbedded w/mod cemented vf grain sand, v moist, no odor.
							Encountered Groundwater!
	SM					90	Silty Sand, mod reddish orange-lt brown, silt-vf grain, unconsol, w sorted, w/2% clay in matrix, interbedded w/mod cemented vf grain sand, wet, no odor.
						95	
						100	
							TD @ 102 Feet
						105	
						110	

LITHOLOGIC LOG (MONITORING WELL)

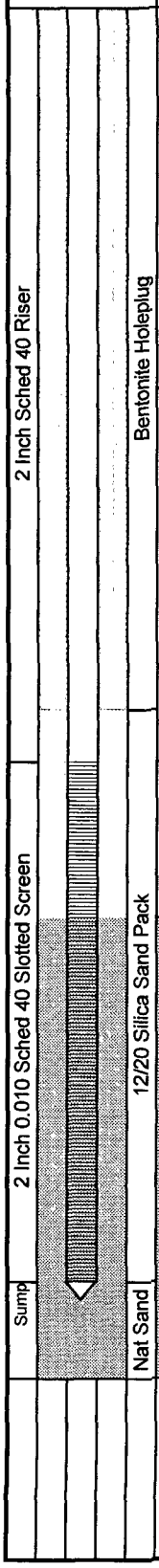
TRIDENT ENVIRONMENTAL

MONITORING WELL NO:	MW-4	TOTAL DEPTH:	103 Feet
SITE ID:	C Line	CLIENT:	Duke Energy Field Services
SURFACE ELEVATION:		COUNTY:	Lea
CONTRACTOR:	Eades Drilling	STATE:	N ew Mexico
DRILLING METHOD:	Air/Mud Rotary	LOCATION:	Monument, NM
START DATE:	11/8/2002	FIELD REP.:	J. Fergerson
COMPLETION DATE:	11/8/2002	FILE NAME:	
COMMENTS:			



LITH.	SAMPLE USCS	FROM	TO	TYPE	PID	DEPTH	LITHOLOGIC DESCRIPTION: LITHOLOGY, COLOR, GRAIN SIZE, SORTING, ROUNDING, CONSOL., DIST. FEATURES
	CL					5	Silty Clay, lt brown-mod reddish brown, w 30% silt and tr caliche matrix, v moist, no odor.
	SM	9	10	Grab	1.7ppm	10	Silty Sand, v pale-mod orange, silt-vf grain, unconsol, w sorted, w/2% clay in matrix, interbedded w/mod-w cemented vf grain sand, moist, no odor.
	SM					15	Silty Sand, mod reddish orange-lt brown, silt-vf grain, unconsol, w sorted, w/2% clay in matrix, interbedded w/mod-well cemente vf grain sand, moist, no odor.
	SM	19	20	Grab	1.0ppm	20	Silty Sand, v pale orange-lt brown, silt-vf grain, unconsol, w sorted, w/10% clay in matrix, interbedded w/mod-well cemented vf grain sand, sl hydrocarbon odor.
	SM	29	30	Grab	1.3ppm	25 30	
	SM					35	Silty Sand, mod reddish orange-lt brown, silt-vf grain, unconsol, w sorted, w/2% clay in matrix, interbedded w/mod cemented vf grain sand, no odor.
	SM	39	40	Grab	3.1ppm	40 45	Silty Sand, mod reddish orange-lt brown, silt-vf grain, unconsol, w sorted, w/2% clay in matrix, interbedded w/mod cemented vf grain sand, sl hydrocarbon odor.
	SM	49	50	Grab	3.1ppm	50	

MONITORING WELL NO: MW-4 TOTAL DEPTH: 103 Feet

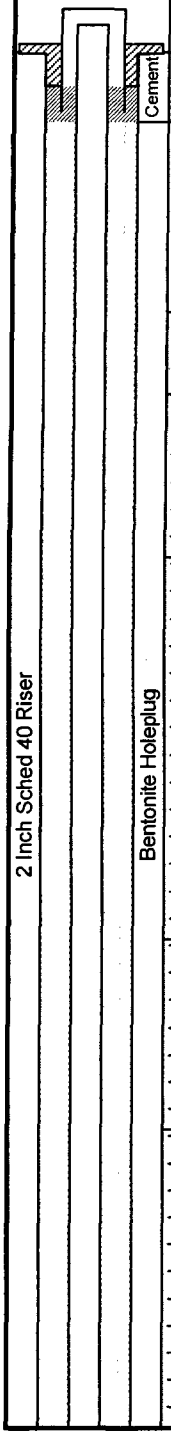


LITH.	SAMPLE USCS	FROM	TO	TYPE	PID	DEPTH	LITHOLOGIC DESCRIPTION: LITHOLOGY, COLOR, GRAIN SIZE, SORTING, ROUNDING, CONSOL., DIST. FEATURES
	SM	59	60	Grab	2.0ppm	55	Silty Sand, mod reddish orange-lt brown, silt-vf grain, unconsol, w sorted, w/2% clay in matrix, interbedded w/mod cemented vf grain sand, sl hydrocarbon odor.
						60	
						65	
	SM					70	Silty Sand, mod reddish orange-lt brown, silt-vf grain, unconsol, w sorted, w/2% clay in matrix, interbedded w/mod-w cemented grain sand, no odor.
						75	
						80	
	SM					85	Silty Sand, mod reddish orange-lt brown, silt-vf grain, unconsol, w sorted, w/2% clay in matrix, interbedded w/mod-w cemented grain sand, v moist, no odor. Encountered Groundwater!
	SM					90	Silty Sand, mod reddish orange-lt brown, silt-vf grain, unconsol, w sorted, w/2% clay in matrix, interbedded w/mod-w cemented grain sand, wet, no odor.
						95	
						100	TD @ 103 Feet!
						105	
						110	

LITHOLOGIC LOG (MONITORING WELL)

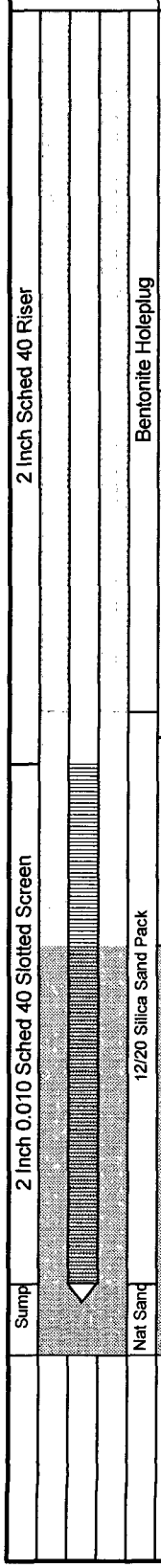
TRIDENT ENVIRONMENTAL

MONITORING WELL NO:	MW-5	TOTAL DEPTH:	102 Feet
SITE ID:	C Line	CLIENT:	Duke Energy Field Services
SURFACE ELEVATION:		COUNTY:	Lea
CONTRACTOR:	Eades Drilling	STATE:	New Mexico
DRILLING METHOD:	Air/Mud Rotary	LOCATION:	Monument, NM
START DATE:	11/7/2002	FIELD REP.:	J. Fergerson
COMPLETION DATE:	11/7/2002	FILE NAME:	
COMMENTS:			



LITH.	SAMPLE USCS	FROM	TO	TYPE	PID	DEPTH	LITHOLOGIC DESCRIPTION: LITHOLOGY, COLOR, GRAIN SIZE, SORTING, ROUNDING, CONSOL., DIST. FEATURES
	CL						Silty Clay, lt brown-mod reddish brown, w 30% silt and tr caliche matrix, v moist, no odor.
	SM					5	Silty Sand, v pale-mod orange, silt-vf grain, unconsol, w sorted, w/2% clay in matrix, interbedded w/mod-w cemented vf grain sand, v moist, no odor.
	CL	9	10	Grab	0.0ppm	10	Silty Clay, lt brown-mod reddish brown, w 30% silt and tr caliche matrix, v moist, no odor.
	SM					15	Silty Sand, mod reddish orange-lt brown, silt-vf grain, unconsol, w sorted, w/2% clay in matrix, interbedded w/mod-well cemented vf grain sand, moist, no odor.
	SM	19	20	Grab	2.4ppm	20	Silty Sand, v pale orange-lt brown, silt-vf grain, unconsol, w sorted, w/10% clay in matrix, interbedded w/mod-well cemented vf grain sand, no odor.
						25	
		29	30	Grab	3.4ppm	30	
	SM					35	Silty Sand, mod reddish orange-lt brown, silt-vf grain, unconsol, w sorted, w/2% clay in matrix, interbedded w/mod cemented vf grain sand, no odor.
	SM	39	40	Grab	4.1ppm	40	Silty Sand, mod reddish orange-lt brown, silt-vf grain, unconsol, w sorted, w/2% clay in matrix, interbedded w/mod cemented vf grain sand, sl hydrocarbon odor.
						45	
		49	50	Grab	3.2ppm	50	

MONITORING WELL NO: MW-5 TOTAL DEPTH: 102 Feet

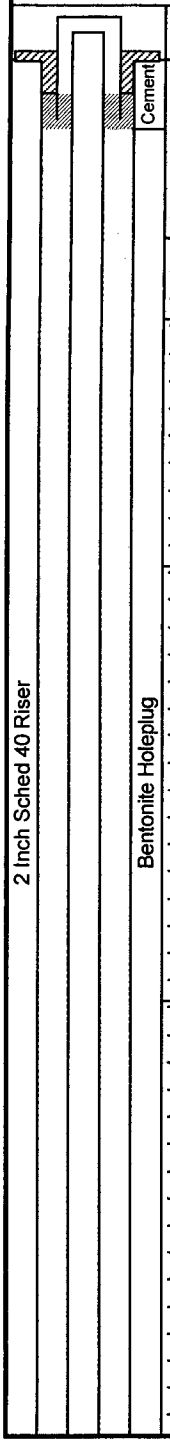


LITH.	SAMPLE USCS	FROM	TO	TYPE	PID	DEPTH	LITHOLOGIC DESCRIPTION: LITHOLOGY, COLOR, GRAIN SIZE, SORTING, ROUNDING, CONSOL., DIST. FEATURES
							Silty Sand, mod reddish orange-lt brown, silt-vf grain, unconsol, w sorted, w/2% clay in matrix, interbedded w/mod-w cemented v grain sand, sl hydrocarbon odor.
						55	
	SM	59	60	Grab	3.4ppm	60	
						65	
							Silty Sand, mod reddish orange-lt brown, silt-vf grain, unconsol, w sorted, w/2% clay in matrix, interbedded w/mod-w cemented v grain sand, sl hydrocarbon odor.
	SM	69	70	Grab	4.8ppm	70	
						75	
	SM	79	80	Grab	5.1ppm	80	Silty Sand, mod reddish orange-lt brown, silt-vf grain, unconsol, w sorted, w/2% clay in matrix, interbedded w/mod cemented vf grain sand, v moist, sl hydrocarbon odor.
		84	85	Grab	3.1ppm	85	Encountered Groundwater!
							Silty Sand, mod reddish orange-lt brown, silt-vf grain, unconsol, w sorted, w/2% clay in matrix, interbedded w/mod cemented vf grain sand, wet, sl hydrocarbon odor.
	SM					90	
						95	
						100	TD @ 102 Feet
						105	
						110	

LITHOLOGIC LOG (MONITORING WELL)

TRIDENT ENVIRONMENTAL

MONITORING WELL NO:	MW-6	TOTAL DEPTH:	102 Feet
SITE ID:	C Line	CLIENT:	Duke Energy Field Services
SURFACE ELEVATION:		COUNTY:	Lea County
CONTRACTOR:	Eades Drilling	STATE:	New Mexico
DRILLING METHOD:	Air/Mud Rotary	LOCATION:	
START DATE:	11/6/2002	FIELD REP.:	J. Fergerson
COMPLETION DATE:	11/7/2002	FILE NAME:	
COMMENTS:			



LITH.	SAMPLE USCS	FROM	TO	TYPE	PID	DEPTH	LITHOLOGIC DESCRIPTION: LITHOLOGY, COLOR, GRAIN SIZE, SORTING, ROUNDING, CONSOL., DIST. FEATURES
	CL					5	Silty Clay, lt brown-mod reddish brown, w 30% silt and tr caliche matrix, v moist, no odor.
	SM						Silty Sand, grayish-mod orange pink, silt-vf grain, unconsol, w sorted, w/2% clay in matrix, interbedded w/mod-w cemented vf grain sand, v moist, no odor.
	SM	9	10	Grab	1.1ppm	10	Silty Sand, mod reddish orange-lt brown, silt-vf grain, unconsol w sorted, w/2% clay in matrix, interbedded w/mod-well cemente vf grain sand, moist, no odor.
						15	
	SM	19	20	Grab	2.0ppm	20	Silty Sand, v pale orange-lt brown, silt-vf grain, unconsol, w sorted, w/10% clay in matrix, interbedded w/mod-well cementec vf grain sand, no odor.
						25	
		29	30	Grab	2.7ppm	30	
						35	Silty Sand, mod orange pink-lt brown, silt-vf grain, unconsol, w sorted, w/2% clay in matrix, interbedded w/mod-w cemented vf grain sand, moist, no odor.
		39	40	Grab	2.3ppm	40	
						45	
		49	50	Grab	3.1ppm	50	

MONITORING WELL NO: MW-6 TOTAL DEPTH: 102 Feet

LITH.	SAMPLE USCS	FROM	TO	TYPE	PID	DEPTH	LITHOLOGIC DESCRIPTION: LITHOLOGY, COLOR, GRAIN SIZE, SORTING, ROUNDING, CONSOL., DIST. FEATURES
	SM	59	60	Grab	2.7ppm	55	Silty Sand, mod reddish orange-lt brown, silt-vf grain, unconsol w sorted, w/2% clay in matrix, interbedded w/mod cemented vf grain sand, no odor.
						60	
						65	
	SM	69	70	Grab	1.7ppm	70	Silty Sand, mod reddish orange-lt brown, silt-vf grain, unconsol w sorted, w/2% clay in matrix, interbedded w/mod cemented vf grain sand, no odor.
						75	
	SM					80	Silty Sand, mod reddish orange-lt brown, silt-vf grain, unconsol w sorted, w/2% clay in matrix, interbedded w/mod cemented vf grain sand, v moist, no odor.
						85	Estimated Depth to Groundwater!
	SM					90	Silty Sand, mod reddish orange-lt brown, silt-vf grain, unconsol, w sorted, w/2% clay in matrix, interbedded w/mod cemented vf grain sand, wet, no odor.
						95	
						100	TD @ 102 Feet
						105	
						110	

APPENDIX 2
LABORATORY ANALYTICAL REPORT

ANALYTICAL REPORT

Prepared for:

JOHN FERGERSON
TRIDENT ENVIRONMENTAL
P.O BOX 7624
MIDLAND, TX 79708

Project:	Duke Energy Field Services
PO#:	
Order#:	G0205055
Report Date:	11/25/2002

Certificates
US EPA Laboratory Code TX00158

ENVIRONMENTAL LAB OF TEXAS

SAMPLE WORK LIST

TRIDENT ENVIRONMENTAL
P.O BOX 7624
MIDLAND, TX 79708
262-5216

Order#: G0205055
Project: F-107
Project Name: Duke Energy Field Services
Location: C-Line

The samples listed below were submitted to Environmental Lab of Texas and were received under chain of custody. Environmental Lab of Texas makes no representation or certification as to the method of sample collection, sample identification, or transportation/handling procedures used prior to the receipt of samples by Environmental Lab of Texas, unless otherwise noted.

Lab ID:	Sample :	Matrix:	Date / Time Collected	Date / Time Received	Container	Preservative
0205055-01	0211151220 (MW-2)	WATER	11/15/02 12:20	11/18/02 11:50	40 mL VOA	Ice

Lab Testing: **Rejected:** No **Temp:** -0.5 C

8015M
8021B/5030 BTEX
Anions
Cations
METALS RCRA 7 Total
Iron
Manganese
Mercury, Total
Total Dissolved Solids (TDS)

0205055-02	0211151340 (MW-5)	WATER	11/15/02 13:40	11/18/02 11:50	40 mL VOA	Ice

Lab Testing: **Rejected:** No **Temp:** -0.5 C

8015M
8021B/5030 BTEX

0205055-03	0211151510 (MW-4)	WATER	11/15/02 15:10	11/18/02 11:50	40 mL VOA	Ice

Lab Testing: **Rejected:** No **Temp:** -0.5 C

8015M
8021B/5030 BTEX
Anions
Cations
METALS RCRA 7 Total
Iron
Manganese
Mercury, Total
Total Dissolved Solids (TDS)

0205055-04	0211151610 (MW-3)	WATER	11/15/02 16:10	11/18/02 11:50	40 mL VOA	Ice

Lab Testing: **Rejected:** No **Temp:** -0.5 C

8015M
8021B/5030 BTEX

ENVIRONMENTAL LAB OF TEXAS

SAMPLE WORK LIST

TRIDENT ENVIRONMENTAL
P.O BOX 7624
MIDLAND, TX 79708
262-5216

Order#: G0205055
Project: F-107
Project Name: *Duke Energy Field Services*
Location: C-Line

The samples listed below were submitted to Environmental Lab of Texas and were received under chain of custody. Environmental Lab of Texas makes no representation or certification as to the method of sample collection, sample identification, or transportation/handling procedures used prior to the receipt of samples by Environmental Lab of Texas, unless otherwise noted.

Lab ID:	Sample :	Matrix:	Date / Time Collected	Date / Time Received	Container	Preservative
0205055-05	0211151720 (MW-6)	WATER	11/15/02 17:20	11/18/02 11:50	40 mL VOA	Ice
	Lab Testing:	**Rejected:** No		**Temp:** -0.5 C		
	8015M					
	8021B/5030 BTEX					
	Anions					
	Cations					
	METALS RCRA 7 Total					
	Iron					
	Manganese					
	Mercury, Total					
	Total Dissolved Solids (TDS)					
0205055-06	0211150000 (Duplicate)	WATER	11/15/02	11/18/02 11:50	40 mL VOA	Ice
	Lab Testing:	**Rejected:** No		**Temp:** -0.5 C		
	8021B/5030 BTEX					
0205055-07	Trip Blank	WATER	11/15/02	11/18/02 11:50	40 mL VOA	Ice
	Lab Testing:	**Rejected:** No		**Temp:** -0.5 C		
	8021B/5030 BTEX					

ENVIRONMENTAL LAB OF TEXAS

ANALYTICAL REPORT

JOHN FERGERSON
TRIDENT ENVIRONMENTAL
P.O BOX 7624
MIDLAND, TX 79708

Order#: G0205055
Project: F-107
Project Name: Duke Energy Field Services
Location: C-Line

Lab ID: 0205055-01
Sample ID: 0211151220 (MW-2)

8015M

Method Blank	Date Prepared	Date Analyzed	Sample Amount	Dilution Factor	Analyst	Method
		11/18/02	1	1	CK	8015M

Parameter	Result mg/L	RL
GRO, C6-C12	<3.00	3.00
DRO, >C12-C35	<3.00	3.00
TOTAL, C6-C35	<3.00	3.00

Surrogates	% Recovered	QC Limits (%)	
1-Chlorooctane	93%	70	130
1-Chlorooctadecane	89%	70	130

8021B/5030 BTEX

Method Blank	Date Prepared	Date Analyzed	Sample Amount	Dilution Factor	Analyst	Method
0003832-02		11/20/02 20:11	1	1	CK	8021B

Parameter	Result mg/L	RL
Benzene	<0.001	0.001
Ethylbenzene	<0.001	0.001
Toluene	<0.001	0.001
p/m-Xylene	<0.001	0.001
o-Xylene	<0.001	0.001

Surrogates	% Recovered	QC Limits (%)	
aaa-Toluene	87%	80	120
Bromofluorobenzene	87%	80	120

DL = Diluted out N/A = Not Applicable RL = Reporting Limit

ENVIRONMENTAL LAB OF TEXAS

ANALYTICAL REPORT

JOHN FERGERSON
TRIDENT ENVIRONMENTAL
P.O BOX 7624
MIDLAND, TX 79708

Order#: G0205055
Project: F-107
Project Name: Duke Energy Field Services
Location: C-Line

Lab ID: 0205055-02
Sample ID: 0211151340 (MW-5)

8015M

Method Blank	Date Prepared	Date Analyzed	Sample Amount	Dilution Factor	Analyst	Method
		11/18/02	1	1	CK	8015M

Parameter	Result mg/L	RL
GRO, C6-C12	<3.00	3.00
DRO, >C12-C35	<3.00	3.00
TOTAL, C6-C35	<3.00	3.00

Surrogates	% Recovered	QC Limits (%)	
1-Chlorooctane	92%	70	130
1-Chlorooctadecane	88%	70	130

8021B/5030 BTEX

Method Blank	Date Prepared	Date Analyzed	Sample Amount	Dilution Factor	Analyst	Method
0003832-02		11/20/02 20:32	1	1	CK	8021B

Parameter	Result mg/L	RL
Benzene	<0.001	0.001
Ethylbenzene	<0.001	0.001
Toluene	<0.001	0.001
p/m-Xylene	<0.001	0.001
o-Xylene	<0.001	0.001

Surrogates	% Recovered	QC Limits (%)	
aaa-Toluene	93%	80	120
Bromofluorobenzene	90%	80	120

DL = Diluted out N/A = Not Applicable RL = Reporting Limit

ENVIRONMENTAL LAB OF TEXAS

ANALYTICAL REPORT

JOHN FERGERSON
TRIDENT ENVIRONMENTAL
P.O BOX 7624
MIDLAND, TX 79708

Order#: G0205055
Project: F-107
Project Name: Duke Energy Field Services
Location: C-Line

Lab ID: 0205055-03
Sample ID: 0211151510 (MW-4)

8015M

Method Blank	Date Prepared	Date Analyzed	Sample Amount	Dilution Factor	Analyst	Method
		11/18/02	1	1	CK	8015M

Parameter	Result mg/L	RL
GRO, C6-C12	<3.00	3.00
DRO, >C12-C35	<3.00	3.00
TOTAL, C6-C35	<3.00	3.00

Surrogates	% Recovered	QC Limits (%)	
1-Chlorooctane	89%	70	130
1-Chlorooctadecane	95%	70	130

8021B/5030 BTEX

Method Blank	Date Prepared	Date Analyzed	Sample Amount	Dilution Factor	Analyst	Method
0003832-02		11/20/02 20:51	1	1	CK	8021B

Parameter	Result mg/L	RL
Benzene	0.114	0.001
Ethylbenzene	0.002	0.001
Toluene	0.039	0.001
p/m-Xylene	0.003	0.001
o-Xylene	<0.001	0.001

Surrogates	% Recovered	QC Limits (%)	
aaa-Toluene	193%	80	120
Bromofluorobenzene	93%	80	120

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ENVIRONMENTAL LAB OF TEXAS

ANALYTICAL REPORT

JOHN FERGERSON
TRIDENT ENVIRONMENTAL
P.O BOX 7624
MIDLAND, TX 79708

Order#: G0205055
Project: F-107
Project Name: Duke Energy Field Services
Location: C-Line

Lab ID: 0205055-04
Sample ID: 0211151610 (MW-3)

8015M

Method Blank	Date Prepared	Date Analyzed	Sample Amount	Dilution Factor	Analyst	Method
		11/18/02	1	1	CK	8015M

Parameter	Result mg/L	RL
GRO, C6-C12	<3.00	3.00
DRO, >C12-C35	<3.00	3.00
TOTAL, C6-C35	<3.00	3.00

Surrogates	% Recovered	QC Limits (%)	
1-Chlorooctane	91%	70	130
1-Chlorooctadecane	87%	70	130

8021B/5030 BTEX

Method Blank	Date Prepared	Date Analyzed	Sample Amount	Dilution Factor	Analyst	Method
0003832-02		11/20/02 21:10	1	1	CK	8021B

Parameter	Result mg/L	RL
Benzene	0.017	0.001
Ethylbenzene	<0.001	0.001
Toluene	0.005	0.001
p/m-Xylene	<0.001	0.001
o-Xylene	<0.001	0.001

Surrogates	% Recovered	QC Limits (%)	
aaa-Toluene	141%	80	120
Bromofluorobenzene	95%	80	120

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ENVIRONMENTAL LAB OF TEXAS

ANALYTICAL REPORT

JOHN FERGERSON
TRIDENT ENVIRONMENTAL
P.O BOX 7624
MIDLAND, TX 79708

Order#: G0205055
Project: F-107
Project Name: Duke Energy Field Services
Location: C-Line

Lab ID: 0205055-05
Sample ID: 0211151720 (MW-6)

8015M

Method Blank	Date Prepared	Date Analyzed	Sample Amount	Dilution Factor	Analyst	Method
		11/18/02	1	1	CK	8015M

Parameter	Result mg/L	RL
GRO, C6-C12	<3.00	3.00
DRO, >C12-C35	<3.00	3.00
TOTAL, C6-C35	<3.00	3.00

Surrogates	% Recovered	QC Limits (%)	
1-Chlorooctane	91%	70	130
1-Chlorooctadecane	88%	70	130

8021B/5030 BTEX

Method Blank	Date Prepared	Date Analyzed	Sample Amount	Dilution Factor	Analyst	Method
0003832-02		11/20/02 21:29	1	1	CK	8021B

Parameter	Result mg/L	RL
Benzene	<0.001	0.001
Ethylbenzene	<0.001	0.001
Toluene	<0.001	0.001
p/m-Xylene	<0.001	0.001
o-Xylene	<0.001	0.001

Surrogates	% Recovered	QC Limits (%)	
aaa-Toluene	91%	80	120
Bromofluorobenzene	91%	80	120

DL = Diluted out N/A = Not Applicable RL = Reporting Limit

ENVIRONMENTAL LAB OF TEXAS

ANALYTICAL REPORT

JOHN FERGERSON
TRIDENT ENVIRONMENTAL
P.O BOX 7624
MIDLAND, TX 79708

Order#: G0205055
Project: F-107
Project Name: Duke Energy Field Services
Location: C-Line

Lab ID: 0205055-06
Sample ID: 0211150000 (Duplicate)

8021B/5030 BTEX

Method Blank	Date Prepared	Date Analyzed	Sample Amount	Dilution Factor	Analyst	Method
0003832-02		11/20/02 21:48	1	1	CK	8021B

Parameter	Result mg/L	RL
Benzene	0.100	0.001
Ethylbenzene	0.002	0.001
Toluene	0.036	0.001
p/m-Xylene	0.003	0.001
o-Xylene	<0.001	0.001

Surrogates	% Recovered	QC Limits (%)	
aaa-Toluene	165%	80	120
Bromofluorobenzene	85%	80	120

Lab ID: 0205055-07
Sample ID: Trip Blank

8021B/5030 BTEX

Method Blank	Date Prepared	Date Analyzed	Sample Amount	Dilution Factor	Analyst	Method
0003832-02		11/20/02 22:08	1	1	CK	8021B

Parameter	Result mg/L	RL
Benzene	<0.001	0.001
Ethylbenzene	<0.001	0.001
Toluene	<0.001	0.001
p/m-Xylene	<0.001	0.001
o-Xylene	<0.001	0.001

Surrogates	% Recovered	QC Limits (%)	
aaa-Toluene	91%	80	120
Bromofluorobenzene	87%	80	120

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ENVIRONMENTAL LAB OF TEXAS

ANALYTICAL REPORT

JOHN FERGERSON
TRIDENT ENVIRONMENTAL
P.O BOX 7624
MIDLAND, TX 79708

Order#:	G0205055
Project:	F-107
Project Name:	Duke Energy Field Services
Location:	C-Line

Approval: Raland K Tuttle 11-26-02
Raland K. Tuttle, Lab Director, QA Officer Date
Celey D. Keene, Org. Tech. Director
Jeanne McMurrey, Inorg. Tech. Director
Sandra Biezugbe, Lab Tech.
Sara Molina, Lab Tech.

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ENVIRONMENTAL LAB OF TEXAS

ANALYTICAL REPORT

JOHN FERGERSON
TRIDENT ENVIRONMENTAL
P.O BOX 7624
MIDLAND, TX 79708

Order#: G0205055
Project: F-107
Project Name: Duke Energy Field Services
Location: C-Line

Lab ID: 0205055-01
Sample ID: 0211151220 (MW-2)

Cations

Parameter	Result	Units	Dilution Factor	RL	Method	Date Prepared	Date Analyzed	Analyst
Calcium	53.4	mg/L	10	0.10	6010B	11/20/2002	11/20/02	SM
Magnesium	16.7	mg/L	10	0.010	6010B	11/20/2002	11/20/02	SM
Potassium	5.52	mg/L	1	0.050	6010B	11/20/2002	11/20/02	SM
Sodium	52.5	mg/L	10	0.10	6010B	11/20/2002	11/20/02	SM

METALS RCRA 7 Total

Parameter	Result	Units	Dilution Factor	RL	Method	Date Prepared	Date Analyzed	Analyst
Arsenic	<0.008	mg/L	1	0.008	3005/6010B	11/19/2002	11/22/02	SM
Barium	0.683	mg/L	1	0.001	3005/6010B	11/19/2002	11/22/02	SM
Cadmium	0.004	mg/L	1	0.001	3005/6010B	11/19/2002	11/22/02	SM
Chromium	0.015	mg/L	1	0.002	3005/6010B	11/19/2002	11/22/02	SM
Lead	<0.011	mg/L	1	0.011	3005/6010B	11/19/2002	11/22/02	SM
Selenium	<0.004	mg/L	1	0.004	3005/6010B	11/19/2002	11/22/02	SM
Silver	<0.002	mg/L	1	0.002	3005/6010B	11/19/2002	11/22/02	SM

Test Parameters

Parameter	Result	Units	Dilution Factor	RL	Method	Date Prepared	Date Analyzed	Analyst
Iron	12.6	mg/L	1	0.002	3005/6010B	11/19/2002	11/21/02	SM
Manganese	0.117	mg/L	1	.001	3005/6010B	11/19/2002	11/21/02	SM
Mercury, Total	0.004	mg/L	1	0.002	7470	11/24/2002	11/24/02	SM

Lab ID: 0205055-03
Sample ID: 0211151510 (MW-4)

Cations

Parameter	Result	Units	Dilution Factor	RL	Method	Date Prepared	Date Analyzed	Analyst
Calcium	211	mg/L	100	1.0	6010B	11/20/2002	11/20/02	SM
Magnesium	80.8	mg/L	10	0.010	6010B	11/20/2002	11/20/02	SM
Potassium	12.7	mg/L	10	0.50	6010B	11/20/2002	11/20/02	SM
Sodium	369	mg/L	100	1.0	6010B	11/20/2002	11/20/02	SM

METALS RCRA 7 Total

Parameter	Result	Units	Dilution Factor	RL	Method	Date Prepared	Date Analyzed	Analyst
Arsenic	<0.008	mg/L	1	0.008	3005/6010B	11/19/2002	11/22/02	SM
Barium	0.496	mg/L	1	0.001	3005/6010B	11/19/2002	11/22/02	SM
Cadmium	0.002	mg/L	1	0.001	3005/6010B	11/19/2002	11/22/02	SM
Chromium	<0.002	mg/L	1	0.002	3005/6010B	11/19/2002	11/22/02	SM
Lead	<0.011	mg/L	1	0.011	3005/6010B	11/19/2002	11/22/02	SM
Selenium	<0.004	mg/L	1	0.004	3005/6010B	11/19/2002	11/22/02	SM
Silver	<0.002	mg/L	1	0.002	3005/6010B	11/19/2002	11/22/02	SM

N/A = Not Applicable RL = Reporting Limit

ENVIRONMENTAL LAB OF TEXAS

ANALYTICAL REPORT

JOHN FERGERSON
TRIDENT ENVIRONMENTAL
P.O BOX 7624
MIDLAND, TX 79708

Order#: G0205055
Project: F-107
Project Name: Duke Energy Field Services
Location: C-Line

Lab ID: 0205055-03
Sample ID: 0211151510 (MW-4)

Test Parameters

Parameter	Result	Units	Dilution Factor	RL	Method	Date Prepared	Date Analyzed	Analyst
Iron	0.304	mg/L	1	0.002	3005/6010B	11/19/2002	11/21/02	SM
Manganese	0.144	mg/L	1	.001	3005/6010B	11/19/2002	11/21/02	SM
Mercury, Total	<0.002	mg/L	1	0.002	7470	11/24/2002	11/24/02	SM

Lab ID: 0205055-05
Sample ID: 0211151720 (MW-6)

Cations

Parameter	Result	Units	Dilution Factor	RL	Method	Date Prepared	Date Analyzed	Analyst
Calcium	664	mg/L	100	1.0	6010B	11/20/2002	11/20/02	SM
Magnesium	375	mg/L	100	0.10	6010B	11/20/2002	11/20/02	SM
Potassium	31.5	mg/L	10	0.50	6010B	11/20/2002	11/20/02	SM
Sodium	838	mg/L	100	1.0	6010B	11/20/2002	11/20/02	SM

METALS RCRA 7 Total

Parameter	Result	Units	Dilution Factor	RL	Method	Date Prepared	Date Analyzed	Analyst
Arsenic	0.011	mg/L	1	0.008	3005/6010B	11/19/2002	11/22/02	SM
Barium	0.407	mg/L	1	0.001	3005/6010B	11/19/2002	11/22/02	SM
Cadmium	0.002	mg/L	1	0.001	3005/6010B	11/19/2002	11/22/02	SM
Chromium	0.005	mg/L	1	0.002	3005/6010B	11/19/2002	11/22/02	SM
Lead	<0.011	mg/L	1	0.011	3005/6010B	11/19/2002	11/22/02	SM
Selenium	<0.004	mg/L	1	0.004	3005/6010B	11/19/2002	11/22/02	SM
Silver	<0.002	mg/L	1	0.002	3005/6010B	11/19/2002	11/22/02	SM

Test Parameters

Parameter	Result	Units	Dilution Factor	RL	Method	Date Prepared	Date Analyzed	Analyst
Iron	3.49	mg/L	1	0.002	3005/6010B	11/19/2002	11/21/02	SM
Manganese	0.094	mg/L	1	.001	3005/6010B	11/19/2002	11/21/02	SM
Mercury, Total	<0.002	mg/L	1	0.002	7470	11/24/2002	11/24/02	SM

Approval: Raland K Tuttle 11-26-02
Raland K. Tuttle, Lab Director, QA Officer Date
Celey D. Keene, Org. Tech. Director
Jeanne McMurrey, Inorg. Tech. Director
Sandra Biezugbe, Lab Tech.
Sara Molina, Lab Tech.

N/A = Not Applicable RL = Reporting Limit

ENVIRONMENTAL LAB OF TEXAS

ANALYTICAL REPORT

JOHN FERGERSON
TRIDENT ENVIRONMENTAL
P.O BOX 7624
MIDLAND, TX 79708

Order#: G0205055
Project: F-107
Project Name: Duke Energy Field Services
Location: C-Line

Lab ID: 0205055-01
Sample ID: 0211151220 (MW-2)

Anions

Parameter	Result	Units	Dilution Factor	RL	Method	Date Analyzed	Analyst
Bicarbonate Alkalinity	162	mg/L	1	2.00	310.1	11/18/02	SB
Carbonate Alkalinity	<0.10	mg/L	1	0.10	310.1	11/18/02	SB
Chloride	44.3	mg/L	1	5.00	9253	11/19/02	SB
Hydroxide Alkalinity	<0.10	mg/L	1	0.10	310.1	11/18/02	SB
SULFATE, 375.4	111	mg/L	2.5	1.25	375.4	11/19/02	SB

Test Parameters

Parameter	Result	Units	Dilution Factor	RL	Method	Date Analyzed	Analyst
Total Dissolved Solids (TDS)	428	mg/L	1	5.0	160.1	11/18/02	TAL

Lab ID: 0205055-03
Sample ID: 0211151510 (MW-4)

Anions

Parameter	Result	Units	Dilution Factor	RL	Method	Date Analyzed	Analyst
Bicarbonate Alkalinity	282	mg/L	1	2.00	310.1	11/18/02	SB
Carbonate Alkalinity	<0.10	mg/L	1	0.10	310.1	11/18/02	SB
Chloride	904	mg/L	1	5.00	9253	11/19/02	SB
Hydroxide Alkalinity	<0.10	mg/L	1	0.10	310.1	11/18/02	SB
SULFATE, 375.4	348	mg/L	5	2.5	375.4	11/19/02	SB

Test Parameters

Parameter	Result	Units	Dilution Factor	RL	Method	Date Analyzed	Analyst
Total Dissolved Solids (TDS)	2359	mg/L	1	5.0	160.1	11/18/02	TAL

Lab ID: 0205055-05
Sample ID: 0211151720 (MW-6)

Anions

Parameter	Result	Units	Dilution Factor	RL	Method	Date Analyzed	Analyst
Bicarbonate Alkalinity	240	mg/L	1	2.00	310.1	11/18/02	SB
Carbonate Alkalinity	<0.10	mg/L	1	0.10	310.1	11/18/02	SB
Chloride	3010	mg/L	1	5.00	9253	11/19/02	SB
Hydroxide Alkalinity	<0.10	mg/L	1	0.10	310.1	11/18/02	SB
SULFATE, 375.4	1300	mg/L	25	12.5	375.4	11/19/02	SB

Test Parameters

Parameter	Result	Units	Dilution Factor	RL	Method	Date Analyzed	Analyst
Total Dissolved Solids (TDS)	6564	mg/L	1	5.0	160.1	11/18/02	TAL

RL = Reporting Limit N/A = Not Applicable

ENVIRONMENTAL LAB OF TEXAS

ANALYTICAL REPORT

JOHN FERGERSON
TRIDENT ENVIRONMENTAL
P.O BOX 7624
MIDLAND, TX 79708

Order#:	G0205055
Project:	F-107
Project Name:	Duke Energy Field Services
Location:	C-Line

Approval: Raland K Tuttle 11-26-02

Raland K. Tuttle, Lab Director, QA Officer — Date
Celey D. Keene, Org. Tech. Director
Jeanne McMurrey, Inorg. Tech. Director
Sandra Biezugbe, Lab Tech.
Sara Molina, Lab Tech.

RL = Reporting Limit N/A = Not Applicable

ENVIRONMENTAL LAB OF TEXAS

QUALITY CONTROL REPORT

8015M

Order#: G0205055

BLANK WATER	LAB-ID #	Sample Concentr.	Spike Concentr.	QC Test Result	Pct (%) Recovery	RPD
TOTAL, C6-C35-mg/L	0003801-02			<3.00		
MS WATER	**LAB-ID #**	**Sample Concentr.**	**Spike Concentr.**	**QC Test Result**	**Pct (%) Recovery**	**RPD**
TOTAL, C6-C35-mg/L	0205055-01	0	95.2	94.0	98.7%	
MSD WATER	**LAB-ID #**	**Sample Concentr.**	**Spike Concentr.**	**QC Test Result**	**Pct (%) Recovery**	**RPD**
TOTAL, C6-C35-mg/L	0205055-01	0	95.2	94.0	98.7%	0.%
SRM WATER	**LAB-ID #**	**Sample Concentr.**	**Spike Concentr.**	**QC Test Result**	**Pct (%) Recovery**	**RPD**
TOTAL, C6-C35-mg/L	0003801-05		100	93.1	93.1%	

ENVIRONMENTAL LAB OF TEXAS

QUALITY CONTROL REPORT

8021B/5030 BTEX

Order#: G0205055

BLANK WATER	LAB-ID #	Sample Concentr.	Spike Concentr.	QC Test Result	Pct (%) Recovery	RPD
Benzene-mg/L	0003832-02			<0.001		
Ethylbenzene-mg/L	0003832-02			<0.001		
Toluene-mg/L	0003832-02			<0.001		
p/m-Xylene-mg/L	0003832-02			<0.001		
o-Xylene-mg/L	0003832-02			<0.001		
CONTROL WATER	**LAB-ID #**	**Sample Concentr.**	**Spike Concentr.**	**QC Test Result**	**Pct (%) Recovery**	**RPD**
Benzene-mg/L	0003832-03		0.1	0.100	100.%	
Ethylbenzene-mg/L	0003832-03		0.1	0.103	103.%	
Toluene-mg/L	0003832-03		0.1	0.102	102.%	
p/m-Xylene-mg/L	0003832-03		0.2	0.219	109.5%	
o-Xylene-mg/L	0003832-03		0.1	0.105	105.%	
CONTROL DUP WATER	**LAB-ID #**	**Sample Concentr.**	**Spike Concentr.**	**QC Test Result**	**Pct (%) Recovery**	**RPD**
Benzene-mg/L	0003832-04		0.1	0.099	99.%	1.%
Ethylbenzene-mg/L	0003832-04		0.1	0.102	102.%	1.%
Toluene-mg/L	0003832-04		0.1	0.101	101.%	1.%
p/m-Xylene-mg/L	0003832-04		0.2	0.218	109.%	0.5%
o-Xylene-mg/L	0003832-04		0.1	0.104	104.%	1.%
SRM WATER	**LAB-ID #**	**Sample Concentr.**	**Spike Concentr.**	**QC Test Result**	**Pct (%) Recovery**	**RPD**
Benzene-mg/L	0003832-05		0.1	0.101	101.%	
Ethylbenzene-mg/L	0003832-05		0.1	0.103	103.%	
Toluene-mg/L	0003832-05		0.1	0.102	102.%	
p/m-Xylene-mg/L	0003832-05		0.2	0.218	109.%	
o-Xylene-mg/L	0003832-05		0.1	0.106	106.%	

ENVIRONMENTAL LAB OF TEXAS

QUALITY CONTROL REPORT

Anions

Order#: G0205055

BLANK WATER	LAB-ID #	Sample Concentr.	Spike Concentr.	QC Test Result	Pct (%) Recovery	RPD
Bicarbonate Alkalinity-mg/L	0003794-01			<2.00		
Carbonate Alkalinity-mg/L	0003793-01			<0.10		
Chloride-mg/L	0003814-01			<5.00		
Hydroxide Alkalinity-mg/L	0003795-01			<0.10		
SULFATE, 375.4-mg/L	0003815-01			<0.50		
DUPLICATE WATER	**LAB-ID #**	**Sample Concentr.**	**Spike Concentr.**	**QC Test Result**	**Pct (%) Recovery**	**RPD**
Bicarbonate Alkalinity-mg/L	0205055-01	162		163		0.6%
Carbonate Alkalinity-mg/L	0205055-01	0		<0.10		0.%
Hydroxide Alkalinity-mg/L	0205055-01	0		<0.10		0.%
SULFATE, 375.4-mg/L	0205055-01	111		110		0.9%
MS WATER	**LAB-ID #**	**Sample Concentr.**	**Spike Concentr.**	**QC Test Result**	**Pct (%) Recovery**	**RPD**
Chloride-mg/L	0205055-01	44.3	100	144	99.7%	
MSD WATER	**LAB-ID #**	**Sample Concentr.**	**Spike Concentr.**	**QC Test Result**	**Pct (%) Recovery**	**RPD**
Chloride-mg/L	0205055-01	44.3	100	142	97.7%	1.4%
SRM WATER	**LAB-ID #**	**Sample Concentr.**	**Spike Concentr.**	**QC Test Result**	**Pct (%) Recovery**	**RPD**
Bicarbonate Alkalinity-mg/L	0003794-04		0.05	0.0496	99.2%	
Carbonate Alkalinity-mg/L	0003793-04		0.05	0.0496	99.2%	
Chloride-mg/L	0003814-04		5000	4960	99.2%	
Hydroxide Alkalinity-mg/L	0003795-04		0.05	0.0496	99.2%	
SULFATE, 375.4-mg/L	0003815-04		50	47.0	94.%	

ENVIRONMENTAL LAB OF TEXAS

QUALITY CONTROL REPORT

Cations

Order#: G0205055

BLANK WATER	LAB-ID #	Sample Concentr.	Spike Concentr.	QC Test Result	Pct (%) Recovery	RPD
Calcium-mg/L	0003826-02			<0.010		
Magnesium-mg/L	0003826-02			<0.001		
Potassium-mg/L	0003826-02			<0.050		
Sodium-mg/L	0003826-02			<0.010		
DUPLICATE WATER	**LAB-ID #**	**Sample Concentr.**	**Spike Concentr.**	**QC Test Result**	**Pct (%) Recovery**	**RPD**
Calcium-mg/L	0205023-01	591		590		0.2%
Magnesium-mg/L	0205023-01	254		252		0.8%
Potassium-mg/L	0205023-01	88		87.4		0.7%
Sodium-mg/L	0205023-01	3150		3120		1.%
SRM WATER	**LAB-ID #**	**Sample Concentr.**	**Spike Concentr.**	**QC Test Result**	**Pct (%) Recovery**	**RPD**
Calcium-mg/L	0003826-05		2	2.16	108.%	
Magnesium-mg/L	0003826-05		2	2.15	107.5%	
Potassium-mg/L	0003826-05		2	1.86	93.%	
Sodium-mg/L	0003826-05		2	1.80	90.%	

ENVIRONMENTAL LAB OF TEXAS

QUALITY CONTROL REPORT

METALS RCRA 7 Total

Order#: G0205055

BLANK WATER	LAB-ID #	Sample Concentr.	Spike Concentr.	QC Test Result	Pct (%) Recovery	RPD
Arsenic-mg/L	0003850-02			<0.008		
Barium-mg/L	0003850-02			<0.001		
Cadmium-mg/L	0003850-02			<0.001		
Chromium-mg/L	0003850-02			<0.002		
Lead-mg/L	0003850-02			<0.011		
Selenium-mg/L	0003850-02			<0.004		
Silver-mg/L	0003850-02			<0.002		
CONTROL WATER	LAB-ID #	Sample Concentr.	Spike Concentr.	QC Test Result	Pct (%) Recovery	RPD
Arsenic-mg/L	0003850-03		0.8	0.800	100.%	
Barium-mg/L	0003850-03		0.2	0.212	106.%	
Cadmium-mg/L	0003850-03		0.2	0.200	100.%	
Chromium-mg/L	0003850-03		0.2	0.202	101.%	
Lead-mg/L	0003850-03		1	1.08	108.%	
Selenium-mg/L	0003850-03		0.4	0.404	101.%	
Silver-mg/L	0003850-03		0.4	0.386	96.5%	
CONTROL DUP WATER	LAB-ID #	Sample Concentr.	Spike Concentr.	QC Test Result	Pct (%) Recovery	RPD
Arsenic-mg/L	0003850-04		0.8	0.804	100.5%	0.5%
Barium-mg/L	0003850-04		0.2	0.210	105.%	0.9%
Cadmium-mg/L	0003850-04		0.2	0.199	99.5%	0.5%
Chromium-mg/L	0003850-04		0.2	0.202	101.%	0.%
Lead-mg/L	0003850-04		1	1.09	109.%	0.9%
Selenium-mg/L	0003850-04		0.4	0.400	100.%	1.%
Silver-mg/L	0003850-04		0.4	0.384	96.%	0.5%
SRM WATER	LAB-ID #	Sample Concentr.	Spike Concentr.	QC Test Result	Pct (%) Recovery	RPD
Arsenic-mg/L	0003850-05		1	1.04	104.%	
Barium-mg/L	0003850-05		1	1.05	105.%	
Cadmium-mg/L	0003850-05		1	1.05	105.%	
Chromium-mg/L	0003850-05		1	1.06	106.%	
Lead-mg/L	0003850-05		1	1.01	101.%	
Selenium-mg/L	0003850-05		1	1.01	101.%	
Silver-mg/L	0003850-05		0.5	0.508	101.6%	

ENVIRONMENTAL LAB OF TEXAS

QUALITY CONTROL REPORT

Test Parameters

Order#: G0205055

BLANK WATER	LAB-ID #	Sample Concentr.	Spike Concentr.	QC Test Result	Pct (%) Recovery	RPD
Iron-mg/L	0003851-01			<0.002		
Manganese-mg/L	0003851-01			<.001		
Mercury, Total-mg/L	0003863-01			<0.002		
Total Dissolved Solids (TDS)-mg/L	0003819-01			<5.0		
CONTROL WATER	LAB-ID #	Sample Concentr.	Spike Concentr.	QC Test Result	Pct (%) Recovery	RPD
Iron-mg/L	0003851-02		0.2	0.208	104.%	
Manganese-mg/L	0003851-02		0.2	0.205	102.5%	
Mercury, Total-mg/L	0003863-02		0.015	0.016	106.7%	
CONTROL DUP WATER	LAB-ID #	Sample Concentr.	Spike Concentr.	QC Test Result	Pct (%) Recovery	RPD
Iron-mg/L	0003851-03		0.2	0.210	105.%	1.%
Manganese-mg/L	0003851-03		0.2	0.205	102.5%	0.%
Mercury, Total-mg/L	0003863-03		0.015	0.016	106.7%	0.%
DUPLICATE WATER	LAB-ID #	Sample Concentr.	Spike Concentr.	QC Test Result	Pct (%) Recovery	RPD
Total Dissolved Solids (TDS)-mg/L	0205055-01	428		428		0.%
SRM WATER	LAB-ID #	Sample Concentr.	Spike Concentr.	QC Test Result	Pct (%) Recovery	RPD
Iron-mg/L	0003851-04		1	0.988	98.8%	
Manganese-mg/L	0003851-04		1	0.998	99.8%	
Mercury, Total-mg/L	0003863-04		0.015	0.015	100.%	

TRIDENT ENVIRONMENTAL

Trident Environmental
P.O. Box 7624
Midland, Texas 79708
(915) 262-5216
(915)262-5216 (Fax)

F-107-021115

Chain of Custody

Date 11/15/02 Page 1 of 1

Lab Name: Environmental Lab of Texas
Address: 12600 W. Interstate 20 E
Odessa, Texas 79763
Telephone: 915-563-1800

Samplers (SIGNATURES): John Fergerson

0205055

Sample Identification	Matrix	Date	Time	Sample Type: G - Grab, C- Composite	BTEX (EPA 8021B)	MTBE (EPA 8021B)	SVOC (EPA 8270)	PAH (EPA 8270)	VOC (EPA 8260)	TPH (EPA 418.1)	TPH (TX-1005)	TPH (TX-1006)	GRO (EPA 8015G)	DRO (EPA 8015D)	TDS (EPA 160.1)	Anions/Cations + TDS	Total Metals	TCLP Metals	RCRA Metals & Fe + Mn						Number of Containers
0211151220 (MW-2) 01	Water	11/15/02	1220		✓								✓	✓		✓			✓						6
0211151340 (MW-5) 02	Water	11/15/02	1340		✓								✓	✓											4
0211151510 (MW-4) 03	Water	11/15/02	1510		✓								✓	✓		✓			✓						6
0211151610 (MW-3) 04	Water	11/15/02	1610		✓								✓	✓											4
0211151720 (MW-6) 05	Water	11/15/02	1720		✓								✓	✓		✓			✓						6
0211150000 (Duplicate) 06	Water	11/15/02	0000		✓																				2
Trip Blank 07	Water				✓																				2
40 mL VOAs																									

Analysis Request

Project Information	
Project Name:	Duke Energy Field Srvcs
Project Location:	C-Line
Project Manager:	John Fergerson
Cost Center No.:	F-107
Shipping ID No.:	
Bill to (see below):	Duke Energy Field Srvcs

Sample Receipt	
Total Containers:	
COC Seals:	
Rec'd Good Cond/Cold:	-0.5°C
Conforms to Records:	
Lab No.:	

Special Instructions/Comments:
Attn: Steve Weathers
370 17th Street, Suite 900
Denver, CO 80202

Relinquished By: (1)	Relinquished By: (2)	Relinquished By: (3)
(Company) Trident Environmental	(Company)	(Company)
(Printed Name) John Fergerson	(Printed Name)	(Printed Name)
(Signature) John Fergerson	(Signature)	(Signature)
(Date) 11/18/02 (Time) 1150	(Date) (Time)	(Date) (Time)
Received By: (1)	**Received By: (2)**	**Received By: (3)**
(Company) Environmental Lab	(Company)	(Company)
(Printed Name) Celey Keene	(Printed Name)	(Printed Name)
(Signature) Celey Keene	(Signature)	(Signature)
(Date) 11/18/02 (Time) 11:50	(Date) (Time)	(Date) (Time)

Original Analytical Report → Steve Weathers
Fax Copy to → Mike Stewart (Remediacon) Office 303-674-4370 Fax 720-528-8132
John Fergerson (Trident) See Above

Copy signed original form for Trident Environmental records

ANALYTICAL REPORT

Prepared for:

DALE LITTLEJOHN
TRIDENT ENVIRONMENTAL
P.O. BOX 7624
MIDLAND, TX 79708

Project:	DEFS: C-1-Line
PO#:	
Order#:	G0205254
Report Date:	12/19/2002

Certificates
US EPA Laboratory Code TX00158

ENVIRONMENTAL LAB OF TEXAS

SAMPLE WORK LIST

TRIDENT ENVIRONMENTAL
P.O. BOX 7624
MIDLAND, TX 79708
689-4578

Order#: G0205254
Project: F-108
Project Name: DEFS: C-1-Line
Location: U-Bar Ranch

The samples listed below were submitted to Environmental Lab of Texas and were received under chain of custody. Environmental Lab of Texas makes no representation or certification as to the method of sample collection, sample identification, or transportation/handling procedures used prior to the receipt of samples by Environmental Lab of Texas, unless otherwise noted.

Lab ID:	Sample :	Matrix:	Date / Time Collected	Date / Time Received	Container	Preservative
0205254-01	Windmill	WATER	12/12/02 14:15	12/13/02 16:11	See COC	Ice

Lab Testing: **Rejected:** No **Temp:** -3 C

8021B/5030 BTEX
Anions
Cations
Total Dissolved Solids (TDS)

0205254-02	MW-1	WATER	12/13/02 8:35	12/13/02 16:11	See COC	Ice

Lab Testing: **Rejected:** No **Temp:** -3 C

8021B/5030 BTEX
Anions
Cations
Total Dissolved Solids (TDS)

0205254-03	MW-2	WATER	12/13/02 9:35	12/13/02 16:11	See COC	Ice

Lab Testing: **Rejected:** No **Temp:** -3 C

8021B/5030 BTEX
Anions
Cations
Total Dissolved Solids (TDS)

0205254-04	MW-3	WATER	12/13/02 10:35	12/13/02 16:11	See COC	Ice

Lab Testing: **Rejected:** No **Temp:** -3 C

8021B/5030 BTEX
Anions
Cations
Total Dissolved Solids (TDS)

ENVIRONMENTAL LAB OF TEXAS

ANALYTICAL REPORT

DALE LITTLEJOHN
TRIDENT ENVIRONMENTAL
P.O. BOX 7624
MIDLAND, TX 79708

Order#: G0205254
Project: F-108
Project Name: DEFS: C-1-Line
Location: U-Bar Ranch

Lab ID: 0205254-01
Sample ID: Windmill

8021B/5030 BTEX

Method Blank	Date Prepared	Date Analyzed	Sample Amount	Dilution Factor	Analyst	Method
0004088-02		12/15/02 17:05	1	1	CK	8021B

Parameter	Result mg/L	RL
Benzene	<0.001	0.001
Toluene	<0.001	0.001
Ethylbenzene	<0.001	0.001
p/m-Xylene	<0.001	0.001
o-Xylene	<0.001	0.001

Surrogates	% Recovered	QC Limits (%)	
aaa-Toluene	83%	80	120
Bromofluorobenzene	91%	80	120

Lab ID: 0205254-02
Sample ID: MW-1

8021B/5030 BTEX

Method Blank	Date Prepared	Date Analyzed	Sample Amount	Dilution Factor	Analyst	Method
0004088-02		12/17/02 0:27	1	1	CK	8021B

Parameter	Result mg/L	RL
Benzene	0.003	0.001
Toluene	<0.001	0.001
Ethylbenzene	<0.001	0.001
p/m-Xylene	<0.001	0.001
o-Xylene	<0.001	0.001

Surrogates	% Recovered	QC Limits (%)	
aaa-Toluene	103%	80	120
Bromofluorobenzene	105%	80	120

DL = Diluted out N/A = Not Applicable RL = Reporting Limit

ENVIRONMENTAL LAB OF TEXAS

ANALYTICAL REPORT

DALE LITTLEJOHN
TRIDENT ENVIRONMENTAL
P.O. BOX 7624
MIDLAND, TX 79708

Order#: G0205254
Project: F-108
Project Name: DEFS: C-1-Line
Location: U-Bar Ranch

Lab ID: 0205254-03
Sample ID: MW-2

8021B/5030 BTEX

Method Blank	Date Prepared	Date Analyzed	Sample Amount	Dilution Factor	Analyst	Method
0004088-02		12/17/02 0:47	1	1	CK	8021B

Parameter	Result mg/L	RL
Benzene	0.020	0.001
Toluene	<0.001	0.001
Ethylbenzene	0.002	0.001
p/m-Xylene	0.002	0.001
o-Xylene	<0.001	0.001

Surrogates	% Recovered	QC Limits (%)	
aaa-Toluene	103%	80	120
Bromofluorobenzene	103%	80	120

Lab ID: 0205254-04
Sample ID: MW-3

8021B/5030 BTEX

Method Blank	Date Prepared	Date Analyzed	Sample Amount	Dilution Factor	Analyst	Method
0004088-02		12/15/02 18:21	1	1	CK	8021B

Parameter	Result mg/L	RL
Benzene	<0.001	0.001
Toluene	<0.001	0.001
Ethylbenzene	<0.001	0.001
p/m-Xylene	<0.001	0.001
o-Xylene	<0.001	0.001

Surrogates	% Recovered	QC Limits (%)	
aaa-Toluene	89%	80	120
Bromofluorobenzene	97%	80	120

DL = Diluted out N/A = Not Applicable RL = Reporting Limit

ENVIRONMENTAL LAB OF TEXAS

ANALYTICAL REPORT

DALE LITTLEJOHN
TRIDENT ENVIRONMENTAL
P.O. BOX 7624
MIDLAND, TX 79708

Order#:	G0205254
Project:	F-108
Project Name:	DEFS: C-1-Line
Location:	U-Bar Ranch

Approval: Raland K Tuttle 12-20-02
Raland K. Tuttle, Lab Director, QA Officer Date
Celey D. Keene, Org. Tech Director
Jeanne McMurrey, Inorg. Tech. Director
Sandra Biezugbe, Lab Tech.
Sara Molina, Lab Tech.

DL = Diluted out N/A = Not Applicable RL = Reporting Limit

ENVIRONMENTAL LAB OF TEXAS

ANALYTICAL REPORT

DALE LITTLEJOHN
TRIDENT ENVIRONMENTAL
P.O. BOX 7624
MIDLAND, TX 79708

Order#: G0205254
Project: F-108
Project Name: DEFS: C-1-Line
Location: U-Bar Ranch

Lab ID: 0205254-01
Sample ID: Windmill

Cations

Parameter	Result	Units	Dilution Factor	RL	Method	Date Prepared	Date Analyzed	Analyst
Calcium	83.6	mg/L	100	1.0	6010B	12/19/2002	12/19/02	SM
Magnesium	18.2	mg/L	10	0.010	6010B	12/19/2002	12/19/02	SM
Potassium	8.78	mg/L	1	0.050	6010B	12/19/2002	12/19/02	SM
Sodium	52.1	mg/L	10	0.10	6010B	12/19/2002	12/19/02	SM

Lab ID: 0205254-02
Sample ID: MW-1

Cations

Parameter	Result	Units	Dilution Factor	RL	Method	Date Prepared	Date Analyzed	Analyst
Calcium	61.5	mg/L	10	0.10	6010B	12/19/2002	12/19/02	SM
Magnesium	8.00	mg/L	1	0.001	6010B	12/19/2002	12/19/02	SM
Potassium	4.86	mg/L	1	0.050	6010B	12/19/2002	12/19/02	SM
Sodium	42.6	mg/L	10	0.10	6010B	12/19/2002	12/19/02	SM

Lab ID: 0205254-03
Sample ID: MW-2

Cations

Parameter	Result	Units	Dilution Factor	RL	Method	Date Prepared	Date Analyzed	Analyst
Calcium	72.0	mg/L	10	0.10	6010B	12/19/2002	12/19/02	SM
Magnesium	9.98	mg/L	1	0.001	6010B	12/19/2002	12/19/02	SM
Potassium	4.66	mg/L	1	0.050	6010B	12/19/2002	12/19/02	SM
Sodium	72.9	mg/L	10	0.10	6010B	12/19/2002	12/19/02	SM

Lab ID: 0205254-04
Sample ID: MW-3

Cations

Parameter	Result	Units	Dilution Factor	RL	Method	Date Prepared	Date Analyzed	Analyst
Calcium	45.6	mg/L	10	0.10	6010B	12/19/2002	12/19/02	SM
Magnesium	7.61	mg/L	1	0.001	6010B	12/19/2002	12/19/02	SM
Potassium	3.39	mg/L	1	0.050	6010B	12/19/2002	12/19/02	SM
Sodium	48.0	mg/L	10	0.10	6010B	12/19/2002	12/19/02	SM

N/A = Not Applicable RL = Reporting Limit

ENVIRONMENTAL LAB OF TEXAS

ANALYTICAL REPORT

DALE LITTLEJOHN	Order#:	G0205254
TRIDENT ENVIRONMENTAL	Project:	F-108
P.O. BOX 7624	Project Name:	DEFS: C-1-Line
MIDLAND, TX 79708	Location:	U-Bar Ranch

Approval: Raland K Tuttle 12-20-02

Raland K. Tuttle, Lab Director, QA Officer — Date

Celey D. Keene, Org. Tech. Director

Jeanne McMurrey, Inorg. Tech. Director

Sandra Biezugbe, Lab Tech.

Sara Molina, Lab Tech.

N/A = Not Applicable RL = Reporting Limit

ENVIRONMENTAL LAB OF TEXAS

ANALYTICAL REPORT

DALE LITTLEJOHN
TRIDENT ENVIRONMENTAL
P.O. BOX 7624
MIDLAND, TX 79708

Order#: G0205254
Project: F-108
Project Name: DEFS: C-1-Line
Location: U-Bar Ranch

Lab ID: 0205254-01
Sample ID: Windmill

Anions

Parameter	Result	Units	Dilution Factor	RL	Method	Date Analyzed	Analyst
Bicarbonate Alkalinity	206	mg/L	1	2.00	310.1	12/13/02	SB
Carbonate Alkalinity	<0.10	mg/L	1	0.10	310.1	12/13/02	SB
Chloride	48.7	mg/L	1	5.00	9253	12/14/02	SB
Hydroxide Alkalinity	<0.10	mg/L	1	0.10	310.1	12/13/02	SB
SULFATE, 375.4	104	mg/L	2	1.0	375.4	12/15/02	SB

Test Parameters

Parameter	Result	Units	Dilution Factor	RL	Method	Date Analyzed	Analyst
Total Dissolved Solids (TDS)	658	mg/L	1	5.0	160.1	12/15/02	SB

Lab ID: 0205254-02
Sample ID: MW-1

Anions

Parameter	Result	Units	Dilution Factor	RL	Method	Date Analyzed	Analyst
Bicarbonate Alkalinity	166	mg/L	1	2.00	310.1	12/13/02	SB
Carbonate Alkalinity	<0.10	mg/L	1	0.10	310.1	12/13/02	SB
Chloride	33.7	mg/L	1	5.00	9253	12/14/02	SB
Hydroxide Alkalinity	<0.10	mg/L	1	0.10	310.1	12/13/02	SB
SULFATE, 375.4	87.0	mg/L	2	1.0	375.4	12/15/02	SB

Test Parameters

Parameter	Result	Units	Dilution Factor	RL	Method	Date Analyzed	Analyst
Total Dissolved Solids (TDS)	351	mg/L	1	5.0	160.1	12/15/02	SB

Lab ID: 0205254-03
Sample ID: MW-2

Anions

Parameter	Result	Units	Dilution Factor	RL	Method	Date Analyzed	Analyst
Bicarbonate Alkalinity	168	mg/L	1	2.00	310.1	12/13/02	SB
Carbonate Alkalinity	<0.10	mg/L	1	0.10	310.1	12/13/02	SB
Chloride	48.7	mg/L	1	5.00	9253	12/14/02	SB
Hydroxide Alkalinity	<0.10	mg/L	1	0.10	310.1	12/13/02	SB
SULFATE, 375.4	167	mg/L	2.5	1.25	375.4	12/15/02	SB

Test Parameters

Parameter	Result	Units	Dilution Factor	RL	Method	Date Analyzed	Analyst
Total Dissolved Solids (TDS)	535	mg/L	1	5.0	160.1	12/15/02	SB

RL = Reporting Limit N/A = Not Applicable

ENVIRONMENTAL LAB OF TEXAS

QUALITY CONTROL REPORT

Anions

Order#: G0205254

BLANK WATER	LAB-ID #	Sample Concentr.	Spike Concentr.	QC Test Result	Pct (%) Recovery	RPD
Bicarbonate Alkalinity-mg/L	0004068-01			<2.00		
Carbonate Alkalinity-mg/L	0004070-01			<0.10		
Chloride-mg/L	0004067-01			<5.0		
Hydroxide Alkalinity-mg/L	0004072-01			<0.10		
SULFATE, 375.4-mg/L	0004076-01			<0.50		
DUPLICATE WATER	**LAB-ID #**	**Sample Concentr.**	**Spike Concentr.**	**QC Test Result**	**Pct (%) Recovery**	**RPD**
Bicarbonate Alkalinity-mg/L	0205254-01	206		205		0.5%
Carbonate Alkalinity-mg/L	0205254-01	0		<0.10		0.%
Hydroxide Alkalinity-mg/L	0205254-01	0		<0.10		0.%
SULFATE, 375.4-mg/L	0205254-01	104		103		1.%
MS WATER	**LAB-ID #**	**Sample Concentr.**	**Spike Concentr.**	**QC Test Result**	**Pct (%) Recovery**	**RPD**
Chloride-mg/L	0205235-01	88.6	250	337	99.4%	
MSD WATER	**LAB-ID #**	**Sample Concentr.**	**Spike Concentr.**	**QC Test Result**	**Pct (%) Recovery**	**RPD**
Chloride-mg/L	0205235-01	88.6	250	341	101.%	1.2%
SRM WATER	**LAB-ID #**	**Sample Concentr.**	**Spike Concentr.**	**QC Test Result**	**Pct (%) Recovery**	**RPD**
Bicarbonate Alkalinity-mg/L	0004068-04		0.05	0.0496	99.2%	
Carbonate Alkalinity-mg/L	0004070-04		0.05	0.0496	99.2%	
Chloride-mg/L	0004067-04		5000	4960	99.2%	
Hydroxide Alkalinity-mg/L	0004072-04		0.05	0.0496	99.2%	
SULFATE, 375.4-mg/L	0004076-04		50	51.0	102.%	

ENVIRONMENTAL LAB OF TEXAS

QUALITY CONTROL REPORT

Cations

Order#: G0205254

BLANK WATER	LAB-ID #	Sample Concentr.	Spike Concentr.	QC Test Result	Pct (%) Recovery	RPD
Calcium-mg/L	0004113-02			<0.010		
Magnesium-mg/L	0004113-02			<0.001		
Potassium-mg/L	0004113-02			<0.050		
Sodium-mg/L	0004113-02			<0.010		
DUPLICATE WATER	**LAB-ID #**	**Sample Concentr.**	**Spike Concentr.**	**QC Test Result**	**Pct (%) Recovery**	**RPD**
Calcium-mg/L	0205254-01	83.6		85.4		2.1%
Magnesium-mg/L	0205254-01	18.2		17.8		2.2%
Potassium-mg/L	0205254-01	8.78		8.71		0.8%
Sodium-mg/L	0205254-01	52.1		51.5		1.2%
SRM WATER	**LAB-ID #**	**Sample Concentr.**	**Spike Concentr.**	**QC Test Result**	**Pct (%) Recovery**	**RPD**
Calcium-mg/L	0004113-05		2	2.02	101.%	
Magnesium-mg/L	0004113-05		2	2.19	109.5%	
Potassium-mg/L	0004113-05		2	1.90	95.%	
Sodium-mg/L	0004113-05		2	1.95	97.5%	

ENVIRONMENTAL LAB OF TEXAS

QUALITY CONTROL REPORT

Test Parameters

Order#: G0205254

BLANK WATER	LAB-ID #	Sample Concentr.	Spike Concentr.	QC Test Result	Pct (%) Recovery	RPD
Total Dissolved Solids (TDS)-mg/L	0004094-01			<5.0		
DUPLICATE WATER	LAB-ID #	Sample Concentr.	Spike Concentr.	QC Test Result	Pct (%) Recovery	RPD
Total Dissolved Solids (TDS)-mg/L	0205249-01	649		640		1.4%

TRIDENT ENVIRONMENTAL

Trident Environmental
P.O. Box 7624
Midland, Texas 79708
(915) 682-0008
(915) 262-5216 (Fax)

Original Results to: Steave Weathers (DEFS)
Fax Copies to: Mike Stewart (Remediacon)
John Fergerson (Trident)

F-105-12/02

Chain of Custody

Date 12/13/02 Page 1 of 1

Lab Name: Environmental Labs (of Texas)
Address: 12600 West I-20 East
Odessa, TX 79763
Telephone: (505) 563-1800 Fax: (915) 563-1713

Samplers (SIGNATURES): Dale Littlejohn

Sample Identification	Matrix	Date	Time	Sample Type: G - Grab, C - Composite	BTEX (EPA 8021B)	MTBE (EPA 8021B)	SVOC (EPA 8270)	PAH (EPA 8270)	VOC (EPA 8260)	TPH (EPA 418.1)	TPH (TX-1005)	TPH (TX-1006)	GRO (EPA 8015G)	DRO (EPA 8015D)	TDS (EPA 160.1)	Ca, Mg, Na, K, HCO3, Cl, SO4, & TDS	Tot.Metal (FE, Ba, Mn)	TCLP Metals	Number of Containers
5754-01 Windmill	Water	12/12/02	1415	G	✓											✓			3
-02 MW-1	"	12/13/02	0835	G	✓											✓			3
-03 MW-2	"	"	0935	G	✓											✓			3
-04 MW-3	"	"	1035	G	✓											✓			3
				W															
				a															
4/1L HDPE				t															
8/40mL VOAs				E															
-3C				R															

Project Information		Sample Receipt	
Project Name:	DEFS: C-1-Line	Total Containers:	
Project Location:	U-Bar Ranch	COC Seals:	
Project Manager:	John Fergerson	Rec'd Good Cond/Cold:	
Cost Center No.:	F-108	Conforms to Records:	
Shipping ID No.:		Lab No.:	
Bill to (see below):			

Special Instructions/Comments: Please send invoice direct to client:
Duke Energy Field Services, Attention: Steave Weathers
P. O. Box 5493, Denver, Colorado 80217

Relinquished By: (1) (Company)	Relinquished By: (2) (Company)	Relinquished By: (3) (Company)
Trident Environmental		
(Printed Name) Dale T. Littlejohn	(Printed Name)	(Printed Name)
(Signature) Dale T. Littlejohn	(Signature)	(Signature)
(Date) 12/13/02 (Time) 1505	(Date) (Time)	(Date) (Time)
Received By: (1) (Company) ENVIRONMENTAL LAB	**Received By: (2) (Company)**	**Received By: (3) (Company)**
(Printed Name) DAWN CAUDILL	(Printed Name)	(Printed Name)
(Signature)	(Signature)	(Signature)
(Date) 12/13/02 (Time) 1505	(Date) (Time)	(Date) (Time)

Copy signed original form for Trident Environmental records