Cork
Environmental
Resource
Group

November 11, 2013

Mr. Tom Harris, Administrator
Louisiana Department of Environmental Quality
Remedial Services Division
P.O. Box 4312
Baton Rouge, Louisiana 70821-4312

Re: RECAP Site Investigation Work Plan
Denbury Resources, Inc.
125-1 Site (Saltwater Pipeline Release)
Off LA Highway 132 (South of Furgeson Road)
Dunn, Richland Parish, Louisiana
LDEQ Agency Interest No. 186776

Dear Mr. Harris:

Enclosed please find three (3) copies of the RECAP Site Investigation Work Plan prepared by Cork Environmental Resource Group, Inc. (CERG), on behalf of Denbury Resources, Inc. (DRI), for the above referenced Site. The Work Plan was prepared to address an area of investigation (AOI) associated with a saltwater pipeline release which occurred in March 2013.

DRI is prepared to initiate the activities presented in the Work Plan immediately upon approval of the LDEQ. If you have any questions or need additional information, please do not hesitate to contact me at (318) 605-2124.

Sincerely,

Brandon Cork
President

WBC/wbc

Enclosure

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230 Boll Weevil Blvd., Monroe, LA 71203
Ph: 318.605.2124

Cc: Mr. Steve Archibald, Team Leader – LDEQ Northeast Regional Office – Electronic Copy via E-mail

Mr. Ryan Jacob, HSE Field Operations Manager, Denbury Resources, Inc.

Mr. Tracy Carter, HSE Supervisor, Denbury Resources, Inc.

Mr. Roy Hill, Earth Consulting Group, Inc.

Cork
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RECAP SITE INVESTIGATION WORK PLAN
125-1 SITE (SALTWATER PIPELINE RELEASE)
OFF LA HIGHWAY 132 (SOUTH OF FURGESON RD.)
DUNN, RICHLAND PARISH, LOUISIANA
LDEQ AGENCY INTEREST NO. 186776

Prepared for

DENBURY RESOURCES, INC.
481 HIGHWAY 609
DELHI, LOUISIANA 71232

NOVEMBER 7, 2013

RISK EVALUATION/CORRECTIVE ACTION PROGRAM
SITE INVESTIGATION WORK PLAN

AT

125-1 SITE (SALTWATER PIPELINE RELEASE)
OFF LA HIGHWAY 132 (SOUTH OF FURGESON RD.)
DUNN, LOUISIANA
RICHLAND PARISH
LDEQ AGENCY INTEREST NO. 186776

PREPARED FOR:

DENBURY RESOURCES, INC.
481 HIGHWAY 609
DELHI, LOUISIANA 71232

CERG, INC. PROJECT NO. 13-104101

NOVEMBER 7, 2013

PREPARED BY:

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1.0 INTRODUCTION

Cork Environmental Resource Group, Inc. (CERG) has been retained by Denbury Resources, Inc. (DRI) to prepare a Risk Evaluation/Corrective Action Program (RECAP) Site Investigation Work Plan (Work Plan) for the 125-1 Saltwater Pipeline Release Site (Site) located south of Ferguson Road approximately 3.25 miles southeast of Dunn, Louisiana in Sections 32 and 33, Township 17 North, Range 9 East in Richland Parish. A Project Location Map is included in **Appendix A, Figure 1**.

2.0 OBJECTIVES

The objective of this Work Plan is to obtain approval from the Louisiana Department of Environmental Quality (LDEQ) concerning the technology, methodology, and regulatory criteria to be utilized in the investigation of environmental concerns at the Site. In addition, the Work Plan is intended to insure that all concerns of the LDEQ, DRI, and CERG have been addressed prior to conducting field activities at the Site, promoting efficient and economical utilization of resources, and expediting the site investigation process. Data collected during the site investigation will be evaluated according to requirements of Louisiana Administrative Code (LAC) 33:I Chapter 13 (RECAP) and used to determine whether soil and/or groundwater contamination may be present at levels that could require further evaluation and/or remediation. Limited data previously collected at the Site was used as a guide and basis for some of the decision making in the preparation of this Work Plan. All proposed activities presented in this Work Plan will be conducted in accordance with procedures and protocols contained in DRI's Health and Safety Guidelines.

3.0 SCOPE OF WORK

The Scope of Work detailed in this Work Plan includes:

- Site specific information concerning site history, size, setting, land use, groundwater use, geology, and hydrogeology.
- Evaluation of previously collected soil data to guide site investigation activities.
- Evaluation of past activities conducted at the Site to aid in identifying potential areas of investigation (AOIs) and/or areas of concern (AOCs).
- Identification of the appropriate constituents of concern (COCs).
- Identification of the methodology to be utilized to appropriately classify Site groundwater.
- Identification of the appropriate analytical methods, detection limits, and documentation to be utilized in the laboratory analysis of the COCs.
- Identification of the appropriate quality assurance/quality control measures to be applied during sample collection and laboratory analysis of the soil and groundwater samples.
- Identification of proposed sampling locations for soil and groundwater.
- Identification of appropriate sample collection procedures.
- Identification of appropriate samples to be submitted for laboratory analysis.

4.0 BACKGROUND

Information, data, and files provided by DRI were reviewed to establish a history of the Site. Results of the historical records review and other pertinent Site information are discussed in the following sections.

4.1 SITE HISTORY

The Site consists of a pipeline right-of-way (ROW) owned and maintained by DRI which contains a 6-inch underground saltwater injection flow line. The Site is located within the Delhi Gas Field which was originally developed for crude oil and natural gas drilling and production in the 1940s. Drilling and production activities continued in the Delhi Gas Field through approximately the 1990s when production in the field began to taper off.

DRI purchased the Delhi field in approximately 2005 in order to conduct tertiary crude oil recovery. This process involves the injection of carbon dioxide (CO2) into the geological formation which is used to move the remaining deposits of crude oil to various producing wells located throughout the field. Saltwater returns (produced water) from the producing wells are captured and moved through underground flow lines to various saltwater injection wells located along the perimeter of the field. The saltwater is re-injected to form a "water curtain" along the perimeter of the field in order to prevent crude oil from migrating beyond the radius of influence of the producing wells. DRI began the use of the tertiary crude oil recovery process in the Delhi Field in November 2009.

In March 2013, a leak was discovered in the 6-inch flow line associated with the DFU 125-1 saltwater injection well by an adjacent landowner. The LDEQ and LA State Police were notified of the release on March 26, 2013. A map indicating the location of the Site is included in **Appendix A, Figure 1**. A map indicating the significant features of the Site is presented in **Appendix A, Figure 2**.

4.2 PREVIOUS ACTIVITIES CONDUCTED AT THE SITE

According to information obtained from DRI, on or about March 26, 2013, failure in a piping joint in the 6-inch flow line caused the surface release of approximately 200 barrels of saltwater into the ROW, adjoining property and an adjacent surface water body (Muddy Slough) which is a tributary that drains into Turkey Creek. It was determined that released fluids traveled approximately 2.7 miles downstream in Muddy Slough. In addition, there was a reported additional 0.5 barrels of crude oil released, however the crude oil was contained on land at the leak site. The flow line was shut down immediately following discovery of the leak.

Subsequent to the release, containment structures were constructed along Muddy Slough to prevent further migration of the fluids into this surface water body. Fluids at the surface near the release were removed by vacuum trucks and staged in frac tanks for later

injection in nearby saltwater disposal wells. Fresh water was used to flush the impacted surface areas at and adjacent to the release and recovered by vacuum trucks. In addition, salinity tests were performed in Muddy Slough and recovery zones were established for fluid recovery along the impacted areas under the direction of the LDEQ – Emergency Response Division. The recovery activities continued in this manner until mid-May 2013, at which time it was determined that the chloride levels in Muddy Slough were below the applicable standard (250 ppm). In addition, surface water samples collected from Turkey Creek during this time revealed no exceedances in chloride levels above the applicable standard, indicating that the surface water impact had been confined to Muddy Slough. Information concerning the recovery efforts conducted by DRI following the initial release is detailed in an Incident Action Plan (IAP) which is included in **Appendix B**. Repairs to the saltwater injection flow line were completed by DRI in October 2013.

On April 23, 2013, soil samples were collected from the area near the pipe leak where fluids had been released at the surface in an effort to determine an initial assessment of the impact at the Site. Surface soil samples were collected from eight locations ranging in depth from ground surface to 1.5 feet below ground surface (bgs). The samples were submitted to the University of Louisiana at Monroe (ULM) Soil-Plant Laboratory and analyzed for total petroleum hydrocarbons-oil range organics (TPH-ORO) and total chlorides. Results of the laboratory data indicated an exceedance in the RECAP Soil Screening Standards (Soil SS) for chlorides at five of the sample locations and at varying depths. In addition, one sample exceeded the Soil SS for TPH-ORO at boring location DS-4. A summary of the results from this sampling event is included in **Appendix C, Table 1**. A map indicating the sample locations is included in **Appendix A, Figure 3**. Laboratory analytical data is included in **Appendix D**.

On May 20, 2013, additional soil samples were collected from the affected area where fluids had been released at the surface in order to evaluate any change in the saltwater impact at the Site. Surface soil samples were collected from 10 locations ranging in depth from ground surface to 1.5 feet bgs. The samples were submitted to the ULM Soil-Plant Laboratory and analyzed for total chlorides. Results of the laboratory data indicated an exceedance in the RECAP Soil SS for chlorides at nine of the sample locations at varying depths. A summary of the results from this sampling event is included in **Appendix C, Table 1**. A map indicating the sample locations from this event is included in **Appendix A, Figure 3**. Laboratory analytical data is included in **Appendix D**.

A wetland delineation was performed at the Site in June 2013 in order to determine if any of the affected areas associated with the release were designated as wetlands. Results of the wetland delineation confirmed the presence of wetlands in some of the affected areas at the Site. A copy of the wetland delineation report is included in **Appendix E**.

A team leader notification and request for Investigation Work Plan was issued to DRI by the LDEQ – Underground Storage Tank and Remediation Services Division (LDEQ – USTRD) on June 25, 2013. Due to other more significant issues associated with a

separate incident in the Delhi Field, DRI was granted an extension of time to prepare and submit the Work Plan.

On September 17, 2013, additional soil samples were collected from the affected area where fluids had been released at the surface in order to evaluate current conditions associated with the saltwater impact at the Site. Surface soil samples were collected at 16 locations from the top six inches of the soil. These samples were submitted to Sherry Laboratories in Lafayette, Louisiana and analyzed for total chlorides and total sodium. Results of the laboratory data indicated an exceedance in the RECAP Soil SS for chlorides at one location and for sodium at 10 locations. A summary of the results from this sampling event is included in **Appendix C, Table 1**. A map indicating the sample locations from this event is included in **Appendix A, Figure 3**. Laboratory analytical data is included in **Appendix D**.

4.3 SITE SIZE

The Site is located south of Furgeson Road in the northeast portion of Section 32 and the northwest portion of Section 33, Township 17 North, Range 9 East in Richland Parish, Louisiana. The area of investigation (AOI) is approximately 26 acres +/- based on the affected area where fluids from the piping leak had been released at the surface.

4.4 SITE SETTING

The Site is located in Richland Parish, Louisiana in the northeast portion of Section 32 and the northwest portion of Section 33, Township 17 North, Range 9 East, approximately 3.25 miles southeast of the town of Dunn (refer to **Appendix A, Figure 1**). The Site is located in a rural area surrounded by pastureland and wooded areas used for timber production. A livestock pond is located approximately 1,200 feet north of the Site. An intermittent stream, Muddy Slough is the nearest downgradient surface water body and is located approximately 600 feet southwest of the Site. The Site is located south of Furgeson Road and can be accessed via the ROW associated with the saltwater injection flow line. A Site map is included in **Appendix A, Figure 2**.

4.5 LAND USE

The Site is currently undeveloped with the exception of the saltwater injection flow line ROW which is maintained by DRI. Areas around the Site are used for pastureland and timber production and current land use is characterized as agricultural in nature.

Pastureland is located west, north and northeast of the Site and is used for grazing of local livestock (cattle). Wooded areas used for timber production are located south and southwest of the Site. Some residential home sites are located north of the Site along Furgeson Road. There are no anticipated changes in land use at the Site and no other known land uses of the surrounding properties. A Site map is included in **Appendix A, Figure 2**.

4.6 GROUNDWATER USE

There are no groundwater wells currently located at the Site and no known groundwater use. Groundwater in the area is typically first encountered in shallow perched aquifers approximately 10 to 20 feet bgs depending on seasonal conditions. Groundwater gradients are typically flat in the area, however, the groundwater flow direction is assumed to be towards the southwest in the direction of Muddy Slough.

Information obtained from the Louisiana Department of Natural Resources (LDNR) Water Well Database was reviewed to determine the presence of registered water wells located within a one mile radius of the Site in order to evaluate groundwater use in the vicinity. A total of 22 water wells were identified within the search radius. Of the 22 wells identified, three of the wells were registered to DRI as rig supply wells and were listed as plugged and abandoned. Fifteen (15) of the water wells are registered as monitoring wells that were installed at depths ranging from 29 to 36 feet bgs. All 15 of the monitoring wells are located approximately 1.0 miles northwest of the Site. Of the available information pertaining to these wells, the depths to groundwater were identified as ranging from 21.68 to 27.18 feet bgs. The four (4) remaining wells were registered as irrigation wells. The first of these wells is located approximately 0.3 miles southeast of the Site. The well was installed to a depth of 90 feet bgs with a depth to groundwater listed as 21 feet bgs. The second irrigation well is located approximately 0.9 miles southwest of the Site and was installed to a depth of 102 feet bgs with a depth to groundwater listed as 18 feet bgs. The third irrigation well is located approximately 0.9 miles northwest of the Site and was installed to a depth of 50 feet bgs with a depth to groundwater listed as 23 feet bgs. The fourth irrigation well is located approximately 1.0 miles southeast of the Site and was installed to a depth of 92 feet bgs with a depth to groundwater listed as 19 feet bgs. A map indicating the water wells located within a one-mile radius of the Site is included in **Appendix A, Figure 4**. Information pertaining to the water wells obtained from the LDNR Water Wells Database is included in **Appendix F, Water Well Information**.

4.7 REGIONAL GEOLOGY

According to the United States Department of Agriculture (USDA) Soil Conservation Service (SCS) Soil Survey of Richland Parish, the parish consists generally of two major physiographic areas. The level to gently undulating terraces which extend from north to south through the central part of the parish and the level to gently undulating alluvial plains that extend along the eastern and western edges of the parish.

The terraces make up nearly half of the parish and soils are mainly loamy and formed in either thick loess or thin loess over stream deposits. The thick loess typically consists of four feet or more of silty, wind-laid deposits, while the thin loess mantle is typically less than four feet thick. The majority of acreage in the terraces is utilized for crop cultivation while a small portion is used for pasture or woodland.

The remainder of the parish consists of flood plains. These soils range from loamy to clayey and from well drained to poorly drained. The majority of acreage in the flood plains is used for crop cultivation while a small percentage is used for pasture and woodland.

According to the soil survey, the primary soil types in the area are the Calhoun Series and the Grenada Series. The Calhoun series are described as poorly drained, slowly permeable soils that formed in thick loess of late Pleistocene age and are located on terraces. The Calhoun series are fine-silty, mixed thermic Typic Glossaqualfs and are commonly found near Calloway, Gilbert, Grenada and Loring series soils. The Grenada Series are described as moderately well drained soils that formed in thick loess of late Pleistocene age and are located on terraces. The Grenada series are fine-silty, mixed thermic Glossic Fragiudalfs and are commonly found near Calhoun, Calloway and Loring series soils.

4.8 SITE GEOLOGY

According to the Richland Parish Soil Survey, the predominate soil types at the Site are the Calhoun silt loam, the Calhoun-Calloway silt loams, gently undulating, the Calloway silt loams, and the Grenada-Calhoun silt loams, gently undulating. The Calhoun silt loam is described as nearly level, poorly drained soil located on broad flats and in narrow depressional areas on the terrace uplands. It contains silt loam surface and subsurface layers and a silty clay loam subsoil. The Calhoun-Calloway silt loams, gently undulating are described as nearly level soils located on the terrace uplands. The poorly drained Calhoun soil is on narrow flats and in swales and the somewhat poorly drained Calloway soil is located on very low ridges. Both are loamy throughout the soil profile. The Calloway silt loam is described as a very gently sloping, somewhat poorly drained soil formed in loess and is loamy throughout the soil profile. The Grenada-Calhoun silt loam, gently undulating is described as gently undulating soils located in ridges and swales on the terrace uplands. They are moderately to poorly drained and loamy throughout the soil profile.

Below the surface soils, the sediments grade from silty clays to sands of the Pleistocene and Holocene-aged Misissippi River Valley Alluvium (MRVA). The sands extend to approximately 100 feet below the surface, where they rest unconformably on the Eocene-aged Claiborne Group. The top of the Claiborne Group consists of silts and clays of the Cockfield Formation. The Cockfield Formation is approximately 400 feet thick and increases in sand content with depth. The Cockfield formation rests on the Cook Mountain Formation which consists of approximately 160 feet of primarily silts and clays. The Sparta Formation is below the Cook Mountain Formation and consist of approximately 250 feet of massive sands with interbedded clays. The base of the Claiborne group is the Cane River Formation that consists of approximately 80 feet of silts and clays.

4.9 REGIONAL HYDROGEOLOGY

The Site is located in the Gulf Coastal Plain Physiographic Province. Freshwater is found within the province in three geologic units: the MRVA of Pleistocene and Holocene Age, the Cockfield Formation, and Sparta Sand of Eocene Age. The nearest surface water body is Muddy Slough located approximately 600 feet southwest of the Site.

The Eocene-aged Claiborne Group is comprised of, in ascending order, the Cane River, Sparta, Cook Mountain, and Cockfield formations. The Sparta and Cockfield aquifers are important sources of fresh groundwater west of the Site. The Cane River and Cook Mountain formations are minor sources of groundwater because they are composed primarily of silts and clays. The Cook Mountain Formation acts as a confining layer for the Sparta aquifer and inhibits flow of groundwater between the Cockfield and Sparta aquifers. The formations outcrop west of the Site were the Sparta and Cockfield aquifers are sources of fresh groundwater. The units dip downward to the east and as a result the Sparta aquifer is too saline for use in the area of the Site. The chloride content of the Cockfield aquifer increase with depth in the aquifer and is generally not used as a source of groundwater in the area of the Site. The MRVA is the primary source of groundwater in the area of the Site. Domestic water wells are generally installed in the shallower portions of the aquifer and irrigation wells are installed deeper in the aquifer where coarser sands produce greater quantities of groundwater. The deeper portions of the aquifer have locally been impacted by saltwater, likely from historical oil field activities and/or production of groundwater resulting in upward flow from deeper saline zones of the Cockfield aquifer. The water bearing zone of the MRVA extends from approximately 20 feet to 100 feet below the surface. Groundwater flow in the aquifer system is regionally east to southeast.

5.0 IDENTIFICATION OF CONSTITUENTS OF CONCERN

Information obtained from DRI regarding the pipeline release, data previously collected at the Site, guidelines contained in the LDEQ's RECAP document, and guidelines concerning produced water releases located on the LDEQ's website were evaluated to determine the appropriate COCs for soil and groundwater to be considered for this Work Plan.

5.1 CONSTITUENTS OF CONCERN FOR SOIL

Based on information and data reviewed, the impact to soils at the Site is a result of the surface release of fluids from the saltwater injection flow line. Limited surface soil sampling conducted in April, May and September 2013 confirmed the presence of elevated chlorides and sodium in surface soils at the Site. In addition, guidelines contained in the LDEQ RECAP document and guidelines presented on the LDEQ website concerning produced water releases were reviewed to determine an appropriate list of COCs for soil. Based on the available information and guidelines reviewed, the appropriate preliminary list of COCs for soil has been identified below.

- Benzene, toluene, ethylbenzene and xylenes (BTEX)

- Total petroleum hydrocarbon (TPH) fractions including
    - Aliphatics C6-C8
    - Aliphatics >C8-C10
    - Aliphatics >C10-C12
    - Aliphatics >C12-C16
    - Aliphatics >C16-C35
    - Aromatics C8-C10
    - Aromatics >C10-C12
    - Aromatics >C12-C16
    - Aromatics >C16-C21
    - Aromatics >C21-C35

- Polycyclic aromatic hydrocarbons (PAH) including
    - Acenaphthene
    - Acenaphthylene
    - Benzo(a)anthracene
    - Benzo(a)pyrene
    - Benzo(b)fluoranthene
    - Benzo(k)fluoranthene
    - Chrysene
    - Dibenz(a,h)anthracene
    - Fluorene
    - Indeno(1,2,3-cd)pyrene
    - 2-Methylnaphthalene
    - Naphthalene

    - Phenanthrene
    - Pyrene

- Metals including
    - Arsenic
    - Barium
    - Cadmium
    - Chromium
    - Lead
    - Mercury
    - Selenium
    - Silver
    - Zinc

- Total chlorides

- Total sodium

- LDNR 29-B parameters including
    - Electrical conductivity (EC)
    - Sodium absorption ration (SAR)
    - Exchangeable sodium percentage (ESP)

5.2 CONSTITUENTS OF CONCERN FOR GROUNDWATER

Based on the information reviewed, it is not believed that the groundwater at the Site would have been impacted from the surface release. However, in accordance with guidelines presented in the RECAP document and guidelines presented on the LDEQ's website concerning produced water releases, the appropriate preliminary list of COCs for groundwater has been identified below.

- BTEX

- TPH fractions including
    - Aliphatics C6-C8
    - Aliphatics >C8-C10
    - Aliphatics >C10-C12
    - Aliphatics >C12-C16
    - Aliphatics >C16-C35
    - Aromatics C8-C10
    - Aromatics >C10-C12
    - Aromatics >C12-C16
    - Aromatics >C16-C21
    - Aromatics >C21-C35

- PAHs including
    - Acenaphthene
    - Acenaphthylene
    - Benzo(a)anthracene
    - Benzo(a)pyrene
    - Benzo(b)fluoranthene
    - Benzo(k)fluoranthene
    - Chrysene
    - Dibenz(a,h)anthracene
    - Fluorene
    - Indeno(1,2,3-cd)pyrene
    - 2-Methylnaphthalene
    - Naphthalene
    - Phenanthrene
    - Pyrene

- Metals including
    - Arsenic
    - Barium
    - Cadmium
    - Chromium
    - Lead
    - Mercury
    - Selenium
    - Silver
    - Zinc

- Total chlorides

- Total sodium

- LDNR 29-B parameters including
    - EC

6.0 QUALITY ASSURANCE/QUALITY CONTROL

6.1 ANALYTICAL METHODS AND QUANTITATION LIMITS

All soil and groundwater samples collected during the Site investigation will be submitted to a contract laboratory accredited by the State of Louisiana. The proposed analytical methods were selected based on the COCs identified in Sections 5.1 and 5.2 of this Work Plan and acceptable analytical methods presented in the RECAP guidance document. Sample quantitation limits for each COC will be at or below the applicable RECAP Screening Standard (SS) as required by LDEQ RECAP guidelines. The following table presents the analytical methods and applicable sample quantitation limit for each COC

ANALYTICAL METHODS AND QUANTITATION LIMITS

Parameter	Media	Method	Target Sample Detection Limit	
			Soil (mg/kg)	Water (mg/L)
BTEX	Soil/GW	8260		
Benzene			0.051	0.005
Toluene			20	1.0
Ethylbenzene			19	0.7
Xylenes			18	10
TPH Fractions	Soil/GW	VPH/EPH or Texas 1006		
Aliphatics C6-C8			1,200	3.2
Aliphatics >C8-C10			120	0.15
Aliphatics >C10-C12			230	0.15
Aliphatics >C12-C16			370	0.15
Aliphatics >C16-C35			7,100	7.3
Aromatics C8-C10			65	0.15
Aromatics >C10-C12			100	0.15
Aromatics >C12-C16			180	0.15
Aromatics >C16-C21			150	0.15
Aromatics >C21-C35			180	0.15
PAHs	Soil/GW	8310 or 8270		
Acenaphthene			220	0.037
Acenaphthylene			88	0.1
Benzo(a)anthracene			0.62	0.0078
Benzo(a)pyrene			0.33	0.0002
Benzo(b)fluoranthene			0.62	0.0048
Benzo(k)fluoranthene			6.2	0.0025
Chrysene			62	0.0016

Parameter	Media	Method	Target Sample Detection Limit	
			Soil (mg/kg)	Water (mg/L)
Dibenz(a,h)anthracene			0.33	0.0025
Fluorene			230	0.024
Indeno(1,2,3-cd)pyrene			0.62	0.0037
2-Methylnaphthalene			1.7	0.00062
Naphthalene			1.5	0.01
Phenanthrene			660	0.18
Pyrene			230	0.0180
Metals	Soil/GW	6010/6020 or 7074/7471 (Mercury)		
Arsenic			12	0.01
Barium			550	2.0
Cadmium			3.9	0.005
Chromium			23	0.1
Lead			100	0.015
Mercury			2.3	0.002
Selenium			20	0.05
Silver			39	0.018
Zinc			2,300	1.1
Other				
Total Chlorides	Soil/GW	9253 or SPLP	5,000	250
Total Sodium	Soil/GW	6010 or 3050	1,200	60
LDNR 29-B		E&P Manual		
EC	Soil/GW		4 mmho/cm	0.7 mmho/cm
SAR	Soil/GW		12 meq	3 meq
ESP	Soil		15%	

6.2 DATA PACKAGE

A Level II laboratory data package will be generated according to the requirements presented in LDEQ's RECAP document and will include chromatograms and an electronic deliverable data summary. Quality assurance/quality control (QA/QC) documentation will include sample documentation, determination and documentation of detection limits, analyte identification and quantification, QC blanks, matrix spike recoveries, performance evaluation samples (laboratory control samples), analytical error determination, and total measurement error determination.

6.3 FIELD QUALITY ASSURANCE/QUALITY CONTROL SAMPLES

Field personnel conducting sampling activities will collect sets of field samples for QA/QC purposes. Field QA/QC data will be collected according to the guidelines presented in the LDEQ's RECAP document and will include:

- 1 rinsate sample per day per parameter for soils
- 1 field blank per day
- 1 field duplicate sample per 20 field samples
- 1 matrix spike/matrix spike duplicate sample per 20 field samples

All field samples will be collected according to the methods presented in Sections 7.2.2 and 7.3.2 of this Work Plan. Latex gloves will be worn and sampling equipment will be decontaminated between each sample location. All QA/QC samples will be documented and packaged on ice for storage and shipment to the contract laboratory under the appropriate chain-of-custody.

7.0 SAMPLING ACTIVITES

7.1 AREA OF INVESTIGATION

Based on the information reviewed and previous activities conducted at the Site, the AOI for this Work Plan has been identified as the area near the saltwater injection flow line leak where fluids had been released at the surface. Preliminary information indicates that this area contains approximately 26 acres +/-. A map indicating the AOI for the Site is included in **Appendix A, Figure 5**.

7.2 SOIL SAMPLING

7.2.1 SOIL SAMPLE LOCATIONS

Soil samples will be collected form the AOI in order to determine the vertical and horizontal extent of impact for the COCs identified in Section 5.1 of this Work Plan. Soil sample collection will begin near the point of release (source) and radiate outward as necessary until delineation of the COCs has been achieved. The exact number of soil boring locations required to demonstrate delineation is not known, however, a minimum of five soil borings will be initially installed near the source. Dependent upon the results of the initial sampling, it may be necessary to conduct additional sampling events in order to achieve delineation of the COCs. Likewise, those COCs which are found to be below their respective Soil SS in the initial sampling will be eliminated from further evaluation within the AOI. A map indicating the proposed soil sample locations is included in **Appendix A, Figure 5**.

7.2.2 SOIL SAMPLING PROCEDURES

Soil samples will be collected in accordance with applicable RECAP guidelines. For the initial sampling event, a Geo-Probe® unit utilizing a Macrocore Piston Rod System® will be used to conduct continuous soil sampling in the AOI. At each proposed sample location, the sampling device will be advanced to a depth of four (4) feet bgs to obtain a core sample of the surface soils. Upon retrieval of the sampling device and removal of the core sample, the soils will be visually inspected and soil characteristics will be documented in a field log. At this time, representative portions of the soil sample will be placed into clean, laboratory-supplied containers, labeled, and immediately packed in ice for storage and possible shipment to the contract laboratory. For volatile organic constituents (VOCs) and semi-VOCs, another representative portion of the soil sample will be placed in a clean, 16-ounce glass container, covered with foil, sealed, and allowed to volatilize for approximately 15 minutes prior to field screening with a photo ionization detector (PID). After allowing each soil sample to volatilize for approximately 15 minutes, the tip of the PID will be inserted through the foil seal, and the reading of the PID will be documented next to the corresponding sample in the field log.

Prior to the next advance of the sampling device and collection of subsequent core samples, latex gloves will be changed and the sample device will be properly

decontaminated. This sampling procedure will be repeated for subsequent core samples until the PID readings have indicated that the vertical extent of the soil contamination has been defined. In this event, the boring will be terminated and a soil sample will be collected from the boring termination. Soil samples selected for laboratory analysis will include samples exhibiting the highest PID readings, soil samples collected from the soil-groundwater interface (if encountered), and soil samples collected from the boring termination in accordance with RECAP guidelines. In addition, appropriate laboratory QA/QC samples, and sample duplicates will be collected and submitted for laboratory analysis. Due to the nature of some of the COCs (metals, chlorides, EC, SAR and ESP) data evaluation of the initial sampling event will be necessary to determine if any additional soil sampling may be required for these parameters.

At the completion of each soil boring and prior to subsequent borings, the sampling equipment will be properly decontaminated. Investigation derived waste (soil cuttings and decon water) will be drummed and labeled for proper disposal. Soil borings will be installed and abandoned in accordance with LDOTD and LDEQ regulations for plugging and abandonment of monitoring wells/boreholes presented in the *Construction of Geotechnical Boreholes and Groundwater Monitoring System Handbook*, December 2000. Soil boring coordinates and elevations will be surveyed by a registered land surveyor.

7.3 GROUNDWATER SAMPLING

7.3.1 GROUNDWATER SAMPLE LOCATIONS

Based on information reviewed, it is not suspected that groundwater at the Site would have been impacted from the surface release. However, a groundwater sample will be collected from the AOI for the COCs identified in Section 5.2 of this Work Plan. For the initial sampling event, a groundwater sample will be collected from a temporary well located slightly downgradient of the source (in the direction of Muddy Slough). Although not anticipated, dependent upon the results of the initial sampling, it may be necessary to conduct additional sampling events in order to achieve delineation of any elevated COCs. Likewise, those COCs which are found to be below their respective Groundwater SS in the initial sampling will be eliminated from further evaluation within the AOI. In addition to the temporary well, two (2) additional piezometers will also be installed at appropriate locations in order to verify groundwater flow direction. A map indicating the proposed groundwater sample location and piezometers is included in **Appendix A, Figure 5**.

7.3.2 GROUNDWATER SAMPLING PROCEDURES

A Geo-Probe® unit will be utilized to advance a boring to the appropriate depth at which groundwater is encountered. Once groundwater has been encountered, a temporary monitoring well, constructed of PVC well screen and riser, will be installed to collect a representative groundwater sample. Clean coarse sand will be installed in the boring to serve as a filter pack for the temporary monitoring well. If possible, the boring will be

purged until the groundwater appears to be free of sediments. At this time, the groundwater samples will be collected for laboratory analysis. The groundwater samples will be placed in clean laboratory-supplied glass containers, labeled, and packaged on ice for storage and shipment to the contract laboratory for analysis under the appropriate chain-of-custody. In addition, appropriate laboratory QA/QC samples and sample duplicates will be collected and submitted for laboratory analysis. Latex gloves will be worn to prevent cross contamination.

At the completion of the temporary monitor well and prior to installation of subsequent piezometers, the drilling device will be properly decontaminated. Investigation derived waste (soil cuttings, decon water and purge water) will be drummed and labeled for proper disposal. The temporary monitor well and piezometers will be installed and abandoned in accordance with LDOTD and LDEQ regulations for plugging and abandonment of monitoring wells/boreholes presented in the *Construction of Geotechnical Boreholes and Groundwater Monitoring System Handbook*, December 2000. Temporary well coordinates and elevations will be surveyed by a registered land surveyor. Depth to groundwater will be measured in the temporary well and piezometers and recorded in a field log in order to determine groundwater elevation prior to well development and collection of the groundwater samples.

7.4 SOIL CHARACTERISTICS ANALYSIS

If deemed necessary, soil sample(s) may be collected for possible fate and transport modeling in the event that the results of the soil and groundwater analysis indicate that further evaluation of the AOI is warranted. The soil sample(s) will be collected from a non-impacted, unsaturated zone that is representative of subsurface conditions encountered during soil-boring activities at the Site.

If collected, the soil sample(s) will be labeled, packaged and shipped to the contract laboratory for the following soil characteristics analysis according to the required methods:

- Organic Matter (ASTM D 2974)
- Unified Soil Classification System (ASTM D 2487)
- Atterberg Limits (ASTM D 4318)
- Particle Size Analysis (ASTM D 422)
- Soil pH (ASTM D 4972)
- Moisture Content (ASTM D 2216)
- Specific Gravity (ASTM D 854)

In addition, it will be requested that the contract laboratory calculate dry density and total porosity of the soil sample(s).

7.5 ADDITIONAL GROUNDWATER DATA

If deemed necessary, additional groundwater data may be collected for possible fate and transport modeling in the event that the results of the soil and groundwater analysis indicate that further evaluation of the AOI is warranted. Installation of additional temporary wells may be necessary to collect other groundwater data pertaining to hydraulic conditions at the Site such as hydraulic conductivity, well yield, etc.

8.0 CONCLUSION

The intention of this Work Plan is collect sufficient data to adequately assess the soil and groundwater conditions associated with the previous surface release of fluids from a saltwater injection flow line at the Site. All methodologies and information proposed in this Work Plan are in accordance with guidelines presented in the RECAP document. It is believed that information obtained during the RECAP investigation will provide the data needed to effectively manage the Site under one of the current RECAP Management Options or to establish remedial goals if necessary. On behalf of Denbury Resources, CERG respectfully request LDEQ approval of the activities proposed in this Work Plan. A RECAP Submittal Report will be forwarded to the LDEQ upon completion of the activities proposed in this Work Plan.

9.0 REFERENCES

Denbury Resources, Inc., DFU 125-1 Site Incident Action Plan, June 11, 2013.

Louisiana Department of Environmental Quality, Risk Evaluation / Corrective Action Program Document, October 20, 2003.

Louisiana Department of Environmental Quality Website, Risk Evaluation / Corrective Action Program, Frequently Asked Questions – Produced Water Releases.

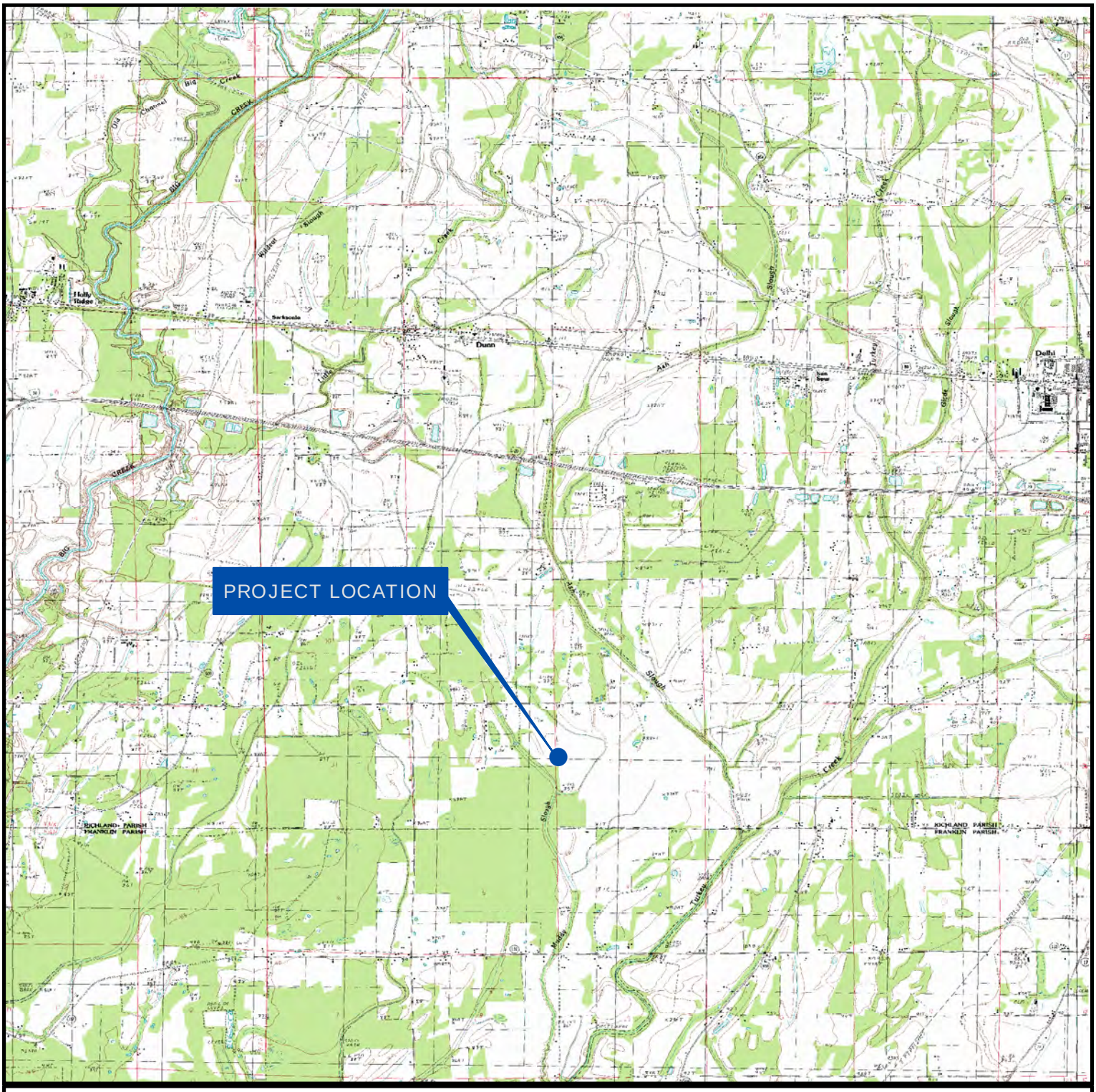
Louisiana Department of Natural Resources, SONRIS Water Well Database, 2013.

Louisiana State University, Digital Atlas, Aerial Photographs.

United States Department of Agriculture – Soil Conservation Service, *Soil Survey of Richland Parish*, 1993.

United States Department of Agriculture – Natural Resources Conservation Service, Web Soil Survey Website.

APPENDIX A
FIGURES



0 4,000 8,000 Feet

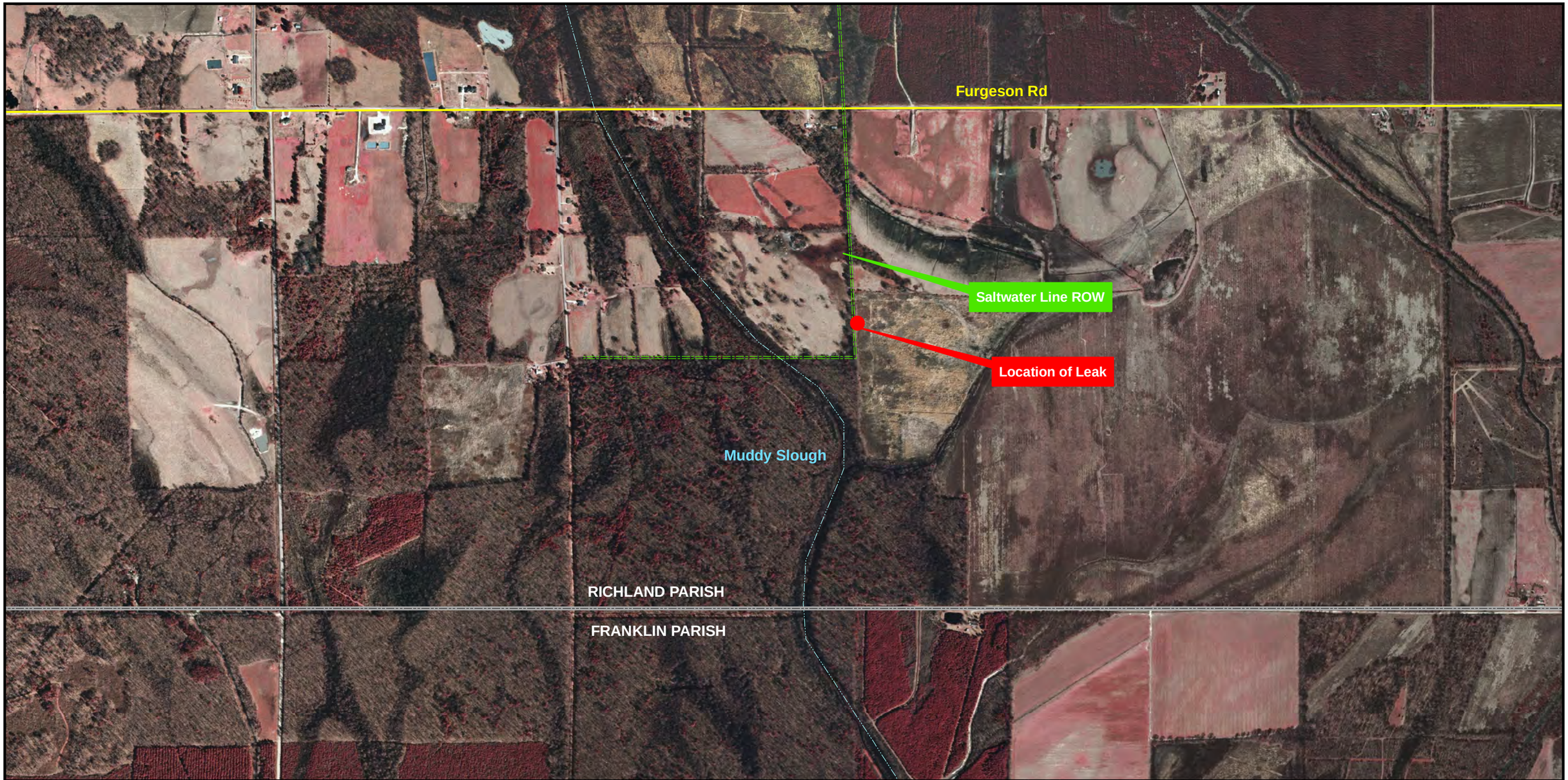
FIGURE 1
PROJECT LOCATION MAP

SOURCE: USGS 7.5 MINUTE TOPOGRAPHIC MAP
DUNN, LA QUADRIANGLE

N

Cork
Environmental
Resource
Group

DENBURY RESOURCES, INC.
DFU 125-1 SITE
FURGESON ROAD
RICHLAND PARISH, LA



0 750 1,500 Feet

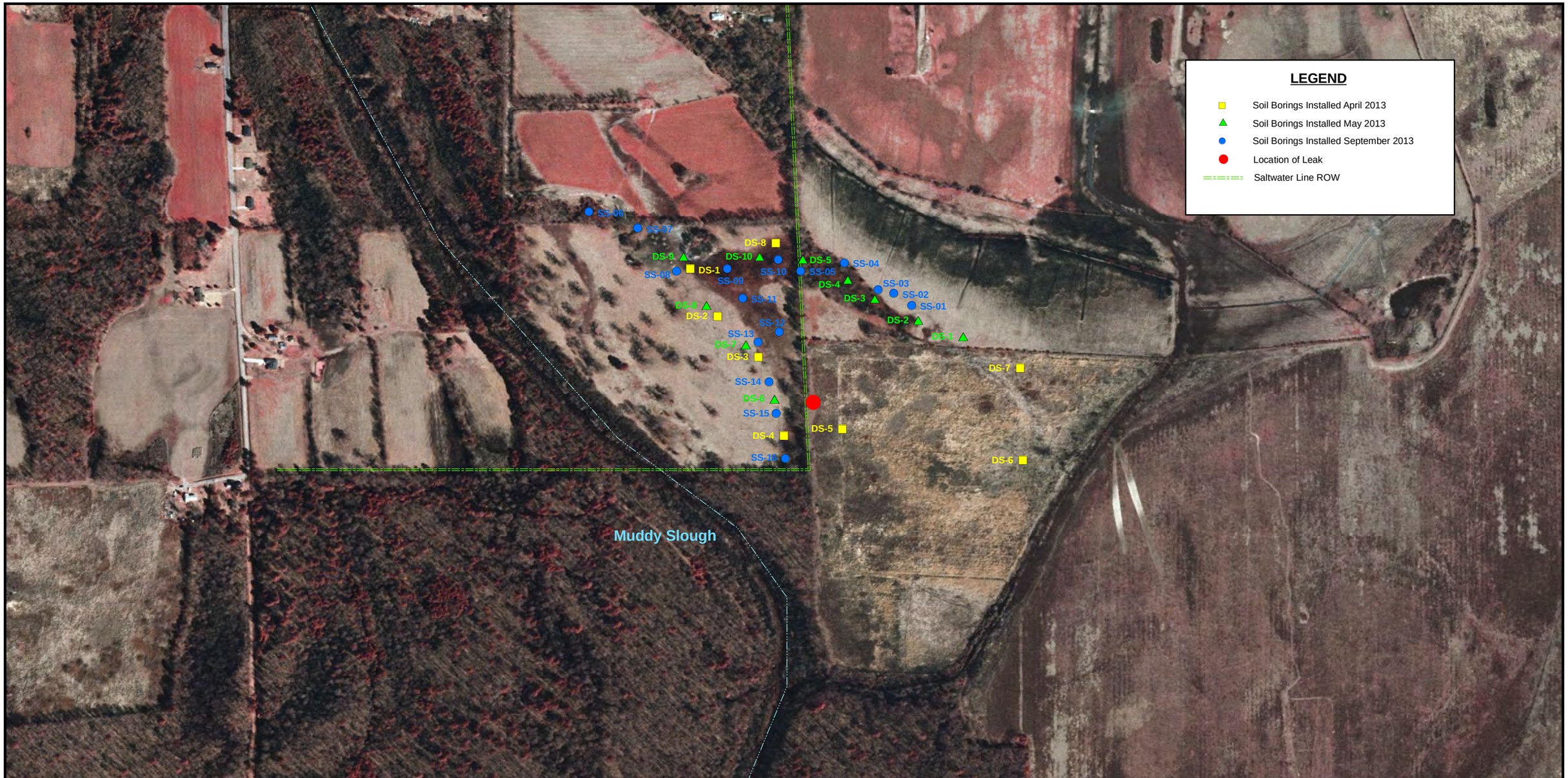
N

FIGURE 2
SITE MAP

Cork Environmental Resource Group

SOURCE: AERIAL PHOTOGRAPHY - LOUISIANA STATE UNIVERSITY STATE GIS ATLAS

DENBURY RESOURCES, INC.
DFU 125-1 SITE
FURGESON ROAD
RICHLAND PARISH, LA



0 350 700 Feet

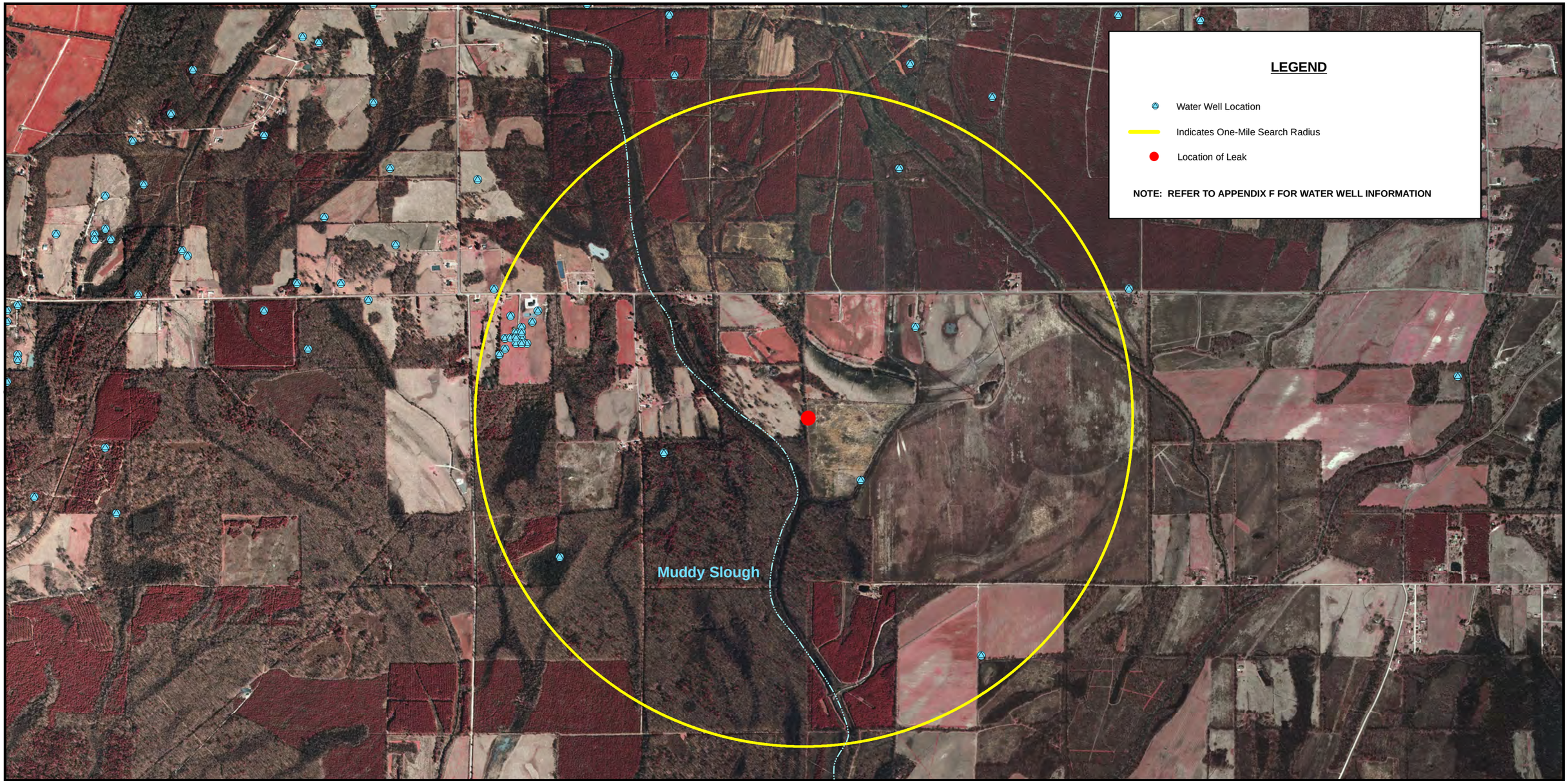
N

Cork Environmental Resource Group

SOURCE: AERIAL PHOTOGRAPHY - LOUISIANA STATE UNIVERSITY STATE GIS ATLAS

FIGURE 3
HISTORICAL SOIL SAMPLE LOCATIONS

DENBURY RESOURCES, INC.
DFU 125-1 SITE
FURGESON ROAD
RICHLAND PARISH, LA



0 0.25 0.5 Miles

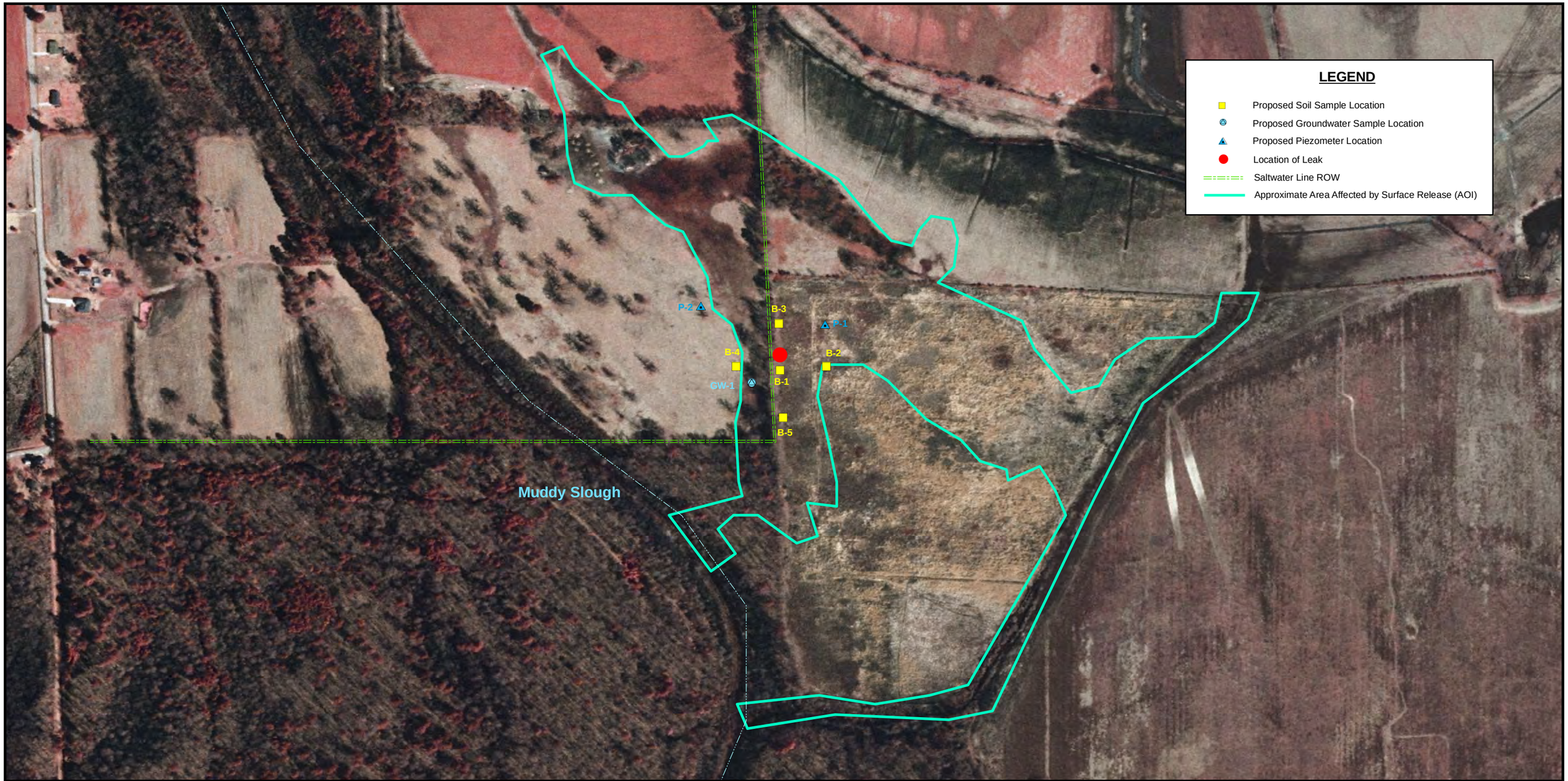
N

FIGURE 4
WATER WELLS WITHIN ONE-MILE RADIUS

Cork Environmental Resource Group

SOURCE: AERIAL PHOTOGRAPHY - LOUISIANA STATE UNIVERSITY STATE GIS ATLAS

DENBURY RESOURCES, INC.
DFU 125-1 SITE
FURGESON ROAD
RICHLAND PARISH, LA



0 350 700 Feet

N

FIGURE 5
AREA OF INVESTIGATION MAP

Cork Environmental Resource Group

SOURCE: AERIAL PHOTOGRAPHY - LOUISIANA STATE UNIVERSITY STATE GIS ATLAS

DENBURY RESOURCES, INC.
DFU 125-1 SITE
FURGESON ROAD
RICHLAND PARISH, LA

APPENDIX B
INCIDENT ACTION PLAN

INCIDENT ACTION PLAN COVER SHEET

Incident Name	DFU 125-1
Incident Number	13-01317
Date Prepared	6/11/13
Time Prepared	1200
Prepared by	Mark Walley
Latitude	32º24’48”
Longitude	91º33’39”
Operational Start Date/Time	6/04/13 @ 0700
Operational Finish Date/Time	6/10/13 @ 0700
APPROVAL	
FOSC	**N/A**
SOSC	**Brad Osbon, LADEQ**
RP	**Denbury Onshore, LLC**

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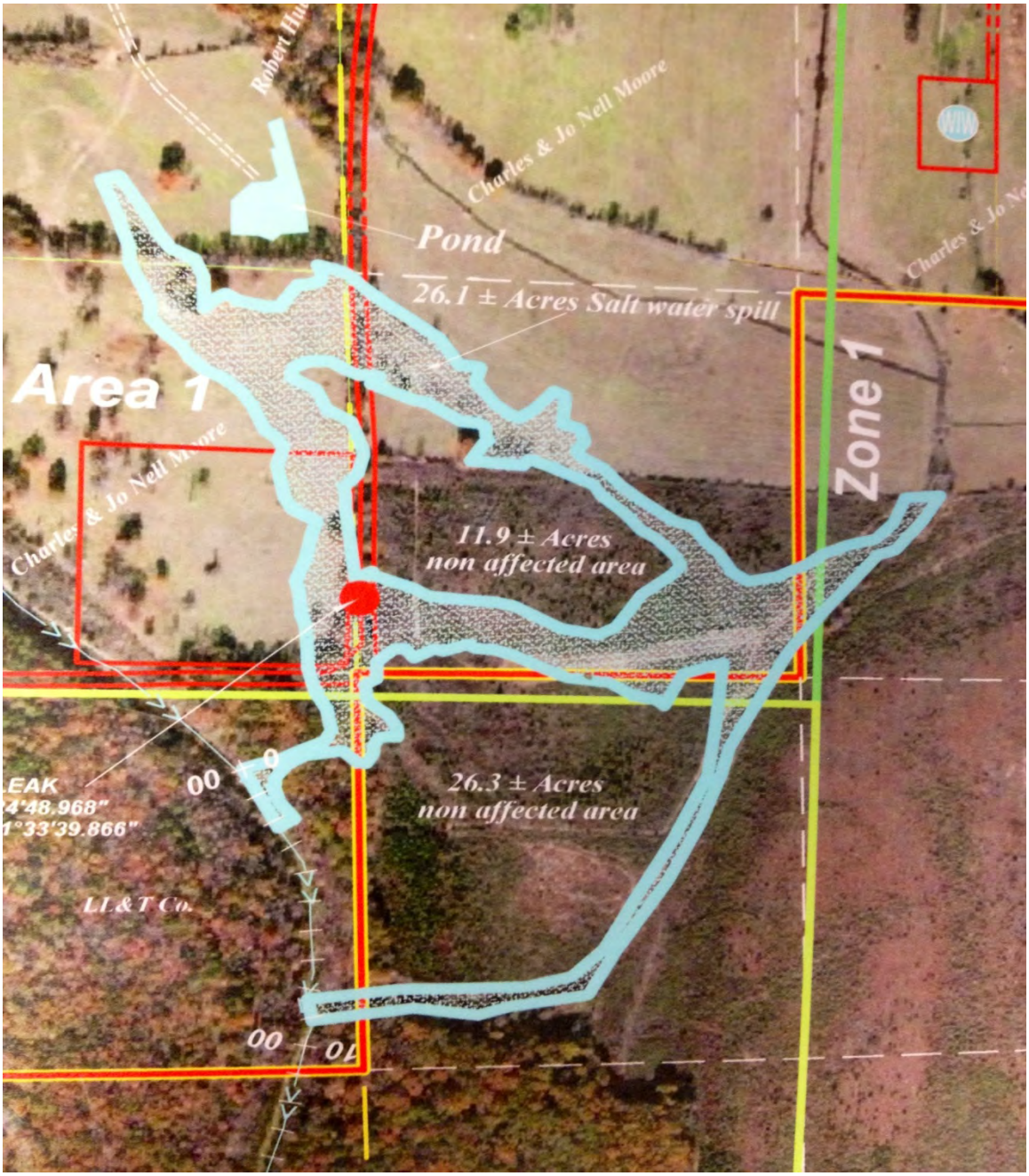
X	**Incident Briefing (ICS 201)**		
X	**Summary of Current Actions**		
X	**Resources Summary**		
X	**Incident Objectives (ICS 202)**		
X	**Daily Safety and Health Message**		

INCIDENT BRIEFING
ICS 201 - 1

Incident Name	DFU 125-1

MAP / SKETCH



INCIDENT BRIEFING
ICS 201 – 2A

SUMMARY OF CURRENT ACTIONS

3/26/13-4/1/13

The Production Foreman was notified by LA DEQ that a land owner had called in a spill on his property. Operations investigated and discovered that the 6" zap lock flow line to the DFU 125-1 saltwater injection well had failed releasing 200 barrels of saltwater into the ROW, adjoining property, adjacent drainage features, and flowing into Muddy Slough. The release was stopped by shutting down the water injection flow line from Test Site #4. The released fluids traveled approximately 2.7 miles in Muddy Slough. There was 0.5 barrels of crude oil released but contained on land at the leak site.

Safety & Environmental:

- No public safety concerns observed.
- No safety incidents reported.
- Salinity tests are being performed to monitor the chlorides present and to determine the amount of freshwater flushing to dilute chlorides in Muddy Slough.

Notifications:

The following notifications were made by Mark Walley, HSE Coordinator, Denbury Onshore, LLC:

Action	Date	Time	Information
LA State Police	**03/26/13**	**1447**	**Tara**
Richland Parish Sheriff Office	**03/26/13**	**1452**	**Mona**

Recovery:

- Saltwater is being removed by vacuum trucks and taken to frac tanks located at the Delhi EOR facility to be pumped into the 151-2 and 151-3 SWD wells. Fresh water is being used to flush the impacted areas and recovered by vacuum trucks.
- Three (3) recovery points have been established for fluid recovery along the impacted areas of Muddy Slough. (See orange dots on map).

Fluids Recovered		
Date	**Barrels**	**Cumulative Total**
3/26/13-4/1/13	**16,800**	**16,800**

Containment:

- Containment structures were installed and freshwater flushing/removal operations are ongoing at this time.
- Containment structures have been installed in adjacent non-impacted drainage areas and features to prevent rain events from breaching containment structures in Muddy Slough.
- Containment structures are being monitored on 24 hr basis at this time due to forecasted rain events.

INCIDENT BRIEFING
ICS 201 – 2A

SUMMARY OF CURRENT ACTIONS

4/2/13-4/8/13

Safety & Environmental:

- No public safety concerns observed.
- No safety incidents reported.
- Salinity tests are being performed to monitor the chlorides present and to determine the amount of freshwater flushing to dilute chlorides in Muddy Slough. Levels in Zones 1 and 2 ranges from 3,000-7,000 ppm.
- An ARGO amphibious unit is used to agitate fluids in Muddy Slough and push fluids south to the collection point.
- Collected water samples on 2013-04-07 from Zones 1 and 2 for laboratory analysis to confirm field chloride readings.
- Salinity tests were performed in Turkey Creek on 2013-04-08, main tributary that Muddy Slough drains into. Chloride levels were 100 ppm which is below state the state regulatory limits of 250 ppm for Turkey Creek.

Recovery:

- The main recovery point is located on HWY 132 where vacuum trucks are recovering liquids from a manmade dam built just north of three (3) culverts in Muddy Slough.
- Due to only one foot of gradient from release point to HWY 132 and the road shoulder damage, a new location was made on the west side of Jack Franks road. Restoration of road will be completed per State DOT request.
- The recovery location on Jack Franks road is approximately one acre. The location is matted and large enough to stage frac tanks with a PJ-8 pump recovering fluids into the frac tanks, allowing vacuum trucks to empty the frac tanks and transport fluids to the EOR Facility.
- Disposal of fluids are at the EOR Facility SWD well 151-2 and the facility Vortex Tank.
- A pump was rigged up to SWD well 151-3 but the well would not take the fluids.

Fluids Recovered		
Date	**Barrels**	**Cumulative Total**
4/2/13-4/8/13	**67,124**	**83,924**

Containment:

- Containment at HWY 132 was utilized until 2013-04-07.
- Containment dam was made on 2013-04-07 on west side of Jack Franks road.
- Slow release of fluids from the original containment structure at HWY 132 to allow Muddy Slough levels north of HWY 132 to equalize and drop.
- Containment structures are being monitored on 24 hr basis at this time due to forecasted rain events.

INCIDENT BRIEFING
ICS 201 – 2A

SUMMARY OF CURRENT ACTIONS

4/9/13-4/15/13

Safety & Environmental:

- No public safety concerns observed.
- No safety incidents reported.
- Jack Franks road has been soil cemented to better access to the containment and fluid collection location.
- Meeting with LADEQ determined that fluids could be released into Turkey Creek if chloride levels reached below 250 ppm using passive overflow dam system.
- Chloride levels tested below 250 ppm after rain water filled Muddy Slough from recent heavy rain event.
- Muddy Slough is being monitored by USES to ensure that chloride levels do not exceed 250 ppm (LADEQ regulations) from overflow dam structures.

Recovery:

- The recovery of fluids is still ongoing in Zone 1 due to recent heavy rains reforming in low elevation pasture areas.
- Vacuum trucks are utilized to recover fluids from the low elevation impacted pasture area. A recovery point with six frac tanks is still being utilized to recover standing fluids in Zone 1.
- Contained fluids are being transported and disposed of at the EOR Facility into SWD well 151-2 and the vortex tank.
- Frac tanks are being demobilized and removed from the field as they are being emptied.
- As of 2013-04-16, there are 24 of 81 total frac tanks remaining to be emptied and demobilized.

Fluids Recovered		
Date	**Barrels**	**Cumulative Total**
4/9/13-4/15/13	**63,261**	**147,185**

Containment:

- Containment structures in Zones 2 and 3 were gradually removed from Muddy Slough as monitored chloride levels below 250 ppm were recorded to allow full flow and drainage of rain water from surrounding areas that also drain into Muddy Slough.
- One containment structure in Zone 1 remains in place at this time. The containment structure is located upstream in Muddy Slough and is being utilized to control release non-impacted water to ensure complete flushing of impacted areas in Muddy Slough.

INCIDENT BRIEFING
ICS 201 – 2A

SUMMARY OF CURRENT ACTIONS

4/16/13-4/22/13

Safety & Environmental:

- No public safety concerns observed.
- No safety incidents reported.
- Periodic monitoring of Muddy Slough (bi-weekly) by USES to ensure that chloride levels do not exceed 250 ppm (LADEQ regulations).
- USES will continue periodic monitoring (bi-weekly) of Turkey Creek to ensure chloride levels are below 250 ppm (LADEQ regulations).
- Zone 1 is now the only area of high concentrated chlorides remaining. These areas are contained to prevent movement of remaining fluids.

Recovery:

- The recovery of fluids is still ongoing in Zone 1 in low elevation pasture areas.
- Pumping remaining high chloride fluids from drainage feature along edge of cut-over to collection pond in zone 1.
- Fluid levels in low areas of pasture have been reduced to begin dilution of remaining chlorides utilizing water from adjacent fresh water ponds.
- Vacuum trucks are utilized to recover fluids from the low elevation impacted pasture area. A recovery point with six frac tanks is still being utilized to recover standing fluids in Zone 1.
- Contained fluids are being transported and disposed of at the EOR Facility into SWD well 151-2 and the vortex tank.
- Frac tanks are being demobilized and removed from the field as they are being emptied.
- As of 2013-04-22, there are 13 of 81 total frac tanks remaining to be emptied and demobilized.

Fluids Recovered		
Date	**Barrels**	**Cumulative Total**
4/16/13-4/22/13	**27,632**	**174,817**

Containment:

- One containment structure in Zone 1 remains in place at this time. The containment structure is located upstream in Muddy Slough and is being utilized to control release non-impacted water to ensure complete flushing of impacted areas in Muddy Slough.

INCIDENT BRIEFING
ICS 201 – 2A

SUMMARY OF CURRENT ACTIONS

4/23/13-4/29/13

Safety & Environmental:

- No public safety concerns observed.
- No safety incidents reported.
- Periodic monitoring of Muddy Slough (bi-weekly) by USES to ensure that chloride levels do not exceed 250 ppm (LADEQ regulations).
- USES will continue periodic monitoring (bi-weekly) of Turkey Creek to ensure chloride levels are below 250 ppm (LADEQ regulations).
- Zone 1 is now the only area of high concentrated chlorides remaining. These areas are contained to prevent movement of remaining fluids.
- Landowner is $66,600 for hay due to not being able to graze the impacted area in Zone 1.
- Soil samples were taken on 4/24/13. (See map for results)

Recovery:

- The recovery of fluids is still ongoing in Zone 1 in low elevation pasture areas.
- Pumping remaining high chloride fluids from drainage feature along edge of cut-over to collection pond in zone 1.
- Vacuum trucks are utilized to recover fluids from the pond that fluids are being pumped into from the impacted area(s). A recovery point with six frac tanks is still being utilized to recover standing fluids in Zone 1.
- Contained fluids are being transported and disposed of at the EOR Facility into SWD well 151-2 and the vortex tank.
- All mats were removed from the recovery location on Jack Franks Rd. and restored back to original condition. Native grasses will be replanted at the location.
- As of 2013-04-29, there are 13 of 81 total frac tanks remaining to be emptied and demobilized.

Fluids Recovered		
Date	**Barrels**	**Cumulative Total**
4/23/13-4/29/13	**12,000**	**186,817**

Containment:

- One containment structure in Zone 1 remains in place at this time. The containment structure is located upstream in Muddy Slough and is being utilized to control release non-impacted water to ensure complete flushing of impacted areas in Muddy Slough.

INCIDENT BRIEFING
ICS 201 – 2A

SUMMARY OF CURRENT ACTIONS

4/30/13-5/6/13

Safety & Environmental:

- No public safety concerns observed.
- No safety incidents reported.
- Periodic monitoring of Muddy Slough (bi-weekly) by USES to ensure that chloride levels do not exceed 250 ppm (LADEQ regulations).
- USES will continue periodic monitoring (bi-weekly) of Turkey Creek to ensure chloride levels are below 250 ppm (LADEQ regulations).

Recovery:

- The recovery of fluids is still ongoing in Zone 1 in low elevation pasture areas.
- High chloride fluids are being pumped from areas along the ROW and cut-over into the recovery point by 2" & 3" pumps.
- Vacuum trucks are utilized to recover fluids from the pond that fluids are being pumped into from the impacted area(s).
- Contained fluids are being transported and disposed of at the EOR Facility into SWD well 151-2 and the vortex tank.
- Fluid recovery was shut down on 2013-05-01 due to rain events and to allow natural dilution of chlorides throughout the impacted area.
- As of 2013-05-06, there are 13 of 81 total frac tanks remaining to be emptied and demobilized.

Fluids Recovered		
Date	**Barrels**	**Cumulative Total**
4/30/13-5/6/13	**5,232**	**192,049**

Containment:

- One containment structure in Zone 1 remains in place at this time. The containment structure is located upstream in Muddy Slough and is being utilized to control release non-impacted water to ensure complete flushing of impacted areas in Muddy Slough.

INCIDENT BRIEFING
ICS 201 – 2A

SUMMARY OF CURRENT ACTIONS

5/7/13-5/13/13

Safety & Environmental:

- No public safety concerns observed.
- No safety incidents reported.
- Periodic monitoring of Muddy Slough (bi-weekly) by USES to ensure that chloride levels do not exceed 250 ppm (LADEQ regulations).
- USES will continue periodic monitoring (bi-weekly) of Turkey Creek to ensure chloride levels are below 250 ppm (LADEQ regulations).

Recovery:

- The recovery of fluids is still ongoing in Zone 1 in low elevation pasture areas due to chloride levels not decreasing as fast as anticipated with recent light rainfall.
- High chloride fluids are being pumped from areas along the ROW and cut-over into the recovery point by 2" & 3" pumps.
- Vacuum trucks are utilized to recover fluids from the collection point that are being pumped into from the impacted area(s).
- Contained fluids are being transported and disposed of at the EOR Facility into SWD well 151-2 and the vortex tank.
- As of 2013-05-14, there are 12 of 81 total frac tanks remaining to be emptied and demobilized.

Fluids Recovered		
Date	**Barrels**	**Cumulative Total**
5/7/13-5/13/13	**14,852**	**206,901**

Containment:

- One containment structure in Zone 1 remains in place at this time. The containment structure is located upstream in Muddy Slough and is being utilized to control release non-impacted water to ensure complete flushing of impacted areas in Muddy Slough.

INCIDENT BRIEFING
ICS 201 – 2A

SUMMARY OF CURRENT ACTIONS

5/14/13-5/20/13

Safety & Environmental:

- No public safety concerns observed.
- No safety incidents reported.
- The spill has been turned over to the LADEQ Remediation Department.

Recovery:

- No recovery efforts are taking place at this time.
- As of 2013-05-21, there are 12 of 81 total frac tanks remaining to be emptied and demobilized.
- Surface fluids from Zone1 have been removed from low elevation areas.

Fluids Recovered		
Date	**Barrels**	**Cumulative Total**
5/14/13-5/20/13	**10,104**	**217,005**

Containment:

- One containment structure in Zone 1 remains in place at this time along the eastern edge of pasture area to keep fluids within the impacted area during the next rain events.

INCIDENT BRIEFING
ICS 201 – 2A

SUMMARY OF CURRENT ACTIONS

5/21/13-5/27/13

Safety & Environmental:

- No public safety concerns observed.
- No safety incidents reported.
- The spill has been turned over to the LADEQ Remediation Department.

Recovery:

- No recovery efforts are taking place at this time.
- As of 2013-05-28, there are 12 of 81 total frac tanks remaining to be emptied and demobilized.
- Surface fluids from Zone1 have been removed from low elevation areas.

Fluids Recovered		
Date	**Barrels**	**Cumulative Total**
5/21/13-5/27/13	**0**	**217,005**

Containment:

- One containment structure in Zone 1 remains in place at this time along the eastern edge of pasture area to keep fluids within the impacted area during the next rain events.

INCIDENT BRIEFING
ICS 201 – 2A

SUMMARY OF CURRENT ACTIONS

5/28/13-6/03/13

Safety & Environmental:

- No public safety concerns observed.
- No safety incidents reported.
- The spill has been turned over to the LADEQ Remediation Department.

Recovery:

- No recovery efforts are taking place at this time.
- As of 2013-06-03, there are 4 of 81 total frac tanks remaining to be emptied and demobilized.
- Surface fluids from Zone1 have been removed from low elevation areas.

Fluids Recovered		
Date	**Barrels**	**Cumulative Total**
5/28/13-6/03/13	**0**	**217,005**

Containment:

- One containment structure in Zone 1 remains in place at this time along the eastern edge of pasture area to keep fluids within the impacted area during the next rain events.

INCIDENT BRIEFING
ICS 201 – 2A

SUMMARY OF CURRENT ACTIONS

6/04/13-6/10/13

Safety & Environmental:

- No public safety concerns observed.
- No safety incidents reported.
- A meeting was held with LADEQ to discuss in-situ soil remediation for the impacted areas. During the meeting, the practicality of performing in-situ treatment in a wetland area was discussed. In summary, LADEQ concurred that in-situ treatment in a wetland area would not be feasible and monitoring/natural attenuation would be the best path forward if these areas meet wetland criteria. Messinger & Associates will conduct a wetland delineation of the impacted areas in the near future and a follow up meeting with LADEQ will be held to discuss the path forward after the results of the delineation are received.

Recovery:

- No recovery efforts are taking place at this time.
- As of 2013-06-11, there are 4 of 81 total frac tanks remaining to be emptied and demobilized.
- Surface fluids from Zone1 have been removed from low elevation areas.

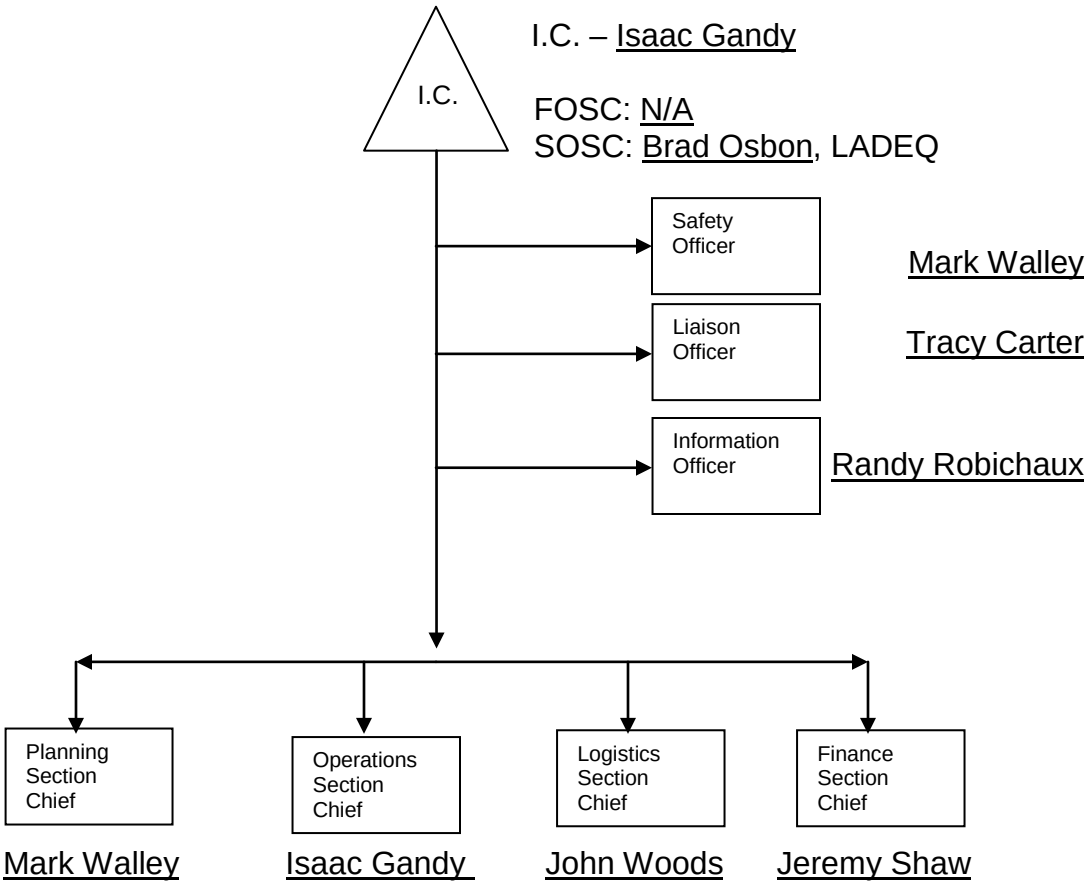
Fluids Recovered		
Date	**Barrels**	**Cumulative Total**
6/04/13-6/10/13	**0**	**217,005**

Containment:

- One containment structure in Zone 1 remains in place at this time along the eastern edge of pasture area to keep fluids within the impacted area during the next rain events.

INCIDENT BRIEFING
201 - 3

CURRENT ORGANIZATION



INCIDENT BRIEFING
ICS 201 - 4

RESOURCES SUMMARY

RESOURCE	PROVIDER	ETA	ON-SCENE	ASSIGNMENT
(4) Frac Tank	Boots Smith		Yes	Fluid Disposal at EOR

PERSONNEL SUMMARY

COMPANY	ETA	ON-SCENE	ASSIGNMENT
Denbury (2)		Yes	Incident Management

Denbury	RESPONSE OBJECTIVES ICS 202
Incident Name	DFU 125-1
Incident Number	13-01317
Date Prepared	6/11/13
Time Prepared	1200
Prepared by	Mark Walley
Latitude	32º24’48”
Longitude	91º33’39”
Operational Start Date/Time	6/04/13 @ 0700
Operational Finish Date/Time	6/10/13 @ 0700

OBJECTIVES FOR OPERATIONAL PERIOD

1. SAFETY - Safety is always the #1 Objective and Priority.
2. Monitor & Maintain Site Containment - Ensure proper containment of remaining released fluids to minimize environmental impact to prevent entry into Muddy Slough.

SAFETY MESSAGE FOR OPERATIONAL PERIOD

- **STAY HYDRATED**
- **BE AWARE OF SURROUNDINGS (snakes and other wildlife related hazards)**
- **BE AWARE OF UNEVEN TERRAIN AND MUDDY AREAS.**
- **BE AWARE OF PINCH POINTS, SLIPS, TRIPS, AND FALLS.**

RESPONSE OBJECTIVES
ICS 202

WEATHER REPORT

Today Jun 11	Mostly Sunny	94°F	74°F	CHANCE OF RAIN: 0%	WIND: SW at 7 mph Details
Wed Jun 12	Mostly Sunny	95°	74°	CHANCE OF RAIN: 0%	WIND: SW at 9 mph Details
Thu Jun 13	Mostly Sunny	95°	76°	CHANCE OF RAIN: 0%	WIND: WSW at 10 mph Details
Fri Jun 14	Mostly Sunny	94°	72°	CHANCE OF RAIN: 0%	WIND: N at 6 mph Details
Sat Jun 15	Mostly Sunny	95°	74°	CHANCE OF RAIN: 0%	WIND: ESE at 5 mph Details
Sun Jun 16	Mostly Sunny Full Father's Day Forecast	95°	74°	CHANCE OF RAIN: 0%	WIND: SW at 7 mph Details
Mon Jun 17	Partly Cloudy	96°	72°	CHANCE OF RAIN: 10%	WIND: SSW at 8 mph Details

ATTACHMENTS

X	**Digital Photographs**		

INCIDENT BRIEFING
ICS 201 - 1

Incident Name	**DFU 125-1**

Digital Photographs

125-1 Spill Origin

INCIDENT BRIEFING
ICS 201 - 1

Incident Name	DFU 125-1

Digital Photographs

Along ROW

INCIDENT BRIEFING
ICS 201 - 1

Incident Name	**DFU 125-1**

Digital Photographs

Recovery Point

Communications Plan
ICS 205

NAME	OFFICE	CELL	EMAIL
Randy Robichaux, Denbury	972-673-2000	985-209-2873	randy.robichaux@denbury.com
Tracy Carter, Denbury	601-718-6211	318-348-5949	tracy.carter@denbury.com
Mark Walley, Denbury	601-718-6200	601-502-3911	william.walley@denbury.com
Isaac Gandy, Denbury		318-488-1448	Isaac.gandy@denbury.com
John Woods, Denbury		318-488-0683	John.woods@denbury.com
Joey Smith, Denbury	972-673-2161		Joey.smith@denbury.com
Jeremy Shaw, Denbury	601-276-5506	601-730-0233	Jeremy.shaw@denbury.com
Brad Osbon, LADEQ	318-362-5437		bradley.osbon@la.gov

APPENDIX C
TABLE 1

TABLE 1
HISTORICAL SOIL ANALYTICAL SUMMARY
DFU 125-1 SITE

Denbury Resources, Inc.
DFU 125-1 Site
Richland Parish, LA

Sample Location	Sample ID	Sample Date	Sample Depth (ft)	Parameters (mg/kg)		
				TPH-ORO	Chlorides	Sodium
				180 (1)	5,000 (2)	1,200 (2)
DS-1	DS1-1	4/23/13	0 - 0.5	150	**7,178**	NS
	DS1-2	4/23/13	0.5 - 1.0	<5.2	780	NS
	DS1-3	4/23/13	1.0 - 1.5	8.3J	780	NS
DS-2	DS2-1	4/23/13	0 - 0.5	55	**6,778**	NS
	DS2-2	4/23/13	0.5 - 1.0	<5.1	1,380	NS
	DS2-3	4/23/13	1.0 - 1.5	<5.2	1,580	NS
DS-3	DS3-1	4/23/13	0 - 0.5	55	4,980	NS
	DS3-2	4/23/13	0.5 - 1.0	6.8J	**6,980**	NS
	DS3-3	4/23/13	1.0 - 1.5	<5.2	**6,976**	NS
DS-4	DS4-1	4/23/13	0 - 0.5	**350**	780	NS
DS-5	DS5-1	4/23/13	0 - 0.5	90	**10,176**	NS
	DS5-2	4/23/13	0.5 - 1.0	<5.1	**5,980**	NS
	DS5-3	4/23/13	1.0 - 1.5	<5.1	2,380	NS
DS-6	DS6-1	4/23/13	0 - 0.5	74	**9,176**	NS
	DS6-2	4/23/13	0.5 - 1.0	<5.1	4,380	NS
	DS6-3	4/23/13	1.0 - 1.5	<5.1	2,780	NS
DS-7	DS7-1	4/23/13	0 - 0.5	6.3J	4,180	NS
	DS7-2	4/23/13	0.5 - 1.0	<5.3	3,380	NS
	DS7-3	4/23/13	1.0 - 1.5	<5.2	3,380	NS
DS-8	DS8-1	4/23/13	0 - 0.5	58	2,580	NS
	DS8-2	4/23/13	0.5 - 1.0	49	580	NS
	DS8-3	4/23/13	1.0 - 1.5	23	780	NS
DS-1	DS1-1	5/20/13	0 - 0.5	NS	1,700	NS
	DS1-2	5/20/13	0.5 - 1.0	NS	1,100	NS
	DS1-3	5/20/13	1.0 - 1.5	NS	300	NS
DS-2	DS2-1	5/20/13	0 - 0.5	NS	**5,100**	NS
	DS2-2	5/20/13	0.5 - 1.0	NS	4,700	NS
	DS2-3	5/20/13	1.0 - 1.5	NS	3,900	NS
DS-3	DS3-1	5/20/13	0 - 0.5	NS	**7,100**	NS
	DS3-2	5/20/13	0.5 - 1.0	NS	2,300	NS
	DS3-3	5/20/13	1.0 - 1.5	NS	1,900	NS
DS-4	DS4-1	5/20/13	0 - 0.5	NS	**7,900**	NS
	DS4-2	5/20/13	0.5 - 1.0	NS	**5,300**	NS
	DS4-3	5/20/13	1.0 - 1.5	NS	1,100	NS
DS-5	DS5-1	5/20/13	0 - 0.5	NS	**7,100**	NS
	DS5-2	5/20/13	0.5 - 1.0	NS	2,300	NS
	DS5-3	5/20/13	1.0 - 1.5	NS	1,300	NS
DS-6	DS6-1	5/20/13	0 - 0.5	NS	**19,496**	NS
	DS6-2	5/20/13	0.5 - 1.0	NS	2,300	NS
	DS6-3	5/20/13	1.0 - 1.5	NS	900	NS
DS-7	DS7-1	5/20/13	0 - 0.5	NS	**7,696**	NS
	DS7-2	5/20/13	0.5 - 1.0	NS	2,900	NS
	DS7-3	5/20/13	1.0 - 1.5	NS	300	NS

Sample Location	Sample ID	Sample Date	Sample Depth (ft)	Parameters (mg/kg)		
				TPH-ORO	Chlorides	Sodium
				180 (1)	5,000 (2)	1,200 (2)
DS-8	DS8-1	5/20/13	0 - 0.5	NS	**17,096**	NS
	DS8-2	5/20/13	0.5 - 1.0	NS	**6,700**	NS
	DS8-3	5/20/13	1.0 - 1.5	NS	2,100	NS
DS-9	DS9-1	5/20/13	0 - 0.5	NS	**7,696**	NS
	DS9-2	5/20/13	0.5 - 1.0	NS	**6,500**	NS
	DS9-3	5/20/13	1.0 - 1.5	NS	1,300	NS
DS-10	DS10-1	5/20/13	0 - 0.5	NS	**6,700**	NS
	DS10-2	5/20/13	0.5 - 1.0	NS	**1,700**	NS
	DS10-3	5/20/13	1.0 - 1.5	NS	1,100	NS
SS01	SS-01	9/17/13	0 - 0.5	NS	2,250	1,060
SS02	SS-02	9/17/13	0 - 0.5	NS	2,020	**1,290**
SS03	SS-03	9/17/13	0 - 0.5	NS	2,260	**2,370**
SS04	SS-04	9/17/13	0 - 0.5	NS	2,760	**1,390**
SS05	SS-05	9/17/13	0 - 0.5	NS	1,870	**1,320**
SS06	SS-06	9/17/13	0 - 0.5	NS	1,680	1,090
SS07	SS-07	9/17/13	0 - 0.5	NS	2,260	**1,210**
SS08	SS-08	9/17/13	0 - 0.5	NS	3,330	**1,700**
SS09	SS-09	9/17/13	0 - 0.5	NS	4,540	**2,340**
SS10	SS-10	9/17/13	0 - 0.5	NS	4,300	**2,780**
SS11	SS-11	9/17/13	0 - 0.5	NS	3,840	**2,430**
SS12	SS-12	9/17/13	0 - 0.5	NS	3,010	**1,940**
SS13	SS-13	9/17/13	0 - 0.5	NS	**5,140**	**3,340**
SS14	SS-14	9/17/13	0 - 0.5	NS	4,050	**2,230**
SS15	SS-15	9/17/13	0 - 0.5	NS	4,500	**2,440**
SS16	SS-16	9/17/13	0 - 0.5	NS	3,520	**1,740**

(mg/kg) *milligrams per kilogram*

(1) *LDEQ RECAP Screening Standard based on Soil Non-Industrial (Soil SSni)*

(2) *LDEQ RECAP Screening Standard based on Soil Protective of Groundwater (Soil SSGW)*

Bold *Indicates value exceeded applicable LDEQ RECAP Screening Standard*

NS *Not Sampled for this parameter*

J *Laboratory Qualifier (estmated value - The result is > the method detection limit and < the quantitation limit)*

APPENDIX D
LABORATORY ANALYTICAL DATA

APRIL 23, 2013 SAMPLING EVENT

UNIVERSITY OF LOUISIANA
MONROE

REPORT OF ANALYSIS FOR DENBURY

ULM LAB #:	12-(4386-4410)	I.D #:	VARIOUS
SAMPLE TYPE:	SEDIMENT	DATE RECEIVED:	04/24/13
ANALYSIS:	CHLORIDE	DATE REPORTED:	04/26/13
TEST METHOD:	modified SM 4500-CL C 19TH	DETECTION LIMIT:	1.53

REPORT TABLE:

ULM LAB #	*SAMPLE ID*	*RESULT Water solution extracted from soil*	*RESULT Soil*	*REPORT UNITS*
12-4386	DS1-1	1,794	7,178	MG/L
12-4387	DS1-2	195	780	MG/L
12-4388	DS1-3	195	780	MG/L
12-4389	DS2-1	1,694	6,778	MG/L
12-4390	DS2-2	345	1,380	MG/L
12-4391	DS2-3	395	1,580	MG/L
12-4392	DS3-1	1,245	4,980	MG/L
12-4393	DS3-2	1,745	6,980	MG/L
12-4394	DS3-3	1,744	6,976	MG/L
12-4395	DS4-1	195	780	MG/L
12-4396	DS5-1	2,544	10,176	MG/L
12-4397	DS5-2	1,495	5,980	MG/L
12-4398	DS5-3	595	2,380	MG/L
12-4399	DS6-1	2,294	9,176	MG/L
12-4400	DS6-2	1,095	4,380	MG/L
12-4401	DS6-3	695	2,780	MG/L
12-4402	DS7-1	1,045	4,180	MG/L
12-4403	DS7-2	845	3,380	MG/L
12-4404	DS7-3	845	3,380	MG/L
12-4405	DS8-1	645	2,580	MG/L
12-4406	DS8-2	145	580	MG/L
12-4407	DS8-3	195	780	MG/L
12-4408	BG-1	20	80	MG/L
12-4409	BG-2	35	140	MG/L
12-4410	BG-3	5	20	MG/L

QA / QC REPORT:

ANALYSIS	ANALYSIS DATE & TIME	ANALYST
CHLORIDE	04/25/13@13:26	DHB

Ivri Ramosta
Director

Soil-Plant Analysis Laboratory
C&NS Building, Room 117 700 University Ave. Monroe, LA 71209-0505
Phone: (318) 342-1948 Fax: (318) 342-1949

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Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

ANALYTICAL RESULTS

Prepared by:

Eurofins Lancaster Laboratories
2425 New Holland Pike
Lancaster, PA 17601

Prepared for:

ULM Soil-Plant Analysis Lab
700 University Avenue
CNSB Room 117
Monroe LA 71209-0505

May 02, 2013

Project: Denbury

Submittal Date: 04/25/2013
Group Number: 1385473
PO Number: NA
State of Sample Origin: LA

Client Sample Description	Lancaster Labs (LLI) #
DS1-1 12-4386 Grab Soil Sample	7034239
DS1-2 12-4387 Grab Soil Sample	7034240
DS1-3 12-4388 Grab Soil Sample	7034241
DS2-1 12-4389 Grab Soil Sample	7034242
DS2-2 12-4390 Grab Soil Sample	7034243
DS2-3 12-4391 Grab Soil Sample	7034244
DS3-1 12-4392 Grab Soil Sample	7034245
DS3-2 12-4393 Grab Soil Sample	7034246
DS3-3 12-4394 Grab Soil Sample	7034247
DS4-1 12-4395 Grab Soil Sample	7034248
DS5-1 12-4396 Grab Soil Sample	7034249
DS5-2 12-4397 Grab Soil Sample	7034250
DS5-3 12-4398 Grab Soil Sample	7034251
DS6-1 12-4399 Grab Soil Sample	7034252
DS6-2 12-4400 Grab Soil Sample	7034253
DS6-3 12-4401 Grab Soil Sample	7034254
DS7-1 12-4402 Grab Soil Sample	7034255
DS7-2 12-4403 Grab Soil Sample	7034256
DS7-3 12-4404 Grab Soil Sample	7034257
DS8-1 12-4405 Grab Soil Sample	7034258
DS8-2 12-4406 Grab Soil Sample	7034259
DS8-3 12-4407 Grab Soil Sample	7034260
BG 1 12-4408 Grab Soil Sample	7034261
BG 2 12-4409 Grab Soil Sample	7034262
BG 3 12-4410 Grab Soil Sample	7034263

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

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Analysis Report

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ELECTRONIC COPY TO	ULM Soil-Plant Analysis Lab	Attn: Terri Lancaster
ELECTRONIC COPY TO	ULM Soil-Plant Analysis Lab	Attn: Kristopher Kelley

Respectfully Submitted,

Angela M. Miller

Angela M. Miller
Specialist

(717) 556-7260

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Analysis Report

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Sample Description: DS1-1 12-4386 Grab Soil Sample
Denbury

LLI Sample # SW 7034239
LLI Group # 1385473
Account # 11331

Project Name: Denbury

Collected: 04/23/2013 13:00 by WB

Submitted: 04/25/2013 09:30
Reported: 05/02/2013 14:17

ULM Soil-Plant Analysis Lab
700 University Avenue
CNSB Room 117
Monroe LA 71209-0505

UL1-1

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Dilution Factor
	GC Petroleum Hydrocarbons	SW-846 8015B	mg/kg	mg/kg	
08345	ORO >C28 - C35	n.a.	150	7.3	1
	The LCS recovery is 98% and the MS recovery is 96%.				
	Wet Chemistry	SM 2540 G-1997	%	%	
00111	Moisture	n.a.	45.3	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.				

General Sample Comments

The Sample Quantitation Limit (SQL) is equal to the Limit of Quantitation (LOQ).

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
08345	TPH-DRO LA soil	SW-846 8015B	1	131150010A	04/26/2013 14:04	Glorines Suarez-Rivera	1
11221	TPH-DRO w/ LA Ranges	SW-846 3546	1	131150010A	04/25/2013 16:45	JoElla L Rice	1
00111	Microwave Moisture	SM 2540 G-1997	1	13115820006B	04/25/2013 21:41	Scott W Freisher	1

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Analysis Report

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Sample Description: DS1-2 12-4387 Grab Soil Sample
Denbury

LLI Sample # SW 7034240
LLI Group # 1385473
Account # 11331

Project Name: Denbury

Collected: 04/23/2013 13:05 by WB

Submitted: 04/25/2013 09:30
Reported: 05/02/2013 14:17

ULM Soil-Plant Analysis Lab
700 University Avenue
CNSB Room 117
Monroe LA 71209-0505

UL1-2

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Dilution Factor
GC Petroleum Hydrocarbons		SW-846 8015B	mg/kg	mg/kg	
08345	ORO >C28 - C35	n.a.	N.D.	5.2	1
The LCS recovery is 98% and the MS recovery is 96%.					
Wet Chemistry		SM 2540 G-1997	%	%	
00111	Moisture	n.a.	23.6	0.50	1
Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.					

General Sample Comments

The Sample Quantitation Limit (SQL) is equal to the Limit of Quantitation (LOQ).

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
08345	TPH-DRO LA soil	SW-846 8015B	1	131150010A	04/26/2013 06:24	Glorines Suarez-Rivera	1
11221	TPH-DRO w/ LA Ranges	SW-846 3546	1	131150010A	04/25/2013 16:45	JoElla L Rice	1
00111	Microwave Moisture	SM 2540 G-1997	1	131158200006B	04/25/2013 21:41	Scott W Freisher	1

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Analysis Report

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Sample Description: DS1-3 12-4388 Grab Soil Sample
Denbury

LLI Sample # SW 7034241
LLI Group # 1385473
Account # 11331

Project Name: Denbury

Collected: 04/23/2013 13:10 by WB

Submitted: 04/25/2013 09:30
Reported: 05/02/2013 14:17

ULM Soil-Plant Analysis Lab
700 University Avenue
CNSB Room 117
Monroe LA 71209-0505

UL1-3

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Dilution Factor
GC Petroleum Hydrocarbons	SW-846 8015B		mg/kg		mg/kg	
08345	ORO >C28 - C35	n.a.	8.3	J	5.4	1
The LCS recovery is 98% and the MS recovery is 96%.						
Wet Chemistry	SM 2540 G-1997		%		%	
00111	Moisture	n.a.	25.9		0.50	1
Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.						

General Sample Comments

The Sample Quantitation Limit (SQL) is equal to the Limit of Quantitation (LOQ).

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
08345	TPH-DRO LA soil	SW-846 8015B	1	131150010A	04/26/2013 11:25	Glorines Suarez-Rivera	1
11221	TPH-DRO w/ LA Ranges	SW-846 3546	1	131150010A	04/25/2013 16:45	JoElla L Rice	1
00111	Microwave Moisture	SM 2540 G-1997	1	13115820006B	04/25/2013 21:41	Scott W Freisher	1

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Analysis Report

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Sample Description: DS2-1 12-4389 Grab Soil Sample
Denbury

LLI Sample # SW 7034242
LLI Group # 1385473
Account # 11331

Project Name: Denbury

Collected: 04/23/2013 13:15 by WB

Submitted: 04/25/2013 09:30
Reported: 05/02/2013 14:17

ULM Soil-Plant Analysis Lab
700 University Avenue
CNSB Room 117
Monroe LA 71209-0505

UL2-1

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Dilution Factor
	GC Petroleum Hydrocarbons	SW-846 8015B	mg/kg	mg/kg	
08345	ORO >C28 - C35	n.a.	55	5.3	1
	The LCS recovery is 98% and the MS recovery is 96%.				
	Wet Chemistry	SM 2540 G-1997	%	%	
00111	Moisture	n.a.	24.7	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.				

General Sample Comments

The Sample Quantitation Limit (SQL) is equal to the Limit of Quantitation (LOQ).

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
08345	TPH-DRO LA soil	SW-846 8015B	1	131150010A	04/26/2013 12:24	Glorines Suarez-Rivera	1
11221	TPH-DRO w/ LA Ranges Microwave	SW-846 3546	1	131150010A	04/25/2013 16:45	JoElle L Rice	1
00111	Moisture	SM 2540 G-1997	1	13115820006B	04/25/2013 21:41	Scott W Freisher	1

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Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: DS2-2 12-4390 Grab Soil Sample
Denbury

LLI Sample # SW 7034243
LLI Group # 1385473
Account # 11331

Project Name: Denbury

Collected: 04/23/2013 13:20 by WB

Submitted: 04/25/2013 09:30
Reported: 05/02/2013 14:17

ULM Soil-Plant Analysis Lab
700 University Avenue
CNSB Room 117
Monroe LA 71209-0505

UL2-2

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Dilution Factor
	GC Petroleum Hydrocarbons	SW-846 8015B	mg/kg	mg/kg	
08345	DRO >C28 - C35	n.a.	N.D.	5.1	1
	The LCS recovery is 98% and the MS recovery is 96%.				
	Wet Chemistry	SM 2540 G-1997	%	%	
00111	Moisture	n.a.	21.2	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.				

General Sample Comments

The Sample Quantitation Limit (SQL) is equal to the Limit of Quantitation (LOQ).

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
08345	TPH-DRO LA soil	SW-846 8015B	1	131150010A	04/26/2013 05:44	Glorines Suarez-Rivera	1
11221	TPH-DRO w/ LA Ranges	SW-846 3546	1	131150010A	04/25/2013 16:45	JoElla L Rice	1
00111	Microwave Moisture	SM 2540 G-1997	1	13115820006B	04/25/2013 21:41	Scott W Freisher	1

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Analysis Report

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Sample Description: DS2-3 12-4391 Grab Soil Sample
Denbury

LLI Sample # SW 7034244
LLI Group # 1385473
Account # 11331

Project Name: Denbury

Collected: 04/23/2013 13:25 by WB

Submitted: 04/25/2013 09:30
Reported: 05/02/2013 14:17

ULM Soil-Plant Analysis Lab
700 University Avenue
CNSB Room 117
Monroe LA 71209-0505

UL2-3

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Dilution Factor
	GC Petroleum Hydrocarbons	SW-846 8015B	mg/kg	mg/kg	
08345	ORO >C28 - C35	n.a.	N.D.	5.2	1
	The LCS recovery is 98% and the MS recovery is 96%.				
	Wet Chemistry	SM 2540 G-1997	%	%	
00111	Moisture	n.a.	23.8	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.				

General Sample Comments

The Sample Quantitation Limit (SQL) is equal to the Limit of Quantitation (LOQ).

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
08345	TPH-DRO LA soil	SW-846 8015B	1	131150010A	04/26/2013 06:04	Glorines Suarez-Rivera	1
11221	TPH-DRO w/ LA Ranges Microwave	SW-846 3546	1	131150010A	04/25/2013 16:45	JoElla L Rice	1
00111	Moisture	SM 2540 G-1997	1	13115820006B	04/25/2013 21:41	Scott W Freisher	1

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Analysis Report

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Sample Description: DS3-1 12-4392 Grab Soil Sample
Denbury

LLI Sample # SW 7034245
LLI Group # 1385473
Account # 11331

Project Name: Denbury

Collected: 04/23/2013 13:30 by WB

Submitted: 04/25/2013 09:30
Reported: 05/02/2013 14:17

ULM Soil-Plant Analysis Lab
700 University Avenue
CNSB Room 117
Monroe LA 71209-0505

UL3-1

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Dilution Factor
	GC Petroleum Hydrocarbons	SW-846 8015B	mg/kg	mg/kg	
08345	ORO >C28 - C35	n.a.	55	5.6	1
	The LCS recovery is 98% and the MS recovery is 56%.				
	Wet Chemistry	SM 2540 G-1997	%	%	
00111	Moisture	n.a.	28.3	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.				

General Sample Comments

The Sample Quantitation Limit (SQL) is equal to the Limit of Quantitation (LOQ).

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
08345	TPH-DRO LA soil	SW-846 8015B	1	131150010A	04/26/2013 11:45	Glorinea Suarez-Rivera	1
11221	TPH-DRO w/ LA Ranges	SW-846 3546	1	131150010A	04/25/2013 16:45	JoElle L Rice	1
00111	Microwave Moisture	SM 2540 G-1997	1	13115820006B	04/25/2013 21:41	Scott W Freisher	1

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Analysis Report

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Sample Description: DS3-2 12-4393 Grab Soil Sample
Denbury

LLI Sample # SW 7034246
LLI Group # 1385473
Account # 11331

Project Name: Denbury

Collected: 04/23/2013 13:35 by WB

Submitted: 04/25/2013 09:30
Reported: 05/02/2013 14:17

ULM Soil-Plant Analysis Lab
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CNSB Room 117
Monroe LA 71209-0505

UL3-2

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Dilution Factor
	GC Petroleum Hydrocarbons	SW-846 8015B	mg/kg		mg/kg	
08345	ORO >C28 - C35	n.a.	6.8	J	5.1	1
	The LCS recovery is 98% and the MS recovery is 96%.					
	Wet Chemistry	SM 2540 G-1997	%		%	
00111	Moisture	n.a.	21.5		0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.					

General Sample Comments

The Sample Quantitation Limit (SQL) is equal to the Limit of Quantitation (LOQ).

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
08345	TPH-DRO LA soil	SW-846 8015B	1	131150010A	04/26/2013 06:44	Glorines Suarez-Rivera	1
11221	TPH-DRO w/ LA Ranges	SW-846 3546	1	131150010A	04/25/2013 16:45	JoElla L Rice	1
00111	Microwave Moisture	SM 2540 G-1997	1	13115820006B	04/25/2013 21:41	Scott W Freisher	1

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Sample Description: DS3-3 12-4394 Grab Soil Sample
Denbury

LLI Sample # SW 7034247
LLI Group # 1385473
Account # 11331

Project Name: Denbury

Collected: 04/23/2013 13:40 by WB

Submitted: 04/25/2013 09:30
Reported: 05/02/2013 14:17

ULM Soil-Plant Analysis Lab
700 University Avenue
CNSB Room 117
Monroe LA 71209-0505

UL3-3

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Dilution Factor
	GC Petroleum Hydrocarbons	SW-846 8015B	mg/kg	mg/kg	
08345	ORO >C28 - C35	n.a.	N.D.	5.2	1
	The LCS recovery is 98% and the MS recovery is 96%.				
	Wet Chemistry	SM 2540 G-1997	%	%	
00111	Moisture	n.a.	23.0	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.				

General Sample Comments

The Sample Quantitation Limit (SQL) is equal to the Limit of Quantitation (LOQ).

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
08345	TPH-DRO LA soil	SW-846 8015B	1	131150010A	04/26/2013 08:24	Glorines Suarez-Rivera	1
11221	TPH-DRO w/ LA Ranges	SW-846 3546	1	131150010A	04/25/2013 16:45	JoElla L Rice	1
00111	Microwave Moisture	SM 2540 G-1997	1	13115820006B	04/25/2013 21:41	Scott W Freisher	1

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Sample Description: DS4-1 12-4395 Grab Soil Sample
Denbury

LLI Sample # SW 7034248
LLI Group # 1385473
Account # 11331

Project Name: Denbury

Collected: 04/23/2013 13:45 by WB

Submitted: 04/25/2013 09:30
Reported: 05/02/2013 14:17

ULM Soil-Plant Analysis Lab
700 University Avenue
CNSB Room 117
Monroe LA 71209-0505

UL4-1

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Dilution Factor
GC Petroleum Hydrocarbons	SW-846 8015B		mg/kg	mg/kg	
08345	ORO >C28 - C35	n.a.	350	13	1
	The LCS recovery is 98% and the MS recovery is 96%.				
Wet Chemistry	SM 2540 G-1997		%	%	
00111	Moisture	n.a.	70.3	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.				

General Sample Comments

The Sample Quantitation Limit (SQL) is equal to the Limit of Quantitation (LOQ).

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
08345	TPH-DRO LA soil	SW-846 8015B	1	131150010A	04/26/2013 13:24	Glorines Suarez-Rivera	1
11221	TPH-DRO w/ LA Ranges Microwave	SW-846 3546	1	131150010A	04/25/2013 16:45	JoElla L Rice	1
00111	Moisture	SM 2540 G-1997	1	13115820006B	04/25/2013 21:41	Scott W Freisher	1

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Analysis Report

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Sample Description: DS5-1 12-4396 Grab Soil Sample
Denbury

LLI Sample # SW 7034249
LLI Group # 1385473
Account # 11331

Project Name: Denbury

Collected: 04/23/2013 13:50 by WB

Submitted: 04/25/2013 09:30
Reported: 05/02/2013 14:17

ULM Soil-Plant Analysis Lab
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Monroe LA 71209-0505

UL5-1

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Dilution Factor
GC Petroleum Hydrocarbons	SW-846 8015B		mg/kg	mg/kg	
08345	ORO >C28 - C35	n.a.	90	6.7	1
	The LCS recovery is 98% and the MS recovery is 96%.				
Wet Chemistry	SM 2540 G-1997		%	%	
00111	Moisture	n.a.	40.6	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.				

General Sample Comments

The Sample Quantitation Limit (SQL) is equal to the Limit of Quantitation (LOQ).

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
08345	TPH-DRO LA soil	SW-846 8015B	1	131150010A	04/26/2013 12:44	Glorines Suarez-Rivera	1
11221	TPH-DRO w/ LA Ranges Microwave	SW-846 3546	1	131150010A	04/25/2013 16:45	JoElla L Rice	1
00111	Moisture	SM 2540 G-1997	1	13115820006B	04/25/2013 21:41	Scott W Freisher	1

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Sample Description: DS5-2 12-4397 Grab Soil Sample
Denbury

LLI Sample # SW 7034250
LLI Group # 1385473
Account # 11331

Project Name: Denbury

Collected: 04/23/2013 13:55 by WB

Submitted: 04/25/2013 09:30
Reported: 05/02/2013 14:17

ULM Soil-Plant Analysis Lab
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UL5-2

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Dilution Factor
	GC Petroleum Hydrocarbons	SW-846 8015B	mg/kg	mg/kg	
08345	DRO >C28 - C35	n.a.	N.D.	5.1	1
	The LCS recovery is 98% and the MS recovery is 96%.				
	Wet Chemistry	SM 2540 G-1997	%	%	
00111	Moisture	n.a.	21.1	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.				

General Sample Comments

The Sample Quantitation Limit (SQL) is equal to the Limit of Quantitation (LOQ).

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
08345	TPH-DRO LA soil	SW-846 8015B	1	131150010A	04/26/2013 07:04	Glorines Suarez-Rivera	1
11221	TPH-DRO w/ LA Ranges	SW-846 3546	1	131150010A	04/25/2013 16:45	JoElla L Rice	1
	Microwave						
00111	Moisture	SM 2540 G-1997	1	131158200006B	04/25/2013 21:41	Scott W Freisher	1

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Analysis Report

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Sample Description: DS5-3 12-4398 Grab Soil Sample
Denbury

LLI Sample # SW 7034251
LLI Group # 1385473
Account # 11331

Project Name: Denbury

Collected: 04/23/2013 14:00 by WB

Submitted: 04/25/2013 09:30
Reported: 05/02/2013 14:17

ULM Soil-Plant Analysis Lab
700 University Avenue
CNSB Room 117
Monroe LA 71209-0505

UL5-3

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Dilution Factor
GC Petroleum Hydrocarbons		SW-846 8015B	mg/kg	mg/kg	
08345	ORO >C28 - C35	n.a.	N.D.	5.1	1
	The LCS recovery is 98% and the MS recovery is 96%.				
Wet Chemistry		SM 2540 G-1997	%	%	
00111	Moisture	n.a.	21.4	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.				

General Sample Comments

The Sample Quantitation Limit (SQL) is equal to the Limit of Quantitation (LOQ).

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
08345	TPH-DRO LA soil	SW-846 8015B	1	131150010A	04/26/2013 07:24	Glorines Suarez-Rivera	1
11221	TPH-DRO w/ LA Ranges Microwave	SW-846 3546	1	131150010A	04/25/2013 16:45	JoElla L Rice	1
00111	Moisture	SM 2540 G-1997	1	13115820006B	04/25/2013 21:41	Scott W Freisher	1

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Analysis Report

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Sample Description: DS6-1 12-4399 Grab Soil Sample
Denbury

LLI Sample # SW 7034252
LLI Group # 1385473
Account # 11331

Project Name: Denbury

Collected: 04/23/2013 14:05 by WB

Submitted: 04/25/2013 09:30
Reported: 05/02/2013 14:17

ULM Soil-Plant Analysis Lab
700 University Avenue
CNSB Room 117
Monroe LA 71209-0505

UL6-1

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Dilution Factor
	GC Petroleum Hydrocarbons	SW-846 8015B	mg/kg	mg/kg	
08345	ORO >C28 - C35	n.a.	74	6.1	1
	The LCS recovery is 98% and the MS recovery is 96%.				
	Wet Chemistry	SM 2540 G-1997	%	%	
00111	Moisture	n.a.	34.7	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.				

General Sample Comments

The Sample Quantitation Limit (SQL) is equal to the Limit of Quantitation (LOQ).

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
08345	TPH-DRO LA soil	SW-846 8015B	1	131150010A	04/26/2013 12:05	Glorines Suarez-Rivera	1
11221	TPH-DRO w/ LA Ranges	SW-846 3546	1	131150010A	04/25/2013 16:45	JoElla L Rice	1
	Microwave						
00111	Moisture	SM 2540 G-1997	1	13115820006B	04/25/2013 21:41	Scott W Freisher	1

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Analysis Report

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Sample Description: DS6-2 12-4400 Grab Soil Sample
Denbury

LLI Sample # SW 7034253
LLI Group # 1385473
Account # 11331

Project Name: Denbury

Collected: 04/23/2013 14:10 by WB

Submitted: 04/25/2013 09:30
Reported: 05/02/2013 14:17

ULM Soil-Plant Analysis Lab
700 University Avenue
CNSB Room 117
Monroe LA 71209-0505

UL6-2

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Dilution Factor
	GC Petroleum Hydrocarbons	SW-846 8015B	mg/kg	mg/kg	
08345	ORO >C28 - C35	n.a.	N.D.	5.1	1
	The LCS recovery is 98% and the MS recovery is 96%.				
	Wet Chemistry	SM 2540 G-1997	%	%	
00111	Moisture	n.a.	21.8	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.				

General Sample Comments

The Sample Quantitation Limit (SQL) is equal to the Limit of Quantitation (LOQ).

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
08345	TPH-DRO LA soil	SW-846 8015B	1	131150010A	04/26/2013 08:43	Glorines Suarez-Rivera	1
11221	TPH-DRO w/ LA Ranges	SW-846 3546	1	131150010A	04/25/2013 16:45	JoElle L Rice	1
00111	Microwave Moisture	SM 2540 G-1997	1	13115820006B	04/25/2013 21:41	Scott W Freisher	1

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Analysis Report

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Sample Description: DS6-3 12-4401 Grab Soil Sample
Denbury

LLI Sample # SW 7034254
LLI Group # 1385473
Account # 11331

Project Name: Denbury

Collected: 04/23/2013 14:15 by WB

Submitted: 04/25/2013 09:30
Reported: 05/02/2013 14:17

ULM Soil-Plant Analysis Lab
700 University Avenue
CNSB Room 117
Monroe LA 71209-0505

UL6-3

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Dilution Factor
	GC Petroleum Hydrocarbons	SW-846 8015B	mg/kg	mg/kg	
08345	ORO >C28 - C35	n.a.	N.D.	5.1	1
	The LCS recovery is 98% and the MS recovery is 96%.				
	Wet Chemistry	SM 2540 G-1997	%	%	
00111	Moisture	n.a.	22.3	0.80	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.				

General Sample Comments

The Sample Quantitation Limit (SQL) is equal to the Limit of Quantitation (LOQ).

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
08345	TPH-DRO LA soil	SW-846 8015B	1	131150010A	04/26/2013 09:45	Glorines Suarez-Rivera	1
11221	TPH-DRO w/ LA Ranges Microwave	SW-846 3546	1	131150010A	04/25/2013 16:45	JoElle L Rice	1
00111	Moisture	SM 2540 G-1997	1	13115820006B	04/25/2013 21:41	Scott W Freisher	1

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Analysis Report

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Sample Description: DS7-1 12-4402 Grab Soil Sample
Denbury

LLI Sample # SW 7034255
LLI Group # 1385473
Account # 11331

Project Name: Denbury

Collected: 04/23/2013 14:20 by WB

Submitted: 04/25/2013 09:30
Reported: 05/02/2013 14:17

ULM Soil-Plant Analysis Lab
700 University Avenue
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Monroe LA 71209-0505

UL7-1

CAT No.	Analysis Name	CAS Number	Dry Result		Dry Method Detection Limit	Dilution Factor
	GC Petroleum Hydrocarbons	SW-846 8015B	mg/kg		mg/kg	
08345	ORO >C28 - C35	n.a.	6.3	J	6.1	1
	The LCS recovery is 104% and the MS recovery is 67%.					
	Wet Chemistry	SM 2540 G-1997	%		%	
00111	Moisture	n.a.	35.5		0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.					

General Sample Comments

The Sample Quantitation Limit (SQL) is equal to the Limit of Quantitation (LOQ).

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
08345	TPH-DRO LA soil	SW-846 8015B	1	131190013A	05/01/2013 04:09	Glorines Suarez-Rivera	1
11221	TPH-DRO w/ LA Ranges	SW-846 3546	2	131190013A	04/30/2013 08:00	Olivia Arosemena	1
00111	Microwave Moisture	SM 2540 G-1997	1	13115820006B	04/25/2013 21:41	Scott W Freisher	1

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Analysis Report

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Sample Description: DS7-2 12-4403 Grab Soil Sample
Denbury

LLI Sample # SW 7034256
LLI Group # 1385473
Account # 11331

Project Name: Denbury

Collected: 04/23/2013 14:25 by WB

Submitted: 04/25/2013 09:30
Reported: 05/02/2013 14:17

ULM Soil-Plant Analysis Lab
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CNSB Room 117
Monroe LA 71209-0505

UL7-2

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Dilution Factor
	GC Petroleum Hydrocarbons	SW-846 8015B	mg/kg	mg/kg	
08345	ORO >C28 - C35	n.a.	N.D.	5.3	1
	The LCS recovery is 98% and the MS recovery is 96%.				
	Wet Chemistry	SM 2540 G-1997	%	%	
00111	Moisture	n.a.	24.5	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.				

General Sample Comments

The Sample Quantitation Limit (SQL) is equal to the Limit of Quantitation (LOQ).

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
08345	TPH-DRO LA soil	SW-846 8015B	1	131150010A	04/26/2013 07:44	Glorines Suarez-Rivera	1
11221	TPH-DRO w/ LA Ranges Microwave	SW-846 3546	1	131150010A	04/25/2013 16:45	JoElla L Rice	1
00111	Moisture	SM 2540 G-1997	1	13115820006B	04/25/2013 21:41	Scott N Freisher	1

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Sample Description: DS7-3 12-4404 Grab Soil Sample
Denbury

LLI Sample # SW 7034257
LLI Group # 1385473
Account # 11331

Project Name: Denbury

Collected: 04/23/2013 14:30 by WB

Submitted: 04/25/2013 09:30
Reported: 05/02/2013 14:17

ULM Soil-Plant Analysis Lab
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UL7-3

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Dilution Factor
	GC Petroleum Hydrocarbons	SW-846 8015B	mg/kg	mg/kg	
08345	ORO >C28 - C35	n.a.	N.D.	5.2	1
	The LCS recovery is 98% and the MS recovery is 96%.				
	Wet Chemistry	SM 2540 G-1997	%	%	
00111	Moisture	n.a.	23.7	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.				

General Sample Comments

The Sample Quantitation Limit (SQL) is equal to the Limit of Quantitation (LOQ).

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
08345	TPH-DRO LA soil	SW-846 8015B	1	131150010A	04/26/2013 08:04	Glorines Suarez-Rivera	1
11221	TPH-DRO w/ LA Ranges	SW-846 3546	1	131150010A	04/25/2013 16:45	JoElla L Rice	1
00111	Microwave Moisture	SM 2540 G-1997	1	13115820006B	04/25/2013 21:41	Scott W Freisher	1

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Analysis Report

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Sample Description: DS8-1 12-4405 Grab Soil Sample
Denbury

LLI Sample # SW 7034258
LLI Group # 1385473
Account # 11331

Project Name: Denbury

Collected: 04/23/2013 14:35 by WB

Submitted: 04/25/2013 09:30
Reported: 05/02/2013 14:17

ULM Soil-Plant Analysis Lab
700 University Avenue
CNSB Room 117
Monroe LA 71209-0505

UL8-1

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Dilution Factor
	GC Petroleum Hydrocarbons	SW-846 8015B	mg/kg	mg/kg	
08345	ORO >C28 - C35	n.a.	58	5.1	1
	The LCS recovery is 98% and the MS recovery is 96%.				
	Wet Chemistry	SM 2540 G-1997	%	%	
00111	Moisture	n.a.	22.3	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.				

General Sample Comments

The Sample Quantitation Limit (SQL) is equal to the Limit of Quantitation (LOQ).

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
08345	TPH-DRO LA soil	SW-846 8015B	1	131150010A	04/26/2013 13:04	Glorines Suarez-Rivera	1
11221	TPH-DRO w/ LA Ranges	SW-846 3546	1	131150010A	04/25/2013 16:45	JoElla L Rice	1
00111	Microwave Moisture	SM 2540 G-1997	1	13115820005B	04/25/2013 22:26	Scott W Freisher	1

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Analysis Report

PCL XL Error
Subsystem: I/O
Operator: Reading
Position: 661

Sample Description: DS8-2 12-4406 Grab Soil Sample
Denbury

LLI Sample # SW 7034259
LLI Group # 1385473
Account # 11331

Project Name: Denbury

Collected: 04/23/2013 14:40 by WB

Submitted: 04/25/2013 09:30
Reported: 05/02/2013 14:17

ULM Soil-Plant Analysis Lab
700 University Avenue
CNSB Room 117
Monroe LA 71209-0505

UL8-2

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Dilution Factor
GC Petroleum Hydrocarbons	SW-846 8015B		mg/kg	mg/kg	
08345	ORO >C28 - C35	n.a.	49	5.1	1
The LCS recovery is 100% and the MS recovery is 97%.					
Wet Chemistry	SM 2540 G-1997		%	%	

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Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: DS8-3 12-4407 Grab Soil Sample
Denbury

LLI Sample # SW 7034260
LLI Group # 1385473
Account # 11331

Project Name: Denbury

Collected: 04/23/2013 14:45 by WB

Submitted: 04/25/2013 09:30
Reported: 05/02/2013 14:17

ULM Soil-Plant Analysis Lab
700 University Avenue
CNSB Room 117
Monroe LA 71209-0505

UL8-3

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Dilution Factor
GC Petroleum Hydrocarbons		SW-846 8015B	mg/kg	mg/kg	
08345	ORO >C28 - C35	n.a.	23	5.0	1
The LCS recovery is 100% and the MS recovery is 97%.					
Wet Chemistry		SM 2540 G-1997	%	%	
00111	Moisture	n.a.	19.8	0.50	1
Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.					

General Sample Comments

The Sample Quantitation Limit (SQL) is equal to the Limit of Quantitation (LOQ).

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
08345	TPH-DRO LA soil	SW-846 8015B	1	131150011A	04/26/2013 02:42	Glorines Suarez-Rivera	1
11221	TPH-DRO w/ LA Ranges Microwave	SW-846 3546	1	131150011A	04/25/2013 16:45	JoElle L Rice	1
00111	Moisture	SM 2540 G-1997	1	131158200058	04/25/2013 22:26	Scott W Freisher	1

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Analysis Report

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Sample Description: BG 1 12-4408 Grab Soil Sample
Denbury

LLI Sample # SW 7034261
LLI Group # 1385473
Account # 11331

Project Name: Denbury

Collected: 04/24/2013 08:00 by WB

Submitted: 04/25/2013 09:30
Reported: 05/02/2013 14:17

ULM Soil-Plant Analysis Lab
700 University Avenue
CNSB Room 117
Monroe LA 71209-0505

ULBG1

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Dilution Factor
GC Petroleum Hydrocarbons		SW-846 8015B	mg/kg	mg/kg	
08345	ORO >C28 - C35	n.a.	130	6.0	1
	The LCS recovery is 100% and the MS recovery is 97%.				
Wet Chemistry		SM 2540 G-1997	%	%	
00111	Moisture	n.a.	33.5	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.				

General Sample Comments

The Sample Quantitation Limit (SQL) is equal to the Limit of Quantitation (LOQ).

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
08345	TPH-DRO LA soil	SW-846 8015B	1	131150011A	04/26/2013 03:02	Glorines Suarez-Rivera	1
11221	TPH-DRO w/ LA Ranges Microwave	SW-846 3546	1	131150011A	04/25/2013 16:45	JoElla L Rice	1
00111	Moisture	SM 2540 G-1997	1	13115820005B	04/25/2013 22:26	Scott W Freisher	1

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Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-2681 • www.LancasterLabs.com

Sample Description: BG 2 12-4409 Grab Soil Sample
Denbury

LLI Sample # SW 7034262
LLI Group # 1385473
Account # 11331

Project Name: Denbury

Collected: 04/24/2013 08:05 by WB

Submitted: 04/25/2013 09:30
Reported: 05/02/2013 14:17

ULM Soil-Plant Analysis Lab
700 University Avenue
CNSB Room 117
Monroe LA 71209-0505

ULBG2

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Dilution Factor
GC Petroleum Hydrocarbons	SW-846 8015B		mg/kg	mg/kg	
08345	ORO >C28 - C35	n.a.	N.D.	5.2	1
	The LCS recovery is 100% and the MS recovery is 97%.				
Wet Chemistry	SM 2540 G-1997		%	%	
00111	Moisture	n.a.	23.5	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.				

General Sample Comments

The Sample Quantitation Limit (SQL) is equal to the Limit of Quantitation (LOQ).

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
08345	TPH-DRO LA soil	SW-846 8015B	1	131150011A	04/26/2013 21:07	Glorines Suarez-Rivera	1
11221	TPH-DRO w/ LA Ranges Microwave	SW-846 3546	1	131150011A	04/25/2013 16:45	JoElla L Rice	1
00111	Moisture	SM 2540 G-1997	1	13115820005B	04/25/2013 22:26	Scott W Freisher	1

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Analysis Report

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Sample Description: BG 3 12-4410 Grab Soil Sample
Denbury

LLI Sample # SW 7034263
LLI Group # 1385473
Account # 11331

Project Name: Denbury

Collected: 04/24/2013 08:10 by WB

Submitted: 04/25/2013 09:30
Reported: 05/02/2013 14:17

ULM Soil-Plant Analysis Lab
700 University Avenue
CNSB Room 117
Monroe LA 71209-0505

ULBG3

CAT No.	Analysis Name	CAS Number	Dry Result	Dry Method Detection Limit	Dilution Factor
GC Petroleum Hydrocarbons		SW-846 8015B	mg/kg	mg/kg	
08345	ORO >C28 - C35	n.a.	N.D.	5.1	1
	The LCS recovery is 100% and the MS recovery is 97%.				
Wet Chemistry		SM 2540 G-1997	%	%	
00111	Moisture	n.a.	21.5	0.50	1
	Moisture represents the loss in weight of the sample after oven drying at 103 - 105 degrees Celsius. The moisture result reported is on an as-received basis.				

General Sample Comments

The Sample Quantitation Limit (SQL) is equal to the Limit of Quantitation (LOQ).

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
08345	TPH-DRO LA soil	SW-846 8015B	1	131150011A	04/26/2013 21:27	Glorines Suarez-Rivera	1
11221	TPH-DRO w/ LA Ranges Microwave	SW-846 3546	1	131150011A	04/25/2013 16:45	JoElla L Rice	1
00111	Moisture	SM 2540 G-1997	1	13115820005B	04/28/2013 22:26	Scott W Freisher	1

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Analysis Report

Quality Control Summary

Client Name: ULM Soil-Plant Analysis Lab
Reported: 05/02/13 at 02:17 PM

Group Number: 1385473

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

All Inorganic Initial Calibration and Continuing Calibration Blanks met acceptable method criteria unless otherwise noted on the Analysis Report.

Laboratory Compliance Quality Control

Analysis Name	Blank Result	Blank MDL	Report Units	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: 131150010A	Sample number(s): 7034239-7034254,7034256-7034258							
ORO >C28 - C35	N.D.	4.0	mg/kg					
Batch number: 131150011A	Sample number(s): 7034259-7034263							
ORO >C28 - C35	N.D.	4.0	mg/kg					
Batch number: 131190013A	Sample number(s): 7034255							
ORO >C28 - C35	N.D.	4.0	mg/kg					
Batch number: 13115820005B	Sample number(s): 7034258-7034263							
Moisture				100		99-101		
Batch number: 13115820006B	Sample number(s): 7034239-7034257							
Moisture				100		99-101		

Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike
Background (BKG) = the sample used in conjunction with the duplicate

Analysis Name	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD MAX	BKG Conc	DUP Conc	DUP RPD	Dup RPD Max
Batch number: 131150010A	Sample number(s): 7034239-7034254,7034256-7034258					BKG: 7034254			
ORO >C28 - C35						N.D.	N.D.	0 (1)	100
Batch number: 131150011A	Sample number(s): 7034259-7034263					BKG: 7034259			
ORO >C28 - C35						39	18	75 (1)	100
Batch number: 131190013A	Sample number(s): 7034255			BKG: 7034255					
ORO >C28 - C35						4.1 J	7.3 J	57 (1)	100
Batch number: 13115820005B	Sample number(s): 7034258-7034263					BKG: P030574			
Moisture						17.4	16.1	8	13
Batch number: 13115820006B	Sample number(s): 7034239-7034257					BKG: 7034254			
Moisture						22.3	22.7	2	13

*- Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

Quality Control Summary

Client Name: ULM Soil-Plant Analysis Lab
Reported: 05/02/13 at 02:17 PM

Group Number: 1385473

Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: TPH-DRO LA soil
Batch number: 131150010A

	Orthoterphenyl
7034239	86
7034240	66
7034241	72
7034242	84
7034243	71
7034244	68
7034245	71
7034246	77
7034247	71
7034248	79
7034249	61
7034250	75
7034251	67
7034252	80
7034253	75
7034254	75
7034256	54
7034257	64
7034258	73
Blank	100
DUP	73
Limits:	52-136

Analysis Name: TPH-DRO LA soil
Batch number: 131150011A

	Orthoterphenyl
7034259	82
7034260	87
7034261	83
7034262	76
7034263	82
Blank	100
DUP	76
Limits:	52-136

Analysis Name: TPH-DRO LA soil
Batch number: 131190013A

	Orthoterphenyl
7034255	83
Blank	102
DUP	97
Limits:	52-136

*- Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

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Quality Control Summary

Client Name: ULM Soil-Plant Analysis Lab
Reported: 05/02/13 at 02:17 PM

Group Number: 1385473

*- Outside of specification
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

A-11331 G-1385473

SOIL-PLANT ANALYSIS LABORAT

The University of Louisiana at Mon
Monroe, LA 71209
Phone (318) 342-1948

INFORMATION SHEET

Customer Denbury Receiving date 4/

Charge to

Type of Analysis chlorides, ORO *R

ORO only!

Sample Number	Lab Number	Special Instructions
See attached	12-4386	
	12-~~4407~~ TL 4410	

Comments:

Customer Signature: Estimated Cost:

University of Louisiana @ Monroe
Soil-Plant Analysis Laboratory

CHAIN OF CUSTODY

A-11331 G-1385473 S-

P.O.#: Project:

COMPANY: Denbury Resources, Inc
ADDRESS: 2929 Layfair Dr Suite 200
Flowood, MS 39232

CONTACT: Mark Walley

REPORT TO: (NAME / ADDRESS)
same

PHONE: (601)718-6200

ULM LOG #	CLIENT I.D.	DATE / TIME COLLECTED	COMP	GRAB	PRESERVATIVES	ANALYSIS REQ
12-4386	DS 1-1	04/23/13 1300		x	x	Chlorides, ORC
12-4387	DS1-2	04/23/13 1305		x	x	Chlorides, ORC
4388	DS1-3	04/23/13 1310		x	x	Chlorides, ORC
4389	DS2-1	04/23/13 1315		x	x	Chlorides, ORC
4390	DS 2-2	04/23/13 1320		x	x	Chlorides, ORC
4391	DS2-3	04/23/13 1325		x	x	Chlorides, ORC
4392	DS 3-1	04/23/13 1330		x	x	Chlorides, ORC
4393	DS 3-2	04/23/13 1335		x	x	Chlorides, ORC

REMARKS:
FLOW = PH = SAMPLES ICED? Y

1. RELINQUISHED BY: Jeremy Shaw (NAME) 4-24-13 / 0930 (DATE / TIME) RECEIVED BY: Terri Ramos (NAME)

2. RELINQUISHED BY: Terri Ramos (NAME) 4/24/13 16:00 (DATE / TIME) RECEIVED BY: Bruny (NAME)

University of Louisiana @ Monroe
Soil-Plant Analysis Laboratory

CHAIN OF CUSTODY

A- 11331 G- 1385473 S-7.

P.O.#: Project:

COMPANY: Denbury Resources, Inc
ADDRESS: 2929 Layfair Dr Suite 200
Flowood, MS 39232

CONTACT: Mark Walley

REPORT TO: (NAME / ADDRESS)
same

PHONE: (601)718-6200

ULM LOG #	CLIENT I.D.	DATE / TIME COLLECTED	COMP	GRAB	PRESERVATIVES	ANALYSIS RE(
12-4394	DS 3-3	04/23/13 1340		x	x	Chlorides, OR(
-4395	DS 4-1	04/23/13 1345		x	x	Chlorides, OR(
-4396	DS 5-1	04/23/13 1350		x	x	Chlorides, OR(
-4397	DS 5-2	04/23/13 1355		x	x	Chlorides, OR(
-4398	DS 5-3	04/23/13 1400		x	x	Chlorides, OR(
-4399	DS 6-1	04/23/13 1405		x	x	Chlorides, OR(
-4400	DS 6-2	04/23/13 1410		x	x	Chlorides, OR(
-4401	DS 6-3	04/23/13 1415		x	x	Chlorides, OR(

REMARKS:
FLOW = PH = SAMPLES ICED?

1. RELINQUISHED BY: Jeremy Shaw (NAME) 4-24-13/ 0930 (DATE / TIME) RECEIVED BY: Terri Lam (NAME)
2. RELINQUISHED BY: Terri Lancaste (NAME) 4/24/13/16:00 (DATE / TIME) RECEIVED BY: [illegible] (NAME)

University of Louisiana @ Monroe
Soil-Plant Analysis Laboratory

CHAIN OF CUSTODY

S-7084239-2003 A-11331 G-1385473

P.O.#: Project:

COMPANY: Denbury Resources, Inc
ADDRESS: 2929 Layfair Dr Suite 200
Flowood, MS 39232

CONTACT: Mark Walley

REPORT TO: (NAME / ADDRESS)
same

PHONE: (601)718-6200

ULM LOG #	CLIENT I.D.	DATE / TIME COLLECTED	COMP	GRAB	PRESERVATIVES	ANALYSIS RE
12-4402	DS 7-1	04/23/13 1420		x	x	Chlorides, OR
-4403	DS 7-2	04/23/13 1425		x	x	Chlorides, OR
-4404	DS 7-3	04/23/13 1430		x	x	Chlorides, OR
-4405	DS 8-1	04/23/13 1435		x	x	Chlorides, OR
-4406	DS 8-2	04/23/13 1440		x	x	Chlorides, OR
-4407	DS 8-3	04/23/13 1445		x	x	Chlorides, OR
		04/23/13		x	x	Chlorides, OR
		04/23/13		x	x	Chlorides, OR

REMARKS:
FLOW = PH = SAMPLES ICED?

1. RELINQUISHED BY: Jeremy Shaw (NAME) 4-24-13, 0930 (DATE / TIME) RECEIVED BY: Terri Lance (NAME)
2. RELINQUISHED BY: Terri Lancaster (NAME) 4/24/13, 16:00 (DATE / TIME) RECEIVED BY: [illegible] (NAME)

University of Louisiana @ Monroe
Soil-Plant Analysis Laboratory

CHAIN OF CUSTODY

A-11331 G-138543 · S-

P.O.#: Project:

COMPANY: Denbury Resources, Inc
ADDRESS: 2929 Layfair Dr Suite 200
Flowood, MS 39232

CONTACT: Mark Walley

REPORT TO: (NAME / ADDRESS)
same

PHONE: (601)718-6200

ULM LOG #	CLIENT I.D.	DATE / TIME COLLECTED	COMP	GRAB	PRESERVATIVES	ANALYSIS REQ
12-4408	BG 1	04/24/13 0800		x	x	Chlorides, ORC
-4409	BG 2	04/24/13 0805		x	x	Chlorides, ORC
-4410	BG 3	04/24/13 0810		x	x	Chlorides, ORC

REMARKS:
FLOW = PH = SAMPLES ICED? Y

1. RELINQUISHED BY: Jeremy Shaw (NAME) 4-24-13 ~~4-25-13~~ 0930 (DATE / TIME) RECEIVED BY: Terri Jamie (NAME)
2. RELINQUISHED BY: Terri Jamieson (NAME) 4/24/13 16:00 (DATE / TIME) RECEIVED BY: (NAME)
3. RELINQUISHED BY: (NAME) / (DATE / TIME) RECEIVED BY: Bruny Alby (NAME)

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Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

RL	Reporting Limit	BMQL	Below Minimum Quantitation Level
N.D.	none detected	MPN	Most Probable Number
TNTC	Too Numerous To Count	CP Units	cobalt-chloroplatinate units
IU	International Units	NTU	nephelometric turbidity units
umhos/cm	micromhos/cm	ng	nanogram(s)
C	degrees Celsius	F	degrees Fahrenheit
meq	milliequivalents	lb.	pound(s)
g	gram(s)	kg	kilogram(s)
µg	microgram(s)	mg	milligram(s)
mL	milliliter(s)	L	liter(s)
m3	cubic meter(s)	µL	microliter(s)
		pg/L	picogram/liter

< less than - The number following the sign is the limit of quantitation, the smallest amount of analyte which can be reliably determined using this specific test.

> greater than

J estimated value – The result is ≥ the Method Detection Limit (MDL) and < the Limit of Quantitation (LOQ).

ppm parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg), or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter of gas per liter of gas.

ppb parts per billion

Dry weight basis Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.

U.S. EPA CLP Data Qualifiers:

Organic Qualifiers

A	TIC is a possible aldol-condensation product
B	Analyte was also detected in the blank
C	Pesticide result confirmed by GC/MS
D	Compound quantitated on a diluted sample
E	Concentration exceeds the calibration range of the instrument
N	Presumptive evidence of a compound (TICs only)
P	Concentration difference between primary and confirmation columns >25%
U	Compound was not detected
X,Y,Z	Defined in case narrative

Inorganic Qualifiers

B	Value is <CRDL, but ≥IDL
E	Estimated due to interference
M	Duplicate injection precision not met
N	Spike sample not within control limits
S	Method of standard additions (MSA) used for calculation
U	Compound was not detected
W	Post digestion spike out of control limits
*	Duplicate analysis not within control limits
+	Correlation coefficient for MSA <0.995

Analytical test results meet all requirements of NELAC unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff. This report shall not be reproduced except in full, without the written approval of the laboratory.

Times are local to the area of activity. Parameters listed in the 40 CFR part 136 Table II as "analyze immediately" are not performed within 15 minutes.

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MAY 20, 2013 SAMPLING EVENT

UNIVERSITY OF LOUISIANA
MONROE

REPORT OF ANALYSIS FOR DENBURY

ULM LAB #:	12-(4848-4877)	I.D #:	VARIOUS
SAMPLE TYPE:	SEDIMENT	DATE RECEIVED:	05/21/13
ANALYSIS:	CHLORIDE	DATE REPORTED:	05/23/13
TEST METHOD:	modified SM 4500-CL C 19TH	DETECTION LIMIT:	1.53

REPORT TABLE:

ULM LAB #	*SAMPLE ID*	*RESULT Water solution extracted from soil*	*RESULT Soil*	*REPORT UNITS*
12-4848	DS1-1	425	1,700	MG/L
12-4849	DS1-2	275	1,100	MG/L
12-4850	DS1-3	75	300	MG/L
12-4851	DS2-1	1,275	5,100	MG/L
12-4852	DS2-2	1,175	4,700	MG/L
12-4853	DS2-3	975	3,900	MG/L
12-4854	DS3-1	1,775	7,100	MG/L
12-4855	DS3-2	575	2,300	MG/L
12-4856	DS3-3	475	1,900	MG/L
12-4857	DS4-1	1,975	7,900	MG/L
12-4858	DS4-2	1,325	5,300	MG/L
12-4859	DS4-3	275	1,100	MG/L
12-4860	DS5-1	1,775	7,100	MG/L
12-4861	DS5-2	575	2,300	MG/L
12-4862	DS5-3	325	1,300	MG/L
12-4863	DS6-1	4,874	19,496	MG/L
12-4864	DS6-2	575	2,300	MG/L
12-4865	DS6-3	225	900	MG/L
12-4866	DS7-1	1,924	7,696	MG/L
12-4867	DS7-2	725	2,900	MG/L
12-4868	DS7-3	75	300	MG/L
12-4869	DS8-1	4,274	17,096	MG/L
12-4870	DS8-2	1,675	6,700	MG/L
12-4871	DS8-3	525	2,100	MG/L
12-4872	DS9-1	1,924	7,696	MG/L
12-4873	DS9-2	1,625	6,500	MG/L
12-4874	DS9-3	325	1,300	MG/L
12-4875	DS10-1	1,675	6,700	MG/L
12-4876	DS10-2	425	1,700	MG/L
12-4877	DS10-3	275	1,100	MG/L

QA / QC REPORT:

ANALYSIS	ANALYSIS DATE & TIME	ANALYST
CHLORIDE	05/23/13@13:42	DHB

Terri Ramaste
Director

Soil-Plant Analysis Laboratory
C&NS Building, Room 117 700 University Ave. Monroe, LA 71209-0505
Phone: (318) 342-1948 Fax: (318) 342-1949

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SEPTEMBER 17, 2013 SAMPLING EVENT

Sherry Laboratories - Pinhook, ENV
2417 W. Pinhook Road
Lafayette, LA 70508-3344
TEL: 337.235.0483 FAX: 337.233.6540
Website: www.sherrylabs.com

September 20, 2013

Ryan Jacob
Denbury Resources
18167 East Petroleum Dr.
Baton Rouge, LA 70809
TEL: (985) 857-9215
FAX (985) 868-9264

RE: Denbury 152-1 Spill Order No.: 13090894

Dear Ryan Jacob:

Sherry Laboratories Louisiana, LLC received 16 sample(s) on 9/18/2013 for the analyses presented in the following report.

In accordance with your instructions, Sherry Laboratories/Louisiana conducted the analysis shown on the following pages on samples submitted by your company. The results related only to the items tested. Unless otherwise noted, all analyses were conducted using EPA approved methodologies and all test results meet all requirements of TNI. All relevant sampling information is on the attached Chain-of-Custody form.

All soil data, except for 29-B, are on a wet-weight basis unless otherwise indicated in the units field as –dry.

LELAP Certification No.: 01997. A scope of accredited parameters is available upon request. A "#" by the test method or analyte indicates this parameter is outside the scope of accreditation.

Estimated uncertainty is available upon request. This report shall not be reproduced except in full, without the written approval of the laboratory.

If you have any questions regarding these test results, please feel free to call.

Annie Reedy
Assistant Lab Director
2417 W. Pinhook Road
Lafayette, LA 70508-3344

Sherry Laboratories - Pinhook, ENV
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Case Narrative

WO#: **13090894**
Date: **9/20/2013**

CLIENT: Denbury Resources
Project: Denbury 152-1 Spill

Unless specified by the client, a duplicate or MS/MSD, wherever applicable, is randomly selected and analyzed from each analytical batch provided sample volume is sufficient. The sample chosen for duplicate or MS/MSD may or may not be a sample submitted in this workorder. A method blank and/or a lab control sample (LCS)/lab control sample duplicate (LCSD), wherever applicable, are processed as a quality control check for each analytical batch. When the matrix QC data is not available due to insufficient sample volume or when the results indicate possible matrix effect, the validity of the batch is determined by the method blank and LCS/LCSD.

Any other exceptions associated with this report will be footnoted in the results page(s) or the QC summary page(s).

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Analytical Report

(consolidated)

WO#: **13090894**

Date Reported: **9/20/2013**

CLIENT: Denbury Resources **Collection Date:** 9/17/2013 2:25:00 PM

Project: Denbury 152-1 Spill

Lab ID: 13090894-001 **Matrix:** SOIL

Client Sample ID SS010917

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
SOLUBLE CHLORIDE BY SW9253				**SW9253**		Analyst: **SXP**
Chlorides	2,250	264		mg/Kg-dry	50	9/20/2013 11:34:00 AM
METALS IN SOIL OR SLUDGE BY ICP				**SW6010B**	**SW3050B**	Analyst: **STS**
Sodium	1,060	266		mg/Kg	1	9/18/2013 7:51:20 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
C	Value is below Minimum Compound Limit.	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
N	Tentatively identified compounds	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Second column confirmation exceeds
PL	Permit Limit	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

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Analytical Report

(consolidated)

WO#: **13090894**

Date Reported: **9/20/2013**

CLIENT: Denbury Resources **Collection Date:** 9/17/2013 2:32:00 PM

Project: Denbury 152-1 Spill

Lab ID: 13090894-002 **Matrix:** SOIL

Client Sample ID SS020917

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
SOLUBLE CHLORIDE BY SW9253				**SW9253**		Analyst: **SXP**
Chlorides	2,020	284		mg/Kg-dry	50	9/20/2013 11:34:00 AM
METALS IN SOIL OR SLUDGE BY ICP				**SW6010B**	**SW3050B**	Analyst: **STS**
Sodium	1,290	260		mg/Kg	1	9/18/2013 7:57:29 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
C	Value is below Minimum Compound Limit.	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
N	Tentatively identified compounds	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Second column confirmation exceeds
PL	Permit Limit	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

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Analytical Report

(consolidated)

WO#: **13090894**

Date Reported: **9/20/2013**

CLIENT: Denbury Resources **Collection Date:** 9/17/2013 2:37:00 PM

Project: Denbury 152-1 Spill

Lab ID: 13090894-003 **Matrix:** SOIL

Client Sample ID SS030917

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
SOLUBLE CHLORIDE BY SW9253				**SW9253**		Analyst: **SXP**
Chlorides	2,260	276		mg/Kg-dry	50	9/20/2013 11:34:00 AM
METALS IN SOIL OR SLUDGE BY ICP				**SW6010B**	**SW3050B**	Analyst: **STS**
Sodium	2,370	252		mg/Kg	1	9/18/2013 7:59:29 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
C	Value is below Minimum Compound Limit.	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
N	Tentatively identified compounds	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Second column confirmation exceeds
PL	Permit Limit	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

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Analytical Report

(consolidated)

WO#: **13090894**

Date Reported: **9/20/2013**

CLIENT: Denbury Resources **Collection Date:** 9/17/2013 2:41:00 PM

Project: Denbury 152-1 Spill

Lab ID: 13090894-004 **Matrix:** SOIL

Client Sample ID SS040917

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
SOLUBLE CHLORIDE BY SW9253				**SW9253**		Analyst: **SXP**
Chlorides	2,760	250		mg/Kg-dry	50	9/20/2013 11:34:00 AM
METALS IN SOIL OR SLUDGE BY ICP				**SW6010B**	**SW3050B**	Analyst: **STS**
Sodium	1,390	267		mg/Kg	1	9/18/2013 8:01:28 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
C	Value is below Minimum Compound Limit.	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
N	Tentatively identified compounds	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Second column confirmation exceeds
PL	Permit Limit	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

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Analytical Report

(consolidated)

WO#: **13090894**

Date Reported: **9/20/2013**

CLIENT: Denbury Resources **Collection Date:** 9/17/2013 2:45:00 PM

Project: Denbury 152-1 Spill

Lab ID: 13090894-005 **Matrix:** SOIL

Client Sample ID SS050917

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
SOLUBLE CHLORIDE BY SW9253				**SW9253**		Analyst: **SXP**
Chlorides	1,870	263		mg/Kg-dry	50	9/20/2013 11:34:00 AM
METALS IN SOIL OR SLUDGE BY ICP				**SW6010B**	**SW3050B**	Analyst: **STS**
Sodium	1,320	263		mg/Kg	1	9/18/2013 8:03:28 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
C	Value is below Minimum Compound Limit.	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
N	Tentatively identified compounds	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Second column confirmation exceeds
PL	Permit Limit	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

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Analytical Report

(consolidated)

WO#: **13090894**

Date Reported: **9/20/2013**

CLIENT: Denbury Resources **Collection Date:** 9/17/2013 2:56:00 PM

Project: Denbury 152-1 Spill

Lab ID: 13090894-006 **Matrix:** SOIL

Client Sample ID SS060917

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
SOLUBLE CHLORIDE BY SW9253				**SW9253**		Analyst: **SXP**
Chlorides	1,680	250		mg/Kg-dry	50	9/20/2013 11:34:00 AM
METALS IN SOIL OR SLUDGE BY ICP				**SW6010B**	**SW3050B**	Analyst: **STS**
Sodium	1,090	255		mg/Kg	1	9/18/2013 8:05:28 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
C	Value is below Minimum Compound Limit.	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
N	Tentatively identified compounds	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Second column confirmation exceeds
PL	Permit Limit	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

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Analytical Report

(consolidated)

WO#: **13090894**

Date Reported: **9/20/2013**

CLIENT: Denbury Resources **Collection Date:** 9/17/2013 3:03:00 PM

Project: Denbury 152-1 Spill

Lab ID: 13090894-007 **Matrix:** SOIL

Client Sample ID SS070917

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
SOLUBLE CHLORIDE BY SW9253				**SW9253**		Analyst: **SXP**
Chlorides	2,260	290		mg/Kg-dry	50	9/20/2013 11:34:00 AM
METALS IN SOIL OR SLUDGE BY ICP				**SW6010B**	**SW3050B**	Analyst: **STS**
Sodium	1,210	265		mg/Kg	1	9/18/2013 8:07:28 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
C	Value is below Minimum Compound Limit.	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
N	Tentatively identified compounds	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Second column confirmation exceeds
PL	Permit Limit	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

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Analytical Report

(consolidated)

WO#: **13090894**

Date Reported: **9/20/2013**

CLIENT: Denbury Resources **Collection Date:** 9/17/2013 3:10:00 PM

Project: Denbury 152-1 Spill

Lab ID: 13090894-008 **Matrix:** SOIL

Client Sample ID SS080917

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
SOLUBLE CHLORIDE BY SW9253				**SW9253**		Analyst: **SXP**
Chlorides	3,330	552		mg/Kg-dry	100	9/20/2013 11:34:00 AM
METALS IN SOIL OR SLUDGE BY ICP				**SW6010B**	**SW3050B**	Analyst: **STS**
Sodium	1,700	258		mg/Kg	1	9/18/2013 8:13:35 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
C	Value is below Minimum Compound Limit.	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
N	Tentatively identified compounds	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Second column confirmation exceeds
PL	Permit Limit	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

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Analytical Report

(consolidated)

WO#: **13090894**

Date Reported: **9/20/2013**

CLIENT: Denbury Resources **Collection Date:** 9/17/2013 3:15:00 PM

Project: Denbury 152-1 Spill

Lab ID: 13090894-009 **Matrix:** SOIL

Client Sample ID SS090917

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
SOLUBLE CHLORIDE BY SW9253				**SW9253**		Analyst: **SXP**
Chlorides	4,540	492		mg/Kg-dry	100	9/20/2013 11:34:00 AM
METALS IN SOIL OR SLUDGE BY ICP				**SW6010B**	**SW3050B**	Analyst: **STS**
Sodium	2,340	251		mg/Kg	1	9/18/2013 8:15:33 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
C	Value is below Minimum Compound Limit.	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
N	Tentatively identified compounds	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Second column confirmation exceeds
PL	Permit Limit	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

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Analytical Report

(consolidated)

WO#: **13090894**

Date Reported: **9/20/2013**

CLIENT: Denbury Resources **Collection Date:** 9/17/2013 3:20:00 PM

Project: Denbury 152-1 Spill

Lab ID: 13090894-010 **Matrix:** SOIL

Client Sample ID SS100917

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
SOLUBLE CHLORIDE BY SW9253				**SW9253**		Analyst: **SXP**
Chlorides	4,300	484		mg/Kg-dry	100	9/20/2013 11:34:00 AM
METALS IN SOIL OR SLUDGE BY ICP				**SW6010B**	**SW3050B**	Analyst: **STS**
Sodium	2,780	261		mg/Kg	1	9/18/2013 8:17:32 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
C	Value is below Minimum Compound Limit.	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
N	Tentatively identified compounds	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Second column confirmation exceeds
PL	Permit Limit	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

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Analytical Report

(consolidated)

WO#: **13090894**

Date Reported: **9/20/2013**

CLIENT: Denbury Resources **Collection Date:** 9/17/2013 3:25:00 PM

Project: Denbury 152-1 Spill

Lab ID: 13090894-011 **Matrix:** SOIL

Client Sample ID SS110917

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
SOLUBLE CHLORIDE BY SW9253				**SW9253**		Analyst: **SXP**
Chlorides	3,840	515		mg/Kg-dry	100	9/20/2013 11:34:00 AM
METALS IN SOIL OR SLUDGE BY ICP				**SW6010B**	**SW3050B**	Analyst: **STS**
Sodium	2,430	257		mg/Kg	1	9/18/2013 8:19:30 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
C	Value is below Minimum Compound Limit.	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
N	Tentatively identified compounds	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Second column confirmation exceeds
PL	Permit Limit	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

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Analytical Report

(consolidated)

WO#: **13090894**

Date Reported: **9/20/2013**

CLIENT: Denbury Resources **Collection Date:** 9/17/2013 3:30:00 PM

Project: Denbury 152-1 Spill

Lab ID: 13090894-012 **Matrix:** SOIL

Client Sample ID SS120917

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
SOLUBLE CHLORIDE BY SW9253				**SW9253**		Analyst: **SXP**
Chlorides	3,010	499		mg/Kg-dry	100	9/20/2013 11:34:00 AM
METALS IN SOIL OR SLUDGE BY ICP				**SW6010B**	**SW3050B**	Analyst: **STS**
Sodium	1,940	256		mg/Kg	1	9/18/2013 8:21:30 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
C	Value is below Minimum Compound Limit.	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
N	Tentatively identified compounds	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Second column confirmation exceeds
PL	Permit Limit	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

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Analytical Report

(consolidated)

WO#: **13090894**

Date Reported: **9/20/2013**

CLIENT: Denbury Resources **Collection Date:** 9/17/2013 3:35:00 PM

Project: Denbury 152-1 Spill

Lab ID: 13090894-013 **Matrix:** SOIL

Client Sample ID SS130917

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
SOLUBLE CHLORIDE BY SW9253				**SW9253**		Analyst: **SXP**
Chlorides	5,140	483		mg/Kg-dry	100	9/20/2013 11:34:00 AM
METALS IN SOIL OR SLUDGE BY ICP				**SW6010B**	**SW3050B**	Analyst: **STS**
Sodium	3,340	250		mg/Kg	1	9/18/2013 8:23:30 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
C	Value is below Minimum Compound Limit.	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
N	Tentatively identified compounds	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Second column confirmation exceeds
PL	Permit Limit	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

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Analytical Report

(consolidated)

WO#: **13090894**

Date Reported: **9/20/2013**

CLIENT: Denbury Resources **Collection Date:** 9/17/2013 3:40:00 PM

Project: Denbury 152-1 Spill

Lab ID: 13090894-014 **Matrix:** SOIL

Client Sample ID SS140917

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
SOLUBLE CHLORIDE BY SW9253				**SW9253**		Analyst: **SXP**
Chlorides	4,050	518		mg/Kg-dry	100	9/20/2013 11:34:00 AM
METALS IN SOIL OR SLUDGE BY ICP				**SW6010B**	**SW3050B**	Analyst: **STS**
Sodium	2,230	261		mg/Kg	1	9/18/2013 8:25:30 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
C	Value is below Minimum Compound Limit.	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
N	Tentatively identified compounds	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Second column confirmation exceeds
PL	Permit Limit	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

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Analytical Report

(consolidated)

WO#: **13090894**

Date Reported: **9/20/2013**

CLIENT: Denbury Resources **Collection Date:** 9/17/2013 3:45:00 PM

Project: Denbury 152-1 Spill

Lab ID: 13090894-015 **Matrix:** SOIL

Client Sample ID SS150917

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
SOLUBLE CHLORIDE BY SW9253				**SW9253**		Analyst: **SXP**
Chlorides	4,500	470		mg/Kg-dry	100	9/20/2013 11:34:00 AM
METALS IN SOIL OR SLUDGE BY ICP				**SW6010B**	**SW3050B**	Analyst: **STS**
Sodium	2,440	257		mg/Kg	1	9/18/2013 8:27:30 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
C	Value is below Minimum Compound Limit.	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
N	Tentatively identified compounds	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Second column confirmation exceeds
PL	Permit Limit	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

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Analytical Report

(consolidated)

WO#: **13090894**

Date Reported: **9/20/2013**

CLIENT: Denbury Resources **Collection Date:** 9/17/2013 3:50:00 PM

Project: Denbury 152-1 Spill

Lab ID: 13090894-016 **Matrix:** SOIL

Client Sample ID SS160917

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
SOLUBLE CHLORIDE BY SW9253				**SW9253**		Analyst: **SXP**
Chlorides	3,520	472		mg/Kg-dry	100	9/20/2013 11:34:00 AM
METALS IN SOIL OR SLUDGE BY ICP				**SW6010B**	**SW3050B**	Analyst: **STS**
Sodium	1,740	267		mg/Kg	1	9/18/2013 8:29:32 PM

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
C	Value is below Minimum Compound Limit.	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	M	Matrix Interference
N	Tentatively identified compounds	ND	Not Detected at the Reporting Limit
O	RSD is greater than RSDlimit	P	Second column confirmation exceeds
PL	Permit Limit	R	RPD outside accepted recovery limits
RL	Reporting Detection Limit	S	Spike Recovery outside accepted recovery limits

Sherry Laboratories - Pinhook, ENV
2417 W. Pinhook Road
Lafayette, LA 70508-3344
TEL: 337.235.0483 FAX: 337.233.6540
Website: www.sherrylabs.com

QC SUMMARY REPORT

WO#: **13090894**
20-Sep-13

Client: Denbury Resources
Project: Denbury 152-1 Spill **BatchID:** **8473**

Sample ID **MB-8473** SampType: **MBLK** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **9/18/2013** RunNo: **26774**
Client ID: **PBS** Batch ID: **8473** TestNo: **SW6010B** **SW3050B** Analysis Date: **9/18/2013** SeqNo: **577462**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sodium	< 250	250									

Sample ID **LCS-8473** SampType: **LCS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **9/18/2013** RunNo: **26774**
Client ID: **LCSS** Batch ID: **8473** TestNo: **SW6010B** **SW3050B** Analysis Date: **9/18/2013** SeqNo: **577463**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sodium	2,560	250	2,500	0	102	80	120				

Sample ID **LCSD-8473** SampType: **LCSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **9/18/2013** RunNo: **26774**
Client ID: **LCSS02** Batch ID: **8473** TestNo: **SW6010B** **SW3050B** Analysis Date: **9/18/2013** SeqNo: **577467**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sodium	2,620	250	2,500	0	105	80	120	2,558	2.39	20	

Sample ID **13090894-001AMS** SampType: **MS** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **9/18/2013** RunNo: **26774**
Client ID: **SS010917** Batch ID: **8473** TestNo: **SW6010B** **SW3050B** Analysis Date: **9/18/2013** SeqNo: **577470**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sodium	3,370	271	2,713	1,058	85.3	75	125				

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank	C	Value is below Minimum Compound Limit.
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	O	RSD is greater than RSDlimit	P	Second column confirmation exceeds
PL	Permit Limit	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits				

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Website: www.sherrylabs.com

QC SUMMARY REPORT

WO#: **13090894**
20-Sep-13

Client: Denbury Resources
Project: Denbury 152-1 Spill **BatchID:** **8473**

Sample ID **13090894-001AMSD** SampType: **MSD** TestCode: **6010_S** Units: **mg/Kg** Prep Date: **9/18/2013** RunNo: **26774**
Client ID: **SS010917** Batch ID: **8473** TestNo: **SW6010B** **SW3050B** Analysis Date: **9/18/2013** SeqNo: **577471**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sodium	3,400	271	2,706	1,058	86.5	75	125	3,371	0.83	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank	C	Value is below Minimum Compound Limit.
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	O	RSD is greater than RSDlimit	P	Second column confirmation exceeds
PL	Permit Limit	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits				

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QC SUMMARY REPORT

WO#: **13090894**
20-Sep-13

Client: Denbury Resources
Project: Denbury 152-1 Spill

BatchID: **R26820**

Sample ID **MB-R26820** SampType: **MBLK** TestCode: **CL_S_9253** Units: **mg/Kg-dry** Prep Date: RunNo: **26820**
Client ID: **PBS** Batch ID: **R26820** TestNo: **SW9253** Analysis Date: **9/20/2013** SeqNo: **578684**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chlorides	< 10	10									

Sample ID **LCSD-R26820** SampType: **LCSD** TestCode: **CL_S_9253** Units: **mg/Kg-dry** Prep Date: RunNo: **26820**
Client ID: **LCSS02** Batch ID: **R26820** TestNo: **SW9253** Analysis Date: **9/20/2013** SeqNo: **578685**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chlorides	117	10	100	0	117	80	120	110	6	20	

Sample ID **LCS-R26820** SampType: **LCS** TestCode: **CL_S_9253** Units: **mg/Kg-dry** Prep Date: RunNo: **26820**
Client ID: **LCSS** Batch ID: **R26820** TestNo: **SW9253** Analysis Date: **9/20/2013** SeqNo: **578686**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chlorides	110	10	100	0	110	80	120				

Sample ID **13090894-016AMSD** SampType: **MSD** TestCode: **CL_S_9253** Units: **mg/Kg-dry** Prep Date: RunNo: **26820**
Client ID: **SS160917** Batch ID: **R26820** TestNo: **SW9253** Analysis Date: **9/20/2013** SeqNo: **578702**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chlorides	8,550	472	4,720	3,519	106	80	120	8,043	6	20	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank	C	Value is below Minimum Compound Limit.
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	O	RSD is greater than RSDlimit	P	Second column confirmation exceeds
PL	Permit Limit	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits				

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Lafayette, LA 70508-3344
TEL: 337.235.0483 FAX: 337.233.6540
Website: www.sherrylabs.com

QC SUMMARY REPORT

WO#: **13090894**

20-Sep-13

Client: Denbury Resources
Project: Denbury 152-1 Spill

BatchID: **R26820**

Sample ID **13090894-016AMS** SampType: **MS** TestCode: **CL_S_9253** Units: **mg/Kg-dry** Prep Date: RunNo: **26820**
Client ID: **SS160917** Batch ID: **R26820** TestNo: **SW9253** Analysis Date: **9/20/2013** SeqNo: **578704**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chlorides	8,040	472	4,720	3,519	96	80	120				

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank	C	Value is below Minimum Compound Limit.
E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	M	Matrix Interference
ND	Not Detected at the Reporting Limit	O	RSD is greater than RSDlimit	P	Second column confirmation exceeds
PL	Permit Limit	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	Spike Recovery outside accepted recovery limits				

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Lafayette, LA 70508-3344
TEL: 337.235.0483 FAX: 337.233.6540
Website: www.sherrylabs.com

Sample Log-In Check List

Client Name: **DENBURY_ONSHORE** Work Order Number: **13090894** RcptNo: **1**

Logged by:	**Emily Tassin**	**9/18/2013 8:30:00 AM**	Emily Tassin
Completed By:	**Emily Tassin**	**9/18/2013 9:07:55 AM**	Emily Tassin
Reviewed By:	**Rhonda David**	**9/20/2013 9:30:02 AM**	Rhonda David

Chain of Custody

1. Is Chain of Custody complete? Yes ☑ No ☐ Not Present ☐
2. How was the sample delivered? FedEx
   Tracking No.: 8026 3690 9173

Log In

3. Coolers are present? Yes ☑ No ☐ NA ☐
4. Shipping container/cooler in good condition? Yes ☑ No ☐
   Custody seals intact on shipping container/cooler? Yes ☐ No ☐ Not Present ☑
   No. Seal Date: Signed By:
5. Was an attempt made to cool the samples? Yes ☑ No ☐ NA ☐
6. Were all samples received at a temperature of >0° C to 6.0°C Yes ☑ No ☐ NA ☐
7. Sample(s) in proper container(s)? Yes ☑ No ☐
8. Sufficient sample volume for indicated test(s)? Yes ☑ No ☐
9. Are samples (except VOA and ONG) properly preserved? Yes ☑ No ☐
10. Was preservative added to bottles? Yes ☐ No ☑ NA ☐
11. Is the headspace in the VOA vials less than 1/4 inch or 6 mm? Yes ☐ No ☐ No VOA Vials ☑
12. Were any sample containers received broken? Yes ☐ No ☑
13. Does paperwork match bottle labels? Yes ☑ No ☐
    (Note discrepancies on chain of custody)
14. Are matrices correctly identified on Chain of Custody? Yes ☑ No ☐
15. Is it clear what analyses were requested? Yes ☑ No ☐
16. Were all holding times able to be met? Yes ☑ No ☐
    (If no, notify customer for authorization.)

Special Handling (if applicable)

17. Was client notified of all discrepancies with this order? Yes ☐ No ☑ NA ☐

Person Notified:		Date	
By Whom:		Via:	☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding:			
Client Instructions:			

18. Additional remarks:
    Improper error correction(s) made by client

Cooler Information

Cooler No	Temp ºC	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	3.2	Good	Not Present			

DBPix Evaluation

SHERRY ENVIRONMENTAL

Sherry Laboratories - Chain of Custody Record

Laboratory Number: 13090894

	Client Information:	Billing Information:
Company Name:	EarthCon	~~Same~~ Denbury Onshore, LLC
Contact Name:	Roy Hill	Todd Bergeron
Address:	P.O. Box 1246	10167 East Petroleum Dr.
		Bldg B
City, State Zip:	Madison MS 39130	Baton Rouge, LA 70807
Phone Number:	601-853-2134	225-388-6500 Ext:
Fax Number:	601-856-3978	225-388-6519
E-mail Address:	rhill@earthcon.com	Todd.Bergeron@denbury.com

PO Number:

Quote Number:

Required QC Level

Bill Monthly: ☐Yes ☐No

Project Name/Number: Denbury 152-1 Spill

Sampler's Signature: Brent Cochran

Shipping Method: UPS / FedEx / Airborne / DHL / Sherry / Hand / Mail

Page 1 of 2

Matrix Code
DW = Drinking Water
AQ = Aqueous/Non-Potable Water
SL = Sludge
SOL = Solid/Soil
O = Oil
PW = Produced Water
CF = Completion Fluid
AIR = Air
DF = Drilling Fluid
OT = Other

Which Regulations Apply: ☐RCRA ☐State ☐POTW ☐Other ☐NPDES ☐USDA/FDA ☐RECAP/RISC

Turn Time: ☐Standard; RUSH: ☒1 Day ☐2 Day ☐Other (Rush turn times will incur a surcharge and must be pre-approved by lab.)

Sample ID/Description	Collection Information: Date	Time	Grab / Composite	Matrix	Container: Quantity	Type P=Plastic, G=Glass, V=Vial	Pres. HCl, HNO_3, H_2SO_4, NaOH, $Na_2S_2O_3$	Requested Tests: Chloride	Sodium	Comments
SS010917	9/17/13	14:25	G	Sol	1	G	none	X	X	
SS020917		14:32								
SS030917		14:37								
SS040917		14:41								
SS050917		14:45								
SS060917		14:56								
SS070917		15:03								
SS080917		15:10								
SS090917		15:15								
SS100917		15:20								

Comments: Fedex: 8026 3690 9173

	Relinquished by	Date/Time	Received by	Date/Time
1	Brent Cochran	9/17/13 17:00		
2				
3			Amelia Cash	9/18/13 8:30

Field Notes:

Received at lab on ice? ☑Yes ☐No Temp: 3.2 °C

All samples submitted to Sherry Laboratories for analysis are accepted on a custodial basis only. Ownership of the material remains with the client submitting the samples. Sherry Laboratories reserves the right to return unused sample portions.

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Lafayette, LA 70508
337-235-0483
Fax: 337-233-6540

2703 National Place
Garland, TX 75041
972-840-8983
Fax: 972-840-8993

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DBPix Evaluation

Sherry Laboratories - Chain of Custody Record

SHERRY ENVIRONMENTAL

Laboratory Number: 13091894

Page 2 of 2

	Client Information:	Billing Information:	PO Number:	Project Name/Number:
Company Name:	EarthCon	~~Same~~ Denbury Onshore, LLC		Denbury 152-1 Spill
Contact Name:			Quote Number:	
Address:				Sampler's Signature: Brent Jackson
			Required QC Level	
City, State Zip:				
Phone Number:		Ext:	Bill Monthly	Shipping Method:
Fax Number:			☐Yes	UPS / FedEx / Airborne
E-mail Address:			☐No	DHL / Sherry / Hand / Mail

Matrix Code
DW = Drinking Water
AQ = Aqueous/Non-Potable Water
SL = Sludge
SOL = Solid/Soil
O = Oil
PW = Produced Water
CF = Completion Fluid
AIR = Air
DF = Drilling Fluid
OT = Other

Which Regulations Apply: ☐RCRA ☐State ☐POTW ☐Other ☐NPDES ☐USDA/FDA ☐RECAP/RISC

Turn Time ☐Standard RUSH ☐1 Day ☐2 Day ☐Other (Rush turn times will incur a surcharge and must be pre-approved by lab.)

Sample ID/Description	Collection Information: Date	Time	Grab / Composite	Matrix	Container: Quantity	Type P=Plastic, G=Glass, V=Vial	Pres. HCl, HNO_3, H_2SO_4, NaOH, $Na_2S_2O_3$	Requested Tests: Chloride	Sodium	Comments
SS110917	9/17/13	15:25	G	Sol	1	G	none	X	X	
SS120917	↓	15:30	↓	↓	↓	↓	↓	↓	↓	
SS130917	↓	15:35	↓	↓	↓	↓	↓	↓	↓	
SS140917	↓	15:40	↓	↓	↓	↓	↓	↓	↓	
SS150917	↓	15:45	↓	↓	↓	↓	↓	↓	↓	
SS160917	↓	15:50	↓	↓	↓	↓	↓	↓	↓	

	Relinquished by	Date/Time	Received by	Date/Time
1	Brent Jackson	9/17/13 17:00		
2				
3			[illegible]	9/18/13 8:30

Field Notes:

Received at lab on ice? ☑Yes ☐No Temp: 3.2

All samples submitted to Sherry Laboratories for analysis are accepted on a custodial basis only. Ownership of the material remains with the client submitting the samples. Sherry Laboratories reserves the right to return unused sample portions.

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APPENDIX E
WETLAND DELINEATION REPORT

Wetland Delineation Report

Delhi UT Holt-Bryant
Salt Water Spill from Water Injection Line
Wetland Impacts

Sections 32 & 33, T 17 N – R 9 E
Richland Parish, Louisiana

PREPARED FOR:

Denbury Resources Inc.
2929 Layfair Drive, Suite 200
Flowood, MS 39232

PREPARED BY:

MESSINGER & ASSOCIATES, INC.
ESTABLISHED 1945

630 East Jefferson Avenue
Bastrop, Louisiana 71220

June 2013

MESSINGER & ASSOCIATES, INC.
ESTABLISHED 1945
Professional Land Surveyors
630 EAST JEFFERSON AVENUE
BASTROP, LOUISIANA 71221

HENRY M. MESSINGER (1912-1979)
REGISTERED LAND SURVEYOR
PARISH SURVEYOR
FRANK L. MESSINGER, III
PROFESSIONAL LAND SURVEYOR
JEFFREY M. MESSINGER
PROFESSIONAL LAND SURVEYOR

RON WILLIAMS
CAD SPECIALIST

PLEASE REFER TO FILE No. 8825
E-mail: survey@masurvey.net
TELEPHONE (318) 281-1636
FAX (318) 281-7078

June 17, 2013

Mr. Tracy Carter, HSE Supervisor
Denbury Resources Inc.
2929 Layfair Drive, Suite 200
Flowood, MS 39232

Mr. Carter,

Project Overview

The purpose of this report is to summarize the methods and findings of a wetland delineation performed by Messinger & Associates, Inc (Messinger). in the Delhi UT Holt-Bryant oil field at the request of Denbury Resources Inc (DRI). The project area is in Sections 32 & 33, T 17 N – R 9 E, Richland Parish, Louisiana. The extent of the project area encompasses the land impacted by a salt water leak from a DRI water injection pipeline and the immediate surrounding area. The purpose of the wetland delineation performed on June 11 & 12, 2013 was to determine the presence of wetlands within the area impacted by the salt water leak. The immediate surrounding area was also delineated to determine the presence of wetlands that may be impacted during efforts to access the salt water leak. The following information and supporting data details the wetland delineation and findings.

Vicinity (Enclosure 1) and Quad (Enclosure 2) maps have been provided for overviews of the proposed project site. Maps identifying the salt water spill area (Enclosure 3), the wetlands on site (Enclosure 4), and the wetlands impacted by salt water (Enclosure 5) are enclosed. A Wetland Impact Table (Enclosure 6) and the Water Upload Spreadsheet (Enclosure 7) are enclosed, detailing wetland impacts. The Wetland Determination Data Forms (Enclosure 8) recorded within the project boundary are also included.

Wetland Delineation and Methodology

The primary focus of this investigation was determining the presence and extent of wetlands and other waters occurring within the project site. The investigation was compiled by wildlife biologist Larry Savage in conjunction with Jeremy Smith of FC&E Engineering, LLC. Standard Gulf Coastal Plain Region Wetland Determination data for soil, vegetation and hydrology parameters were recorded electronically using WetCollect mobile software installed on a Trimble GeoXH handheld unit within the established project boundaries June 11 and 12, 2013. Photographs were taken at each data point to assist with characterization of the site. At each data point a soil probe and Munsell soil chart were used for classification of soil types. A soil pit was excavated to a depth of about 20 inches to determine soil and hydrology characteristics. Dominant vegetation was sampled and listed by priority ranking along with the indicator status as listed in the National List of Plant Species Occurring in Wetlands (Region 2). The plant community was designated as hydrophytic if more that 50% of the dominant plant species across all strata were rated Facultative (FAC), Facultative Wet (FACW), or Obligate (OBL). Standard wetland hydrology indicators were recorded at each data point. If at least one primary, or two secondary

indicators were present, the site was classified a positive for wetland hydrology. Any area that meets all criteria is commonly classified as jurisdictional wetlands and therefore subject to Corps of Engineers regulation.

Hydrology

The project site is bound on the west by Muddy Slough and on the east and south by an unnamed tributary to Muddy Slough. Big Creek is the primary drainage system for the project site. Big Creek is a tributary of Boeuf River which is considered a navigable waterway. Drainage for the project site flows south via Muddy Slough to Turkey Creek. Turkey Creek enters Big Creek via Turkey Creek Cut-off. In this portion of Richland Parish, the entire system of natural water-ways has been modified and with the addition of man-made drains natural wetland hydrology has been severely impacted by accelerated surface water run-off.

Soils

The Macon Ridge is a prominent physiographic region consisting of level to undulating terraces extending from North to South through Richland parish. Geologically the Macon Ridge is "a pile of sand and gravel", glacial outwash deposited by the ancestral Mississippi River during Pleistocene time (Darwin, 1995). The position of the Macon Ridge within the Mississippi River flood plain was demonstrated by the historic 1927 flood when 3 to 6 feet of water flooded the city of Rayville for almost a month.

Soils on Macon Ridge terraces are mainly silt loam deposits formed in either thick loess (4+ feet) or thin loess (< 4 ft.) overlaid on braided stream deposits (Soil Survey of Richland Parish). The Soil Survey of Richland Parish indicates this Delhi Unit project site has one typically hydric soil - Calhoun; and two typically non-hydric soils - Grenada and Calloway. A thumb-nail sketch of soil types encounter within this project area include:

Calhoun Series – Calhoun silt loam, 0 to 1 percent slopes – This soil is level and poorly drained. It is on broad flats and in narrow depressions along drainage ways on terraces. It is subject to rare flooding. Calhoun is formed in thick loess and characterized by low fertility and a level of exchangeable aluminum that is toxic to crops. A perched water table is within a depth of 1.5 feet from December to April. Soils are hydric in broad flats, narrow drainage ways and depressions.

Ap - 0–6": grayish brown (10YR 5/2) silt loam; few fine distinct dark yellowish brown (10YR 4/6) mottles
Eg1 - 6–14"; light gray (10YR 7/1 silt loam; common medium yellowish brown (10YR 4/6) mottles
Eg2 - 14-23"; light gray (10YR 6/1) silt loam; few medium prominent strong brown (7.5YR 5/6) mottles.

Calloway Series – Calloway silt loam, 1 to 3 percent slopes – This soil is somewhat poorly drained and very gently sloping. It is on low ridges and knolls on terraces. Soil is characterized by medium fertility and, air and water move through it at a slow rate. Rooting depth is limited by the fragipan. Calloway is non-hydric.

Ap1 - 0-6"; dark brown (10YR 4/3) silt loam.
Ap2 - 6-10"; dark brown (10YR 4/3) silt loam.
B/E- 10-25"; about 60% yellowish brown (10YR 5/6 & 5/4) (Bt) and 40% light brownish gray (10YR 6/2) (E) silt loam; common medium distinct light brownish gray (10YR 6/2) mottles.

Grenada Series – Grenada silt loam, 1 to 12 percent slope – This soil is very gently sloping and moderately well drained. It is formed in thick loess and found on terrace ridges. It is characterized by medium fertility and a level of exchangeable aluminum that is potentially toxic to crops. Plants are adversely affected by a lack of water during dry periods. They have a fragipan and permeability is moderate above and slow below the fragipan. Grenada is non-hydric.

Ap - 0 to 6 inches; dark brown (10YR 4/3) silt loam
Bw1- 6 to 16 inches; yellowish brown (10YR 5/6) silt loam
Bw2- 16-23"; mottled yellowish brown (10YR 5/6) and light yellowish brown (10YR 6/4) silt loam; common distinct brown ((10YR 4/4) mottles.

Vegetation

The Louisiana Department of Wildlife and Fisheries (LDWF) divide Louisiana into six Ecoregions for wildlife and habitat management purposes (Lester, 2005). Each ecoregion shares similar ecological attributes such as vegetation, soils, geology, climate, hydrology, and wildlife. The Macon Ridge is located in the Mississippi River Alluvial Plain ecoregion. Remnants of the natural Macon Ridge plant community are characterized as "Hardwood Flatwoods". Hardwood flatwoods are further divided into two distinct sub-types: "wet" hardwood flatwoods and "mesic" hardwood flatwoods (excerpts from Lester, 2005).

- **Wet hardwood flatwoods** (willow oak or "pin" oak flats) occur on hydric soils on poorly drained flats and depressions and usually are not affected by overbank flooding of a drainage way. On the Macon Ridge the principal soil series that support this community are Calhoun and Gilbert silt loams.

- **Mesic hardwood flatwoods** ("ridges") occur on non-hydric, better drained soils on higher topographic positions, such as on low ridges and knolls. Mesic hardwood flatwoods support greater floristic diversity than wet hardwoods. Principal soil series that support this community are Calloway, Grenada, Gigger and Necessity.

The Macon Ridge landscape is dominated by agricultural land use and is largely treeless. Remnant stands of hardwood flatwoods are highly fragmented. Only 33,000 acres of the parish remained in woodland in 1987 (Soil Survey of Richland Parish). Typically these remaining forest fragments are areas not suitable for farming due to one or more of the following characteristics: wetness, slope, uneven topography, low fertility, or potentially toxic levels of aluminum or sodium. Significant areas of marginal farmland have recently been reforested via the Wetlands Reserve Program and Conservation Reserve Program into pine plantations or mixed hardwood species.

Findings and Wetland Impacts

Within the project site surrounding the salt water leak, wetlands were found to be present. The wetland delineation revealed that 11.87 acres of herbaceous wetlands, 20.07 acres of scrub-shrub wetlands, and 5.08 acres of forest wetlands were present on the site. Of the wetlands present, the following amounts were impacted by the salt water leak: 9.24 acres of herbaceous wetlands, 9.82 acres of scrub-shrub wetlands, and 1.98 acres of forested wetlands. The wetland impacts were determined by the extents of the salt water contamination observed by the Louisiana Department of Environmental Quality and the survey data collected by Messinger. The survey data was overlaid on the extents of the wetland boundaries determined during the wetland delineation field work on June 11 and 12, 2013.

Sincerely,
MESSINGER & ASSOICATES, INC.

Jeffrey M. Messinger, PLS

Enclosures:
Enclosure 1 – Vicinity Map
Enclosure 2 – Quad Map
Enclosure 3 – Spill Map
Enclosure 4 – Wetland Map
Enclosure 5 – Impact Map
Enclosure 6 – Wetland Impacts Table
Enclosure 7 – Waters Upload Sheet
Enclosure 8 – Wetland Determination Data Forms

References

1. Allen, Charles M., Dawn A. Newman, and Harry H Winters. 2002. Trees, Shrubs, and Woody Vines of Louisiana. Allen Native Ventures, LLC, Pitkin, LA.

2. Cowardin, L. M., Carter, V., Golet, F. C., and LaRoe, E. T. 1979. Classification of Wetlands and Deepwater Habitats of the United States, FWS/OBS-79/31, U.S. fish and Wildlife Service, Office of Biological Services, Washington, D. C.

3. Lester, Gary D., Stephen G. Sorensen, Patricia L. Faulkner, Christopher S. Reid, and Ines E. Maxit. 2005 Louisiana Comprehensive Wildlife Conservation Strategy. Louisiana Department of Wildlife and Fisheries. Baton Rouge, Louisiana.

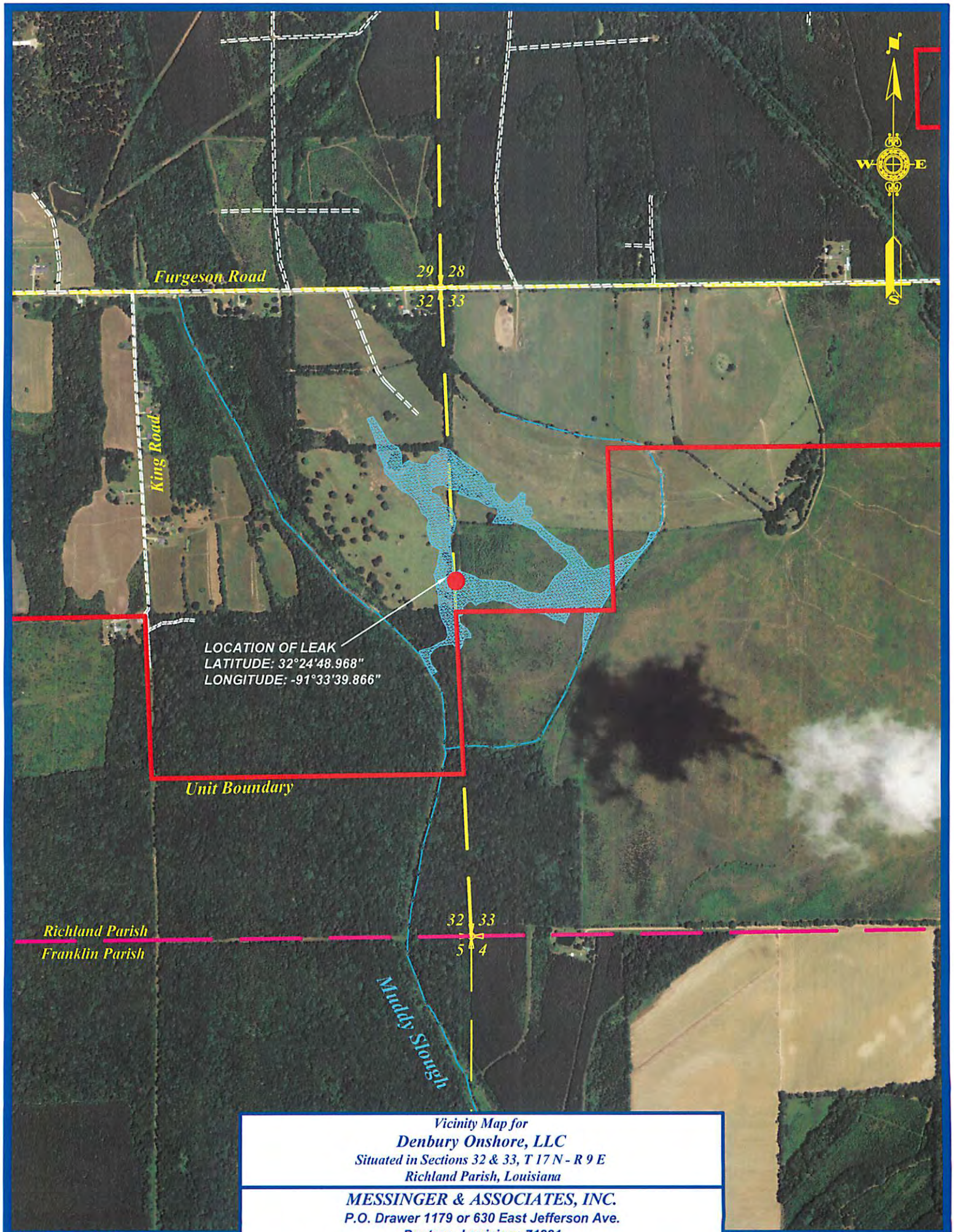
4. Reed, P. B., Jr. 1988 National list of plant species that occur in wetlands: Southeast (Region 2). U.S. Fish Wildl. Serv. Biol. Rep. 88(26.2). 124 pp.

5. Spearing, Darwin 1995, Roadside Geology of Louisiana. Mountain Press Publishing Company. Missoula Montana. 240 pages.

6. U. S. Army Corps of Engineers. 1987. Wetland Delineation Manuel – Coastal Plain Supplement October 2008.

7. U. S. Department of Agriculture – Natural Resources Conservation Service, ***National Hydric Soils List – Richland Parish, La.*** February, 2010.

8. U. S. Department of Agriculture-Soil Conservation Service. September 1993 Soil Survey of Richland Parish, Louisiana. USDA SCS and Louisiana Agricultural Experiment Station, Baton Rouge, LA.



Vicinity Map for

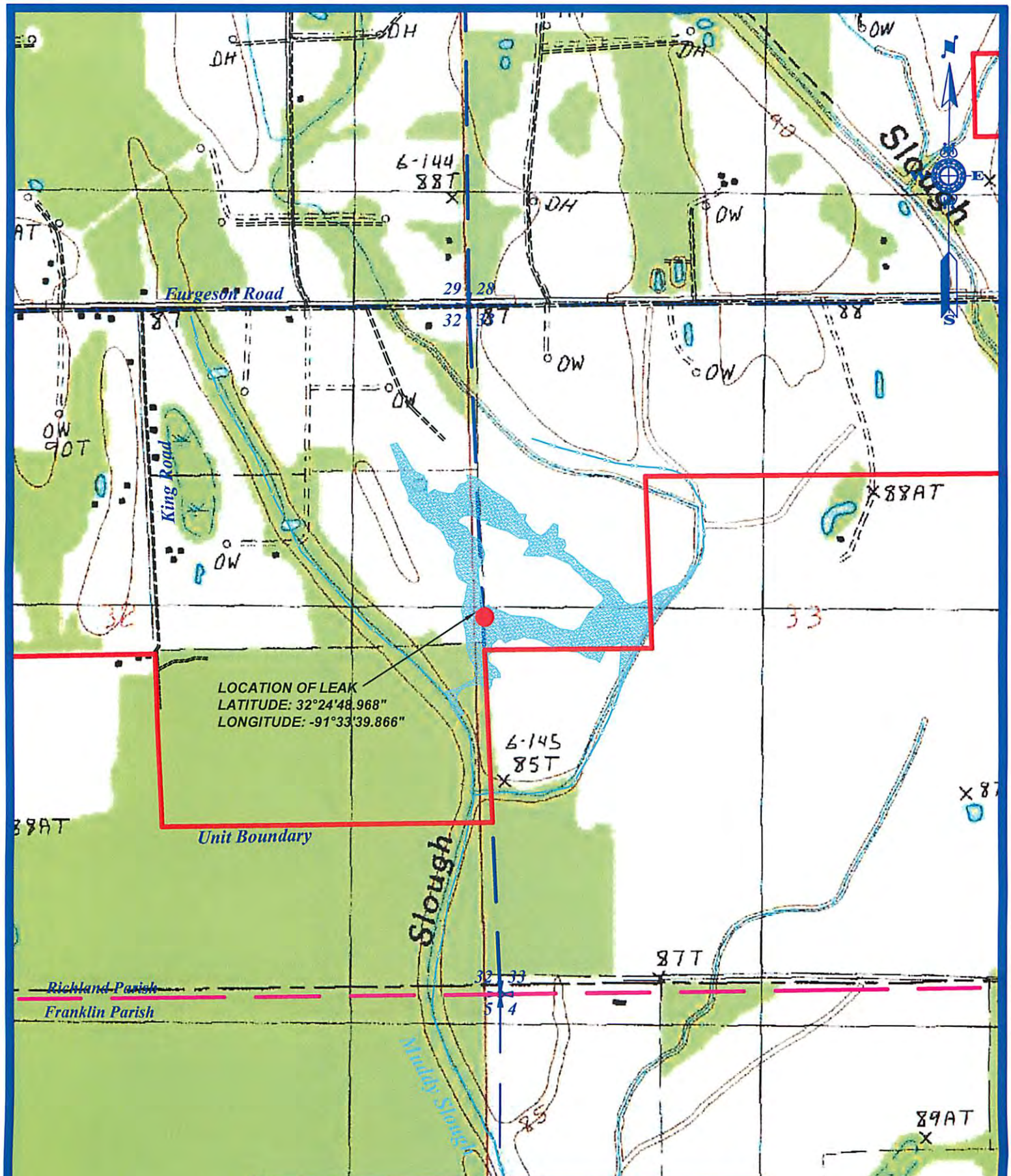
Denbury Onshore, LLC

Situated in Sections 32 & 33, T 17 N - R 9 E
Richland Parish, Louisiana

MESSINGER & ASSOCIATES, INC.
P.O. Drawer 1179 or 630 East Jefferson Ave.
Bastrop, Louisiana 71221
Phone:(318) 281-1636 Fax:(318) 281-7078 e-mail: survey@masurvey.net

FILE: 8825 PHASE 2010
Drawing Number: E-0360

Date: June 13, 2013
Scale: 1" = 1000'
Enclosure 1



Quad Map for

Denbury Onshore, LLC

Situated in Sections 32 & 33, T 17 N - R 9 E

Richland Parish, Louisiana

MESSINGER & ASSOCIATES, INC.

P.O. Drawer 1179 or 630 East Jefferson Ave.

Bastrop, Louisiana 71221

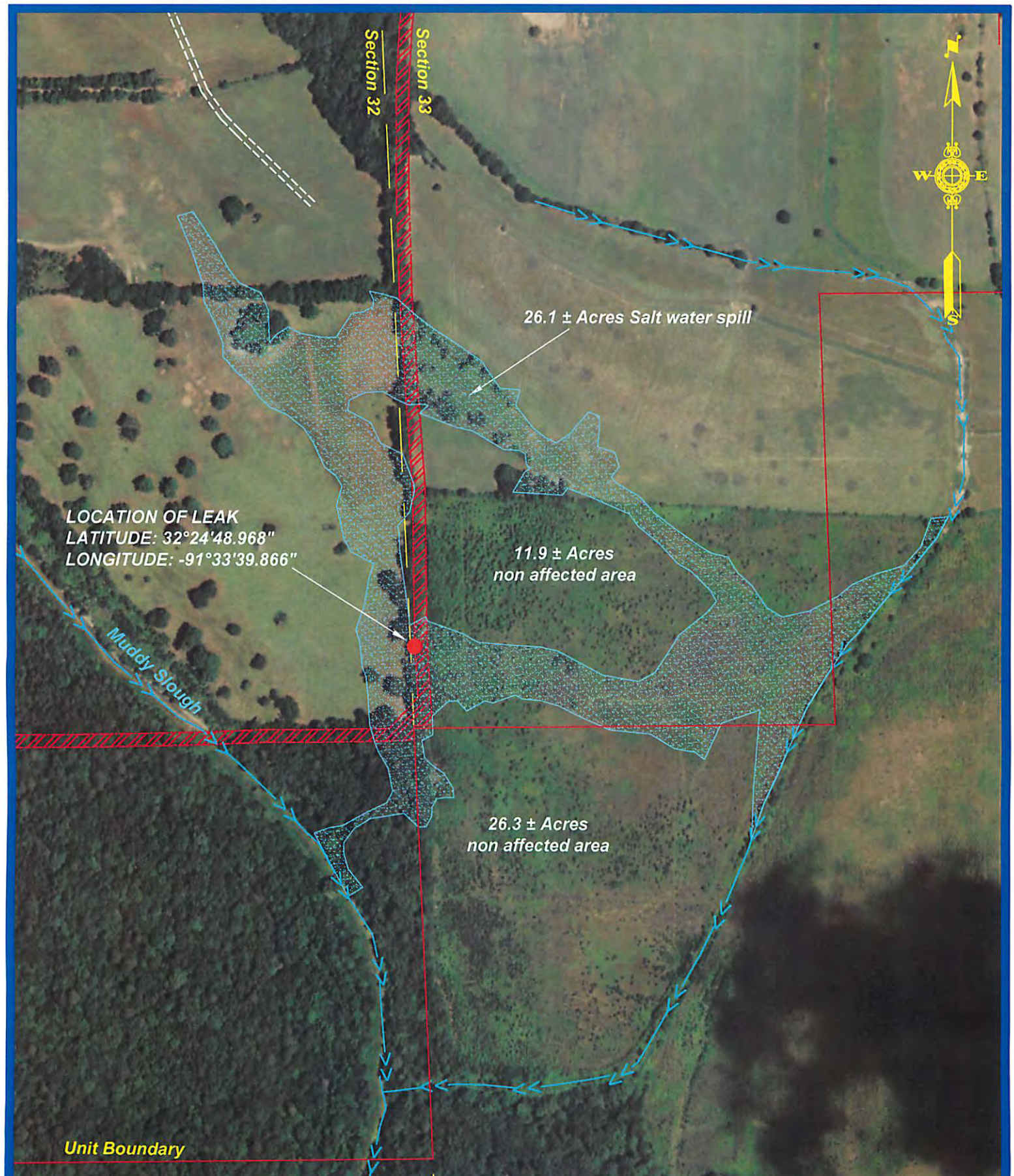
Phone:(318) 281-1636 Fax:(318) 281-7078 e-mail: survey@masurvey.net

FILE: 8825 PHASE 2010

Drawing Number: E-0361

Date: June 13, 2013

Scale: 1" = 1000' *Enclosure 2*



Spill Map for

Denbury Onshore, LLC

Situated in Sections 32 & 33, T 17 N - R 9 E

Richland Parish, Louisiana

- Pipeline Right of Way
- Forested Wetland
- Scrub-Shrub Wetland
- Herbaceous Wetland
- Spill Area

MESSINGER & ASSOCIATES, INC.

P.O. Drawer 1179 or 630 East Jefferson Ave.

Bastrop, Louisiana 71221

Phone:(318) 281-1636 Fax:(318) 281-7078 e-mail: survey@masurvey.net

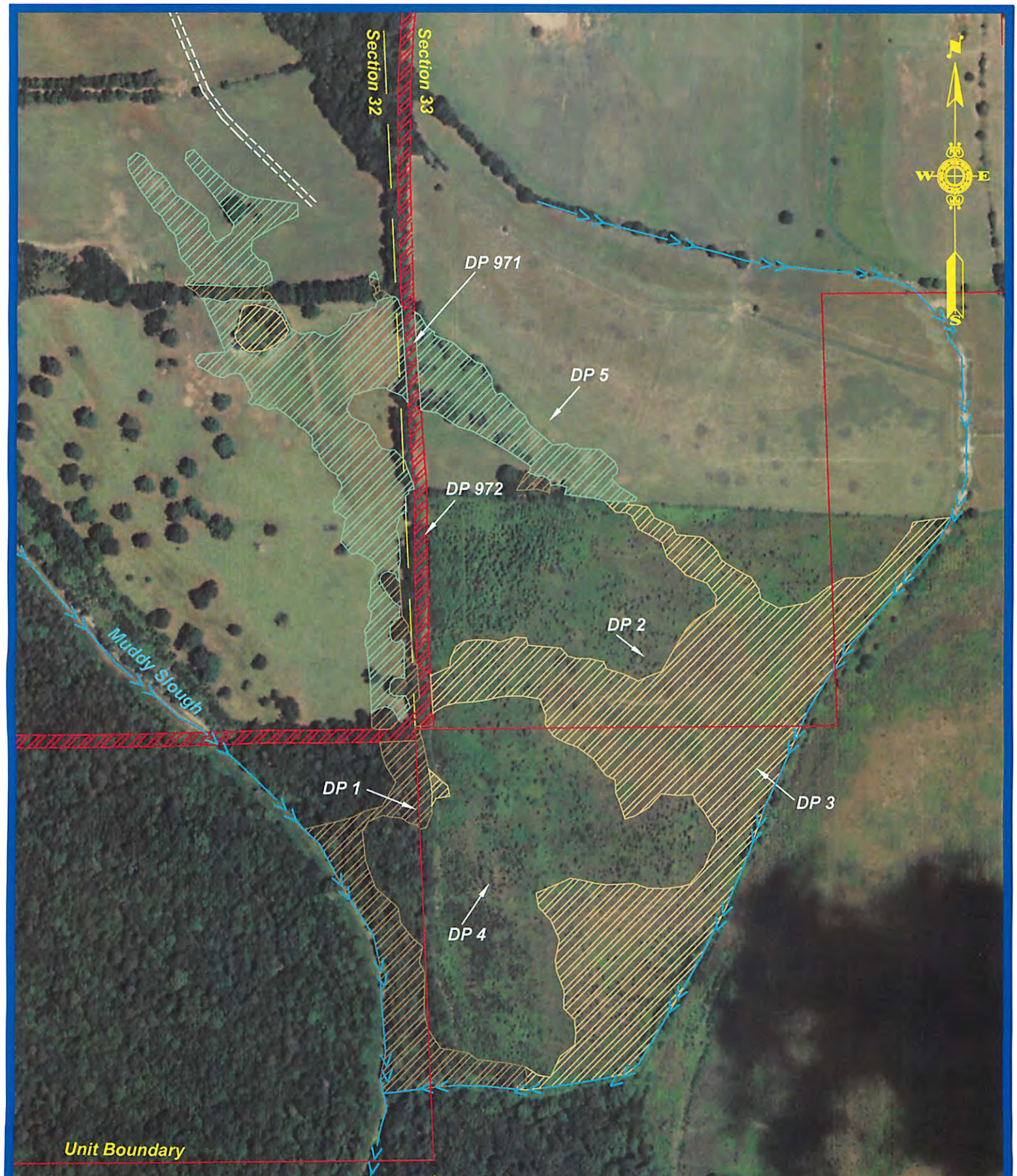
FILE: 8825 PHASE 2010

Drawing Number: E-0362

Date: June 13, 2013

Scale: 1" = 400'

Enclosure 3



Wetland Map for

Denbury Onshore, LLC

Situated in Sections 32 & 33, T 17 N - R 9 E

Richland Parish, Louisiana

- Pipeline Right of Way
- Forested Wetland
- Scrub-Shrub Wetland
- Herbaceous Wetland
- Spill Area

MESSINGER & ASSOCIATES, INC.

P.O. Drawer 1179 or 630 East Jefferson Ave.

Bastrop, Louisiana 71221

Phone:(318) 281-1636 Fax:(318) 281-7078 e-mail: survey@masurvey.net

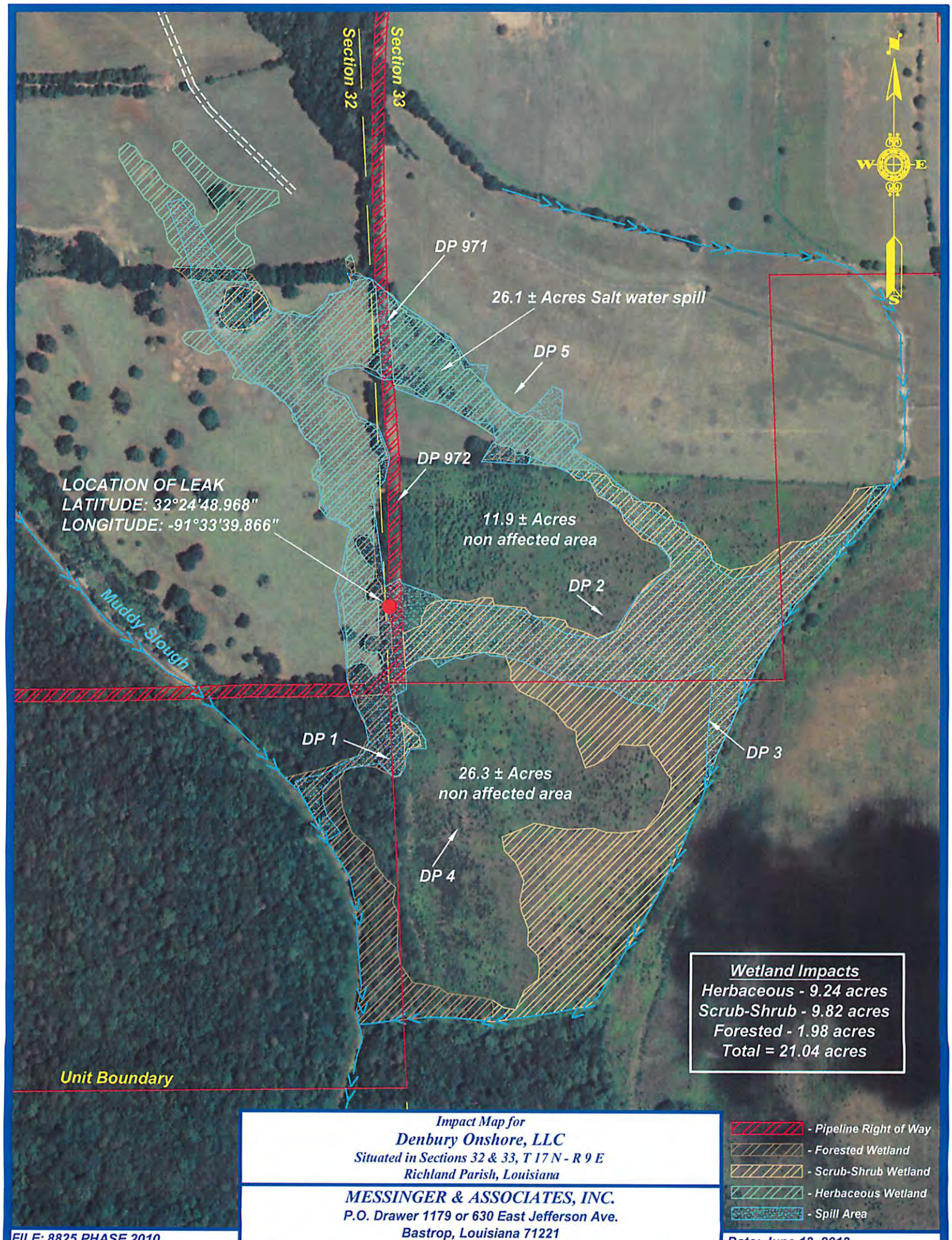
FILE: 8825 PHASE 2010

Drawing Number: E-0363

Date: June 13, 2013

Scale: 1" = 400'

Enclosure 4



Impact Map for
Denbury Onshore, LLC
Situated in Sections 32 & 33, T 17 N - R 9 E
Richland Parish, Louisiana

MESSINGER & ASSOCIATES, INC.
P.O. Drawer 1179 or 630 East Jefferson Ave.
Bastrop, Louisiana 71221
Phone:(318) 281-1636 Fax:(318) 281-7078 e-mail: survey@masurvey.net

FILE: 8825 PHASE 2010
Drawing Number: E-0364

Date: June 13, 2013
Scale: 1" = 400'

Enclosure 5

Wetland Impact Table for Denbury Onshore, LLC.
Prepared by Messinger & Associates, Inc.

Salt Water Spill	Acreage	Impacted Acreage	Local Waterway	Latitude	Longitude
Herbaceous Wetlands	11.87	9.24	Muddy Slough	32.41360°	-91.56107°
Scrub-Shrub Wetlands	20.07	9.82	Muddy Slough	32.41360°	-91.56107°
Forested Wetlands	5.08	1.98	Muddy Slough	32.41360°	-91.56107°
Totals	**37.02**	**21.04**			

Waters Upload Sheet for Denbury Onshore, LLC.
Prepared by Messinger & Associates, Inc.

Waters_Name	Cowardin_Code	HGM_Code	Area (acres)	Linear (Ft)	Waters_Types	Latitude	Longitude	Local_Waterway
Wetland 1	PEM	DEPRESS	11.87		RPWWD	32.41360	-91.56107	MUDDY SLOUGH
Wetland 2	PSS6	DEPRESS	20.07		RPWWD	32.41360	-91.56107	MUDDY SLOUGH
Wetland 3	PFO6	DEPRESS	5.08		RPWWD	32.41360	-91.56107	MUDDY SLOUGH
Water 1	R2	RIVERINE		2830	RPW	32.41360	-91.56107	MUDDY SLOUGH
Water 2	R2	RIVERINE		2465	RPW	32.41360	-91.56107	MUDDY SLOUGH

Data Points
WETLAND DETERMINATION DATA FORM
ATLANTIC AND GULF COASTAL PLAIN REGION

Denbury Onshore, LLC
Salt Water Leak
Wetland Impacts

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: 20130611 Delhi City/County: Richland Sampling Date: 6/11/2013 2:30:00 PM

Applicant/Owner: Denbury State: LA Sampling Point: DP 1

Investigator(s): Messinger & Assoc., Inc Section, Township, Range: 32,T17N-R9E

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): concave Slope (%): 0 - 2%

Subregion (LRR or MLRA): LRR P Lat: 32.4122014366667 Long: -91.56120776 Datum: WGS84

Soil Map Unit Name: Calhoun NWI classification: PFO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No ____	**Is the Sampled Area within a Wetland?** Yes ✓ No ____
Hydric Soil Present?	Yes ✓ No ____	
Wetland Hydrology Present?	Yes ✓ No ____	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ✓ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ✓ FAC-Neutral Test (D5)
- ___ Sphagnum moss (D8) (LRR T, U)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 20.00

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: DP 1

Tree Stratum (Plot sizes: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Carya cordiformis	35	Yes	FAC
2. Fraxinus pennsylvanica	30	Yes	FACW
3. Quercus pagoda	25	Yes	FACW
4. Quercus phellos	5	No	FACW
5.			
6.			
	95 = Total Cover		
50% of total cover: 47.5	20% of total cover: 19		
Sapling Stratum (30)			
1. Fraxinus pennsylvanica	10	Yes	FACW
2. Ulmus alata	10	Yes	FACU
3. Carya cordiformis	5	No	FAC
4. Ulmus americana	5	No	FAC
5.			
6.			
	30 = Total Cover		
50% of total cover: 15	20% of total cover: 6		
Shrub Stratum (30)			
1. Arundinaria gigantea	20	Yes	FACW
2.			
3.			
4.			
5.			
6.			
	20 = Total Cover		
50% of total cover: 10	20% of total cover: 4		
Herb Stratum (30)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Woody Vine Stratum (30)			
1. Toxicodendron radicans	10	Yes	FAC
2.			
3.			
4.			
5.			
	10 = Total Cover		
50% of total cover: 5	20% of total cover: 2		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 85.71 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	90	x 2 = 180
FAC species	55	x 3 = 165
FACU species	10	x 4 = 40
UPL species	0	x 5 = 0
Column Totals:	155 (A)	385 (B)

Prevalence Index = B/A = 2.48

Hydrophytic Vegetation Indicators:

__ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

✓ 3 - Prevalence Index is ≤3.0[1]

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Definitions of Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: DP 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 4	10YR 4/2	100					SIL	
4 - 20	10YR 5/1	90	10YR 5/6	10.00	C	M	SIL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12) (LRR T, U)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ___

Depth (inches): 0.00

Hydric Soil Present? Yes ✓ No ___

Remarks:

Data Point 1- Site Overview (west)

Data Point 1 - Soil Profile

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: 20130611 Delhi City/County: Richland Sampling Date: 6/11/2013 3:16:38 PM

Applicant/Owner: Denbury State: LA Sampling Point: DP 2

Investigator(s): Messinger & Assoc., Inc Section, Township, Range: 33,T17N-R9E

Landform (hillslope, terrace, etc.): Ridge Local relief (concave, convex, none): convex Slope (%): 0 - 2%

Subregion (LRR or MLRA): LRR P Lat: 32.4134592813726 Long: -91.5587812627451 Datum: WGS84

Soil Map Unit Name: Grenada NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

Data Point taken in pine plantation with history of agriculture.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum moss (D8) (LRR T, U)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): _____
Water Table Present?	Yes _____	No ✓	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: DP 2

Tree Stratum (Plot sizes: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Pinus taeda	50	Yes	FAC
2. Liquidambar styraciflua	20	Yes	FAC
3.			
4.			
5.			
6.			
	70 = Total Cover		
50% of total cover: 35	20% of total cover: 14		

Sapling Stratum (30)			
1. Acer rubrum	10	Yes	FAC
2. Liquidambar styraciflua	10	Yes	FAC
3. Diospyros virginiana	5	Yes	FAC
4.			
5.			
6.			
	25 = Total Cover		
50% of total cover: 12.5	20% of total cover: 5		

Shrub Stratum (30)			
1. Baccharis halimifolia	40	Yes	FAC
2.			
3.			
4.			
5.			
6.			
	40 = Total Cover		
50% of total cover: 20	20% of total cover: 8		

Herb Stratum (30)			
1. Solidago canadensis	40	Yes	FACU
2. Rubus argutus	10	No	FAC
3. Juncus effusus	5	No	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	55 = Total Cover		
50% of total cover: 27.5	20% of total cover: 11		

Woody Vine Stratum (30)			
1. Vitis rotundifolia	10	Yes	FAC
2.			
3.			
4.			
5.			
	10 = Total Cover		
50% of total cover: 5	20% of total cover: 2		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 87.5 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	5	x 1 =	5
FACW species	0	x 2 =	0
FAC species	155	x 3 =	465
FACU species	40	x 4 =	160
UPL species	0	x 5 =	0
Column Totals:	200 (A)		630 (B)

Prevalence Index = B/A = 3.15

Hydrophytic Vegetation Indicators:

__ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

__ 3 - Prevalence Index is ≤3.0[1]

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Definitions of Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: DP 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	10YR 5/6	100					SIL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12) (LRR T, U)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ____ **No** ✓

Remarks:

Data Point 2- Site Overview (east)

Data Point 2 - Soil Profile

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: 20130611 Delhi City/County: Richland Sampling Date: 6/11/2013 5:51:51 PM

Applicant/Owner: Denbury State: LA Sampling Point: DP 3

Investigator(s): Messinger & Assoc., Inc Section, Township, Range: 33,T17N-R9E

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): concave Slope (%): 0 - 2%

Subregion (LRR or MLRA): LRR P Lat: 32.4125531411111 Long: -91.55766094 Datum: WGS84

Soil Map Unit Name: Calhoun NWI classification: PSS

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No ____	**Is the Sampled Area within a Wetland?** Yes ✓ No ____
Hydric Soil Present?	Yes ✓ No ____	
Wetland Hydrology Present?	Yes ✓ No ____	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ✓ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ✓ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) (LRR U)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ✓ FAC-Neutral Test (D5)
- ___ Sphagnum moss (D8) (LRR T, U)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No ✓	Depth (inches): ____

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: DP 3

Tree Stratum (Plot sizes: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Sapling Stratum (30)			
1. Fraxinus pennsylvanica	5	Yes	FACW
2.			
3.			
4.			
5.			
6.			
	5 = Total Cover		
50% of total cover: 2.5	20% of total cover: 1		
Shrub Stratum (30)			
1. Baccharis halimifolia	85	Yes	FAC
2. Cephalanthus occidentalis	5	No	OBL
3.			
4.			
5.			
6.			
	90 = Total Cover		
50% of total cover: 45	20% of total cover: 18		
Herb Stratum (30)			
1. Iva annua	10	Yes	FAC
2. Juncus effusus	10	Yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	20 = Total Cover		
50% of total cover: 10	20% of total cover: 4		
Woody Vine Stratum (30)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	15	x 1 =	15
FACW species	5	x 2 =	10
FAC species	95	x 3 =	285
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	115 (A)		310 (B)

Prevalence Index = B/A = 2.7

Hydrophytic Vegetation Indicators:

__ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

✓ 3 - Prevalence Index is ≤3.0[1]

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Definitions of Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: DP 3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 4	10YR 5/2	85	10YR 5/8	15.00	C	M	SIL	
4 - 20	10YR 5/2	75	10YR 6/8	25.00	C	M	SIL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12) (LRR T, U)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

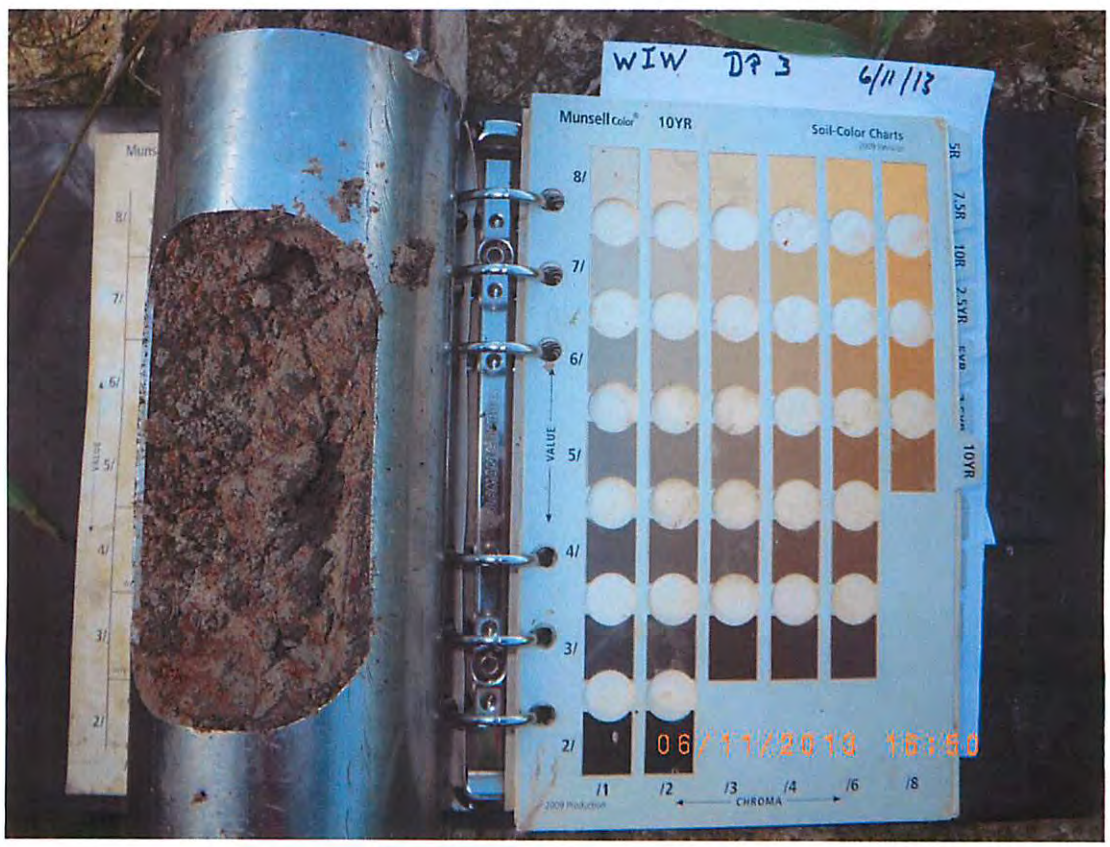
Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks:

Data Point 3- Site Overview (north)



Data Point 3 - Soil Profile

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: 20130611 Delhi City/County: Richland Sampling Date: 6/11/2013 6:15:08 PM

Applicant/Owner: Denbury State: LA Sampling Point: DP 4

Investigator(s): Messinger & Assoc., Inc Section, Township, Range: 33,T17N-R9E

Landform (hillslope, terrace, etc.): Ridge Local relief (concave, convex, none): convex Slope (%): 0 - 2%

Subregion (LRR or MLRA): LRR P Lat: 32.4115707411765 Long: -91.5604491068627 Datum: WGS84

Soil Map Unit Name: Grenada NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____
Hydric Soil Present?	Yes _____	No ✓
Wetland Hydrology Present?	Yes _____	No ✓

Is the Sampled Area within a Wetland? Yes _____ No ✓

Remarks:

Data Point taken in pine plantation with history of agriculture.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ✓ FAC-Neutral Test (D5)
- ___ Sphagnum moss (D8) (LRR T, U)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): _____
Water Table Present?	Yes _____	No ✓	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: DP 4

Tree Stratum (Plot sizes: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Pinus taeda	85	Yes	FAC
2.			
3.			
4.			
5.			
6.			
	85 = Total Cover		
50% of total cover: 42.5	20% of total cover: 17		
Sapling Stratum (30)			
1. Liquidambar styraciflua	5	Yes	FAC
2.			
3.			
4.			
5.			
6.			
	5 = Total Cover		
50% of total cover: 2.5	20% of total cover: 1		
Shrub Stratum (30)			
1. Baccharis halimifolia	35	Yes	FAC
2.			
3.			
4.			
5.			
6.			
	35 = Total Cover		
50% of total cover: 17.5	20% of total cover: 7		
Herb Stratum (30)			
1. Rubus argutus	10	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	10 = Total Cover		
50% of total cover: 5	20% of total cover: 2		
Woody Vine Stratum (30)			
1. Trachelospermum difforme	25	Yes	FACW
2. Ampelopsis arborea	5	No	FAC
3.			
4.			
5.			
	30 = Total Cover		
50% of total cover: 15	20% of total cover: 6		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	25	x 2 =	50
FAC species	140	x 3 =	420
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	165 (A)		470 (B)

Prevalence Index = B/A = 2.85

Hydrophytic Vegetation Indicators:

__ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

✓ 3 - Prevalence Index is ≤3.0[1]

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Definitions of Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: DP 4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 12	10YR 4/3	100					SIL	
12 - 20	10YR 6/2	100					SIL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12) (LRR T, U)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

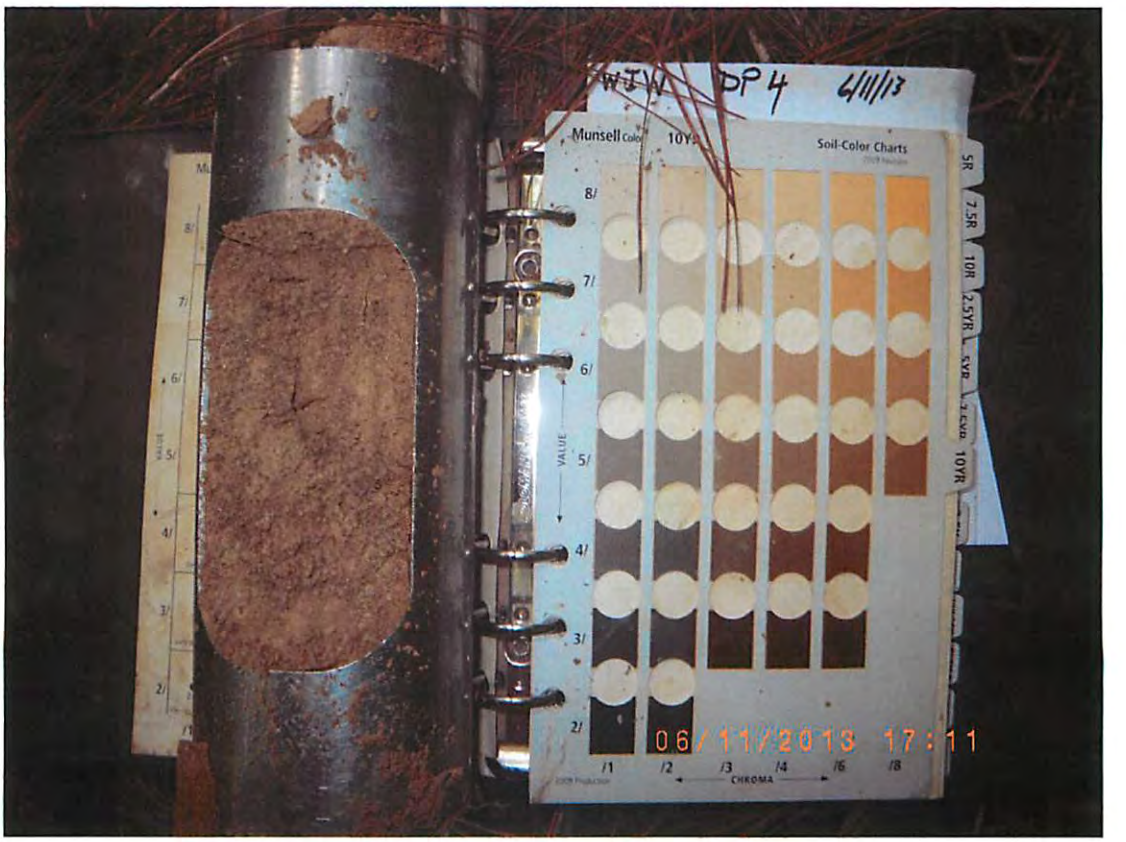
Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

Data Point 4- Site Overview (south)



Data Point 4 - Soil Profile

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: 20130611 Delhi City/County: Richland Sampling Date: 6/12/2013 11:10:35

Applicant/Owner: Denbury State: LA Sampling Point: DP 5

Investigator(s): Messinger & Assoc., Inc Section, Township, Range: 33,T17N-R9E

Landform (hillslope, terrace, etc.): Ridge Local relief (concave, convex, none): Linear Slope (%): 0 - 2%

Subregion (LRR or MLRA): LRR P Lat: 32.4155013666667 Long: -91.5598217941177 Datum: WGS84

Soil Map Unit Name: Calloway NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ✓ FAC-Neutral Test (D5)
- ___ Sphagnum moss (D8) (LRR T, U)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): _____
Water Table Present?	Yes _____	No ✓	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: DP 5

Tree Stratum (Plot sizes: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		

Sapling Stratum (30)			
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		

Shrub Stratum (30)			
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		

Herb Stratum (30)			
1. Axonopus fissifolius	60	Yes	FACW
2. Paspalum caespitosum	25	Yes	FAC
3. Juncus marginatus	15	No	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100 = Total Cover		
50% of total cover: 50	20% of total cover: 20		

Woody Vine Stratum (30)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	75	x 2 = 150
FAC species	25	x 3 = 75
FACU species	0	x 4 = 0
UPL species	0	x 5 = 0
Column Totals:	100 (A)	225 (B)

Prevalence Index = B/A = 2.25

Hydrophytic Vegetation Indicators:

__ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

✓ 3 - Prevalence Index is ≤3.0[1]

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Definitions of Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: DP 5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 2	10YR 4/2	100					SIL	
2 - 20	10YR 4/4	100					SIL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12) (LRR T, U)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

Data Point 5- Site Overview (west)

Data Point 5 - Soil Profile

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Delhi IV - 2 City/County: Richland Sampling Date: 6/28/2011 96

Applicant/Owner: Denbury Onshore, LLC State: LA Sampling Point: DP 971

Investigator(s): Messinger & Assoc., Inc Section, Township, Range: 33,T17N-R9E

Landform (hillslope, terrace, etc.): Swale Local relief (concave, convex, none): LC Slope (%): 0 - 2%

Subregion (LRR or MLRA): LRR P Lat: 32.41626845 Long: -91.5611839927083 Datum: 1984

Soil Map Unit Name: Calhoun NWI classification: PFO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ✓ No ____
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ✓ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ✓ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No ✓	Depth (inches): ____

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP 971

Tree Stratum (Plot sizes: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Quercus lyrata	20	Yes	OBL
2. Liquidambar styraciflua	10	Yes	FAC
3.			
4.			
5.			
6.			
7.			
	30	= Total Cover	
Sapling Stratum (30)			
1. Diospyros virginiana	10	Yes	FAC
2. Quercus lyrata	10	Yes	OBL
3.			
4.			
5.			
6.			
7.			
	20	= Total Cover	
Shrub Stratum (30)			
1. Styrax americanus	30	Yes	FACW
2. Cephalanthus occidentalis	15	Yes	OBL
3. Diospyros virginiana	10	No	FAC
4. Quercus lyrata	10	No	OBL
5.			
6.			
7.			
	65	= Total Cover	
Herb Stratum (30)			
1. Carex hyalinolepis	30	Yes	OBL
2. Saururus cernuus	25	Yes	OBL
3. Juncus effusus	20	Yes	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	75	= Total Cover	
Woody Vine Stratum (30)			
1. Campsis radicans	30	Yes	FAC
2.			
3.			
4.			
5.			
	30	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 10 (A)

Total Number of Dominant Species Across All Strata: 10 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	110	x 1 =	110
FACW species	50	x 2 =	100
FAC species	60	x 3 =	180
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	220 (A)		390 (B)

Prevalence Index = B/A = 1.77

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

✓ Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Definitions of Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: DP 971

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 20	10YR 6/2	80	10YR 6/8	20.00	C	PL	SIL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ✓ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12) (LRR T, U)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks:

<u>Data Point 971</u> - Site Overview (south)

<u>Data Point 971</u> – Soil Profile

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Delhi IV - 2 City/County: Richland Sampling Date: 6/28/2011 1

Applicant/Owner: Denbury Onshore, LLC State: LA Sampling Point: DP 972

Investigator(s): Messinger & Assoc., Inc Section, Township, Range: 33,T17N-R9E

Landform (hillslope, terrace, etc.): Ridge Local relief (concave, convex, none): LL Slope (%): 0 - 2%

Subregion (LRR or MLRA): LRR P Lat: 32.4145292676471 Long: -91.5610721343137 Datum: 1984

Soil Map Unit Name: Callaway NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No _____	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____ No ✓	
Wetland Hydrology Present?	Yes _____ No ✓	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): _____
Water Table Present?	Yes _____	No ✓	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP 972

Tree Stratum (Plot sizes: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. Gleditsia triacanthos	25	Yes	FAC
2. Liquidambar styraciflua	25	Yes	FAC
3. Quercus phellos	20	Yes	FACW
4. Quercus Pagoda	10	No	FAC
5.			
6.			
7.			
	80	= Total Cover	
Sapling Stratum (30)			
1. Diospyros virginiana	10	Yes	FAC
2. Liquidambar styraciflua	10	Yes	FAC
3. Ulmus alata	10	Yes	FACU
4.			
5.			
6.			
7.			
	30	= Total Cover	
Shrub Stratum (30)			
1. Arundinaria gigantea	25	Yes	FACW
2. Ligustrum sinense	20	Yes	FAC
3.			
4.			
5.			
6.			
7.			
	45	= Total Cover	
Herb Stratum (30)			
1. Chasmanthium laxum	15	Yes	FACW
2. Ambrosia artemisiifolia	10	Yes	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	25	= Total Cover	
Woody Vine Stratum (30)			
1. Trachelospermum difforme	25	Yes	FACW
2. Parthenocissus quinquefolia	15	Yes	FAC
3. Lonicera japonica	10	No	FAC
4.			
5.			
	50	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 10 (A)

Total Number of Dominant Species Across All Strata: 12 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 83.33 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	85	x 2 =	170
FAC species	125	x 3 =	375
FACU species	20	x 4 =	80
UPL species	0	x 5 =	0
Column Totals:	230 (A)		625 (B)

Prevalence Index = B/A = 2.72

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

✓ Prevalence Index is ≤3.0[1]

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Definitions of Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks: (If observed, list morphological adaptations below).

SOIL

Sampling Point: DP 972

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 10	10YR 5/3	100					SIL	
10 - 20	10YR 4/6	100					SIL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) **(MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A,B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- ___ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12) (LRR T, U)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

Data Point 972 - Site Overview (north)

Data Point 972 – Soil Profile

APPENDIX F
WATER WELL INFORMATION

REGISTERED WATER WELLS WITHIN ONE-MILE RADIUS OF SITE

LDNR Well ID	Owner	Total Depth (ft)	Depth to Water (ft)	Use	Completion Date	Distance from Site	Status
083-5441Z	3-M Farms	90	21	Irrigation	2000	0.2 miles SE	Active
083-5848Z	Denbury Onshore	100	17	Rig Supply	2012	0.4 miles W	Plugged & Abandoned
083-5847Z	Denbury Onshore	90	23	Rig Supply	2012	0.5 miles NE	Plugged & Abandoned
083-5559Z	Eddie Jinks	102	18	Irrigation	2006	0.9 miles SW	Active
083-5691Z	T. Carmouche	31	24.07	Monitor	2008	0.9 miles NW	Active
083-5649Z	T. Carmouche	30	23.63	Monitor	2008	0.9 miles NW	Active
083-5686Z	T. Carmouche	32	24.13	Monitor	2008	0.9 miles NW	Active
083-5560Z	Edward King	50	23	Irrigation	2006	0.9 miles NW	Active
083-5684Z	T. Carmouche	33	24.42	Monitor	2008	0.9 miles NW	Active
083-5615Z	T. Carmouche	30	25.60	Monitor	2008	0.9 miles NW	Active
083-5687Z	T. Carmouche	31	23.81	Monitor	2008	0.9 miles NW	Active
083-714	Fred Hunter, Jr.	92	19	Irrigation	1988	0.9 miles SE	Active
083-5685Z	T. Carmouche	32	25.02	Monitor	2008	0.9 miles NW	Active
083-5618Z	T. Carmouche	36	27.18	Monitor	2008	0.9 miles NW	Active

LDNR Well ID	Owner	Total Depth (ft)	Depth to Water (ft)	Use	Completion Date	Distance from Site	Status
083-5616Z	T. Carmouche	31	25.28	Monitor	2008	0.9 miles NW	Active
083-5682Z	T. Carmouche	32	25.56	Monitor	2008	0.9 miles NW	Active
083-5683Z	T. Carmouche	32	24.91	Monitor	2008	0.9 miles NW	Active
083-5688Z	T. Carmouche	29	22.79	Monitor	2008	1.0 miles NW	Active
083-5861Z	Denbury Onshore	80	30	Rig Supply	2012	1.0 miles NE	Plugged & Abandoned
083-5690Z	T. Carmouche	29	21.68	Monitor	2008	1.0 miles NW	Active
083-5689Z	T. Carmouche	33	22.80	Monitor	2008	1.0 miles NW	Active
083-5684Z	T. Carmouche	29	22.80	Monitor	2008	1.0 miles NW	Active