AE Order Number Banner

Report Description

This report shows an AE Order Number in Barcode format for purposes of scanning. The Barcode format is Code 39.

App Number: pTO1508953401

1RP - 3588

ASPEN OPERATING COMPANY LLC

8/12/2016

SOUTH ENVIRONMENTAL SERVICES, INC.

P.O BOX 11064
MIDLAND, TEXAS 79702
OFFICE: (432) 682-3547
FAX: (432) 682-4182

35080

May 1, 2015

Ms. Kellie Jones
Oil Conservations Division, District 1
1625 N. French Dr.
Hobbs, New Mexico 88240

Re: Remediation Work Plan
T.P "A" State Lease Battery, API No. 30-025-03646
Remediation of Produced Water Impacted Soil
Lea County, New Mexico

Ms. Jones,

South Environmental Services, Inc. (SES), on behalf of Aspen Operating Company, LLC (Aspen), is pleased to submit this Remediation Work Plan to the Oil Conservation Division of New Mexico (OCD) for the remediation of crude oil and produced water impacted soil at the above referenced site.

Background Information

A produced water release of 700 barrels occurred March 27, 2015. Of the 700 barrels lost, 655 barrels were recovered for a net loss of 45 barrels. The cause of the release was the Murphey level switch on the SWD tank failed to activate, which in turn caused the injection pump to not start. This caused the SWD tank to overflow. A SCADA alarm system is in place at this facility, however the SCADA alarm system failed to alert the lease operator of the high level.

The majority of produced water was contained inside the secondary containment, but as the produced water continued to rise inside the secondary containment, it began to run over the firewall and into a 50 feet by 50 feet area of native pastureland just south of the location.

According to the United States Department of Agriculture (USDA) division Natural Resource Conservation Service (NRCS) Web Soil Survey, the location of all impacted soil from the aforementioned release is classified as Kermit soils and dune land, 0 to 12 % slopes. This soil type is composed of 45% Kermit and similar soils, 45% dune land, and 10% minor components (Palomas, Pyote, Maljamar, and Wink). This soil is classified as not prime farmland, and the typical soil profile contains 2 horizons; A and C, both of which are fine sand. The runoff class is listed as very low with the natural drainage class listed as excessively drained. The soil is listed as being composed of 98.9% sand and makes it a class A hydrologic soil group which means that the soil has a high infiltration rate when thoroughly wet, and the soil has a high rate of water transmission.

The ranking for this site according to NMOCD guidelines is 0, giving it the remedial levels of: 1000 ppm for chlorides, 5000 ppm for TPH, 10 ppm for Benzene, and 50 ppm for BTEX.

Scope of Work

SES proposes that the following activities be completed to achieve compliance with Oil Conservation Division of New Mexico Statewide Rule for Total Petroleum Hydrocarbons (TPH) (<5,000 mg/kg), Chlorides (<1000ppm), Benzene (<10.0 mg/kg), and BTEX (<50 mg/kg), as set out below:

- Mobilize SES personnel and equipment to the site,
- Blend and treat approximately 415 cubic yards (50 feet X 150 feet X 1.5 feet deep) of impacted soil inside the secondary containment area and approximately 90 cubic yards (50 feet X 50 feet X 1 foot deep) of impacted soil in the pasture area with all natural, environmentally friendly bio-enhancement nutrients, absorbent, and surfactant in an in-situ land farm,
- Treat chloride-impacted soil with environmentally safe product that, through ion-exchange, replaces sodium ions in the soil with calcium ions.
- Flush the area treated for chloride-contamination with fresh water as the last step in the chloride treatment process
- Perform confirmation sampling event to verify remedial levels, TPH <5,000 mg/kg (ppm), Chlorides <1000 mg/kg (ppm), Benzene < 10 mg/kg (ppm), and BTEX <50 mg/kg (ppm),
- Re-seed impacted pasture area with seed mix created for this specific location,
- Preparation of a Site Remediation and Closure Report for submittal to the OCD, as required to resolve the enforcement action regulatory requirements as set out below.

Distribution of Hydrocarbons and Chlorides in Soil

The distribution of hydrocarbons in the unsaturated zone will be determined by utilizing the following techniques:

1. Visual observations of soil during remediation;
2. Visual observations of soil during the following remediation;
3. Visual observations of soil samples; and
4. Laboratory analyses of the above samples.

Ensuing remediation of impacted soil, conformation soil samples will be collected, based on a minimum of one (1) discrete sample for each 500 square feet of surface feet of surface area. Following conformation sampling, any area still exhibiting concentrations higher than aforementioned remedial levels will be re-treated and resampled to confirm attainment of remedial goals. All samples will be submitted for laboratory analysis for TPH, BTEX, and Chlorides as referenced above.

QA/QC Procedures-Soil Sampling

Samples of subsurface and treated soils will be obtained utilizing proper EPA protocols and/or standards. Representative soil samples will be collected using clean, disposable gloves and clean sampling tools. The soil sample will then be placed in a sterile glass container equipped with a Teflon-lined lid furnished b the analytical laboratory. The container will be filled to capacity to limit the amount of head-space present. Each container will be labeled and placed on ice in an insulated cooler. Upon selection of samples for analysis, the cooler will be sealed for shipment to the laboratory. Proper chain-of-custody documentation will be maintained throughout the sampling and transportation process.

Soil samples will be delivered to Permian Basin Environmental Lab, LP of Midland, Texas for TPH, Chlorides, and BTEX analysis using the methods described below. Soil samples will be analyzed for BTEX, TPH, and Chlorides within fourteen days following the collection date.

The soil samples were analyzed as follows:

1. BTEX concentrations in accordance with EPA Method 8021B.
2. TPH concentrations in accordance with EPA Method 8015M.
3. Chlorides concentrations in accordance with EPA 300.1

The laboratory will be responsible for proper QA/QC procedures. These procedures will either be transmitted with the laboratory reports or on file at the laboratory.

Regulatory Reporting

Following completion of the remedial actions, in compliance with the criteria set forth in Oil Conservation Division of New Mexico, South Environmental will develop and submit a Site Remediation and Closure Report to the OCD's office in Hobbs, New Mexico.

Upon OCD approval, the site will be restored as near as possible to the original site conditions.

Thank you for your assistance in this matter. If you have any questions or require additional information, please contact me at 432-254-7550.

Sincerely,
SOUTH ENVIRONMENTAL SERVICES, INC

Kade Chapman
Environmental Project Manager

Cc: Aspen Operating Company, LLC, Fort Worth, Texas

ATTACHMENT: 1

LABORATORY ANALYSIS TABLE

Table 1

CONCENTRATIONS OF TPH AND CHLORIDE IN SOIL

Site Activities Report
Aspen Operating Company, LLC, T.P. "A" State Lease Battery

Lea County, New Mexico

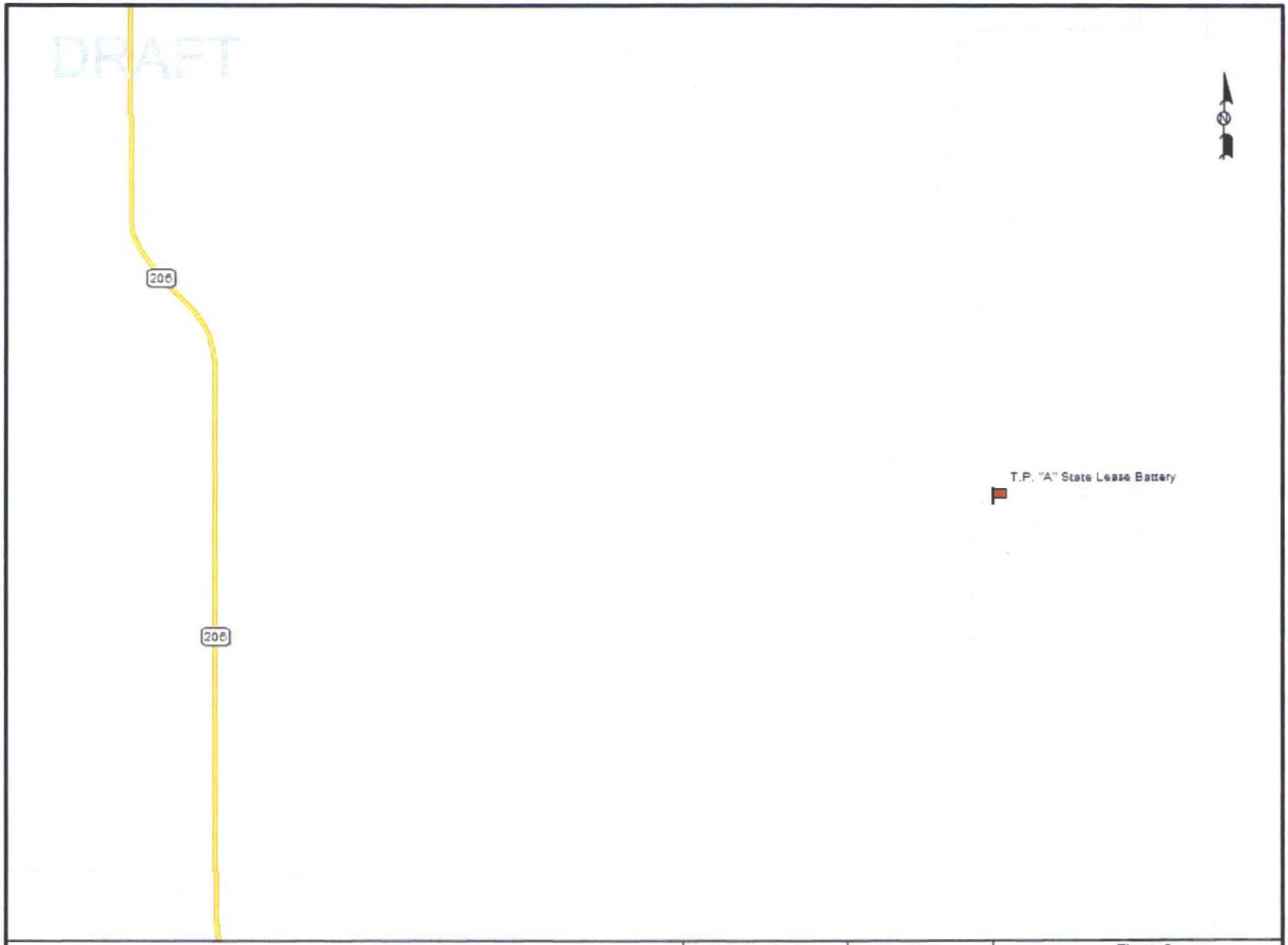
All concentrations are in mg/kg

SAMPLE DATE	SAMPLE ID	Depth	EPA 8015M					E300
			TPH C_6-C_{12} (GRO)	TPH C_{12}-C_{28} (DRO)	TPH C_{28}-C_{35} (ORO)	TPH C_6-C_{35}	% Moisture	Chloride
04/21/15	NWTB1-001	18"	1820	20000	1860	**23680**	**12.00**	**9880**
	FD2-001	12"	ND	226	52.0	**278**	**6.00**	**2910**

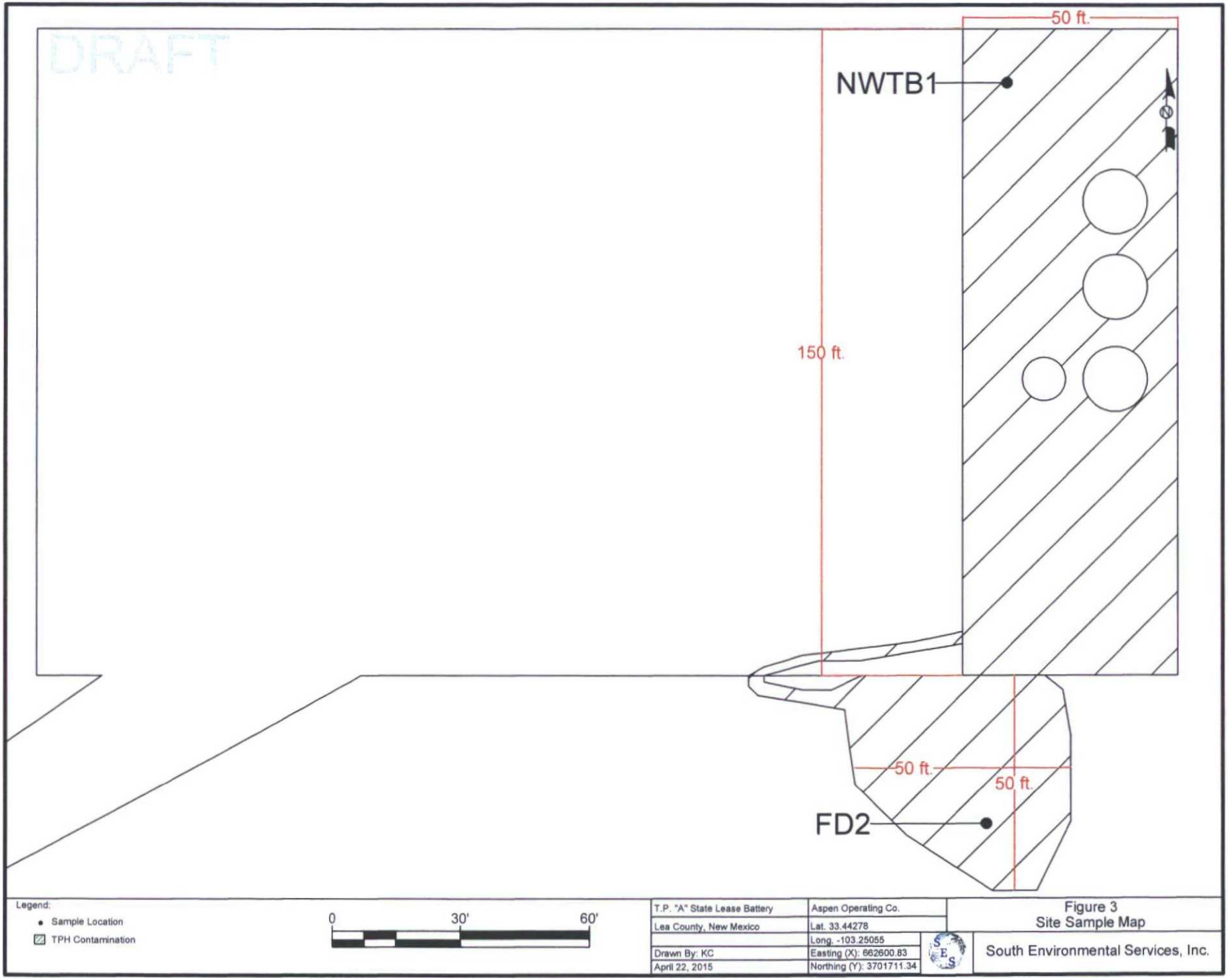
ATTACHMENT: 2

SITE FIGURES

T.P. "A" State Lease Battery	Aspen Operating Co.		Figure 1 Aerial Photograph
Lea County, New Mexico	Lat. 33.44278		
	Long. -103.25055		South Environmental Services, Inc.
Drawn By: KC	Easting (X): 662600.83		
April 22, 2015	Northing (Y): 3701711.34		

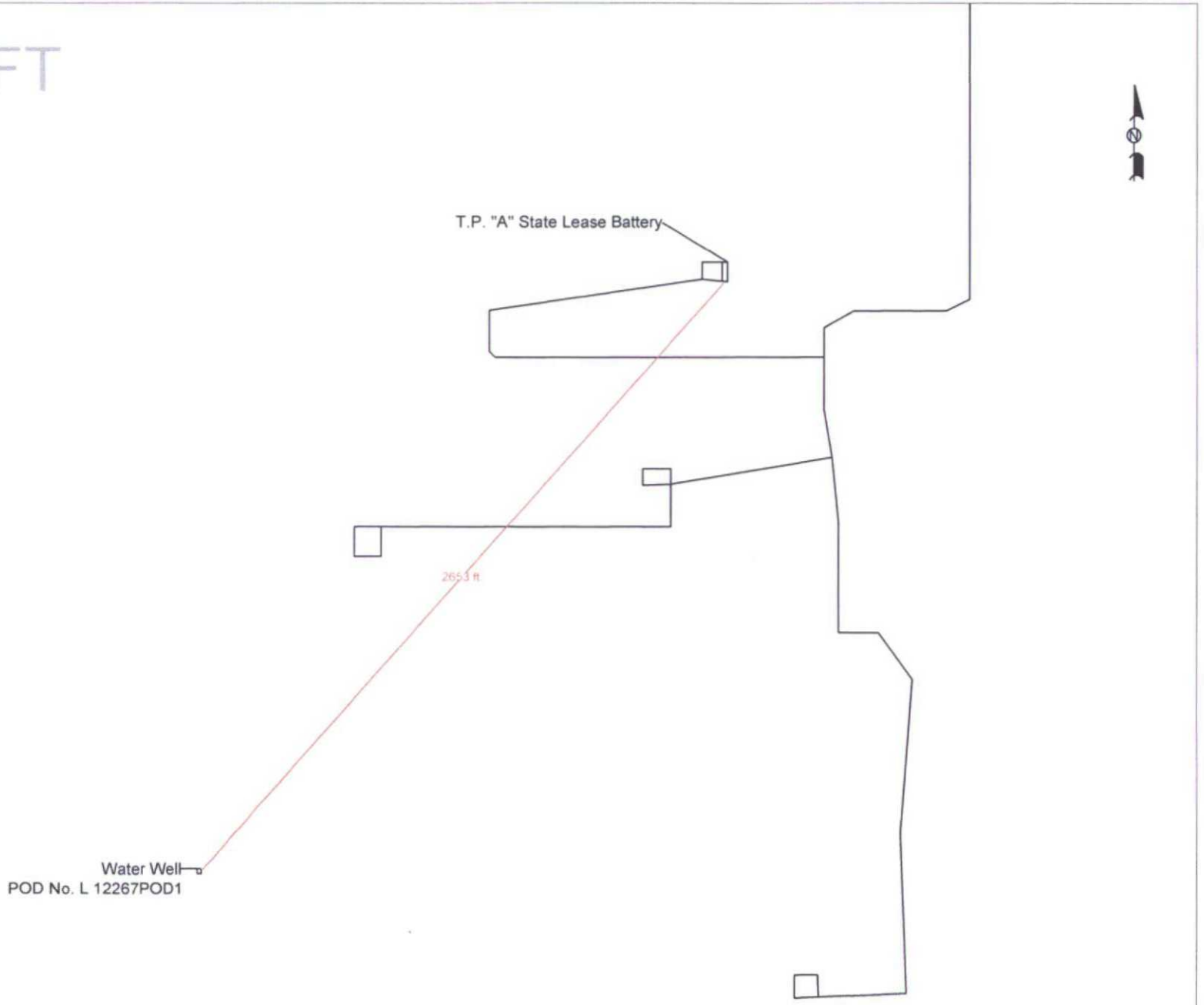


T.P. "A" State Lease Battery	Aspen Operating Co.	Figure 2 Street Atlas Map	
Lea County, New Mexico	Lat. 33.44278		
	Long. -103.25055	South Environmental Services, Inc.	
Drawn By: KC	Easting (X): 662600.83		
April 22, 2015	Northing (Y): 3701711.34		


DRAFT
50 ft.
NWTB1
N
150 ft.
50 ft.
50 ft.
FD2
Legend:
Sample Location
TPH Contamination
0
30'
60'
T.P. "A" State Lease Battery
Lea County, New Mexico
Drawn By: KC
April 22, 2015
Aspen Operating Co.
Lat. 33.44278
Long. -103.25055
Easting (X): 662600.83
Northing (Y): 3701711.34
Figure 3
Site Sample Map
South Environmental Services, Inc.

T.P. "A" State Lease Battery	Aspen Operating Co.	Figure 4 Distance to Nearest Water Well (Aerial)
Lea County, New Mexico	Lat. 33.44278	
	Long. -103.25055	South Environmental Services, Inc.
Drawn By: KC	Easting (X): 662600.83	
April 22, 2015	Northing (Y): 3701711.34	

DRAFT



0 500' 1000'

T.P. "A" State Lease Battery	Aspen Operating Co.	Figure 5 Distance to Nearest Water Well (AutoCAD)
Lea County, New Mexico	Lat. 33.44278	
	Long. -103.25055	
Drawn By: KC	Easting (X): 662600.83	South Environmental Services, Inc.
April 22, 2015	Northing (Y): 3701711.34	

ATTACHMENT: 3

SITE PHOTOGRAPHS

ATTACHMENT: 4

Form C-141

District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 S. First St., Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural Resources

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-141
Revised August 8, 2011

Submit 1 Copy to appropriate District Office in accordance with 19.15.29 NMAC.

Release Notification and Corrective Action

OPERATOR

☒ Initial Report ☐ Final Report

Name of Company Aspen Operating Company, LLC	Contact Michael Wilson
Address 1300 S. University Dr., Suite 200, Ft Worth, 76107	Telephone No. 817-455-2311
Facility Name State AC Battery	Facility Type SWD Battery

Surface Owner Garth Coombes	Mineral Owner State of NM	API No. 30-025-03646

LOCATION OF RELEASE was at the Battery

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County
N	15	10S	36E	660	S	1980	W	LEA

Latitude 33.44249 N **Longitude** -103.25071 W

NATURE OF RELEASE

3/27/15, 12:00 AM.

Type of Release Produced Water at the Battery	Volume of Release 700 BBLS.	Volume Recovered 655 BBLS
Source of Release SWD Tank at Batter over flow	Date and Hour of Occurrence	**Date and Hour of Discovery** 3/27/15
Was Immediate Notice Given? ☒ Yes ☐ No ☐ Not Required	If YES, To Whom? Donna Mull, 3/27/15, 1:02 PM left mssg./ **8:00 AM** Mark Whitaker 3/27/15 @ 1:27 PM. Left Message.	
By Whom? Larry Spittler	Date and Hour 3/27/15 @ 1:00 PM	
Was a Watercourse Reached? ☐ Yes ☒ No	If YES, Volume Impacting the Watercourse.	

If a Watercourse was Impacted, Describe Fully.*

No

Describe Cause of Problem and Remedial Action Taken.*

.* The Murphey level switch on the SWD tank failed to activate and start up the injection pump at the SWD facility causing the SWD tank to high level and over flow. The SWD facility does have a SCADA alarm system which also failed in sending out a High Level Alarm to the lease operator.
Shut down the wells going to the facility. Called out a SCADA Tech and injection pump Tech to service the equipment. Found and replaced a shorted out electric motor on the injection pump. Murphy Level Switch Repaired.

Describe Area Affected and Cleanup Action Taken.*

Tank Battery & Pasture. Called out vacuum truck to vacuum up the standing produced water. Called out a SCADA tech and conducted systems test. Calibrated and reset the SCADA high level alarms. Condcuted a PM on the injection pump to insure the pump is properly working.

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to NMOCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the NMOCD marked as "Final Report" does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Signature:	OIL CONSERVATION DIVISION	
Printed Name: Michael Wilson	Approved by Environmental Specialist:	
Title: Production Manager	Approval Date:	Expiration Date:
E-mail Address: mwilson@aspen-oil.com	Conditions of Approval:	Attached ☐
Date: 3/30/2015 Phone: 817-455-2311		

* Attach Additional Sheets If Necessary

ATTACHMENT: 5

Water Column/Average Depth to Water

New Mexico Office of the State Engineer
Water Column/Average Depth to Water

(A CLW##### in the POD suffix indicates the POD has been replaced & no longer serves a water right file.)

(R=POD has been replaced, O=orphaned, C=the file is closed)

(quarters are 1=NW 2=NE 3=SW 4=SE)
(quarters are smallest to largest)

(NAD83 UTM in meters)

(In feet)

POD Number	POD Sub-basin Code	County	Q 64	Q 16	Q 4	Sec	Tws	Rng	X	Y	Distance	Depth Well	Depth Water	Water Column
L 12267 POD1	L	LE	1	1	1	28	10S	36E	660885	3699687	2653	200	120	80

Average Depth to Water: **120 feet**

Minimum Depth: **120 feet**

Maximum Depth: **120 feet**

Record Count: 1

Basin/County Search:

Basin: Lea County County: Lea

UTMNAD83 Radius Search (in meters):

Easting (X): 662600.83 Northing (Y): 3701711.34 Radius: 3000

ATTACHMENT: 6

Point of Diversion Summary

New Mexico Office of the State Engineer
Point of Diversion Summary

(quarters are 1=NW 2=NE 3=SW 4=SE)
(quarters are smallest to largest) (NAD83 UTM in meters)

POD Number	Q64	Q16	Q4	Sec	Tws	Rng	X	Y
L 12267 POD1	1	1	1	28	10S	36E	660885	3699687

Driller License: 1607
Driller Name: DURAN, LUIS (LD)

Drill Start Date:	07/23/2008	**Drill Finish Date:**	07/25/2008	**Plug Date:**	
Log File Date:	08/25/2008	**PCW Rcv Date:**		**Source:**	Shallow
Pump Type:		**Pipe Discharge Size:**		**Estimated Yield:**	600 GPM
Casing Size:	5.00	**Depth Well:**	200 feet	**Depth Water:**	120 feet

Water Bearing Stratifications:	Top	Bottom	Description
	120	146	Sandstone/Gravel/Conglomerate
	146	190	Sandstone/Gravel/Conglomerate

Casing Perforations:	Top	Bottom
	100	200

ATTACHMENT: 7

Web Soil Survey

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Lea County, New Mexico

T.P. "A" State Lease Battery

April 28, 2015

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the

individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

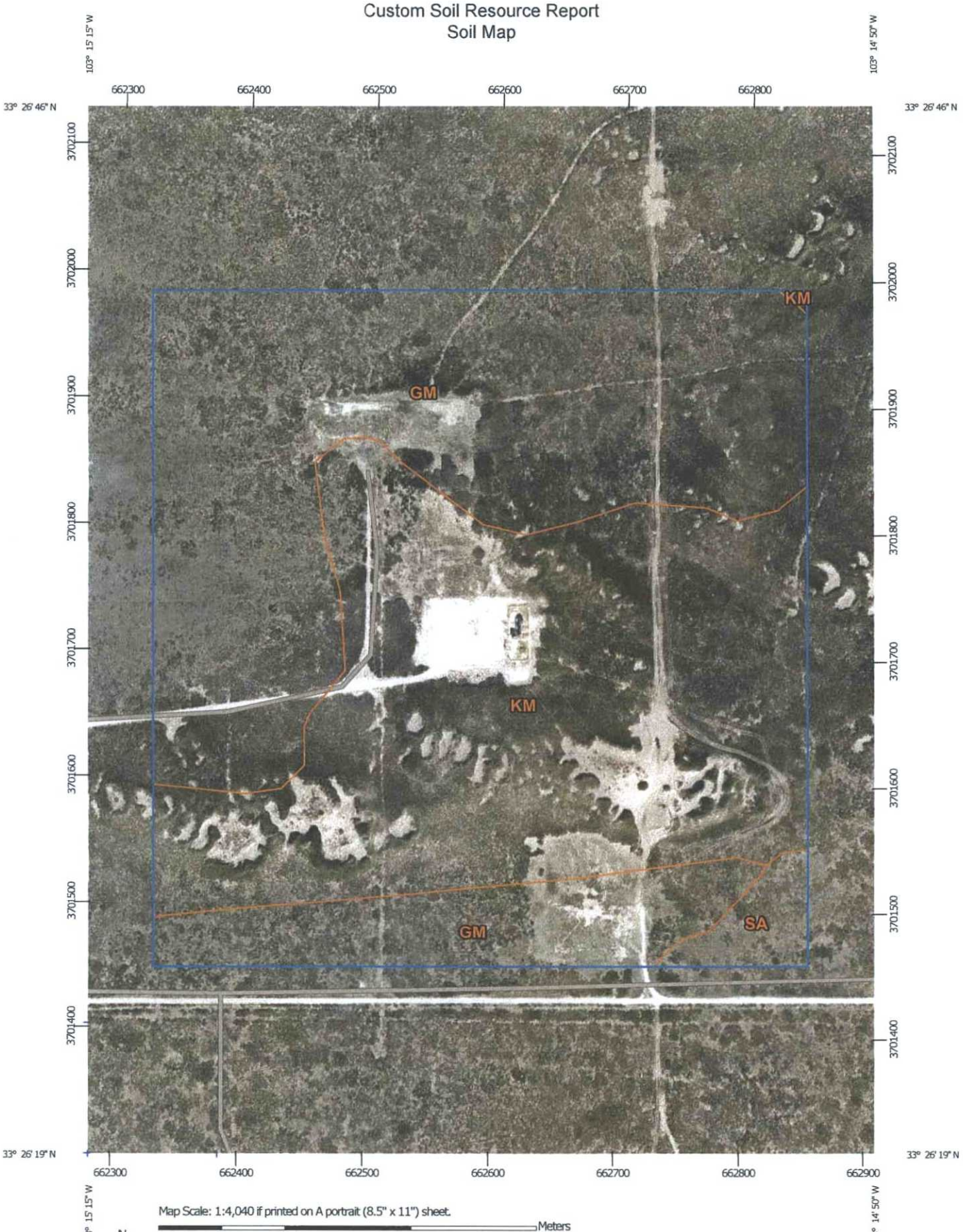
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Lea County, New Mexico
Survey Area Data: Version 11, Sep 30, 2014

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Oct 26, 2010—Oct 30, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Lea County, New Mexico (NM025)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
GM	Gomez loamy fine sand	35.9	51.8%
KM	Kermit soils and dune land, 0 to 12 percent slopes	31.8	46.0%
SA	Sharvana loamy fine sand	1.5	2.2%
Totals for Area of Interest		**69.3**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If

intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Lea County, New Mexico

GM—Gomez loamy fine sand

Map Unit Setting

National map unit symbol: dmpq
Elevation: 3,500 to 4,400 feet
Mean annual precipitation: 12 to 16 inches
Mean annual air temperature: 58 to 60 degrees F
Frost-free period: 190 to 205 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Gomez and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gomez

Setting

Landform: Plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Calcareous alluvium and/or calcareous lacustrine deposits derived from sedimentary rock

Typical profile

A - 0 to 15 inches: loamy fine sand
B1 - 15 to 22 inches: fine sandy loam
B2 - 22 to 60 inches: fine sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 50 percent
Gypsum, maximum in profile: 1 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 2.0
Available water storage in profile: Moderate (about 7.5 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: Sandy plains (R077CY056NM)

Minor Components

Portales

Percent of map unit: 7 percent
Ecological site: Limy upland 16-21" pz (R077CY028TX)

Brownfield

Percent of map unit: 3 percent
Ecological site: Sandy 12-17" pz (R077DY046TX)

Tivoli

Percent of map unit: 3 percent
Ecological site: Sandy 12-17" pz (R077DY046TX)

Patricia

Percent of map unit: 2 percent
Ecological site: Sandy plains (R077CY056NM)

KM—Kermit soils and dune land, 0 to 12 percent slopes

Map Unit Setting

National map unit symbol: dmpx
Elevation: 3,000 to 4,400 feet
Mean annual precipitation: 10 to 15 inches
Mean annual air temperature: 60 to 62 degrees F
Frost-free period: 190 to 205 days
Farmland classification: Not prime farmland

Map Unit Composition

Kermit and similar soils: 45 percent
Dune land: 45 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dune Land

Setting

Landform: Dunes
Landform position (two-dimensional): Shoulder, backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear, concave
Across-slope shape: Convex

Typical profile

A - 0 to 6 inches: fine sand
C - 6 to 60 inches: fine sand

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8e
Hydrologic Soil Group: A

Description of Kermit

Setting

Landform: Dunes
Landform position (two-dimensional): Shoulder, backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear, concave
Across-slope shape: Convex
Parent material: Calcareous sandy eolian deposits derived from sedimentary rock

Typical profile

A - 0 to 8 inches: fine sand
C - 8 to 60 inches: fine sand

Properties and qualities

Slope: 5 to 12 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Very high (20.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 3 percent
Gypsum, maximum in profile: 1 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 2.0
Available water storage in profile: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: Sandhills (R042XC022NM)

Minor Components

Palomas

Percent of map unit: 3 percent
Ecological site: Loamy sand (R042XC003NM)

Pyote

Percent of map unit: 3 percent
Ecological site: Loamy sand (R042XC003NM)

Maljamar

Percent of map unit: 2 percent
Ecological site: Loamy sand (R042XC003NM)

Wink

Percent of map unit: 2 percent
Ecological site: Loamy sand (R042XC003NM)

SA—Sharvana loamy fine sand

Map Unit Setting

National map unit symbol: dmr0
Elevation: 3,000 to 4,400 feet
Mean annual precipitation: 10 to 16 inches
Mean annual air temperature: 58 to 62 degrees F
Frost-free period: 190 to 205 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Sharvana and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sharvana

Setting

Landform: Plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium and/or eolian deposits derived from sedimentary rock

Typical profile

A - 0 to 5 inches: loamy fine sand
Bt - 5 to 16 inches: sandy clay loam
Bkm - 16 to 26 inches: cemented material
BCk - 26 to 60 inches: variable

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 7 to 20 inches to petrocalcic
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 90 percent
Gypsum, maximum in profile: 1 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 2.0
Available water storage in profile: Very low (about 2.1 inches)

Interpretive groups

Land capability classification (irrigated): 6e
Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: D
Ecological site: Sandy plains (R077CY056NM)

Minor Components

Kimbrough
Percent of map unit: 5 percent
Ecological site: Very shallow 16-21" pz (R077CY037TX)

Simona
Percent of map unit: 5 percent
Ecological site: Shallow sandy (R042XC002NM)

Arvana
Percent of map unit: 4 percent
Ecological site: Sandy 16-21" pz (R077CY035TX)

Playas
Percent of map unit: 1 percent
Landform: Playa floors
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Physical Properties

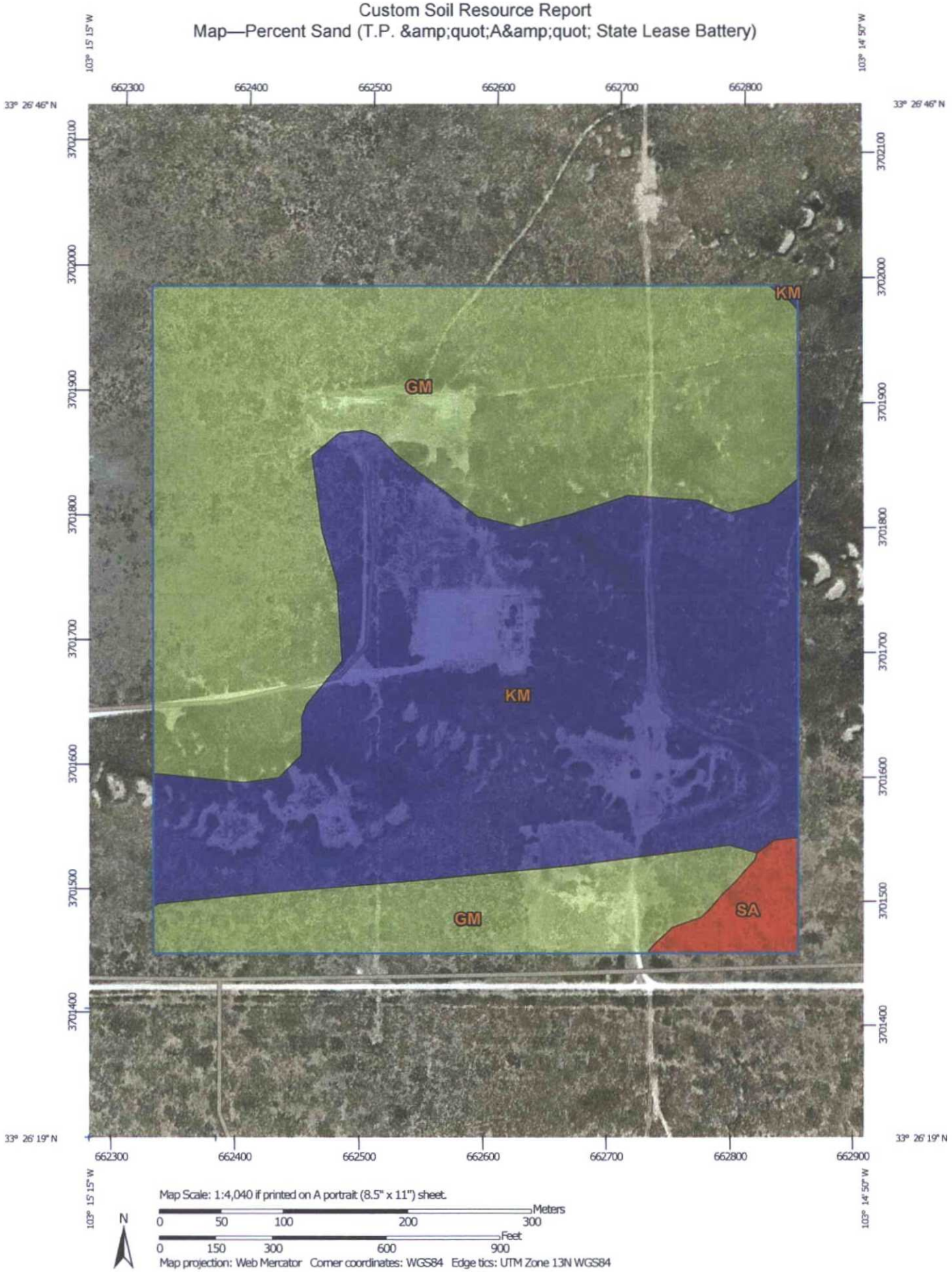
Soil Physical Properties are measured or inferred from direct observations in the field or laboratory. Examples of soil physical properties include percent clay, organic matter, saturated hydraulic conductivity, available water capacity, and bulk density.

Percent Sand (T.P. "A" State Lease Battery)

Sand as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. In the database, the estimated sand content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter. The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

For each soil layer, this attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

Map—Percent Sand (T.P. "A" State Lease Battery)



MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Background

Aerial Photography

Soils

Soil Rating Polygons

- <= 67.1
- > 67.1 and <= 71.6
- > 71.6 and <= 98.9
- Not rated or not available

Soil Rating Lines

- <= 67.1
- > 67.1 and <= 71.6
- > 71.6 and <= 98.9
- Not rated or not available

Soil Rating Points

- <= 67.1
- > 67.1 and <= 71.6
- > 71.6 and <= 98.9
- Not rated or not available

Water Features

Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Lea County, New Mexico
Survey Area Data: Version 11, Sep 30, 2014

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Oct 26, 2010—Oct 30, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Percent Sand (T.P. "A" State Lease Battery)

Percent Sand— Summary by Map Unit — Lea County, New Mexico (NM025)				
Map unit symbol	**Map unit name**	**Rating (percent)**	**Acres in AOI**	**Percent of AOI**
GM	Gomez loamy fine sand	71.6	35.9	51.8%
KM	Kermit soils and dune land, 0 to 12 percent slopes	98.9	31.8	46.0%
SA	Sharvana loamy fine sand	67.1	1.5	2.2%
Totals for Area of Interest			**69.3**	**100.0%**

Rating Options—Percent Sand (T.P. "A" State Lease Battery)

Units of Measure: percent

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Interpret Nulls as Zero: No

Layer Options (Horizon Aggregation Method): All Layers (Weighted Average)

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group (T.P. "A" State Lease Battery)

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Map—Hydrologic Soil Group (T.P. "A" State Lease Battery)

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Lea County, New Mexico
Survey Area Data: Version 11, Sep 30, 2014

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Oct 26, 2010—Oct 30, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Hydrologic Soil Group (T.P. "A" State Lease Battery)

Hydrologic Soil Group— Summary by Map Unit — Lea County, New Mexico (NM025)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
GM	Gomez loamy fine sand	A	35.9	51.8%
KM	Kermit soils and dune land, 0 to 12 percent slopes	A	31.8	46.0%
SA	Sharvana loamy fine sand	D	1.5	2.2%
Totals for Area of Interest			**69.3**	**100.0%**

Rating Options—Hydrologic Soil Group (T.P. "A" State Lease Battery)

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

ATTACHMENT: 8

Laboratory Analysis Report

PERMIAN BASIN
ENVIRONMENTAL LAB, LP
10014 SCR 1213
Midland, TX 79706

PBELAB

Analytical Report

Prepared for:

Ronnie Nickell
Aspen Operating Co., LLC.
1300 S University Dr #200
Ft. Worth, TX 76107

Project: T.P. "A" State Lease Battery
Project Number: [none]
Location: Lea Co. NM

Lab Order Number: 5D22005

NELAP/TCEQ # T104704156-13-3

Report Date: 05/01/15

Aspen Operating Co., LLC.	Project: T.P. "A" State Lease Battery	Fax: 817-882-9071
1300 S University Dr #200	Project Number: [none]	
Ft. Worth TX, 76107	Project Manager: Ronnie Nickell	

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
NWTB1-001 0-18"	5D22005-01	Soil	04/21/15 13:40	04-22-2015 10:53
FD2-001 0-12"	5D22005-02	Soil	04/21/15 13:45	04-22-2015 10:53

Aspen Operating Co., LLC.	Project: T.P. "A" State Lease Battery	Fax: 817-882-9071
1300 S University Dr #200	Project Number: [none]	
Ft. Worth TX, 76107	Project Manager: Ronnie Nickell	

NWTB1-001 0-18"

5D22005-01 (Soil)

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Permian Basin Environmental Lab, L.P.									
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**9880**	56.8	mg/kg dry	50	P5D2706	04/27/15	04/27/15	EPA 300.0	
% Moisture	**12.0**	0.1	%	1	P5D2301	04/23/15	04/23/15	% calculation	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	**1820**	142	mg/kg dry	5	P5D2701	04/23/15	04/23/15	TPH 8015M	
>C12-C28	**20000**	142	mg/kg dry	5	P5D2701	04/23/15	04/23/15	TPH 8015M	
>C28-C35	**1860**	142	mg/kg dry	5	P5D2701	04/23/15	04/23/15	TPH 8015M	
Surrogate: 1-Chlorooctane		*128 %*	*70-130*		*P5D2701*	*04/23/15*	*04/23/15*	*TPH 8015M*	
Surrogate: o-Terphenyl		*114 %*	*70-130*		*P5D2701*	*04/23/15*	*04/23/15*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	**23600**	142	mg/kg dry	5	[CALC]	04/23/15	04/23/15	calc	

Aspen Operating Co., LLC.	Project: T.P. "A" State Lease Battery	Fax: 817-882-9071
1300 S University Dr #200	Project Number: [none]	
Ft. Worth TX, 76107	Project Manager: Ronnie Nickell	

FD2-001 0-12"

5D22005-02 (Soil)

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
General Chemistry Parameters by EPA / Standard Methods									
Chloride	**2910**	10.6	mg/kg dry	10	P5D2706	04/27/15	04/27/15	EPA 300.0	
% Moisture	**6.0**	0.1	%	1	P5D2301	04/23/15	04/23/15	% calculation	
Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M									
C6-C12	ND	26.6	mg/kg dry	1	P5D2701	04/23/15	04/23/15	TPH 8015M	
>C12-C28	**226**	26.6	mg/kg dry	1	P5D2701	04/23/15	04/23/15	TPH 8015M	
>C28-C35	**52.0**	26.6	mg/kg dry	1	P5D2701	04/23/15	04/23/15	TPH 8015M	
Surrogate: 1-Chlorooctane		*103 %*	*70-130*		*P5D2701*	*04/23/15*	*04/23/15*	*TPH 8015M*	
Surrogate: o-Terphenyl		*121 %*	*70-130*		*P5D2701*	*04/23/15*	*04/23/15*	*TPH 8015M*	
Total Petroleum Hydrocarbon C6-C35	**278**	26.6	mg/kg dry	1	[CALC]	04/23/15	04/23/15	calc	

Aspen Operating Co., LLC.
1300 S University Dr #200
Ft. Worth TX, 76107

Project: T.P. "A" State Lease Battery
Project Number: [none]
Project Manager: Ronnie Nickell

Fax: 817-882-9071

General Chemistry Parameters by EPA / Standard Methods - Quality Control

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch P5D2301 - * DEFAULT PREP *** **										
Blank (P5D2301-BLK1)				Prepared & Analyzed: 04/23/15						
% Moisture	ND	0.1	%							
Duplicate (P5D2301-DUP1)		Source: 5D21020-03		Prepared & Analyzed: 04/23/15						
% Moisture	1.0	0.1	%		1.0			0.00	20	
Batch P5D2706 - * DEFAULT PREP *** **										
Blank (P5D2706-BLK1)				Prepared & Analyzed: 04/27/15						
Chloride	ND	1.00	mg/kg wet							
LCS (P5D2706-BS1)				Prepared & Analyzed: 04/27/15						
Chloride	111	1.00	mg/kg wet	100		111	80-120			
LCS Dup (P5D2706-BSD1)				Prepared & Analyzed: 04/27/15						
Chloride	113	1.00	mg/kg wet	100		113	80-120	1.34	20	
Duplicate (P5D2706-DUP1)		Source: 5D21008-06		Prepared & Analyzed: 04/27/15						
Chloride	11000	55.6	mg/kg dry		11100			1.01	20	
Matrix Spike (P5D2706-MS1)		Source: 5D22005-01		Prepared & Analyzed: 04/27/15						
Chloride	15200	56.8	mg/kg dry	5680	9880	94.3	80-120			

Aspen Operating Co., LLC.
1300 S University Dr #200
Ft. Worth TX, 76107

Project: T.P. "A" State Lease Battery
Project Number: [none]
Project Manager: Ronnie Nickell

Fax: 817-882-9071

Total Petroleum Hydrocarbons C6-C35 by EPA Method 8015M - Quality Control

Permian Basin Environmental Lab, L.P.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch P5D2701 - TX 1005										
Blank (P5D2701-BLK1)				Prepared & Analyzed: 04/23/15						
C6-C12	ND	25.0	mg/kg wet							
>C12-C28	ND	25.0	"							
>C28-C35	ND	25.0	"							
Surrogate: 1-Chlorooctane	*93.3*		"	*100*		*93.3*	*70-130*			
Surrogate: o-Terphenyl	*54.6*		"	*50.0*		*109*	*70-130*			
LCS (P5D2701-BS1)				Prepared & Analyzed: 04/23/15						
C6-C12	1110	25.0	mg/kg wet	1000		111	75-125			
>C12-C28	1170	25.0	"	1000		117	75-125			
Surrogate: 1-Chlorooctane	*122*		"	*100*		*122*	*70-130*			
Surrogate: o-Terphenyl	*72.9*		"	*50.0*		*146*	*70-130*			*S-GC*

Notes and Definitions

S-GC	Surrogate recovery outside of control limits. The data was accepted based on valid recovery of the remaining surrogate.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
LCS	Laboratory Control Spike
MS	Matrix Spike
Dup	Duplicate

Report Approved By: Brent Barron Date: 5/1/2015

Brent Barron, Laboratory Director/Technical Director

PBELAB

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST

Permian Basin Environmental Lab, LP
10014 S. County Road 1213
Midland, Texas 79706

Phone: 432-686-7235

Project Manager: Ronnie Nickell
Company Name: Aspen Operating
Company Address:
City/State/Zip:
Telephone No: Fax No:
Sampler Signature: e-mail: Kasey.Wes@SouthEnv.com

Project Name: T.P. "A" State Lease Battery
Project #:
Project Loc: Lea Co NM
PO #:
Report Format: ☒ Standard ☐ TRRP ☐ NPDES

(lab use only)
ORDER #: 5D22005

LAB # (lab use only)	FIELD CODE	Beginning Depth	Ending Depth	Date Sampled	Time Sampled	Field Filtered	Total # of Containers	Preservation & # of Containers: Ice	HNO_3	HCl	H_2SO_4	NaOH	$Na_2S_2O_3$	None	Other (Specify)	Matrix: DW=Drinking Water SL=Sludge GW = Groundwater S=Soil/Solid NP=Non-Potable Specify Other	Analyze For: TPH: 418.1	8015M	TPH: TX 1005	TX 1006	Cations (Ca, Mg, Na, K)	Anions (Cl, SO4, Alkalinity)	SAR / ESP / CEC	Metals: As Ag Ba Cd Cr Pb Hg Se	Volatiles	Semivolatiles	BTEX 8021B/5030 or BTEX 8260	RCI	N.O.R.M.	8015B TCLP:	8015B TOTAL:	RUSH TAT (Pre-Schedule) 24, 48, 72 hrs	Standard TAT
1	NWTB1-001	0"	18"	4/21/15	1:40 PM		1									S																	
2	FO2-001	0"	12"	↓	1:45 PM		1									↓																	

Special Instructions:

Relinquished by:	Date	Time	Received by:	Date	Time
	4/21/15	5:00 PM		4/21/15	5:00 PM
Relinquished by:	Date	Time	Received by:	Date	Time
	4/22/15	8:35 AM		4-22-15	835
Relinquished by:	Date	Time	Received by PBEL:	Date	Time

Laboratory Comments:

Sample Containers Intact?	N
VOCs Free of Headspace?	N
Labels on container(s)	N
Custody seals on container(s)	N
Custody seals on cooler(s)	N
Sample Hand Delivered by Sampler/Client Rep. ?	N
by Courier? UPS DHL FedEx Lone Star	N

Temperature Upon Receipt:
Received: °C
Adjusted: 5.0 °C Factor NCF