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 Department

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

Form C-141
Revised August 24, 2018
Submit to appropriate OCD District office

Incident ID	
District RP	3RP-136661
Facility ID	
Application ID	

Release Notification

pCS1903952552

Responsible Party

Responsible Party: BP America Production Co.	OGRID: 778	Subsequent: **REMEDIATION PLAN**
Contact Name: Steve Moskal	Contact Telephone: (505) 330-9179	
Contact email: steven.moskal@bpx.com	Incident # *(assigned by OCD)* nCS1528741396	
Contact mailing address: 380 Airport Road, Durango CO, 81303		

Location of Release Source

Latitude: 36.902742° Longitude: -108.008073°
(NAD 83 in decimal degrees to 5 decimal places)

Site Name: Mudge B 012R	Site Type: Natural Gas Production Well Pad
Date Release Discovered: September 21, 2018	API#: 30-045-10792

Unit Letter	Section	Township	Range	County
A	17	T31N	R11W	San Juan

Surface Owner: ☐ State ☒ Federal ☐ Tribal ☐ Private (*Name:* _____)

Nature and Volume of Release

Material(s) Released (Select all that apply and attach calculations or specific justification for the volumes provided below)

☐ Crude Oil	Volume Released (bbls)	Volume Recovered (bbls)
☐ Produced Water	Volume Released (bbls):	Volume Recovered (bbls):
	Is the concentration of dissolved chloride in the produced water >10,000 mg/l?	☐ Yes ☐ No
☒ Condensate	Volume Released (bbls): Unknow	Volume Recovered (bbls): 0 bbls
☐ Natural Gas	Volume Released (Mcf)	Volume Recovered (Mcf)
☐ Other (describe)	Volume/Weight Released (provide units)	Volume/Weight Recovered (provide units)

Cause of Release:
Hydrocarbon impacts discovered during the closure of a below grade tank in September of 2015. The site has been delineated via Geoprobe and monitor wells installed. The residual impacts are at depths of 40-43 feet deep. BP proposes to employ soil vapor extraction to remediate the soil and perched groundwater impacts.

NMOCD
OCT 30 2018
DISTRICT III

95

Smith, Cory, EMNRD

From: Smith, Cory, EMNRD
Sent: Friday, February 8, 2019 2:49 PM
To: Steven Moskal - BP America (steven.moskal@BPX.com)
Cc: Fields, Vanessa, EMNRD
Subject: Mudge B 12R Incident# ncs1528741396 3RP-13661

Steve,

OCD has reviewed the remediation plan for SVE at the Mudge B #12R and has approved it with the following conditions of approval.

- BP will collect a water sample from the source well, an analysis for General water chemistry to include, TDS, ph, Cation, Anion, Sulfates, Iron and Manganese to rule out any other ground water contaminates that could be present from a historical pit.
- This site will be subject to the requirements of 20.6.2 NMAC and will require at least 8 consecutive quarters for closure.
- BP maybe required to further delineate the ground water plum down gradient of MW-3
- BP has until May 8, 2019 to install and start SVE operations.
- BP maybe required to collected additional closure samples not described in the remediation plan.
- In addition to the Quarterly SVE reports BP will submit an Annual Ground Water Report.

OCD has assigned this site to 3RP-13661 this approved remediation plan will be scanned into the online file as soon as possible. Vanessa Fields will be your primary contact for the remediation of this site.

Cory Smith
Environmental Specialist
Oil Conservation Division
Energy, Minerals, & Natural Resources
1000 Rio Brazos, Aztec, NM 87410
(505)334-6178 ext 115
cory.smith@state.nm.us

State of New Mexico
Oil Conservation Division

Incident ID	
District RP	
Facility ID	
Application ID	

Was this a major release as defined by 19.15.29.7(A) NMAC? ☐ Yes ☒ No	If YES, for what reason(s) does the responsible party consider this a major release?
If YES, was immediate notice given to the OCD? By whom? To whom? When and by what means (phone, email, etc)? N/A	

Initial Response

The responsible party must undertake the following actions immediately unless they could create a safety hazard that would result in injury

☒ The source of the release has been stopped.

☒ The impacted area has been secured to protect human health and the environment.

☒ Released materials have been contained via the use of berms or dikes, absorbent pads, or other containment devices.

☒ All free liquids and recoverable materials have been removed and managed appropriately.

If all the actions described above have not been undertaken, explain why:

Per 19.15.29.8 B. (4) NMAC the responsible party may commence remediation immediately after discovery of a release. If remediation has begun, please attach a narrative of actions to date. If remedial efforts have been successfully completed or if the release occurred within a lined containment area (see 19.15.29.11(A)(5)(a) NMAC), please attach all information needed for closure evaluation.

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD 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 OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD 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.

Printed Name: _____ Title: _____

Signature: _____ Date: _____

email: _____ Telephone: _____

OCD Only

Received by: _____ Date: _____

State of New Mexico
Oil Conservation Division

Incident ID	
District RP	
Facility ID	
Application ID	

Site Assessment/Characterization

This information must be provided to the appropriate district office no later than 90 days after the release discovery date.

What is the shallowest depth to groundwater beneath the area affected by the release?	41 (ft bgs)
Did this release impact groundwater or surface water?	☒ Yes ☐ No
Are the lateral extents of the release within 300 feet of a continuously flowing watercourse or any other significant watercourse?	☒ Yes ☐ No
Are the lateral extents of the release within 200 feet of any lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark)?	☐ Yes ☒ No
Are the lateral extents of the release within 300 feet of an occupied permanent residence, school, hospital, institution, or church?	☐ Yes ☒ No
Are the lateral extents of the release within 500 horizontal feet of a spring or a private domestic fresh water well used by less than five households for domestic or stock watering purposes?	☐ Yes ☒ No
Are the lateral extents of the release within 1000 feet of any other fresh water well or spring?	☐ Yes ☒ No
Are the lateral extents of the release within incorporated municipal boundaries or within a defined municipal fresh water well field?	☐ Yes ☒ No
Are the lateral extents of the release within 300 feet of a wetland?	☐ Yes ☒ No
Are the lateral extents of the release overlying a subsurface mine?	☐ Yes ☒ No
Are the lateral extents of the release overlying an unstable area such as karst geology?	☐ Yes ☒ No
Are the lateral extents of the release within a 100-year floodplain?	☐ Yes ☒ No
Did the release impact areas **not** on an exploration, development, production, or storage site?	☐ Yes ☒ No

Attach a comprehensive report (electronic submittals in .pdf format are preferred) demonstrating the lateral and vertical extents of soil contamination associated with the release have been determined. Refer to 19.15.29.11 NMAC for specifics.

Characterization Report Checklist: ***Each of the following items must be included in the report.***

☒ Scaled site map showing impacted area, surface features, subsurface features, delineation points, and monitoring wells.
☒ Field data
☒ Data table of soil contaminant concentration data
☒ Depth to water determination
☒ Determination of water sources and significant watercourses within ½-mile of the lateral extents of the release
☒ Boring or excavation logs
☐ Photographs including date and GIS information (Investigation performed prior to Spill Rule Update)
☒ Topographic/Aerial maps
☒ Laboratory data including chain of custody

If the site characterization report does not include completed efforts at remediation of the release, the report must include a proposed remediation plan. That plan must include the estimated volume of material to be remediated, the proposed remediation technique, proposed sampling plan and methods, anticipated timelines for beginning and completing the remediation. The closure criteria for a release are contained in Table 1 of 19.15.29.12 NMAC, however, use of the table is modified by site- and release-specific parameters.

State of New Mexico
Oil Conservation Division

Incident ID	
District RP	
Facility ID	
Application ID	

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD 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 OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD 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.

Printed Name: Steve Moskal Title: Environmental Coordinator

Signature:  Date: October 26, 2018

email: steven.moskal@bpx.com Telephone: (505) 330-9179

OCD Only

Received by: _____ Date: _____

State of New Mexico
Oil Conservation Division

Incident ID	
District RP	
Facility ID	
Application ID	

Remediation Plan

Remediation Plan Checklist: ***Each of the following items must be included in the plan.***

- ☒ Detailed description of proposed remediation technique
- ☒ Scaled sitemap with GPS coordinates showing delineation points
- ☒ Estimated volume of material to be remediated
- ☒ Closure criteria is to Table 1 specifications subject to 19.15.29.12(C)(4) NMAC
- ☒ Proposed schedule for remediation (note if remediation plan timeline is more than 90 days OCD approval is required)

Deferral Requests Only: ***Each of the following items must be confirmed as part of any request for deferral of remediation.***

- ☐ Contamination must be in areas immediately under or around production equipment where remediation could cause a major facility deconstruction.
- ☐ Extents of contamination must be fully delineated.
- ☐ Contamination does not cause an imminent risk to human health, the environment, or groundwater.

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD 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 OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD 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.

Printed Name: Steve Moskal Title: Environmental Coordinator

Signature: Date: October 26, 2018

email: steven.moskal@bpx.com Telephone: (505) 330-9179

OCD Only

Received by: OCD Date: 10/30/18

☐ Approved ☒ Approved with Attached Conditions of Approval ☐ Denied ☐ Deferral Approved

Signature: Date: 2/8/19

State of New Mexico
Oil Conservation Division

Incident ID	
District RP	
Facility ID	
Application ID	

Closure

The responsible party must attach information demonstrating they have complied with all applicable closure requirements and any conditions or directives of the OCD. This demonstration should be in the form of a comprehensive report (electronic submittals in .pdf format are preferred) including a scaled site map, sampling diagrams, relevant field notes, photographs of any excavation prior to backfilling, laboratory data including chain of custody documents of final sampling, and a narrative of the remedial activities. Refer to 19.15.29.12 NMAC.

Closure Report Attachment Checklist: ***Each of the following items must be included in the closure report.***

☐ A scaled site and sampling diagram as described in 19.15.29.11 NMAC

☐ Photographs of the remediated site prior to backfill or photos of the liner integrity if applicable (Note: appropriate OCD District office must be notified 2 days prior to liner inspection)

☐ Laboratory analyses of final sampling (Note: appropriate ODC District office must be notified 2 days prior to final sampling)

☐ Description of remediation activities

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD 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 OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD 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. The responsible party acknowledges they must substantially restore, reclaim, and re-vegetate the impacted surface area to the conditions that existed prior to the release or their final land use in accordance with 19.15.29.13 NMAC including notification to the OCD when reclamation and re-vegetation are complete.

Printed Name: _____ Title: _____

Signature: _____ Date: _____

email: _____ Telephone: _____

OCD Only

Received by: _____ Date: _____

Closure approval by the OCD does not relieve the responsible party of liability should their operations have failed to adequately investigate and remediate contamination that poses a threat to groundwater, surface water, human health, or the environment nor does not relieve the responsible party of compliance with any other federal, state, or local laws and/or regulations.

Closure Approved by: _____ Date: _____

Printed Name: _____ Title: _____

Remediation Plan

BP Remediation Plan Mudge B 12R

To: Cory Smith (NMOCD) ; Vanessa Fields (NMOCD), Emmanuel Adeloye (BLM)

From: Steven Moskal (BP)

CC: Jeff Blagg (Blagg Engineering)

Date: 10/26/2015

Re: Mudge B 12R – Soil vapor extraction remedial plan. API #3004510792, UL-A, S-17, T31N, R11W

The Mudge B 12R site is an active natural gas production pad within the San Juan Basin Gas Field in San Juan County, New Mexico. The site is located on Bureau of Land Management (BLM) land located approximately 145 feet east of a small ephemeral stream draining a very steep slope, covered with well-established sage brush.

A historical production pit was identified in September 2015 during a below grade tank (BGT) retrofit. The earthen pit is located below a BGT that was removed and was scheduled to be upgraded from a single wall/single bottom to a double wall/double bottom tank. Since the discovery of the production pit BP has shut in the well and performed site delineation via a Geo-Probe direct push drill rig. During the delineation, BP collected numerous soil samples which were submitted for laboratory analysis. A total of eight borings were advance to between 42 and 44 feet below ground surface. Piezometers were installed in 6 of the 8 borings using 1-inch PVC pipe with hand drill holes measuring 3/23" diameter. The hand drilled sections of pipe were placed in the bottom 4 to 6 feet of the borings. The activities described remained on the active production pad. The BLM has required an archaeological and biological impact study to be performed prior to conducting an off-site investigation.

The site soils consist of loose silty sands that overlie a yellow shalestone with an unknown thickness. A blue sandstone was found in two borings at a depths of 42 to 43 feet below ground surface where refusal occurred. Saturated soils were noted at approximately 40 feet below ground surface in 6 of the 8 borings. The borings demonstrated contamination (based on visual observation and field screening results) ranging from 7.5 feet to 40 feet below ground surface in the immediate vicinity of the production pit. As the borings stepped out of the location of the production pit, the contaminant zone was greatly reduced to a range of 35 feet to 41 feet below ground surface. The contaminant lens is located primarily in the established downgradient direction of the source area, generally to the southeast/south.

A total of 16 discrete soil confirmation samples were submitted for laboratory analysis for total petroleum hydrocarbons (TPH) via Method 8015D, for benzene, toluene, ethylbenzene and xylene (BTEX) via Method 8021B and chloride via Method 300.0. Soil samples were collected at the samples interval with the highest field screening result or near the bottom of the boring where the suspected groundwater interface occurred. Laboratory results revealed that total petroleum hydrocarbons (TPH) concentrations were below the NMOCD spill soil remediation guidelines (100 ppm) except in one location found near the suspected center of the production pit (730 ppm TPH); BTEX was below standards in all soil samples collected (<50 combined BTEX/<10 benzene); Chloride was above standards in 4 of the 8 borings with depths of 36 feet or greater.

Development of the piezometers was unsuccessful due to a lack of recharge and high sediment load. The piezometers were surveyed to provide an accurate groundwater gradient trending to the southeast/south.

BP then installed three groundwater monitoring wells (upgradient MW-1, source MW-3 and downgradient MW-2) to identify if groundwater impacts and further delineate the known impacts.

REMEDIATION PLAN

The objectives of this proposed remediation plan is to perform in-situ remediation to effectively address the contaminants at depths of 40 feet or greater.

BP proposes to employ soil vapor extraction (SVE) technology to the determined SVE points or monitoring wells described above. The system will incorporate the following:

1) An explosion proof, (Class 1, Div. 1) electrically driven skid mounted SVE pump will be installed on site with an accompanying natural gas powered generator:

    a. Rotron EN505 (2.0 HP, single phase, 230 volt, 12 amp continuous, 56 amp inrush).

The SVE package will be fitted with a water/product knockout drum, high water level shutoff, two vacuum gauges, one flow rate gauge and explosion proof starter switch.

2) The air extraction points will be fitted with 2-inch quick-connect fittings.

3) A 2-inch diameter PVC pipe and/or flexible hose with quick connect fittings will be connected from the SVE blower to one SVE well at a time. The hose will be long enough to reach any of the four (3) SVE points.

4) During operation, the flexible air hose will be moved to other points as deemed necessary by site monitoring:

    A) Exhaust vapors from the SVE pump will be measured with an organic vapor meter (OVM) on a daily basis for the first 5 days operation, weekly for the first month of operation, and then monthly thereafter or adjusted as needed based on system performance.

    B) Upon start up, a gas sample will be collected from the vacuum stream; thereafter, an annual sample will be collected from the vacuum stream and will be laboratory analyzed for total petroleum hydrocarbons (TPH) by U.S. EPA Method 8015B and volatile hydrocarbons (BTEX) by U.S. EPA Method 8021. The location of the collection point will be determined based on the SVE system setup, but will preferably be upstream of the blower to reduce impacts of heat and turbulence to the air stream.

    C) When exhaust vapors appear to reach an asymptotic limit, the air injection hose will be moved to various other injection points and exhaust vapors from other unused observation points will be measured with an organic vapor meter (OVM) on a monthly basis.

5) When site remediation appears to be complete based on monitoring results from the active remediation system, a test borings will be advanced to a depth of approximately 30-35 feet at locations about 10 feet from the remediation point. Soil samples will be collected at various depths of known contamination intervals for laboratory determination of residual hydrocarbons. This testing will include total petroleum hydrocarbons (TPH) by U.S. EPA Method 8015B and volatile hydrocarbons (BTEX) by U.S. EPA Method 8021. Note that the New Mexico Oil Conservation Division (NMOCD), Aztec District Office, will be notified prior to this drilling and sampling so that personnel may be available for witnessing.

NMOCD will be provided with laboratory test results. Following review of the remediation system monitoring and laboratory test results, either site closure, continued system operation or modifications to the remediation plan will be requested.

During operation, BP will strive to operate the system continuously, with hopes of achieving 90% or greater run time.

REPORTING

The performance of the SVE system and remediation will be reported quarterly with field OVM data, estimated run times, system performance, mass removal and product recovery and maintenance or changes in the system configuration will be included. The sampling of the vacuum stream will be reported in an annual report.

A final report will be provided within 60 days of the final closure sampling event.

Regards,

Steve Moskal
BP America Production Co.

Delineation Information


Mudge B 012R SVE Layout
API #30-045-10792
(A), S-17, T31N, R11W
SVE System GPS:
36.902742°, -108.008073°
Legend
Enterprise Pipeline
Monitor Well/SVE Point
Mudge B 12R Wellhead
SVE System
Mudge B 12R Wellhead
MW-1
SVE Point 1
MW-2
SVE System
MW-3
Google Earth
© 2018 Google
N
100 ft

BLAGG ENGINEERING, INC.
P.O. BOX 87
BLOOMFIELD, NM 87413
(505) 632-1199

GP - 1

BORE / TEST HOLE REPORT

CLIENT:	BP AMERICA PRODUCTION CO.
LOCATION NAME:	MUDGE B # 12R (API #: 3004510792) UNIT A, SEC. 17, T31N, R11W
CONTRACTOR:	BLAGG ENGINEERING, INC. / KYVEK ENERGY SERVICES, INC.
EQUIPMENT USED:	GEOPROBE 200
BORING LOCATION:	117 FEET, S40E FROM WELL HEAD (EAST SIDE OF BGT).

BORING #.....	1
MW #.....	NA
PAGE #.....	1
DATE STARTED	09/22/15
DATE FINISHED	09/22/15
OPERATOR.....	KP
LOGGED BY.....	JCB

DEPTH (FT.)	INTERVAL	LITHOLOGY INTERVAL	SAMPLE INTERVAL (FT.)	SAMPLE TIME	FIELD OVM (ppm)	TPH (mg/Kg)	BENZENE & TOTAL BTEX (mg/Kg)	FIELD CLASSIFICATION AND REMARKS
								GROUND SURFACE
2								**SILTY SAND, NON COHESIVE, SLIGHTLY MOIST, FIRM (0.0 - 32.0 FT. B.G.).**
4			3 - 4	0934				DARK YELLOWISH ORANGE, NO STAINING OR APPARENT HYDROCARBON ODOR DETECTED PHYSICALLY (0.0 - 7.5 FT. B.G.).
6								
8			7.5 - 8	0937	520			
10								
12			11 - 12	0940	584			SAME AS ABOVE EXCEPT GRAY WITH STRONG APPARENT HYDROCARBON ODOR (7.5 - 16.0 FT. B.G.).
14								
16			15 - 16	0948	547			
18								
20			19 - 20	0952	683			
22								SAME AS ABOVE EXCEPT GRAY/BLACK LAYERS (16.0 - 27.5 FT. B.G.).
24			23 - 24	1000	612			
26								
28			27 - 28	1008	673			SAME AS ABOVE EXCEPT DARK YELLOWISH ORANGE (27.5 - 28.0 FT. B.G.).
30								SAME AS ABOVE EXCEPT MOTTLED GRAY AND DARK YELLOWISH ORANGE (28.0 - 32.0 FT. B.G.).
32			31 - 32	1014	645			
34								
36			35 - 36	1027	663	730	ND 40	**GRAY TO BLACK MEDIUM COARSE GRAINED SAND, NON COHESIVE, FIRM, SLIGHTLY MOIST, INCREASED MOISTURE AT 40 FT. B.G. (32.0 - 40.0 FT. B.G.).**
38								
40			39 - 40	1040	659			**DARK YELLOWISH ORANGE SILTY SAND, SATURATED (40.0 - 41.0 FT. B.G.).**
42			41 - 42	1100	4.5	ND	ND 0.16	**DARK YELLOWISH ORANGE SHALESTONE, DRY, NO APPARENT HYDROCARBON ODOR (41.0 - 42.0 FT. B.G.).**
44								
46								
48								
50								
52								
54								
56								
58								
60								

NOTES: - SILTY SAND. - SILTY SAND (IMPACTED). - SAND. - SHALESTONE.

- **OVM** - Organic vapor meter or photoionization detector (PID).
- **TPH** - Total Petroleum Hydrocarbons per US EPA Method 8015B.
- **BTEX** - Benzene, toluene, ethylbenzene, total xylenes per US EPA Method 8021B.
- **ND** - Not detected at the Laboratory Reporting Limit
- **ppm** - Parts per million.
- **mg/Kg** - Milligram per kilogram.
- **B.G.** - Below grade.

OVM CALIBRATION

Date: 09/22/2015 Time: 0640
Reading 100.0 ppm

100 ppm calibration gas - isobutylene.
RF = 1.00 (RF = response factor).

DRAWING: MUDGE B 12R GP-1 2015-09-22.SKF | DATE: 10/02/2015 | DWN BY: NJV

BLAGG ENGINEERING, INC.
P.O. BOX 87
BLOOMFIELD, NM 87413
(505) 632-1199

GP - 2

BORE / TEST HOLE REPORT

CLIENT:	BP AMERICA PRODUCTION CO.
LOCATION NAME:	MUDGE B # 12R (API #: 3004510792) UNIT A, SEC. 17, T31N, R11W
CONTRACTOR:	BLAGG ENGINEERING, INC. / KYVEK ENERGY SERVICES, INC.
EQUIPMENT USED:	GEOPROBE 200
BORING LOCATION:	143 FEET, S22E FROM WELL HEAD (SOUTHEAST SIDE OF BGT).

BORING #.....	2
MW #.....	NA
PAGE #.....	2
DATE STARTED	09/22/15
DATE FINISHED	09/22/15
OPERATOR.....	KP
LOGGED BY.....	JCB

DEPTH (FT.)	INTERVAL	LITHOLOGY INTERVAL	SAMPLE INTERVAL (FT.)	SAMPLE TIME	FIELD OVM (ppm)	TPH (mg/Kg)	BENZENE & TOTAL BTEX (mg/Kg)	FIELD CLASSIFICATION AND REMARKS
								GROUND SURFACE
2								DARK YELLOWISH ORANGE SILTY SAND, NON COHESIVE, SLIGHTLY MOIST, FIRM, NO APPARENT HYDROCARBON ODOR DETECTED (0.0 - 4.0 FT. B.G.).
4			3 - 4	1137	0.0			
6								DARK YELLOWISH BROWN SILTY CLAY, COHESIVE, SLIGHTLY MOIST, FIRM, NO APPARENT HYDROCARBON ODOR DETECTED (4.0 - 8.0 FT. B.G.).
8			7.5 - 8	1140	0.0			
10								
12			11 - 12	1144	0.0			
14								
16			15 - 16	1149	0.0			DARK YELLOWISH ORANGE SILTY SAND, NON COHESIVE, SLIGHTLY MOIST, FIRM, MINOR CLAY LAYERS BETWEEN 16.0-20.0 B.G., NO APPARENT HYDROCARBON ODOR DETECTED (8.0 - 23.0 FT. B.G.).
18								
20			19 - 20	1158	0.0			
22								
24			23 - 24	1204	0.0			
26								
28			27 - 28	1209	1.1			DARK YELLOWISH ORANGE MEDIUM COARSE GRAINED SAND, NON COHESIVE, FIRM, SLIGHTLY MOIST, MINOR PEBBLES BETWEEN 24'-28' B.G. (23.0 - 36.0 FT. BELOW GRADE).
30								
32			31 - 32	1213	4.4			
34								
36							ND	SAME AS ABOVE EXCEPT LIGHT GRAY, HYDROCARBON ODOR (35.0 - 36.0 FT. B.G.).
38			36 - 37	1222	79	ND	ND	GRAY SILTY SAND, NON COHESIVE, FIRM, SLIGHTLY MOIST, HYDROCARBON ODOR (36.0 - 39.5 FT. B.G.).
40			39	1230	188			
42			41 - 42	1240	1.2	ND	ND	DARK YELLOWISH ORANGE SILT, COHESIVE, FIRM, MOIST TO WET, NO APPARENT HYDROCARBON ODOR (39.5 - 42.0 FT. B.G.).
44							ND	DARK YELLOWISH ORANGE SHALESTONE, SLIGHTLY MOIST TO DRY, NO APPARENT HYDROCARBON ODOR (42.0 - 44.0 FT. B.G.).
46								
48								
50								
52								
54								
56								
58								
60								

NOTES: - SAND. - SILTY SAND. - SILT. - SILTY CLAY. - SHALESTONE.

- OVM - Organic vapor meter or photoionization detector (PID).
- TPH - Total Petroleum Hydrocarbons per US EPA Method 8015B.
- BTEX - Benzene, toluene, ethylbenzene, total xylenes per US EPA Method 8021B.
- ND - Not detected at the Laboratory Reporting Limit
- ppm - Parts per million.
- mg/Kg - Milligram per kilogram.
- B.G. - Below grade.

OVM CALIBRATION

Date: 09/22/2015 Time: 0640
Reading 100.0 ppm

100 ppm calibration gas - isobutylene.
RF = 1.00 (RF = response factor).

DRAWING: MUDGE B 12R GP-2 2015-09-22.SKF | DATE: 10/02/2015 | DWN BY: NJV

BLAGG ENGINEERING, INC.
P.O. BOX 87
BLOOMFIELD, NM 87413
(505) 632-1199

GP - 3

BORE / TEST HOLE REPORT

CLIENT:	BP AMERICA PRODUCTION CO.
LOCATION NAME:	MUDGE B # 12R (API #: 3004510792) UNIT A, SEC. 17, T31N, R11W
CONTRACTOR:	BLAGG ENGINEERING, INC. / KYVEK ENERGY SERVICES, INC.
EQUIPMENT USED:	GEOPROBE 200
BORING LOCATION:	91 FEET, S42.5E FROM WELL HEAD (NORTH OF BGT).

BORING #.....	3
MW #.....	NA
PAGE #.....	3
DATE STARTED	09/24/15
DATE FINISHED	09/24/15
OPERATOR.....	KP
LOGGED BY.....	JCB

DEPTH (FT.)	SAMPLE INTERVAL (FT.)	SAMPLE TIME	FIELD OVM (ppm)	TPH (mg/Kg)	BENZENE & TOTAL BTEX (mg/Kg)	FIELD CLASSIFICATION AND REMARKS
						GROUND SURFACE
8	7 - 8	0848	0.1			
12	11 - 12	0852	0.0			
16	15 - 16	0856	0.0			DARK YELLOWISH ORANGE SILTY SAND, NON COHESIVE, SLIGHTLY MOIST TO MOIST, FIRM, NO APPARENT HYDROCARBON ODOR DETECTED (0.0 - 31.0 FT. B.G.).
20	19 - 20	0900	0.0			
24	23 - 24	0904	0.4			
28	27 - 28	0910	0.7			
32	31 - 32	0917	1.1			DARK YELLOWISH ORANGE CLAYEY SILT, SLIGHTLY PLASTIC, SLIGHTLY MOIST, NO APPARENT HYDROCARBON ODOR (31.0 - 32.0 FT. B.G.).
36	36	0927	0.8	ND	ND ND	DARK YELLOWISH ORANGE SILTY SAND, NON COHESIVE, SLIGHTLY MOIST, FIRM, MINOR ROUNDED PEBBLES BETWEEN 34 - 36 FT. B.G., NO APPARENT HYDROCARBON ODOR DETECTED (32.0 - 39.0 FT. B.G.).
40	39	0955	0.3			GW on 10/1/2015
42	42	1038		ND	ND ND	DARK YELLOWISH ORANGE MEDIUM COARSE GRAINED SAND WITH PEBBLES, NON COHESIVE, FIRM, SLIGHTLY MOIST, NO APPARENT HYDROCARBON ODOR DETECTED, MOIST TO WET BETWEEN 41 - 44 FT. B.G. (39.0 - 44.0 FT. B.G.).

1 INCH PVC CASING, 45 FT. TOTAL LENGTH, TOP OF CASING ~ 1.8 FT. ABOVE GRADE, BOTTOM OF PIPE ~ 43.2 FT. B.G., HOLES MANUALLY DRILLED LAST 4 FT. OF CASING (39.2 - 43.2 FT. B.G.). DEPTH TO WATER ~ 40.75 FT. B.G., MEASURED 9/25/2015.

NOTES: - SAND. - SILTY SAND. - CLAYEY SILT.

- **OVM** - Organic vapor meter or photoionization detector (PID).
- **TPH** - Total Petroleum Hydrocarbons per US EPA Method 8015B.
- **BTEX** - Benzene, toluene, ethylbenzene, total xylenes per US EPA Method 8021B.
- **ND** - Not detected at the Laboratory Reporting Limit
- **ppm** - Parts per million.
- **mg/Kg** - Milligram per kilogram.
- **B.G.** - Below grade.

OVM CALIBRATION
Date: 09/24/2015 Time: 0700
Reading 100.2 ppm
100 ppm calibration gas - isobutylene.
RF = 1.00 (RF = response factor).

DRAWING: MUDGE B 12R GP-3 2015-09-24.SKF | DATE: 10/05/2015 | DWN BY: NJV

BLAGG ENGINEERING, INC.
P.O. BOX 87
BLOOMFIELD, NM 87413
(505) 632-1199

GP - 4

BORE / TEST HOLE REPORT

CLIENT:	BP AMERICA PRODUCTION CO.
LOCATION NAME:	MUDGE B # 12R (API #: 3004510792) UNIT A, SEC. 17, T31N, R11W
CONTRACTOR:	BLAGG ENGINEERING, INC. / KYVEK ENERGY SERVICES, INC.
EQUIPMENT USED:	GEOPROBE 200
BORING LOCATION:	115 FEET, S21E FROM WELL HEAD (WEST OF BGT).

BORING #.....	4
MW #.....	NA
PAGE #.....	4
DATE STARTED	09/24/15
DATE FINISHED	09/24/15
OPERATOR.....	KP
LOGGED BY.....	JCB

DEPTH (FT.)	SAMPLE INTERVAL (FT.)	SAMPLE TIME	FIELD OVM (ppm)	TPH (mg/Kg)	BENZENE & TOTAL BTEX (mg/Kg)	FIELD CLASSIFICATION AND REMARKS
						GROUND SURFACE
4	3 - 4	1120	0.0			
8	7 - 8	1125	0.0			
12	11 - 12	1130	0.0			
16	15 - 16	1134	0.0			
20	19 - 20	1137	0.0			DARK YELLOWISH ORANGE SILTY SAND, NON COHESIVE, SLIGHTLY MOIST, FIRM, NO APPARENT HYDROCARBON ODOR DETECTED, MOIST BETWEEN 8 - 12 FT. & 28 - 32 FT. B.G. (0.0 - 37.0 FT. B.G.).
24	23 - 24	1142	0.6			
28	27 - 28	1146	1.0			
32	31 - 32	1150	1.1			
36	35 - 36	1200	1.4			
38	38		6.0	ND	ND ND	SAME AS ABOVE EXCEPT GRAY, VERY SLIGHT APPARENT HYDROCARBON ODOR (37.0 - 38.5 FT. B.G.).
40	▽	1210	GW on 10/1/2015			
42	42		0.3	ND	ND ND	SAME AS ABOVE EXCEPT DARK YELLOWISH ORANGE, MOIST TO WET, NO APPARENT HYDROCARBON ODOR (38.5 - 44.0 FT. B.G.).
44		1218				

1 INCH PVC CASING, 45 FT. TOTAL LENGTH, TOP OF CASING ~ 2.6 FT. ABOVE GRADE, BOTTOM OF PIPE ~ 42.4 FT. B.G., HOLES MANUALLY DRILLED LAST 6 FT. OF CASING (36.4 - 42.4 FT. B.G.). DEPTH TO WATER ~ 39.95 FT. B.G., MEASURED 9/25/2015.

NOTES:

- SILTY SAND.
- OVM - Organic vapor meter or photoionization detector (PID).
- TPH - Total Petroleum Hydrocarbons per US EPA Method 8015B.
- BTEX - Benzene, toluene, ethylbenzene, total xylenes per US EPA Method 8021B.
- ND - Not detected at the Laboratory Reporting Limit
- ppm - Parts per million.
- mg/Kg - Milligram per kilogram.
- B.G. - Below grade.

OVM CALIBRATION
Date: 09/24/2015 Time: 0700
Reading 100.2 ppm
100 ppm calibration gas - isobutylene.
RF = 1.00 (RF = response factor).

DRAWING: MUDGE B 12R GP-4 2015-09-24.SKF | DATE: 10/05/2015 | DWN BY: NJV

BLAGG ENGINEERING, INC.
P.O. BOX 87
BLOOMFIELD, NM 87413
(505) 632-1199

GP - 5

BORE / TEST HOLE REPORT

CLIENT:	BP AMERICA PRODUCTION CO.
LOCATION NAME:	MUDGE B # 12R (API #: 3004510792) UNIT A, SEC. 17, T31N, R11W
CONTRACTOR:	BLAGG ENGINEERING, INC. / KYVEK ENERGY SERVICES, INC.
EQUIPMENT USED:	GEOPROBE 200
BORING LOCATION:	146 FEET, S38E FROM WELL HEAD (SOUTHEAST OF BGT).

BORING #.....	5
MW #.....	NA
PAGE #.....	5
DATE STARTED	09/24/15
DATE FINISHED	09/24/15
OPERATOR.....	KP
LOGGED BY.....	JCB

DEPTH (FT.)	SAMPLE INTERVAL (FT.)	SAMPLE TIME	FIELD OVM (ppm)	TPH (mg/Kg)	BENZENE & TOTAL BTEX (mg/Kg)
8	7 - 8	1356	231		
12	11 - 12	1359	749		
16	15 - 16	1402	709		
20	19 - 20	1405	609		
24	23 - 24	1408	784		
28	27 - 28	1411	730		
32	31 - 32	1414	596		
36	35 - 36	1419	783	27	ND ND
40	39 - 40	1434	359		
42	42	1450	14	ND	ND ND

GW on 10/1/2015

FIELD CLASSIFICATION AND REMARKS

GROUND SURFACE

DARK YELLOWISH ORANGE SILTY SAND, NON COHESIVE, SLIGHTLY MOIST, FIRM, NO APPARENT HYDROCARBON ODOR DETECTED (0.0 - 7.5 FT. B.G.).

SAME AS ABOVE EXCEPT GRAY TO BLACK WITH STRONG APPARENT HYDROCARBON ODOR (7.5 - 20.0 FT. B.G.).

GRAY TO BLACK SAND, MEDIUM GRAINED, NON COHESIVE, SLIGHTLY MOIST, FIRM, STRONG APPARENT HYDROCARBON ODOR DETECTED (20.0 - 40.0 FT. B.G.).

MODERATE BROWN SILTY CLAY TO CLAY, PLASTIC, MOIST, FIRM TO STIFF, NO APPARENT HYDROCARBON ODOR DETECTED (40.0 - 44.0 FT. B.G.).

1 INCH PVC CASING, 45 FT. TOTAL LENGTH, TOP OF CASING ~ 1.75 FT. ABOVE GRADE, BOTTOM OF PIPE ~ 43.25 FT. B.G., HOLES MANUALLY DRILLED LAST 6 FT. OF CASING (37.25 - 43.25 FT. B.G.). DEPTH TO WATER ~ 39.99 FT. B.G., MEASURED 9/25/2015.

NOTES: - SAND. - SILTY SAND. - SILTY CLAY TO CLAY.

OVM - Organic vapor meter or photoionization detector (PID).
TPH - Total Petroleum Hydrocarbons per US EPA Method 8015B.
BTEX - Benzene, toluene, ethylbenzene, total xylenes per US EPA Method 8021B.
ND - Not detected at the Laboratory Reporting Limit
ppm - Parts per million.
mg/Kg - Milligram per kilogram.
B.G. - Below grade.

OVM CALIBRATION
Date: 09/24/2015 Time: 0700
Reading 100.2 ppm
100 ppm calibration gas - isobutylene.
RF = 1.00 (RF = response factor).

DRAWING: MUDGE B 12R GP-5 2015-09-24.SKF | DATE: 10/05/2015 | DWN BY: NJV

BLAGG ENGINEERING, INC.
P.O. BOX 87
BLOOMFIELD, NM 87413
(505) 632-1199

GP - 6

BORE / TEST HOLE REPORT

BORING #.....	6
MW #.....	NA
PAGE #.....	6
DATE STARTED	09/24/15
DATE FINISHED	09/24/15
OPERATOR.....	KP
LOGGED BY.....	JCB

CLIENT: BP AMERICA PRODUCTION CO.
LOCATION NAME: MUDGE B # 12R (API #: 3004510792) UNIT A, SEC. 17, T31N, R11W
CONTRACTOR: BLAGG ENGINEERING, INC. / KYVEK ENERGY SERVICES, INC.
EQUIPMENT USED: GEOPROBE 200
BORING LOCATION: 182 FEET, S38E FROM WELL HEAD (SOUTHEAST OF BGT & EDGE OF WELL PAD).

DEPTH (FT.)	SAMPLE INTERVAL (FT.)	SAMPLE TIME	FIELD OVM (ppm)	TPH (mg/Kg)	BENZENE & TOTAL BTEX (mg/Kg)	FIELD CLASSIFICATION AND REMARKS
						GROUND SURFACE
4	3 - 4	1509	0.0			
8	7 - 8	1520	0.0			DARK YELLOWISH ORANGE SILT TO SANDY SILT, NON COHESIVE, SLIGHTLY MOIST, FIRM, NO APPARENT HYDROCARBON ODOR DETECTED (0.0 - 16.0 FT. B.G.).
12	11 - 12	1524	0.0			
16	15 - 16	1528	0.0			
20	19 - 20	1532	0.0			
24	23 - 24	1536	0.0			DARK YELLOWISH ORANGE SAND, MEDIUM GRAINED, NON COHESIVE, SLIGHTLY MOIST, FIRM, NO APPARENT HYDROCARBON ODOR DETECTED (16.0 - 36.0 FT. B.G.).
28	27 - 28	1540	0.0			
32	31 - 32	1544	0.0			
36	35 - 36	1549	3.6			SAA EXCEPT COARSE GRAINED WITH MINOR ROUNDED PEBBLES (36.0 - 38.0 FT. B.G.).
38	38	1549	404	69	ND 0.094	SAA EXCEPT GRAY TO BLACK WITH STRONG HYDROCARBON ODOR (38.0 - 39.0 FT. B.G.).
40	40	1559				DARK YELLOWISH ORANGE SHALESTONE (39.0 - 41.0 FT. B.G.).
42	41	1630	2.1	ND	ND ND	DARK YELLOWISH BROWN SANDY SILT, NON COHESIVE, DRY, FIRM TO DENSE, NO APPARENT HYDROCARBON ODOR DETECTED (41.0 - 42.0 FT. B.G.). DARK YELLOWISH ORANGE SHALESTONE (39.0 - 41.0 FT. B.G.).

Dry to TD on 10/1/2015

1 INCH PVC CASING, 43 FT. TOTAL LENGTH, TOP OF CASING ~ 1.00 FT. ABOVE GRADE, BOTTOM OF PIPE ~ 42.00 FT. B.G., HOLES MANUALLY DRILLED LAST 6 FT. OF CASING (36.00 - 42.00 FT. B.G.). NO WATER DETECTED, MEASURED 9/25/2015.

NOTES: - SILT TO SILTY SAND. - SAND. - SHALESTONE.

- OVM - Organic vapor meter or photoionization detector (PID).
- TPH - Total Petroleum Hydrocarbons per US EPA Method 8015B.
- BTEX - Benzene, toluene, ethylbenzene, total xylenes per US EPA Method 8021B.
- ND - Not detected at the Laboratory Reporting Limit
- ppm - Parts per million.
- mg/Kg - Milligram per kilogram.
- B.G. - Below grade.
- SAA - Same as above

OVM CALIBRATION
Date: 09/24/2015 Time: 0700
Reading 100.2 ppm
100 ppm calibration gas - isobutylene.
RF = 1.00 (RF = response factor).

DRAWING: MUDGE B 12R GP-6 2015-09-24.SKF | DATE: 10/05/2015 | DWN BY: NJV

BLAGG ENGINEERING, INC.
P.O. BOX 87
BLOOMFIELD, NM 87413
(505) 632-1199

GP - 7

BORE / TEST HOLE REPORT

CLIENT:	BP AMERICA PRODUCTION CO.
LOCATION NAME:	MUDGE B # 12R (API #: 3004510792) UNIT A, SEC. 17, T31N, R11W
CONTRACTOR:	BLAGG ENGINEERING, INC. / KYVEK ENERGY SERVICES, INC.
EQUIPMENT USED:	GEOPROBE 200
BORING LOCATION:	176 FEET, S29E FROM WELL HEAD (SOUTH-SOUTHEAST OF BGT).

BORING #.....	7
MW #.....	NA
PAGE #.....	7
DATE STARTED	09/25/15
DATE FINISHED	09/25/15
OPERATOR.....	KP
LOGGED BY.....	JCB

DEPTH (FT.)	SAMPLE INTERVAL (FT.)	SAMPLE TIME	FIELD OVM (ppm)	TPH (mg/Kg)	BENZENE & TOTAL BTEX (mg/Kg)	FIELD CLASSIFICATION AND REMARKS
						GROUND SURFACE
4	3 - 4	0938	0.0			
8	7 - 8	0942	0.0			
12	11 - 12	0947	0.0			DARK YELLOWISH ORANGE SILTY SAND, NON COHESIVE, SLIGHTLY MOIST, FIRM, NO APPARENT HYDROCARBON ODOR DETECTED (0.0 - 24.0 FT. B.G.).
16	15 - 16	0951	0.0			
20	19 - 20	0955	0.0			
24	23 - 24	1000	0.0			
28	27 - 28	1008	0.0			DARK YELLOWISH ORANGE SAND, MEDIUM GRAINED, NON COHESIVE, SLIGHTLY MOIST, FIRM, NO APPARENT HYDROCARBON ODOR DETECTED (24.0 - 28.0 FT. B.G.).
32	31 - 32	1015	0.8			
36	35 - 36	1028	1.5	ND	ND ND	SAA EXCEPT COARSE GRAINED WITH MINOR ROUNDED PEBBLES & MOISTURE INCREASING STARTING AT 30 FT. B.G. (28.0 - 40.0 FT. B.G.).
40	39	1046	1.0			DARK YELLOWISH BROWN SILT, NON COHESIVE, MOIST, DENSE, NO APPARENT HYDROCARBON ODOR DETECTED (40.0 - 41.0 FT. B.G.).
42	41	1130	1.2	ND	ND ND	DARK YELLOWISH ORANGE SAND, NON COHESIVE, MOIST, FIRM, NO APPARENT HYDROCARBON ODOR DETECTED (41.0 - 41.5 FT. B.G.). DARK YELLOWISH ORANGE SANDSTONE (41.5 - 42.5 FT. B.G.). BLUISH SHALESTONE, DRY, NO APPARENT HYDROCARBON ODOR DETECTED (42.5 - 43.0 FT. B.G.).

Dry to TD on 10/1/2015

1 INCH PVC CASING, 43.5 FT. TOTAL LENGTH, TOP OF CASING ~ 1.5 FT. ABOVE GRADE, BOTTOM OF PIPE ~ 42.0 FT. B.G., HOLES MANUALLY DRILLED LAST 6 FT. OF CASING (36.0 - 42.0 FT. B.G.). NO WATER DETECTED, MEASURED 9/25/2015.

NOTES: - SILTY SAND. - SAND. - SILT. - SANDSTONE. - SHALESTONE.

OVM	- Organic vapor meter or photoionization detector (PID).
TPH	- Total Petroleum Hydrocarbons per US EPA Method 8015B.
BTEX	- Benzene, toluene, ethylbenzene, total xylenes per US EPA Method 8021B.
ND	- Not detected at the Laboratory Reporting Limit
ppm	- Parts per million.
mg/Kg	- Milligram per kilogram.
B.G.	- Below grade.
SAA	- Same as above

OVM CALIBRATION
Date: 09/25/2015 Time: 0645
Reading 100.1 ppm
100 ppm calibration gas - isobutylene.
RF = 1.00 (RF = response factor).

DRAWING: MUDGE B 12R GP-7 2015-09-25.SKF | DATE: 10/06/2015 | DWN BY: NJV

BLAGG ENGINEERING, INC.
P.O. BOX 87
BLOOMFIELD, NM 87413
(505) 632-1199

GP - 8

BORE / TEST HOLE REPORT

CLIENT:	BP AMERICA PRODUCTION CO.
LOCATION NAME:	MUDGE B # 12R (API #: 3004510792) UNIT A, SEC. 17, T31N, R11W
CONTRACTOR:	BLAGG ENGINEERING, INC. / KYVEK ENERGY SERVICES, INC.
EQUIPMENT USED:	GEOPROBE 200
BORING LOCATION:	140 FEET, S47E FROM WELL HEAD (EAST OF BGT & EDGE OF WELL PAD).

BORING #.....	8
MW #.....	NA
PAGE #.....	8
DATE STARTED	09/25/15
DATE FINISHED	09/25/15
OPERATOR.....	KP
LOGGED BY.....	JCB

DEPTH (FT.)	SAMPLE INTERVAL (FT.)	SAMPLE TIME	FIELD OVM (ppm)	TPH (mg/Kg)	BENZENE & TOTAL BTEX (mg/Kg)	FIELD CLASSIFICATION AND REMARKS
						GROUND SURFACE
8	7 - 8	1158	0.0			
10						DARK YELLOWISH ORANGE SILTY SAND, NON COHESIVE, SLIGHTLY MOIST, FIRM, NO APPARENT HYDROCARBON ODOR DETECTED (0.0 - 20.0 FT. B.G.).
12	11 - 12	1204	0.0			
16	15 - 16	1208	0.0			
20	19 - 20	1211	0.0			
24	23 - 24	1214	0.0			DARK YELLOWISH ORANGE SAND, MEDIUM GRAINED, NON COHESIVE, SLIGHTLY MOIST, FIRM, NO APPARENT HYDROCARBON ODOR DETECTED (20.0 - 28.0 FT. B.G.).
28	27 - 28	1217	0.6			
32	31 - 32	1222	1.1			SAA EXCEPT COARSE GRAINED WITH MINOR ROUNDED PEBBLES (28.0 - 35.0 FT. B.G.).
36	35 - 36	1228	39	ND	ND ND	SAA EXCEPT GRAY TO BLACK WITH APPARENT HYDROCARBON ODOR DETECTED, MOIST TO WET STARTING AT 40 FT. B.G., SATURATED BETWEEN 40 - 41 FT. B.G. (35.0 - 41 FT. B.G.)
40	39 - 40	1232	17			GW on 10/1/2015
42	41	1255	0.0	ND	ND ND	DARK YELLOWISH ORANGE SILTY CLAY, PLASTIC, WET, FIRM TO STIFF, NO APPARENT HYDROCARBON ODOR DETECTED (41.0 - 42.0 FT. B.G.).
44						BLUISH SHALESTONE, DRY, NO APPARENT HYDROCARBON ODOR DETECTED (42.0 - 43.0 FT. B.G.).

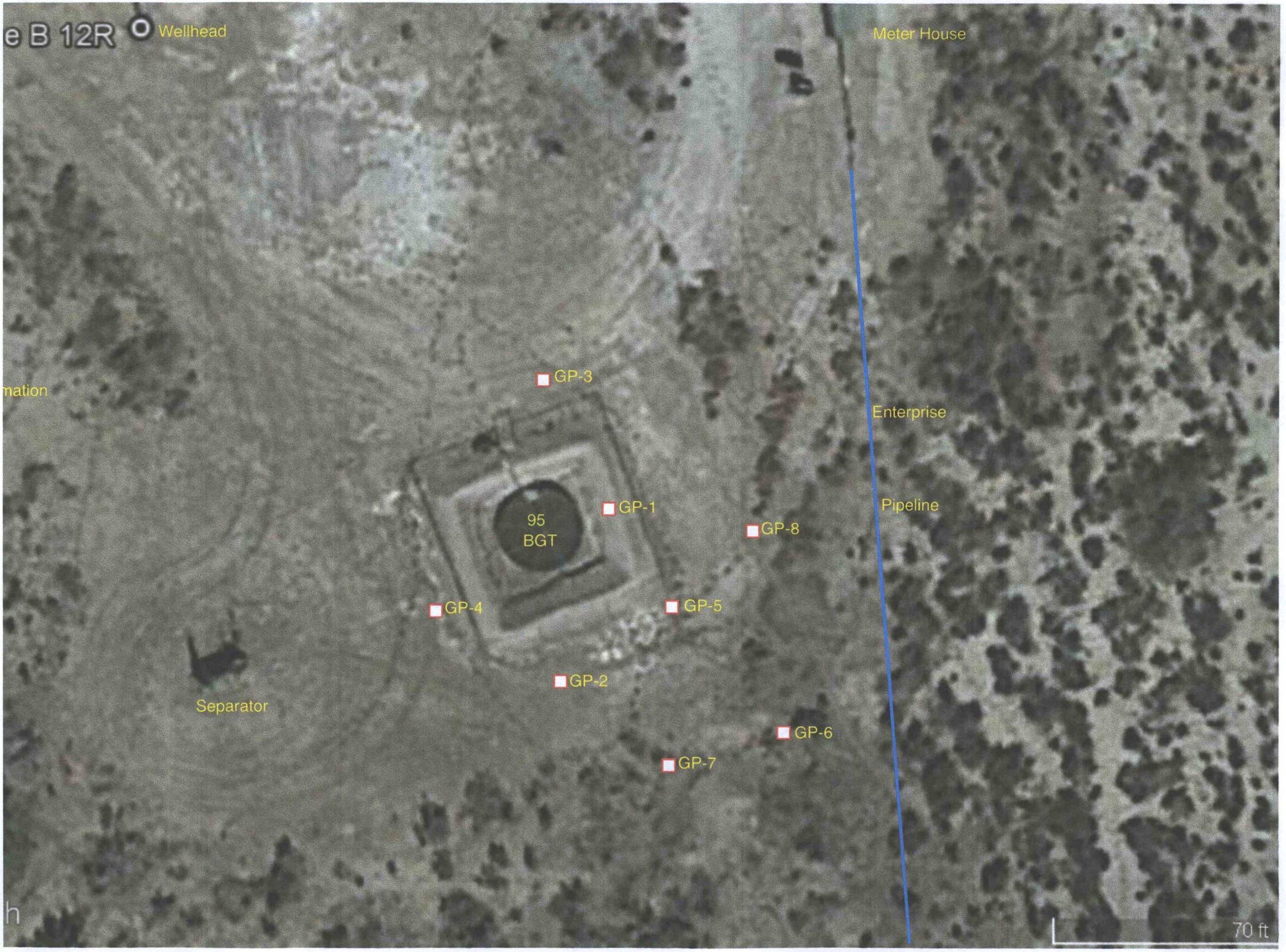
1 INCH PVC CASING, 43.0 FT. TOTAL LENGTH, TOP OF CASING ~ 1.7 FT. ABOVE GRADE, BOTTOM OF PIPE ~ 41.3 FT. B.G., HOLES MANUALLY DRILLED LAST 6 FT. OF CASING (35.3 - 41.3 FT. B.G.). DEPTH TO WATER ~ 39.7 FT. B.G., MEASURED 9/25/2015.

NOTES: - SILTY SAND. - SAND. - SILTY CLAY. - SHALESTONE.

- **OVM** - Organic vapor meter or photoionization detector (PID).
- **TPH** - Total Petroleum Hydrocarbons per US EPA Method 8015B.
- **BTEX** - Benzene, toluene, ethylbenzene, total xylenes per US EPA Method 8021B.
- **ND** - Not detected at the Laboratory Reporting Limit
- **ppm** - Parts per million.
- **mg/Kg** - Milligram per kilogram.
- **B.G.** - Below grade.
- **SAA** - Same as above

OVM CALIBRATION
Date: 09/25/2015 Time: 0645
Reading 100.1 ppm
100 ppm calibration gas - isobutylene.
RF = 1.00 (RF = response factor).

DRAWING: MUDGE B 12R GP-8 2015-09-25.SKF | DATE: 10/06/2015 | DWN BY: NJV


e B 12R
Wellhead
Meter House
mation
GP-3
Enterprise
95
BGT
GP-1
Pipeline
GP-8
GP-4
GP-5
GP-2
Separator
GP-6
GP-7
h
70 ft

Delineation Laboratory Results

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

October 01, 2015

Jeff Blagg
Blagg Engineering
P. O. Box 87
Bloomfield, NM 87413
TEL: (505) 320-1183
FAX (505) 632-3903

RE: Mudge B #12R OrderNo.: 1509B35

Dear Jeff Blagg:

Hall Environmental Analysis Laboratory received 4 sample(s) on 9/24/2015 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0190

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Analytical Report
Lab Order **1509B35**
Date Reported: **10/1/2015**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Blagg Engineering
Project: Mudge B #12R
Lab ID: 1509B35-001 **Matrix:** SOIL

Client Sample ID: GP-1@36'
Collection Date: 9/22/2015 10:27:00 AM
Received Date: 9/24/2015 6:45:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **LGT**	
Chloride	690	30		mg/Kg	20	9/29/2015 3:16:14 PM	21577
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **KJH**	
Diesel Range Organics (DRO)	100	9.9		mg/Kg	1	9/29/2015 9:11:27 AM	21532
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	9/29/2015 9:11:27 AM	21532
Surr: DNOP	88.9	57.9-140		%REC	1	9/29/2015 9:11:27 AM	21532
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	630	49		mg/Kg	10	9/29/2015 10:37:02 AM	21514
Surr: BFB	233	75.4-113	S	%REC	10	9/29/2015 10:37:02 AM	21514
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	ND	0.24		mg/Kg	10	9/29/2015 10:37:02 AM	21514
Toluene	1.0	0.49		mg/Kg	10	9/29/2015 10:37:02 AM	21514
Ethylbenzene	3.0	0.49		mg/Kg	10	9/29/2015 10:37:02 AM	21514
Xylenes, Total	36	0.98		mg/Kg	10	9/29/2015 10:37:02 AM	21514
Surr: 4-Bromofluorobenzene	125	80-120	S	%REC	10	9/29/2015 10:37:02 AM	21514

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Blagg Engineering
Project: Mudge B #12R
Lab ID: 1509B35-002 **Matrix:** SOIL

Client Sample ID: GP-1@42'
Collection Date: 9/22/2015 11:00:00 AM
Received Date: 9/24/2015 6:45:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **LGT**	
Chloride	ND	30		mg/Kg	20	9/29/2015 3:53:26 PM	21577
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **KJH**	
Diesel Range Organics (DRO)	ND	9.7		mg/Kg	1	9/29/2015 10:15:35 AM	21532
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	9/29/2015 10:15:35 AM	21532
Surr: DNOP	82.2	57.9-140		%REC	1	9/29/2015 10:15:35 AM	21532
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	4.7		mg/Kg	1	9/28/2015 4:43:05 PM	21514
Surr: BFB	85.2	75.4-113		%REC	1	9/28/2015 4:43:05 PM	21514
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	ND	0.047		mg/Kg	1	9/28/2015 4:43:05 PM	21514
Toluene	ND	0.047		mg/Kg	1	9/28/2015 4:43:05 PM	21514
Ethylbenzene	ND	0.047		mg/Kg	1	9/28/2015 4:43:05 PM	21514
Xylenes, Total	0.16	0.094		mg/Kg	1	9/28/2015 4:43:05 PM	21514
Surr: 4-Bromofluorobenzene	103	80-120		%REC	1	9/28/2015 4:43:05 PM	21514

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Blagg Engineering
Project: Mudge B #12R
Lab ID: 1509B35-003 **Matrix:** SOIL

Client Sample ID: GP-2@37'
Collection Date: 9/22/2015 12:30:00 PM
Received Date: 9/24/2015 6:45:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **LGT**	
Chloride	830	30		mg/Kg	20	9/29/2015 4:05:50 PM	21577
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **KJH**	
Diesel Range Organics (DRO)	ND	9.9		mg/Kg	1	9/29/2015 10:37:05 AM	21532
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	9/29/2015 10:37:05 AM	21532
Surr: DNOP	85.8	57.9-140		%REC	1	9/29/2015 10:37:05 AM	21532
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	4.7		mg/Kg	1	9/29/2015 1:12:43 AM	21514
Surr: BFB	85.7	75.4-113		%REC	1	9/29/2015 1:12:43 AM	21514
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	ND	0.047		mg/Kg	1	9/29/2015 1:12:43 AM	21514
Toluene	ND	0.047		mg/Kg	1	9/29/2015 1:12:43 AM	21514
Ethylbenzene	ND	0.047		mg/Kg	1	9/29/2015 1:12:43 AM	21514
Xylenes, Total	ND	0.094		mg/Kg	1	9/29/2015 1:12:43 AM	21514
Surr: 4-Bromofluorobenzene	101	80-120		%REC	1	9/29/2015 1:12:43 AM	21514

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Blagg Engineering
Project: Mudge B #12R
Lab ID: 1509B35-004 **Matrix:** SOIL

Client Sample ID: GP-2@42'
Collection Date: 9/22/2015 12:40:00 PM
Received Date: 9/24/2015 6:45:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **LGT**	
Chloride	ND	30		mg/Kg	20	9/29/2015 4:18:15 PM	21577
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **KJH**	
Diesel Range Organics (DRO)	ND	10		mg/Kg	1	9/29/2015 10:58:28 AM	21532
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	9/29/2015 10:58:28 AM	21532
Surr: DNOP	90.0	57.9-140		%REC	1	9/29/2015 10:58:28 AM	21532
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	4.7		mg/Kg	1	9/29/2015 1:35:54 AM	21514
Surr: BFB	85.6	75.4-113		%REC	1	9/29/2015 1:35:54 AM	21514
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	ND	0.047		mg/Kg	1	9/29/2015 1:35:54 AM	21514
Toluene	ND	0.047		mg/Kg	1	9/29/2015 1:35:54 AM	21514
Ethylbenzene	ND	0.047		mg/Kg	1	9/29/2015 1:35:54 AM	21514
Xylenes, Total	ND	0.095		mg/Kg	1	9/29/2015 1:35:54 AM	21514
Surr: 4-Bromofluorobenzene	101	80-120		%REC	1	9/29/2015 1:35:54 AM	21514

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1509B35**

01-Oct-15

Client: Blagg Engineering

Project: Mudge B #12R

Sample ID	**MB-21577**	SampType:	**MBLK**		TestCode:	**EPA Method 300.0: Anions**				
Client ID:	**PBS**	Batch ID:	**21577**		RunNo:	**29185**				
Prep Date:	**9/29/2015**	Analysis Date:	**9/29/2015**		SeqNo:	**886480**	Units:	**mg/Kg**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID	**LCS-21577**	SampType:	**LCS**		TestCode:	**EPA Method 300.0: Anions**				
Client ID:	**LCSS**	Batch ID:	**21577**		RunNo:	**29185**				
Prep Date:	**9/29/2015**	Analysis Date:	**9/29/2015**		SeqNo:	**886481**	Units:	**mg/Kg**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	94.8	90	110			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1509B35**

01-Oct-15

Client: Blagg Engineering

Project: Mudge B #12R

Sample ID **MB-21532**	SampType: **MBLK**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **PBS**	Batch ID: **21532**	RunNo: **29162**
Prep Date: **9/28/2015**	Analysis Date: **9/29/2015**	SeqNo: **885646** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	8.7		10.00		87.2	57.9	140			

Sample ID **LCS-21532**	SampType: **LCS**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **LCSS**	Batch ID: **21532**	RunNo: **29162**
Prep Date: **9/28/2015**	Analysis Date: **9/29/2015**	SeqNo: **885647** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	43	10	50.00	0	86.0	57.4	139			
Surr: DNOP	4.3		5.000		86.5	57.9	140			

Sample ID **1509B35-001AMS**	SampType: **MS**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **GP-1@36'**	Batch ID: **21532**	RunNo: **29162**
Prep Date: **9/28/2015**	Analysis Date: **9/29/2015**	SeqNo: **885649** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	180	10	50.00	100.5	159	42.3	146			S
Surr: DNOP	4.4		5.000		88.0	57.9	140			

Sample ID **1509B35-001AMSD**	SampType: **MSD**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **GP-1@36'**	Batch ID: **21532**	RunNo: **29162**
Prep Date: **9/28/2015**	Analysis Date: **9/29/2015**	SeqNo: **885650** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	160	10	50.15	100.5	122	42.3	146	10.7	28.9	
Surr: DNOP	4.3		5.015		86.2	57.9	140	0	0	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1509B35**

01-Oct-15

Client: Blagg Engineering

Project: Mudge B #12R

Sample ID **MB-21514**	SampType: **MBLK**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **PBS**	Batch ID: **21514**	RunNo: **29150**
Prep Date: **9/25/2015**	Analysis Date: **9/28/2015**	SeqNo: **885044** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	840		1000		84.1	75.4	113			

Sample ID **LCS-21514**	SampType: **LCS**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **LCSS**	Batch ID: **21514**	RunNo: **29150**
Prep Date: **9/25/2015**	Analysis Date: **9/28/2015**	SeqNo: **885045** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	24	5.0	25.00	0	96.8	79.6	122			
Surr: BFB	920		1000		91.8	75.4	113			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1509B35**

01-Oct-15

Client: Blagg Engineering

Project: Mudge B #12R

Sample ID **MB-21514**	SampType: **MBLK**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **PBS**	Batch ID: **21514**	RunNo: **29150**
Prep Date: **9/25/2015**	Analysis Date: **9/28/2015**	SeqNo: **885075** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.050								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 4-Bromofluorobenzene	1.0		1.000		101	80	120			

Sample ID **LCS-21514**	SampType: **LCS**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **LCSS**	Batch ID: **21514**	RunNo: **29150**
Prep Date: **9/25/2015**	Analysis Date: **9/28/2015**	SeqNo: **885076** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.98	0.050	1.000	0	97.9	80	120			
Toluene	0.95	0.050	1.000	0	95.0	80	120			
Ethylbenzene	0.96	0.050	1.000	0	96.0	80	120			
Xylenes, Total	2.9	0.10	3.000	0	97.0	80	120			
Surr: 4-Bromofluorobenzene	1.1		1.000		108	80	120			

Sample ID **1509B35-002AMS**	SampType: **MS**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **GP-1@42'**	Batch ID: **21514**	RunNo: **29150**
Prep Date: **9/25/2015**	Analysis Date: **9/28/2015**	SeqNo: **885081** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.79	0.048	0.9606	0	81.9	69.6	136			
Toluene	0.82	0.048	0.9606	0.02351	83.1	76.2	134			
Ethylbenzene	0.87	0.048	0.9606	0.02299	88.0	75.8	137			
Xylenes, Total	2.8	0.096	2.882	0.1609	91.3	78.9	133			
Surr: 4-Bromofluorobenzene	1.0		0.9606		107	80	120			

Sample ID **1509B35-002AMSD**	SampType: **MSD**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **GP-1@42'**	Batch ID: **21514**	RunNo: **29150**
Prep Date: **9/25/2015**	Analysis Date: **9/28/2015**	SeqNo: **885082** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.86	0.048	0.9625	0	89.6	69.6	136	9.19	20	
Toluene	0.88	0.048	0.9625	0.02351	89.0	76.2	134	6.87	20	
Ethylbenzene	0.91	0.048	0.9625	0.02299	92.2	75.8	137	4.66	20	
Xylenes, Total	2.9	0.096	2.887	0.1609	94.0	78.9	133	2.96	20	
Surr: 4-Bromofluorobenzene	1.0		0.9625		108	80	120	0	0	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: BLAGG | Work Order Number: 1509B35 | RcptNo: 1

Received by/date: JA 09/24/15

Logged By: Celina Sessa 9/24/2015 6:45:00 AM Celina Sessa

Completed By: Celina Sessa 9/24/2015 9:01:37 AM Celina Sessa

Reviewed By: 09/25/15

Chain of Custody

1. Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
2. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
3. How was the sample delivered?	Courier		

Log In

4. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
5. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
6. Sample(s) in proper container(s)?	Yes ☑	No ☐	
7. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
8. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
9. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
10. VOA vials have zero headspace?	Yes ☐	No ☐	No VOA Vials ☑
11. Were any sample containers received broken?	Yes ☐	No ☑	
12. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
13. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
14. Is it clear what analyses were requested?	Yes ☑	No ☐	
15. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

# of preserved bottles checked for pH: _____ (<2 or >12 unless noted)

Adjusted? _____

Checked by: _____

Special Handling (if applicable)

16. 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: _____

17. Additional remarks:

18. Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	1.1	Good	Yes			

Chain-of-Custody Record

Client: BP AMERICA
BLAGG Engineering
Mailing Address:

Phone #: 505-320-1183
email or Fax#:
QA/QC Package:
☒ Standard ☐ Level 4 (Full Validation)
Accreditation
☐ NELAP ☐ Other
☐ EDD (Type)

Turn-Around Time:
☒ Standard ☐ Rush
Project Name: MUDGE B #12R
Project #:
Project Manager: J. BLAGG
Sampler: J. Blagg
On Ice: ☒ Yes ☐ No
Sample Temperature: 2.1-1.0CF=1.1

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 1509B35	BTEX + ~~MTBE + TMB~~'s (8021)	BTEX + MTBE + TPH (Gas only)	TPH 8015B (GRO / DRO / MRO)	TPH (Method 418.1)	EDB (Method 504.1)	PAH's (8310 or 8270 SIMS)	RCRA 8 Metals	Anions (F,Cl,NO_3,NO_2,PO_4,SO_4)	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)	CHLORIDE				Air Bubbles (Y or N)
9/23/2015	1027	SOIL	GP-1 @ 36'	4oz x 1	cool	-001	X		X									X				
"	1100	"	GP-1 @ 42'	"	"	-002	X		X									X				
"	1230	"	GP-2 @ 37'	"	"	-003	X		X									X				
"	1240	"	GP-2 @ 42'	"	"	-004	X		X									X				

Date:	Time:	Relinquished by:	Received by:	Date	Time
9/23/2015	1248			9/23/2015	1248
9/23/15	1810			09/24/15	0645

Remarks: BILL BP
BILLING INFO TO FOLLOW

BP contacts: Steve Moskal + John Ritchie

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

October 05, 2015

Jeff Blagg
Blagg Engineering
P. O. Box 87
Bloomfield, NM 87413
TEL: (505) 320-1183
FAX (505) 632-3903

RE: Mudge B 12R OrderNo.: 1509D18

Dear Jeff Blagg:

Hall Environmental Analysis Laboratory received 12 sample(s) on 9/26/2015 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0190

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Analytical Report
Lab Order **1509D18**
Date Reported: **10/5/2015**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Blagg Engineering
Project: Mudge B 12R
Lab ID: 1509D18-001 **Matrix:** SOIL

Client Sample ID: GP-3 @ 36'
Collection Date: 9/24/2015 9:27:00 AM
Received Date: 9/26/2015 8:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **LGT**	
Chloride	670	30		mg/Kg	20	9/30/2015 6:40:59 PM	21599
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **TOM**	
Diesel Range Organics (DRO)	ND	9.5		mg/Kg	1	10/1/2015 1:08:25 AM	21554
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	10/1/2015 1:08:25 AM	21554
Surr: DNOP	111	57.9-140		%REC	1	10/1/2015 1:08:25 AM	21554
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	4.6		mg/Kg	1	9/30/2015 8:57:33 PM	21562
Surr: BFB	87.1	75.4-113		%REC	1	9/30/2015 8:57:33 PM	21562
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	ND	0.046		mg/Kg	1	9/30/2015 8:57:33 PM	21562
Toluene	ND	0.046		mg/Kg	1	9/30/2015 8:57:33 PM	21562
Ethylbenzene	ND	0.046		mg/Kg	1	9/30/2015 8:57:33 PM	21562
Xylenes, Total	ND	0.093		mg/Kg	1	9/30/2015 8:57:33 PM	21562
Surr: 4-Bromofluorobenzene	103	80-120		%REC	1	9/30/2015 8:57:33 PM	21562

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Blagg Engineering
Project: Mudge B 12R
Lab ID: 1509D18-002 **Matrix:** SOIL

Client Sample ID: GP-3 @ 42'
Collection Date: 9/24/2015 10:38:00 AM
Received Date: 9/26/2015 8:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **LGT**	
Chloride	ND	30		mg/Kg	20	9/30/2015 7:18:12 PM	21599
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **TOM**	
Diesel Range Organics (DRO)	ND	9.7		mg/Kg	1	10/1/2015 1:30:04 AM	21554
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	10/1/2015 1:30:04 AM	21554
Surr: DNOP	111	57.9-140		%REC	1	10/1/2015 1:30:04 AM	21554
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	4.6		mg/Kg	1	9/30/2015 9:20:47 PM	21562
Surr: BFB	88.4	75.4-113		%REC	1	9/30/2015 9:20:47 PM	21562
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	ND	0.046		mg/Kg	1	9/30/2015 9:20:47 PM	21562
Toluene	ND	0.046		mg/Kg	1	9/30/2015 9:20:47 PM	21562
Ethylbenzene	ND	0.046		mg/Kg	1	9/30/2015 9:20:47 PM	21562
Xylenes, Total	ND	0.093		mg/Kg	1	9/30/2015 9:20:47 PM	21562
Surr: 4-Bromofluorobenzene	105	80-120		%REC	1	9/30/2015 9:20:47 PM	21562

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Blagg Engineering
Project: Mudge B 12R
Lab ID: 1509D18-003 **Matrix:** SOIL

Client Sample ID: GP-4 @ 38'
Collection Date: 9/24/2015 12:10:00 PM
Received Date: 9/26/2015 8:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **LGT**	
Chloride	480	30		mg/Kg	20	9/30/2015 7:30:37 PM	21599
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **TOM**	
Diesel Range Organics (DRO)	ND	9.6		mg/Kg	1	10/1/2015 1:51:46 AM	21554
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	10/1/2015 1:51:46 AM	21554
Surr: DNOP	110	57.9-140		%REC	1	10/1/2015 1:51:46 AM	21554
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	4.6		mg/Kg	1	9/30/2015 9:43:56 PM	21562
Surr: BFB	86.3	75.4-113		%REC	1	9/30/2015 9:43:56 PM	21562
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	ND	0.046		mg/Kg	1	9/30/2015 9:43:56 PM	21562
Toluene	ND	0.046		mg/Kg	1	9/30/2015 9:43:56 PM	21562
Ethylbenzene	ND	0.046		mg/Kg	1	9/30/2015 9:43:56 PM	21562
Xylenes, Total	ND	0.093		mg/Kg	1	9/30/2015 9:43:56 PM	21562
Surr: 4-Bromofluorobenzene	101	80-120		%REC	1	9/30/2015 9:43:56 PM	21562

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Blagg Engineering
Project: Mudge B 12R
Lab ID: 1509D18-004 **Matrix:** SOIL

Client Sample ID: GP-4 @ 42'
Collection Date: 9/24/2015 12:18:00 PM
Received Date: 9/26/2015 8:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **LGT**	
Chloride	ND	30		mg/Kg	20	9/30/2015 7:43:00 PM	21599
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **TOM**	
Diesel Range Organics (DRO)	ND	10		mg/Kg	1	10/1/2015 2:13:23 AM	21554
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	10/1/2015 2:13:23 AM	21554
Surr: DNOP	112	57.9-140		%REC	1	10/1/2015 2:13:23 AM	21554
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	4.6		mg/Kg	1	9/30/2015 10:07:05 PM	21562
Surr: BFB	86.4	75.4-113		%REC	1	9/30/2015 10:07:05 PM	21562
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	ND	0.046		mg/Kg	1	9/30/2015 10:07:05 PM	21562
Toluene	ND	0.046		mg/Kg	1	9/30/2015 10:07:05 PM	21562
Ethylbenzene	ND	0.046		mg/Kg	1	9/30/2015 10:07:05 PM	21562
Xylenes, Total	ND	0.093		mg/Kg	1	9/30/2015 10:07:05 PM	21562
Surr: 4-Bromofluorobenzene	102	80-120		%REC	1	9/30/2015 10:07:05 PM	21562

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Blagg Engineering
Project: Mudge B 12R
Lab ID: 1509D18-005 **Matrix:** SOIL

Client Sample ID: GP-5 @ 36'
Collection Date: 9/24/2015 2:19:00 PM
Received Date: 9/26/2015 8:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **LGT**	
Chloride	340	30		mg/Kg	20	9/30/2015 7:55:25 PM	21599
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **TOM**	
Diesel Range Organics (DRO)	10	9.8		mg/Kg	1	10/1/2015 2:35:05 AM	21554
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	10/1/2015 2:35:05 AM	21554
Surr: DNOP	111	57.9-140		%REC	1	10/1/2015 2:35:05 AM	21554
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	17	4.6		mg/Kg	1	9/30/2015 10:30:09 PM	21562
Surr: BFB	164	75.4-113	S	%REC	1	9/30/2015 10:30:09 PM	21562
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	ND	0.046		mg/Kg	1	9/30/2015 10:30:09 PM	21562
Toluene	ND	0.046		mg/Kg	1	9/30/2015 10:30:09 PM	21562
Ethylbenzene	ND	0.046		mg/Kg	1	9/30/2015 10:30:09 PM	21562
Xylenes, Total	ND	0.093		mg/Kg	1	9/30/2015 10:30:09 PM	21562
Surr: 4-Bromofluorobenzene	111	80-120		%REC	1	9/30/2015 10:30:09 PM	21562

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Blagg Engineering
Project: Mudge B 12R
Lab ID: 1509D18-006 **Matrix:** SOIL

Client Sample ID: GP-5 @ 42'
Collection Date: 9/24/2015 2:50:00 PM
Received Date: 9/26/2015 8:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **LGT**	
Chloride	ND	30		mg/Kg	20	9/30/2015 8:07:50 PM	21599
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **TOM**	
Diesel Range Organics (DRO)	ND	10		mg/Kg	1	10/1/2015 2:56:39 AM	21554
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	10/1/2015 2:56:39 AM	21554
Surr: DNOP	120	57.9-140		%REC	1	10/1/2015 2:56:39 AM	21554
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	4.7		mg/Kg	1	9/30/2015 10:53:09 PM	21562
Surr: BFB	87.5	75.4-113		%REC	1	9/30/2015 10:53:09 PM	21562
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	ND	0.047		mg/Kg	1	9/30/2015 10:53:09 PM	21562
Toluene	ND	0.047		mg/Kg	1	9/30/2015 10:53:09 PM	21562
Ethylbenzene	ND	0.047		mg/Kg	1	9/30/2015 10:53:09 PM	21562
Xylenes, Total	ND	0.093		mg/Kg	1	9/30/2015 10:53:09 PM	21562
Surr: 4-Bromofluorobenzene	102	80-120		%REC	1	9/30/2015 10:53:09 PM	21562

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Blagg Engineering
Project: Mudge B 12R
Lab ID: 1509D18-007 **Matrix:** SOIL

Client Sample ID: GP-6 @ 38'
Collection Date: 9/24/2015 3:59:00 PM
Received Date: 9/26/2015 8:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **LGT**	
Chloride	ND	30		mg/Kg	20	9/30/2015 8:45:05 PM	21599
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **TOM**	
Diesel Range Organics (DRO)	56	9.6		mg/Kg	1	10/1/2015 3:18:15 AM	21554
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	10/1/2015 3:18:15 AM	21554
Surr: DNOP	109	57.9-140		%REC	1	10/1/2015 3:18:15 AM	21554
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	13	4.6		mg/Kg	1	9/30/2015 11:16:09 PM	21562
Surr: BFB	189	75.4-113	S	%REC	1	9/30/2015 11:16:09 PM	21562
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	ND	0.046		mg/Kg	1	9/30/2015 11:16:09 PM	21562
Toluene	ND	0.046		mg/Kg	1	9/30/2015 11:16:09 PM	21562
Ethylbenzene	ND	0.046		mg/Kg	1	9/30/2015 11:16:09 PM	21562
Xylenes, Total	0.094	0.092		mg/Kg	1	9/30/2015 11:16:09 PM	21562
Surr: 4-Bromofluorobenzene	106	80-120		%REC	1	9/30/2015 11:16:09 PM	21562

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Blagg Engineering
Project: Mudge B 12R
Lab ID: 1509D18-008 **Matrix:** SOIL

Client Sample ID: GP-6 @ 41'
Collection Date: 9/24/2015 4:30:00 PM
Received Date: 9/26/2015 8:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **LGT**	
Chloride	ND	30		mg/Kg	20	9/30/2015 8:57:29 PM	21599
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **TOM**	
Diesel Range Organics (DRO)	ND	9.6		mg/Kg	1	10/1/2015 3:39:35 AM	21554
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	10/1/2015 3:39:35 AM	21554
Surr: DNOP	106	57.9-140		%REC	1	10/1/2015 3:39:35 AM	21554
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	4.6		mg/Kg	1	10/1/2015 12:48:33 AM	21562
Surr: BFB	86.1	75.4-113		%REC	1	10/1/2015 12:48:33 AM	21562
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	ND	0.046		mg/Kg	1	10/1/2015 12:48:33 AM	21562
Toluene	ND	0.046		mg/Kg	1	10/1/2015 12:48:33 AM	21562
Ethylbenzene	ND	0.046		mg/Kg	1	10/1/2015 12:48:33 AM	21562
Xylenes, Total	ND	0.093		mg/Kg	1	10/1/2015 12:48:33 AM	21562
Surr: 4-Bromofluorobenzene	100	80-120		%REC	1	10/1/2015 12:48:33 AM	21562

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Blagg Engineering
Project: Mudge B 12R
Lab ID: 1509D18-009 **Matrix:** SOIL

Client Sample ID: GP-7 @ 36'
Collection Date: 9/25/2015 10:28:00 AM
Received Date: 9/26/2015 8:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **LGT**	
Chloride	40	30		mg/Kg	20	9/30/2015 9:09:54 PM	21599
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **TOM**	
Diesel Range Organics (DRO)	ND	9.5		mg/Kg	1	10/1/2015 4:01:13 AM	21554
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	10/1/2015 4:01:13 AM	21554
Surr: DNOP	108	57.9-140		%REC	1	10/1/2015 4:01:13 AM	21554
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	4.7		mg/Kg	1	10/1/2015 1:11:40 AM	21562
Surr: BFB	86.2	75.4-113		%REC	1	10/1/2015 1:11:40 AM	21562
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	ND	0.047		mg/Kg	1	10/1/2015 1:11:40 AM	21562
Toluene	ND	0.047		mg/Kg	1	10/1/2015 1:11:40 AM	21562
Ethylbenzene	ND	0.047		mg/Kg	1	10/1/2015 1:11:40 AM	21562
Xylenes, Total	ND	0.093		mg/Kg	1	10/1/2015 1:11:40 AM	21562
Surr: 4-Bromofluorobenzene	100	80-120		%REC	1	10/1/2015 1:11:40 AM	21562

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Blagg Engineering
Project: Mudge B 12R
Lab ID: 1509D18-010 **Matrix:** SOIL

Client Sample ID: GP-7 @ 41'
Collection Date: 9/25/2015 11:30:00 AM
Received Date: 9/26/2015 8:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **LGT**	
Chloride	ND	30		mg/Kg	20	9/30/2015 9:22:19 PM	21599
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **TOM**	
Diesel Range Organics (DRO)	ND	9.7		mg/Kg	1	10/1/2015 4:22:39 AM	21554
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	10/1/2015 4:22:39 AM	21554
Surr: DNOP	108	57.9-140		%REC	1	10/1/2015 4:22:39 AM	21554
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	4.7		mg/Kg	1	10/1/2015 1:34:43 AM	21562
Surr: BFB	87.0	75.4-113		%REC	1	10/1/2015 1:34:43 AM	21562
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	ND	0.047		mg/Kg	1	10/1/2015 1:34:43 AM	21562
Toluene	ND	0.047		mg/Kg	1	10/1/2015 1:34:43 AM	21562
Ethylbenzene	ND	0.047		mg/Kg	1	10/1/2015 1:34:43 AM	21562
Xylenes, Total	ND	0.093		mg/Kg	1	10/1/2015 1:34:43 AM	21562
Surr: 4-Bromofluorobenzene	102	80-120		%REC	1	10/1/2015 1:34:43 AM	21562

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Blagg Engineering
Project: Mudge B 12R
Lab ID: 1509D18-011 **Matrix:** SOIL

Client Sample ID: GP-8 @ 36'
Collection Date: 9/25/2015 12:28:00 PM
Received Date: 9/26/2015 8:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **LGT**	
Chloride	37	30		mg/Kg	20	9/30/2015 9:34:43 PM	21599
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **TOM**	
Diesel Range Organics (DRO)	ND	10		mg/Kg	1	10/1/2015 4:44:12 AM	21554
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	10/1/2015 4:44:12 AM	21554
Surr: DNOP	104	57.9-140		%REC	1	10/1/2015 4:44:12 AM	21554
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	4.7		mg/Kg	1	10/1/2015 1:57:52 AM	21562
Surr: BFB	87.8	75.4-113		%REC	1	10/1/2015 1:57:52 AM	21562
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	ND	0.047		mg/Kg	1	10/1/2015 1:57:52 AM	21562
Toluene	ND	0.047		mg/Kg	1	10/1/2015 1:57:52 AM	21562
Ethylbenzene	ND	0.047		mg/Kg	1	10/1/2015 1:57:52 AM	21562
Xylenes, Total	ND	0.093		mg/Kg	1	10/1/2015 1:57:52 AM	21562
Surr: 4-Bromofluorobenzene	104	80-120		%REC	1	10/1/2015 1:57:52 AM	21562

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.
D	Sample Diluted Due to Matrix
H	Holding times for preparation or analysis exceeded
ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits
S	% Recovery outside of range due to dilution or matrix
B	Analyte detected in the associated Method Blank
E	Value above quantitation range
J	Analyte detected below quantitation limits
P	Sample pH Not In Range
RL	Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Blagg Engineering
Project: Mudge B 12R
Lab ID: 1509D18-012 **Matrix:** SOIL

Client Sample ID: GP-8 @ 41'
Collection Date: 9/25/2015 12:55:00 PM
Received Date: 9/26/2015 8:30:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **LGT**	
Chloride	ND	30		mg/Kg	20	9/30/2015 9:47:08 PM	21599
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **TOM**	
Diesel Range Organics (DRO)	ND	9.9		mg/Kg	1	10/1/2015 5:05:34 AM	21554
Motor Oil Range Organics (MRO)	ND	49		mg/Kg	1	10/1/2015 5:05:34 AM	21554
Surr: DNOP	109	57.9-140		%REC	1	10/1/2015 5:05:34 AM	21554
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	4.6		mg/Kg	1	10/1/2015 2:44:00 AM	21562
Surr: BFB	87.1	75.4-113		%REC	1	10/1/2015 2:44:00 AM	21562
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**	
Benzene	ND	0.046		mg/Kg	1	10/1/2015 2:44:00 AM	21562
Toluene	ND	0.046		mg/Kg	1	10/1/2015 2:44:00 AM	21562
Ethylbenzene	ND	0.046		mg/Kg	1	10/1/2015 2:44:00 AM	21562
Xylenes, Total	ND	0.093		mg/Kg	1	10/1/2015 2:44:00 AM	21562
Surr: 4-Bromofluorobenzene	103	80-120		%REC	1	10/1/2015 2:44:00 AM	21562

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1509D18**

05-Oct-15

Client: Blagg Engineering

Project: Mudge B 12R

Sample ID	**MB-21599**	SampType:	**MBLK**	TestCode:	**EPA Method 300.0: Anions**					
Client ID:	**PBS**	Batch ID:	**21599**	RunNo:	**29225**					
Prep Date:	**9/30/2015**	Analysis Date:	**9/30/2015**	SeqNo:	**888014**	Units:	**mg/Kg**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID	**LCS-21599**	SampType:	**LCS**	TestCode:	**EPA Method 300.0: Anions**					
Client ID:	**LCSS**	Batch ID:	**21599**	RunNo:	**29225**					
Prep Date:	**9/30/2015**	Analysis Date:	**9/30/2015**	SeqNo:	**888015**	Units:	**mg/Kg**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	94.8	90	110			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1509D18**

05-Oct-15

Client: Blagg Engineering

Project: Mudge B 12R

Sample ID **MB-21554**	SampType: **MBLK**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **PBS**	Batch ID: **21554**	RunNo: **29205**
Prep Date: **9/29/2015**	Analysis Date: **9/30/2015**	SeqNo: **887145** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	9.6		10.00		95.8	57.9	140			

Sample ID **LCS-21554**	SampType: **LCS**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **LCSS**	Batch ID: **21554**	RunNo: **29205**
Prep Date: **9/29/2015**	Analysis Date: **9/30/2015**	SeqNo: **887161** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	46	10	50.00	0	91.7	57.4	139			
Surr: DNOP	5.0		5.000		99.4	57.9	140			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1509D18**

05-Oct-15

Client: Blagg Engineering

Project: Mudge B 12R

Sample ID **MB-21562**	SampType: **MBLK**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **PBS**	Batch ID: **21562**	RunNo: **29220**
Prep Date: **9/29/2015**	Analysis Date: **9/30/2015**	SeqNo: **887525** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	850		1000		85.5	75.4	113			

Sample ID **LCS-21562**	SampType: **LCS**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **LCSS**	Batch ID: **21562**	RunNo: **29220**
Prep Date: **9/29/2015**	Analysis Date: **9/30/2015**	SeqNo: **887526** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	25	5.0	25.00	0	99.1	79.6	122			
Surr: BFB	920		1000		92.4	75.4	113			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1509D18**

05-Oct-15

Client: Blagg Engineering

Project: Mudge B 12R

Sample ID **MB-21562**	SampType: **MBLK**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **PBS**	Batch ID: **21562**	RunNo: **29220**
Prep Date: **9/29/2015**	Analysis Date: **9/30/2015**	SeqNo: **887599** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.050								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 4-Bromofluorobenzene	1.0		1.000		102	80	120			

Sample ID **LCS-21562**	SampType: **LCS**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **LCSS**	Batch ID: **21562**	RunNo: **29220**
Prep Date: **9/29/2015**	Analysis Date: **9/30/2015**	SeqNo: **887600** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	1.0	0.050	1.000	0	101	80	120			
Toluene	0.98	0.050	1.000	0	97.8	80	120			
Ethylbenzene	1.0	0.050	1.000	0	101	80	120			
Xylenes, Total	3.0	0.10	3.000	0	101	80	120			
Surr: 4-Bromofluorobenzene	1.1		1.000		110	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix		

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: BLAGG Work Order Number: 1509D18 RcptNo: 1

Received by/date: RM 09/26/15

Logged By: Ashley Gallegos 9/26/2015 8:30:00 AM

Completed By: Ashley Gallegos 9/28/2015 1:53:44 PM

Reviewed By: 09/29/15

Chain of Custody

1. Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
2. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
3. How was the sample delivered?	Courier		

Log In

4. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
5. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
6. Sample(s) in proper container(s)?	Yes ☑	No ☐	
7. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
8. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
9. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
10. VOA vials have zero headspace?	Yes ☐	No ☐	No VOA Vials ☑
11. Were any sample containers received broken?	Yes ☐	No ☑	# of preserved bottles checked for pH: (<2 or >12 unless noted)
12. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
13. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	Adjusted?
14. Is it clear what analyses were requested?	Yes ☑	No ☐	
15. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	Checked by:

Special Handling (if applicable)

16. 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: _____

17. Additional remarks:

18. Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	1.3	Good	Yes			

Chain-of-Custody Record

Client: BP AMERICA

BLAGG

Mailing Address:

Phone #:

email or Fax#:

QA/QC Package:
☒ Standard ☐ Level 4 (Full Validation)

Accreditation
☐ NELAP ☐ Other

☐ EDD (Type)

Turn-Around Time:
☒ Standard ☐ Rush

Project Name: MUDGE B 12R

Project #:

Project Manager: J. BLAGG

Sampler: J. BLAGG
On Ice: ☒ Yes ☐ No
Sample Temperature: 1.4 - 0.1cf = 1.3

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 1509D18	BTEX + ~~MTBE + TMB's~~ (8021)	BTEX + MTBE + TPH (Gas only)	TPH 8015B (GRO / DRO / MRO)	TPH (Method 418.1)	EDB (Method 504.1)	PAH's (8310 or 8270 SIMS)	RCRA 8 Metals	Anions ($F, Cl, NO_3, NO_2, PO_4, SO_4$)	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)	CHLORIDE				Air Bubbles (Y or N)
9/24/15	0927	SOIL	GP-3 @ 36'	4 oz x 1	COOL	-001	X		X									X				
"	1038	"	GP-3 @ 42'	"	"	-002	X		X									X				
"	1210	"	GP-4 @ 38'	"	"	-003	X		X									X				
"	1218	"	GP-4 @ 42'	"	"	-004	X		X									X				
"	1419	"	GP-5 @ 36'	"	"	-005	X		X									X				
"	1450	"	GP-5 @ 42'	"	"	-006	X		X									X				
"	1559	"	GP-6 @ 38'	"	"	-007	X		X									X				
"	1630	"	GP-6 @ 41'	"	"	-008	X		X									X				
9/25/15	1028	"	GP-7 @ 36'	"	"	-009	X		X									X				
"	1130	"	GP-7 @ 41'	"	"	-010	X		X									X				
"	1228	"	GP-8 @ 36'	"	"	-011	X		X									X				
"	1255	"	GP-8 @ 41'	"	"	-012	X		X									X				

Date:	Time:	Relinquished by:	Received by:	Date	Time
9/25/2015	1715	Jeff Blagg	Mindy Walker	9/25/15	1715
9/25/15	1910	Chad Walker			
				09/26/15	0830

Remarks: BILL BP
BILLING INFO TO FOLLOW

BP CONTACTS: STEVE MOSKAL & JOHN RITCHIE

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

Groundwater Monitoring Data

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

October 04, 2018

Steve Moskal

Blagg Engineering
P. O. Box 87
Bloomfield, NM 87413
TEL: (505) 632-1199
FAX (505) 632-3903

RE: Mudge B 12R OrderNo.: 1809H33

Dear Steve Moskal:

Hall Environmental Analysis Laboratory received 3 sample(s) on 9/28/2018 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Blagg Engineering
Project: Mudge B 12R
Lab ID: 1809H33-001 **Matrix:** AQUEOUS

Client Sample ID: MW #1
Collection Date: 9/26/2018 9:05:00 AM
Received Date: 9/28/2018 8:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**	
Benzene	ND	1.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
Toluene	ND	1.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
Ethylbenzene	ND	1.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
1,2-Dichloroethane (EDC)	ND	1.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
Naphthalene	ND	2.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
1-Methylnaphthalene	ND	4.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
2-Methylnaphthalene	ND	4.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
Acetone	ND	10		µg/L	1	10/1/2018 4:35:00 PM	R54556
Bromobenzene	ND	1.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
Bromodichloromethane	ND	1.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
Bromoform	ND	1.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
Bromomethane	ND	3.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
2-Butanone	ND	10		µg/L	1	10/1/2018 4:35:00 PM	R54556
Carbon disulfide	ND	10		µg/L	1	10/1/2018 4:35:00 PM	R54556
Carbon Tetrachloride	ND	1.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
Chlorobenzene	ND	1.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
Chloroethane	ND	2.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
Chloroform	ND	1.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
Chloromethane	ND	3.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
2-Chlorotoluene	ND	1.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
4-Chlorotoluene	ND	1.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
cis-1,2-DCE	ND	1.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
Dibromochloromethane	ND	1.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
Dibromomethane	ND	1.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
1,2-Dichlorobenzene	ND	1.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
1,3-Dichlorobenzene	ND	1.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
1,4-Dichlorobenzene	ND	1.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
Dichlorodifluoromethane	ND	1.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
1,1-Dichloroethane	ND	1.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
1,1-Dichloroethene	ND	1.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
1,2-Dichloropropane	ND	1.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
1,3-Dichloropropane	ND	1.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
2,2-Dichloropropane	ND	2.0		µg/L	1	10/1/2018 4:35:00 PM	R54556

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Blagg Engineering
Project: Mudge B 12R
Lab ID: 1809H33-001
Matrix: AQUEOUS

Client Sample ID: MW #1
Collection Date: 9/26/2018 9:05:00 AM
Received Date: 9/28/2018 8:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**	
1,1-Dichloropropene	ND	1.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
Hexachlorobutadiene	ND	1.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
2-Hexanone	ND	10		µg/L	1	10/1/2018 4:35:00 PM	R54556
Isopropylbenzene	ND	1.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
4-Isopropyltoluene	ND	1.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
4-Methyl-2-pentanone	ND	10		µg/L	1	10/1/2018 4:35:00 PM	R54556
Methylene Chloride	ND	3.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
n-Butylbenzene	ND	3.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
n-Propylbenzene	ND	1.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
sec-Butylbenzene	ND	1.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
Styrene	ND	1.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
tert-Butylbenzene	ND	1.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
1,1,2,2-Tetrachloroethane	ND	2.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
Tetrachloroethene (PCE)	ND	1.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
trans-1,2-DCE	ND	1.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
trans-1,3-Dichloropropene	ND	1.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
1,2,3-Trichlorobenzene	ND	1.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
1,2,4-Trichlorobenzene	ND	1.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
1,1,1-Trichloroethane	ND	1.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
1,1,2-Trichloroethane	ND	1.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
Trichloroethene (TCE)	ND	1.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
Trichlorofluoromethane	ND	1.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
1,2,3-Trichloropropane	ND	2.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
Vinyl chloride	ND	1.0		µg/L	1	10/1/2018 4:35:00 PM	R54556
Xylenes, Total	ND	1.5		µg/L	1	10/1/2018 4:35:00 PM	R54556
Surr: 1,2-Dichloroethane-d4	111	70-130		%Rec	1	10/1/2018 4:35:00 PM	R54556
Surr: 4-Bromofluorobenzene	102	70-130		%Rec	1	10/1/2018 4:35:00 PM	R54556
Surr: Dibromofluoromethane	113	70-130		%Rec	1	10/1/2018 4:35:00 PM	R54556
Surr: Toluene-d8	97.0	70-130		%Rec	1	10/1/2018 4:35:00 PM	R54556

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Blagg Engineering
Client Sample ID: MW #2
Project: Mudge B 12R
Collection Date: 9/26/2018 10:50:00 AM
Lab ID: 1809H33-002
Matrix: AQUEOUS
Received Date: 9/28/2018 8:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**	
Benzene	140	5.0		µg/L	5	10/1/2018 5:00:00 PM	R54556
Toluene	ND	5.0		µg/L	5	10/1/2018 5:00:00 PM	R54556
Ethylbenzene	320	5.0		µg/L	5	10/1/2018 5:00:00 PM	R54556
Methyl tert-butyl ether (MTBE)	ND	5.0		µg/L	5	10/1/2018 5:00:00 PM	R54556
1,2,4-Trimethylbenzene	190	5.0		µg/L	5	10/1/2018 5:00:00 PM	R54556
1,3,5-Trimethylbenzene	5.9	5.0		µg/L	5	10/1/2018 5:00:00 PM	R54556
1,2-Dichloroethane (EDC)	ND	5.0		µg/L	5	10/1/2018 5:00:00 PM	R54556
1,2-Dibromoethane (EDB)	ND	5.0		µg/L	5	10/1/2018 5:00:00 PM	R54556
Naphthalene	ND	10		µg/L	5	10/1/2018 5:00:00 PM	R54556
1-Methylnaphthalene	ND	20		µg/L	5	10/1/2018 5:00:00 PM	R54556
2-Methylnaphthalene	ND	20		µg/L	5	10/1/2018 5:00:00 PM	R54556
Acetone	ND	50		µg/L	5	10/1/2018 5:00:00 PM	R54556
Bromobenzene	ND	5.0		µg/L	5	10/1/2018 5:00:00 PM	R54556
Bromodichloromethane	ND	5.0		µg/L	5	10/1/2018 5:00:00 PM	R54556
Bromoform	ND	5.0		µg/L	5	10/1/2018 5:00:00 PM	R54556
Bromomethane	ND	15		µg/L	5	10/1/2018 5:00:00 PM	R54556
2-Butanone	54	50		µg/L	5	10/1/2018 5:00:00 PM	R54556
Carbon disulfide	ND	50		µg/L	5	10/1/2018 5:00:00 PM	R54556
Carbon Tetrachloride	ND	5.0		µg/L	5	10/1/2018 5:00:00 PM	R54556
Chlorobenzene	ND	5.0		µg/L	5	10/1/2018 5:00:00 PM	R54556
Chloroethane	ND	10		µg/L	5	10/1/2018 5:00:00 PM	R54556
Chloroform	ND	5.0		µg/L	5	10/1/2018 5:00:00 PM	R54556
Chloromethane	ND	15		µg/L	5	10/1/2018 5:00:00 PM	R54556
2-Chlorotoluene	ND	5.0		µg/L	5	10/1/2018 5:00:00 PM	R54556
4-Chlorotoluene	ND	5.0		µg/L	5	10/1/2018 5:00:00 PM	R54556
cis-1,2-DCE	ND	5.0		µg/L	5	10/1/2018 5:00:00 PM	R54556
cis-1,3-Dichloropropene	ND	5.0		µg/L	5	10/1/2018 5:00:00 PM	R54556
1,2-Dibromo-3-chloropropane	ND	10		µg/L	5	10/1/2018 5:00:00 PM	R54556
Dibromochloromethane	ND	5.0		µg/L	5	10/1/2018 5:00:00 PM	R54556
Dibromomethane	ND	5.0		µg/L	5	10/1/2018 5:00:00 PM	R54556
1,2-Dichlorobenzene	ND	5.0		µg/L	5	10/1/2018 5:00:00 PM	R54556
1,3-Dichlorobenzene	ND	5.0		µg/L	5	10/1/2018 5:00:00 PM	R54556
1,4-Dichlorobenzene	ND	5.0		µg/L	5	10/1/2018 5:00:00 PM	R54556
Dichlorodifluoromethane	ND	5.0		µg/L	5	10/1/2018 5:00:00 PM	R54556
1,1-Dichloroethane	ND	5.0		µg/L	5	10/1/2018 5:00:00 PM	R54556
1,1-Dichloroethene	ND	5.0		µg/L	5	10/1/2018 5:00:00 PM	R54556
1,2-Dichloropropane	ND	5.0		µg/L	5	10/1/2018 5:00:00 PM	R54556
1,3-Dichloropropane	ND	5.0		µg/L	5	10/1/2018 5:00:00 PM	R54556
2,2-Dichloropropane	ND	10		µg/L	5	10/1/2018 5:00:00 PM	R54556

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Blagg Engineering
Project: Mudge B 12R
Lab ID: 1809H33-002 **Matrix:** AQUEOUS

Client Sample ID: MW #2
Collection Date: 9/26/2018 10:50:00 AM
Received Date: 9/28/2018 8:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**	
1,1-Dichloropropene	ND	5.0		µg/L	5	10/1/2018 5:00:00 PM	R54556
Hexachlorobutadiene	ND	5.0		µg/L	5	10/1/2018 5:00:00 PM	R54556
2-Hexanone	ND	50		µg/L	5	10/1/2018 5:00:00 PM	R54556
Isopropylbenzene	31	5.0		µg/L	5	10/1/2018 5:00:00 PM	R54556
4-Isopropyltoluene	6.6	5.0		µg/L	5	10/1/2018 5:00:00 PM	R54556
4-Methyl-2-pentanone	ND	50		µg/L	5	10/1/2018 5:00:00 PM	R54556
Methylene Chloride	ND	15		µg/L	5	10/1/2018 5:00:00 PM	R54556
n-Butylbenzene	ND	15		µg/L	5	10/1/2018 5:00:00 PM	R54556
n-Propylbenzene	34	5.0		µg/L	5	10/1/2018 5:00:00 PM	R54556
sec-Butylbenzene	7.4	5.0		µg/L	5	10/1/2018 5:00:00 PM	R54556
Styrene	ND	5.0		µg/L	5	10/1/2018 5:00:00 PM	R54556
tert-Butylbenzene	ND	5.0		µg/L	5	10/1/2018 5:00:00 PM	R54556
1,1,1,2-Tetrachloroethane	ND	5.0		µg/L	5	10/1/2018 5:00:00 PM	R54556
1,1,2,2-Tetrachloroethane	ND	10		µg/L	5	10/1/2018 5:00:00 PM	R54556
Tetrachloroethene (PCE)	ND	5.0		µg/L	5	10/1/2018 5:00:00 PM	R54556
trans-1,2-DCE	ND	5.0		µg/L	5	10/1/2018 5:00:00 PM	R54556
trans-1,3-Dichloropropene	ND	5.0		µg/L	5	10/1/2018 5:00:00 PM	R54556
1,2,3-Trichlorobenzene	ND	5.0		µg/L	5	10/1/2018 5:00:00 PM	R54556
1,2,4-Trichlorobenzene	ND	5.0		µg/L	5	10/1/2018 5:00:00 PM	R54556
1,1,1-Trichloroethane	ND	5.0		µg/L	5	10/1/2018 5:00:00 PM	R54556
1,1,2-Trichloroethane	ND	5.0		µg/L	5	10/1/2018 5:00:00 PM	R54556
Trichloroethene (TCE)	ND	5.0		µg/L	5	10/1/2018 5:00:00 PM	R54556
Trichlorofluoromethane	ND	5.0		µg/L	5	10/1/2018 5:00:00 PM	R54556
1,2,3-Trichloropropane	ND	10		µg/L	5	10/1/2018 5:00:00 PM	R54556
Vinyl chloride	ND	5.0		µg/L	5	10/1/2018 5:00:00 PM	R54556
Xylenes, Total	620	7.5		µg/L	5	10/1/2018 5:00:00 PM	R54556
Surr: 1,2-Dichloroethane-d4	104	70-130		%Rec	5	10/1/2018 5:00:00 PM	R54556
Surr: 4-Bromofluorobenzene	102	70-130		%Rec	5	10/1/2018 5:00:00 PM	R54556
Surr: Dibromofluoromethane	108	70-130		%Rec	5	10/1/2018 5:00:00 PM	R54556
Surr: Toluene-d8	107	70-130		%Rec	5	10/1/2018 5:00:00 PM	R54556

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Blagg Engineering
Project: Mudge B 12R
Lab ID: 1809H33-003 **Matrix:** AQUEOUS

Client Sample ID: MW #3
Collection Date: 9/26/2018 10:00:00 AM
Received Date: 9/28/2018 8:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**	
Benzene	13	1.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
Toluene	ND	1.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
Ethylbenzene	ND	1.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
1,2,4-Trimethylbenzene	3.4	1.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
1,2-Dichloroethane (EDC)	ND	1.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
Naphthalene	ND	2.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
1-Methylnaphthalene	ND	4.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
2-Methylnaphthalene	ND	4.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
Acetone	ND	10		µg/L	1	10/1/2018 5:24:00 PM	R54556
Bromobenzene	ND	1.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
Bromodichloromethane	ND	1.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
Bromoform	ND	1.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
Bromomethane	ND	3.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
2-Butanone	ND	10		µg/L	1	10/1/2018 5:24:00 PM	R54556
Carbon disulfide	ND	10		µg/L	1	10/1/2018 5:24:00 PM	R54556
Carbon Tetrachloride	ND	1.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
Chlorobenzene	ND	1.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
Chloroethane	ND	2.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
Chloroform	ND	1.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
Chloromethane	ND	3.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
2-Chlorotoluene	ND	1.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
4-Chlorotoluene	ND	1.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
cis-1,2-DCE	ND	1.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
Dibromochloromethane	ND	1.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
Dibromomethane	ND	1.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
1,2-Dichlorobenzene	ND	1.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
1,3-Dichlorobenzene	ND	1.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
1,4-Dichlorobenzene	ND	1.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
Dichlorodifluoromethane	ND	1.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
1,1-Dichloroethane	ND	1.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
1,1-Dichloroethene	ND	1.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
1,2-Dichloropropane	ND	1.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
1,3-Dichloropropane	ND	1.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
2,2-Dichloropropane	ND	2.0		µg/L	1	10/1/2018 5:24:00 PM	R54556

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Blagg Engineering
Project: Mudge B 12R
Lab ID: 1809H33-003
Matrix: AQUEOUS
Client Sample ID: MW #3
Collection Date: 9/26/2018 10:00:00 AM
Received Date: 9/28/2018 8:40:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**	
1,1-Dichloropropene	ND	1.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
Hexachlorobutadiene	ND	1.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
2-Hexanone	ND	10		µg/L	1	10/1/2018 5:24:00 PM	R54556
Isopropylbenzene	ND	1.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
4-Isopropyltoluene	ND	1.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
4-Methyl-2-pentanone	ND	10		µg/L	1	10/1/2018 5:24:00 PM	R54556
Methylene Chloride	ND	3.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
n-Butylbenzene	ND	3.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
n-Propylbenzene	ND	1.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
sec-Butylbenzene	ND	1.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
Styrene	ND	1.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
tert-Butylbenzene	ND	1.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
1,1,2,2-Tetrachloroethane	ND	2.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
Tetrachloroethene (PCE)	ND	1.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
trans-1,2-DCE	ND	1.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
trans-1,3-Dichloropropene	ND	1.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
1,2,3-Trichlorobenzene	ND	1.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
1,2,4-Trichlorobenzene	ND	1.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
1,1,1-Trichloroethane	ND	1.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
1,1,2-Trichloroethane	ND	1.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
Trichloroethene (TCE)	ND	1.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
Trichlorofluoromethane	ND	1.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
1,2,3-Trichloropropane	ND	2.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
Vinyl chloride	ND	1.0		µg/L	1	10/1/2018 5:24:00 PM	R54556
Xylenes, Total	ND	1.5		µg/L	1	10/1/2018 5:24:00 PM	R54556
Surr: 1,2-Dichloroethane-d4	106	70-130		%Rec	1	10/1/2018 5:24:00 PM	R54556
Surr: 4-Bromofluorobenzene	99.2	70-130		%Rec	1	10/1/2018 5:24:00 PM	R54556
Surr: Dibromofluoromethane	110	70-130		%Rec	1	10/1/2018 5:24:00 PM	R54556
Surr: Toluene-d8	99.5	70-130		%Rec	1	10/1/2018 5:24:00 PM	R54556

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1809H33**

04-Oct-18

Client: Blagg Engineering

Project: Mudge B 12R

Sample ID **100ng lcs**	SampType: **LCS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSW**	Batch ID: **R54556**	RunNo: **54556**
Prep Date:	Analysis Date: **10/1/2018**	SeqNo: **1808975** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	21	1.0	20.00	0	104	70	130			
Toluene	21	1.0	20.00	0	105	70	130			
Chlorobenzene	22	1.0	20.00	0	108	70	130			
1,1-Dichloroethene	22	1.0	20.00	0	111	70	130			
Trichloroethene (TCE)	20	1.0	20.00	0	99.9	70	130			
Surr: 1,2-Dichloroethane-d4	9.8		10.00		98.2	70	130			
Surr: 4-Bromofluorobenzene	10		10.00		102	70	130			
Surr: Dibromofluoromethane	10		10.00		104	70	130			
Surr: Toluene-d8	10		10.00		99.8	70	130			

Sample ID **RB**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R54556**	RunNo: **54556**
Prep Date:	Analysis Date: **10/1/2018**	SeqNo: **1808978** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	1.0								
Toluene	ND	1.0								
Ethylbenzene	ND	1.0								
Methyl tert-butyl ether (MTBE)	ND	1.0								
1,2,4-Trimethylbenzene	ND	1.0								
1,3,5-Trimethylbenzene	ND	1.0								
1,2-Dichloroethane (EDC)	ND	1.0								
1,2-Dibromoethane (EDB)	ND	1.0								
Naphthalene	ND	2.0								
1-Methylnaphthalene	ND	4.0								
2-Methylnaphthalene	ND	4.0								
Acetone	ND	10								
Bromobenzene	ND	1.0								
Bromodichloromethane	ND	1.0								
Bromoform	ND	1.0								
Bromomethane	ND	3.0								
2-Butanone	ND	10								
Carbon disulfide	ND	10								
Carbon Tetrachloride	ND	1.0								
Chlorobenzene	ND	1.0								
Chloroethane	ND	2.0								
Chloroform	ND	1.0								
Chloromethane	ND	3.0								
2-Chlorotoluene	ND	1.0								

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1809H33**

04-Oct-18

Client: Blagg Engineering

Project: Mudge B 12R

Sample ID **RB**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R54556**	RunNo: **54556**
Prep Date:	Analysis Date: **10/1/2018**	SeqNo: **1808978** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
4-Chlorotoluene	ND	1.0								
cis-1,2-DCE	ND	1.0								
cis-1,3-Dichloropropene	ND	1.0								
1,2-Dibromo-3-chloropropane	ND	2.0								
Dibromochloromethane	ND	1.0								
Dibromomethane	ND	1.0								
1,2-Dichlorobenzene	ND	1.0								
1,3-Dichlorobenzene	ND	1.0								
1,4-Dichlorobenzene	ND	1.0								
Dichlorodifluoromethane	ND	1.0								
1,1-Dichloroethane	ND	1.0								
1,1-Dichloroethene	ND	1.0								
1,2-Dichloropropane	ND	1.0								
1,3-Dichloropropane	ND	1.0								
2,2-Dichloropropane	ND	2.0								
1,1-Dichloropropene	ND	1.0								
Hexachlorobutadiene	ND	1.0								
2-Hexanone	ND	10								
Isopropylbenzene	ND	1.0								
4-Isopropyltoluene	ND	1.0								
4-Methyl-2-pentanone	ND	10								
Methylene Chloride	ND	3.0								
n-Butylbenzene	ND	3.0								
n-Propylbenzene	ND	1.0								
sec-Butylbenzene	ND	1.0								
Styrene	ND	1.0								
tert-Butylbenzene	ND	1.0								
1,1,1,2-Tetrachloroethane	ND	1.0								
1,1,2,2-Tetrachloroethane	ND	2.0								
Tetrachloroethene (PCE)	ND	1.0								
trans-1,2-DCE	ND	1.0								
trans-1,3-Dichloropropene	ND	1.0								
1,2,3-Trichlorobenzene	ND	1.0								
1,2,4-Trichlorobenzene	ND	1.0								
1,1,1-Trichloroethane	ND	1.0								
1,1,2-Trichloroethane	ND	1.0								
Trichloroethene (TCE)	ND	1.0								
Trichlorofluoromethane	ND	1.0								
1,2,3-Trichloropropane	ND	2.0								

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1809H33**

04-Oct-18

Client: Blagg Engineering

Project: Mudge B 12R

Sample ID **RB**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R54556**	RunNo: **54556**
Prep Date:	Analysis Date: **10/1/2018**	SeqNo: **1808978** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Vinyl chloride	ND	1.0								
Xylenes, Total	ND	1.5								
Surr: 1,2-Dichloroethane-d4	10		10.00		104	70	130			
Surr: 4-Bromofluorobenzene	10		10.00		99.5	70	130			
Surr: Dibromofluoromethane	11		10.00		106	70	130			
Surr: Toluene-d8	9.9		10.00		99.0	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: **BLAGG** Work Order Number: **1809H33** RcptNo: **1**

Received By: **Anne Thorne** **9/28/2018 8:40:00 AM** Anne Thorne

Completed By: **Ashley Gallegos** **9/28/2018 11:21:58 AM** AG

Reviewed By: Thom Mayhew labeled by: JC 9.28.18

Chain of Custody

1. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2. How was the sample delivered?	Courier		

Log In

3. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
5. Sample(s) in proper container(s)?	Yes ☑	No ☐	
6. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
7. Are samples (except VOA and ONG) properly preserved?	Yes ☑	No ☐	
8. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
9. VOA vials have zero headspace?	Yes ☑	No ☐	No VOA Vials ☐
10. Were any sample containers received broken?	Yes ☐	No ☑	
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	
12. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
13. Is it clear what analyses were requested?	Yes ☑	No ☐	
14. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	

# of preserved bottles checked for pH: _____ (<2 or >12 unless noted)

Adjusted? JC 9.28.18

Checked by: _____

Special Handling (if applicable)

15. 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: _____

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	1.3	Good	Yes			

Chain-of-Custody Record

Client: BLAGG ENGR. / BP AMERICA

Mailing Address: P.O. BOX 87
BLOOMFIELD, NM 87413

Phone #: (505) 632-1199

email or Fax#:

QA/QC Package:
☑ Standard ☐ Level 4 (Full Validation)

Accreditation:
☐ NELAP ☐ Other

☐ EDD (Type)

Turn-Around Time:
☑ Standard ☐ Rush

Project Name:
MUDGE B #12R

Project #:

Project Manager:
STEVE MOSKAL

Sampler: NELSON VELEZ

On Ice: ☒ Yes ☐ No

Sample Temperature: 2-3-CF-1.0=1.3

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 1809183
9/26/18	0965	WATER	MW # 1	40 ml VOA - 2	HCl & Cool	-001
9/25/18	1050	WATER	MW # 2	40 ml VOA - 2	HCl & Cool	-002
9/26/18	1000	WATER	MW # 3	40 ml VOA - 2	HCl & Cool	-003

Analysis Request

BTEX + MTBE + TMB's (8021B)	BTEX + MTBE + TPH (Gas only)	TPH 8015B (GRO / DRO / MRO)	TPH (Method 418.1)	EDB (Method 504.1)	PAH (8310 or 8270SIMS)	RCRA 8 Metals	Anions (F,Cl,NO_3,NO_2,PO_4,SO_4)	8081 Pesticides / 8082 PCB's	8260B (VOA)	Cation / Anion Balance	Total Dissolved Solids		Grab sample	5 pt. composite sample	Air Bubbles (Y or N)
									✓				✓		
									✓				✓		
									✓				✓		

Date	Time	Relinquished by:	Received by:	Date	Time
9/27/18	1541			9/27/18	1541
9/27/18	1824			09/28/18	0840

Remarks:
BILL DIRECTLY TO BP:
Contact: Steve Moskal
SIO #: 190040007685
WBS ELEMENT: L1-001CV-E:MUDGEB12R

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

July 09, 2018

Steve Moskal

Blagg Engineering
P. O. Box 87
Bloomfield, NM 87413
TEL: (505) 632-1199
FAX (505) 632-3903

RE: Mudge B 12R OrderNo.: 1806I49

Dear Steve Moskal:

Hall Environmental Analysis Laboratory received 3 sample(s) on 6/30/2018 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Analytical Report
Lab Order **1806I49**
Date Reported: **7/9/2018**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Blagg Engineering
Project: Mudge B 12R
Lab ID: 1806I49-001 **Matrix:** AQUEOUS

Client Sample ID: MW #1
Collection Date: 6/28/2018 7:15:00 AM
Received Date: 6/30/2018 10:15:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**	
Benzene	ND	1.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
Toluene	ND	1.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
Ethylbenzene	ND	1.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
1,2,4-Trimethylbenzene	ND	1.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
1,2-Dichloroethane (EDC)	ND	1.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
Naphthalene	ND	2.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
1-Methylnaphthalene	ND	4.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
2-Methylnaphthalene	ND	4.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
Acetone	ND	10		µg/L	1	7/6/2018 6:22:00 PM	R52521
Bromobenzene	ND	1.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
Bromodichloromethane	ND	1.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
Bromoform	ND	1.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
Bromomethane	ND	3.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
2-Butanone	ND	10		µg/L	1	7/6/2018 6:22:00 PM	R52521
Carbon disulfide	ND	10		µg/L	1	7/6/2018 6:22:00 PM	R52521
Carbon Tetrachloride	ND	1.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
Chlorobenzene	ND	1.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
Chloroethane	ND	2.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
Chloroform	ND	1.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
Chloromethane	ND	3.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
2-Chlorotoluene	ND	1.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
4-Chlorotoluene	ND	1.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
cis-1,2-DCE	ND	1.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
Dibromochloromethane	ND	1.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
Dibromomethane	ND	1.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
1,2-Dichlorobenzene	ND	1.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
1,3-Dichlorobenzene	ND	1.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
1,4-Dichlorobenzene	ND	1.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
Dichlorodifluoromethane	ND	1.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
1,1-Dichloroethane	ND	1.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
1,1-Dichloroethene	ND	1.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
1,2-Dichloropropane	ND	1.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
1,3-Dichloropropane	ND	1.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
2,2-Dichloropropane	ND	2.0		µg/L	1	7/6/2018 6:22:00 PM	R52521

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Blagg Engineering
Project: Mudge B 12R
Lab ID: 1806I49-001
Matrix: AQUEOUS
Client Sample ID: MW #1
Collection Date: 6/28/2018 7:15:00 AM
Received Date: 6/30/2018 10:15:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**	
1,1-Dichloropropene	ND	1.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
Hexachlorobutadiene	ND	1.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
2-Hexanone	ND	10		µg/L	1	7/6/2018 6:22:00 PM	R52521
Isopropylbenzene	ND	1.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
4-Isopropyltoluene	ND	1.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
4-Methyl-2-pentanone	ND	10		µg/L	1	7/6/2018 6:22:00 PM	R52521
Methylene Chloride	ND	3.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
n-Butylbenzene	ND	3.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
n-Propylbenzene	ND	1.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
sec-Butylbenzene	ND	1.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
Styrene	ND	1.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
tert-Butylbenzene	ND	1.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
1,1,2,2-Tetrachloroethane	ND	2.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
Tetrachloroethene (PCE)	ND	1.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
trans-1,2-DCE	ND	1.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
trans-1,3-Dichloropropene	ND	1.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
1,2,3-Trichlorobenzene	ND	1.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
1,2,4-Trichlorobenzene	ND	1.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
1,1,1-Trichloroethane	ND	1.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
1,1,2-Trichloroethane	ND	1.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
Trichloroethene (TCE)	ND	1.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
Trichlorofluoromethane	ND	1.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
1,2,3-Trichloropropane	ND	2.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
Vinyl chloride	ND	1.0		µg/L	1	7/6/2018 6:22:00 PM	R52521
Xylenes, Total	ND	1.5		µg/L	1	7/6/2018 6:22:00 PM	R52521
Surr: 1,2-Dichloroethane-d4	99.0	70-130		%Rec	1	7/6/2018 6:22:00 PM	R52521
Surr: 4-Bromofluorobenzene	95.8	70-130		%Rec	1	7/6/2018 6:22:00 PM	R52521
Surr: Dibromofluoromethane	94.1	70-130		%Rec	1	7/6/2018 6:22:00 PM	R52521
Surr: Toluene-d8	96.4	70-130		%Rec	1	7/6/2018 6:22:00 PM	R52521

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Blagg Engineering
Client Sample ID: MW #2
Project: Mudge B 12R
Collection Date: 6/28/2018 8:55:00 AM
Lab ID: 1806I49-002
Matrix: AQUEOUS
Received Date: 6/30/2018 10:15:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES							Analyst: **RAA**
Benzene	110	5.0		µg/L	5	7/6/2018 3:55:00 PM	R52521
Toluene	ND	5.0		µg/L	5	7/6/2018 3:55:00 PM	R52521
Ethylbenzene	270	5.0		µg/L	5	7/6/2018 3:55:00 PM	R52521
Methyl tert-butyl ether (MTBE)	ND	5.0		µg/L	5	7/6/2018 3:55:00 PM	R52521
1,2,4-Trimethylbenzene	190	5.0		µg/L	5	7/6/2018 3:55:00 PM	R52521
1,3,5-Trimethylbenzene	7.9	5.0		µg/L	5	7/6/2018 3:55:00 PM	R52521
1,2-Dichloroethane (EDC)	ND	5.0		µg/L	5	7/6/2018 3:55:00 PM	R52521
1,2-Dibromoethane (EDB)	ND	5.0		µg/L	5	7/6/2018 3:55:00 PM	R52521
Naphthalene	14	10		µg/L	5	7/6/2018 3:55:00 PM	R52521
1-Methylnaphthalene	ND	20		µg/L	5	7/6/2018 3:55:00 PM	R52521
2-Methylnaphthalene	ND	20		µg/L	5	7/6/2018 3:55:00 PM	R52521
Acetone	ND	50		µg/L	5	7/6/2018 3:55:00 PM	R52521
Bromobenzene	ND	5.0		µg/L	5	7/6/2018 3:55:00 PM	R52521
Bromodichloromethane	ND	5.0		µg/L	5	7/6/2018 3:55:00 PM	R52521
Bromoform	ND	5.0		µg/L	5	7/6/2018 3:55:00 PM	R52521
Bromomethane	ND	15		µg/L	5	7/6/2018 3:55:00 PM	R52521
2-Butanone	ND	50		µg/L	5	7/6/2018 3:55:00 PM	R52521
Carbon disulfide	ND	50		µg/L	5	7/6/2018 3:55:00 PM	R52521
Carbon Tetrachloride	ND	5.0		µg/L	5	7/6/2018 3:55:00 PM	R52521
Chlorobenzene	ND	5.0		µg/L	5	7/6/2018 3:55:00 PM	R52521
Chloroethane	ND	10		µg/L	5	7/6/2018 3:55:00 PM	R52521
Chloroform	ND	5.0		µg/L	5	7/6/2018 3:55:00 PM	R52521
Chloromethane	ND	15		µg/L	5	7/6/2018 3:55:00 PM	R52521
2-Chlorotoluene	ND	5.0		µg/L	5	7/6/2018 3:55:00 PM	R52521
4-Chlorotoluene	ND	5.0		µg/L	5	7/6/2018 3:55:00 PM	R52521
cis-1,2-DCE	ND	5.0		µg/L	5	7/6/2018 3:55:00 PM	R52521
cis-1,3-Dichloropropene	ND	5.0		µg/L	5	7/6/2018 3:55:00 PM	R52521
1,2-Dibromo-3-chloropropane	ND	10		µg/L	5	7/6/2018 3:55:00 PM	R52521
Dibromochloromethane	ND	5.0		µg/L	5	7/6/2018 3:55:00 PM	R52521
Dibromomethane	ND	5.0		µg/L	5	7/6/2018 3:55:00 PM	R52521
1,2-Dichlorobenzene	ND	5.0		µg/L	5	7/6/2018 3:55:00 PM	R52521
1,3-Dichlorobenzene	ND	5.0		µg/L	5	7/6/2018 3:55:00 PM	R52521
1,4-Dichlorobenzene	ND	5.0		µg/L	5	7/6/2018 3:55:00 PM	R52521
Dichlorodifluoromethane	ND	5.0		µg/L	5	7/6/2018 3:55:00 PM	R52521
1,1-Dichloroethane	ND	5.0		µg/L	5	7/6/2018 3:55:00 PM	R52521
1,1-Dichloroethene	ND	5.0		µg/L	5	7/6/2018 3:55:00 PM	R52521
1,2-Dichloropropane	ND	5.0		µg/L	5	7/6/2018 3:55:00 PM	R52521
1,3-Dichloropropane	ND	5.0		µg/L	5	7/6/2018 3:55:00 PM	R52521
2,2-Dichloropropane	ND	10		µg/L	5	7/6/2018 3:55:00 PM	R52521

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Blagg Engineering
Project: Mudge B 12R
Lab ID: 1806I49-002 **Matrix:** AQUEOUS

Client Sample ID: MW #2
Collection Date: 6/28/2018 8:55:00 AM
Received Date: 6/30/2018 10:15:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**	
1,1-Dichloropropene	ND	5.0		µg/L	5	7/6/2018 3:55:00 PM	R52521
Hexachlorobutadiene	ND	5.0		µg/L	5	7/6/2018 3:55:00 PM	R52521
2-Hexanone	ND	50		µg/L	5	7/6/2018 3:55:00 PM	R52521
Isopropylbenzene	30	5.0		µg/L	5	7/6/2018 3:55:00 PM	R52521
4-Isopropyltoluene	5.5	5.0		µg/L	5	7/6/2018 3:55:00 PM	R52521
4-Methyl-2-pentanone	ND	50		µg/L	5	7/6/2018 3:55:00 PM	R52521
Methylene Chloride	ND	15		µg/L	5	7/6/2018 3:55:00 PM	R52521
n-Butylbenzene	ND	15		µg/L	5	7/6/2018 3:55:00 PM	R52521
n-Propylbenzene	30	5.0		µg/L	5	7/6/2018 3:55:00 PM	R52521
sec-Butylbenzene	5.5	5.0		µg/L	5	7/6/2018 3:55:00 PM	R52521
Styrene	ND	5.0		µg/L	5	7/6/2018 3:55:00 PM	R52521
tert-Butylbenzene	ND	5.0		µg/L	5	7/6/2018 3:55:00 PM	R52521
1,1,1,2-Tetrachloroethane	ND	5.0		µg/L	5	7/6/2018 3:55:00 PM	R52521
1,1,2,2-Tetrachloroethane	ND	10		µg/L	5	7/6/2018 3:55:00 PM	R52521
Tetrachloroethene (PCE)	ND	5.0		µg/L	5	7/6/2018 3:55:00 PM	R52521
trans-1,2-DCE	ND	5.0		µg/L	5	7/6/2018 3:55:00 PM	R52521
trans-1,3-Dichloropropene	ND	5.0		µg/L	5	7/6/2018 3:55:00 PM	R52521
1,2,3-Trichlorobenzene	ND	5.0		µg/L	5	7/6/2018 3:55:00 PM	R52521
1,2,4-Trichlorobenzene	ND	5.0		µg/L	5	7/6/2018 3:55:00 PM	R52521
1,1,1-Trichloroethane	ND	5.0		µg/L	5	7/6/2018 3:55:00 PM	R52521
1,1,2-Trichloroethane	ND	5.0		µg/L	5	7/6/2018 3:55:00 PM	R52521
Trichloroethene (TCE)	ND	5.0		µg/L	5	7/6/2018 3:55:00 PM	R52521
Trichlorofluoromethane	ND	5.0		µg/L	5	7/6/2018 3:55:00 PM	R52521
1,2,3-Trichloropropane	ND	10		µg/L	5	7/6/2018 3:55:00 PM	R52521
Vinyl chloride	ND	5.0		µg/L	5	7/6/2018 3:55:00 PM	R52521
Xylenes, Total	620	7.5		µg/L	5	7/6/2018 3:55:00 PM	R52521
Surr: 1,2-Dichloroethane-d4	96.5	70-130		%Rec	5	7/6/2018 3:55:00 PM	R52521
Surr: 4-Bromofluorobenzene	97.6	70-130		%Rec	5	7/6/2018 3:55:00 PM	R52521
Surr: Dibromofluoromethane	93.8	70-130		%Rec	5	7/6/2018 3:55:00 PM	R52521
Surr: Toluene-d8	100	70-130		%Rec	5	7/6/2018 3:55:00 PM	R52521

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Blagg Engineering
Project: Mudge B 12R
Lab ID: 1806I49-003
Matrix: AQUEOUS
Client Sample ID: MW #3
Collection Date: 6/28/2018 8:05:00 AM
Received Date: 6/30/2018 10:15:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**	
Benzene	9.1	1.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
Toluene	ND	1.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
Ethylbenzene	1.8	1.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
Methyl tert-butyl ether (MTBE)	ND	1.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
1,2,4-Trimethylbenzene	3.5	1.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
1,3,5-Trimethylbenzene	ND	1.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
1,2-Dichloroethane (EDC)	ND	1.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
1,2-Dibromoethane (EDB)	ND	1.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
Naphthalene	ND	2.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
1-Methylnaphthalene	ND	4.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
2-Methylnaphthalene	ND	4.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
Acetone	ND	10		µg/L	1	7/6/2018 5:08:00 PM	R52521
Bromobenzene	ND	1.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
Bromodichloromethane	ND	1.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
Bromoform	ND	1.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
Bromomethane	ND	3.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
2-Butanone	ND	10		µg/L	1	7/6/2018 5:08:00 PM	R52521
Carbon disulfide	ND	10		µg/L	1	7/6/2018 5:08:00 PM	R52521
Carbon Tetrachloride	ND	1.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
Chlorobenzene	ND	1.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
Chloroethane	ND	2.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
Chloroform	ND	1.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
Chloromethane	ND	3.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
2-Chlorotoluene	ND	1.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
4-Chlorotoluene	ND	1.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
cis-1,2-DCE	ND	1.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
cis-1,3-Dichloropropene	ND	1.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
1,2-Dibromo-3-chloropropane	ND	2.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
Dibromochloromethane	ND	1.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
Dibromomethane	ND	1.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
1,2-Dichlorobenzene	ND	1.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
1,3-Dichlorobenzene	ND	1.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
1,4-Dichlorobenzene	ND	1.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
Dichlorodifluoromethane	ND	1.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
1,1-Dichloroethane	ND	1.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
1,1-Dichloroethene	ND	1.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
1,2-Dichloropropane	ND	1.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
1,3-Dichloropropane	ND	1.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
2,2-Dichloropropane	ND	2.0		µg/L	1	7/6/2018 5:08:00 PM	R52521

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Blagg Engineering
Project: Mudge B 12R
Lab ID: 1806I49-003 **Matrix:** AQUEOUS

Client Sample ID: MW #3
Collection Date: 6/28/2018 8:05:00 AM
Received Date: 6/30/2018 10:15:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 8260B: VOLATILES						Analyst: **RAA**	
1,1-Dichloropropene	ND	1.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
Hexachlorobutadiene	ND	1.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
2-Hexanone	ND	10		µg/L	1	7/6/2018 5:08:00 PM	R52521
Isopropylbenzene	ND	1.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
4-Isopropyltoluene	ND	1.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
4-Methyl-2-pentanone	ND	10		µg/L	1	7/6/2018 5:08:00 PM	R52521
Methylene Chloride	ND	3.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
n-Butylbenzene	ND	3.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
n-Propylbenzene	ND	1.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
sec-Butylbenzene	ND	1.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
Styrene	ND	1.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
tert-Butylbenzene	ND	1.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
1,1,1,2-Tetrachloroethane	ND	1.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
1,1,2,2-Tetrachloroethane	ND	2.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
Tetrachloroethene (PCE)	ND	1.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
trans-1,2-DCE	ND	1.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
trans-1,3-Dichloropropene	ND	1.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
1,2,3-Trichlorobenzene	ND	1.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
1,2,4-Trichlorobenzene	ND	1.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
1,1,1-Trichloroethane	ND	1.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
1,1,2-Trichloroethane	ND	1.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
Trichloroethene (TCE)	ND	1.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
Trichlorofluoromethane	ND	1.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
1,2,3-Trichloropropane	ND	2.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
Vinyl chloride	ND	1.0		µg/L	1	7/6/2018 5:08:00 PM	R52521
Xylenes, Total	4.7	1.5		µg/L	1	7/6/2018 5:08:00 PM	R52521
Surr: 1,2-Dichloroethane-d4	97.3	70-130		%Rec	1	7/6/2018 5:08:00 PM	R52521
Surr: 4-Bromofluorobenzene	99.1	70-130		%Rec	1	7/6/2018 5:08:00 PM	R52521
Surr: Dibromofluoromethane	92.3	70-130		%Rec	1	7/6/2018 5:08:00 PM	R52521
Surr: Toluene-d8	97.3	70-130		%Rec	1	7/6/2018 5:08:00 PM	R52521

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1806I49**

09-Jul-18

Client: Blagg Engineering

Project: Mudge B 12R

Sample ID **100ng lcs**	SampType: **LCS**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **LCSW**	Batch ID: **R52521**	RunNo: **52521**
Prep Date:	Analysis Date: **7/6/2018**	SeqNo: **1722668** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	17	1.0	20.00	0	84.1	70	130			
Toluene	18	1.0	20.00	0	89.5	70	130			
Chlorobenzene	18	1.0	20.00	0	90.6	70	130			
1,1-Dichloroethene	18	1.0	20.00	0	89.0	70	130			
Trichloroethene (TCE)	17	1.0	20.00	0	82.7	70	130			
Surr: 1,2-Dichloroethane-d4	9.8		10.00		98.4	70	130			
Surr: 4-Bromofluorobenzene	9.1		10.00		91.1	70	130			
Surr: Dibromofluoromethane	9.3		10.00		93.0	70	130			
Surr: Toluene-d8	9.6		10.00		96.1	70	130			

Sample ID **rb**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R52521**	RunNo: **52521**
Prep Date:	Analysis Date: **7/6/2018**	SeqNo: **1722669** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	1.0								
Toluene	ND	1.0								
Ethylbenzene	ND	1.0								
Methyl tert-butyl ether (MTBE)	ND	1.0								
1,2,4-Trimethylbenzene	ND	1.0								
1,3,5-Trimethylbenzene	ND	1.0								
1,2-Dichloroethane (EDC)	ND	1.0								
1,2-Dibromoethane (EDB)	ND	1.0								
Naphthalene	ND	2.0								
1-Methylnaphthalene	ND	4.0								
2-Methylnaphthalene	ND	4.0								
Acetone	ND	10								
Bromobenzene	ND	1.0								
Bromodichloromethane	ND	1.0								
Bromoform	ND	1.0								
Bromomethane	ND	3.0								
2-Butanone	ND	10								
Carbon disulfide	ND	10								
Carbon Tetrachloride	ND	1.0								
Chlorobenzene	ND	1.0								
Chloroethane	ND	2.0								
Chloroform	ND	1.0								
Chloromethane	ND	3.0								
2-Chlorotoluene	ND	1.0								

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1806I49**

09-Jul-18

Client: Blagg Engineering

Project: Mudge B 12R

Sample ID **rb**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R52521**	RunNo: **52521**
Prep Date:	Analysis Date: **7/6/2018**	SeqNo: **1722669** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
4-Chlorotoluene	ND	1.0								
cis-1,2-DCE	ND	1.0								
cis-1,3-Dichloropropene	ND	1.0								
1,2-Dibromo-3-chloropropane	ND	2.0								
Dibromochloromethane	ND	1.0								
Dibromomethane	ND	1.0								
1,2-Dichlorobenzene	ND	1.0								
1,3-Dichlorobenzene	ND	1.0								
1,4-Dichlorobenzene	ND	1.0								
Dichlorodifluoromethane	ND	1.0								
1,1-Dichloroethane	ND	1.0								
1,1-Dichloroethene	ND	1.0								
1,2-Dichloropropane	ND	1.0								
1,3-Dichloropropane	ND	1.0								
2,2-Dichloropropane	ND	2.0								
1,1-Dichloropropene	ND	1.0								
Hexachlorobutadiene	ND	1.0								
2-Hexanone	ND	10								
Isopropylbenzene	ND	1.0								
4-Isopropyltoluene	ND	1.0								
4-Methyl-2-pentanone	ND	10								
Methylene Chloride	ND	3.0								
n-Butylbenzene	ND	3.0								
n-Propylbenzene	ND	1.0								
sec-Butylbenzene	ND	1.0								
Styrene	ND	1.0								
tert-Butylbenzene	ND	1.0								
1,1,1,2-Tetrachloroethane	ND	1.0								
1,1,2,2-Tetrachloroethane	ND	2.0								
Tetrachloroethene (PCE)	ND	1.0								
trans-1,2-DCE	ND	1.0								
trans-1,3-Dichloropropene	ND	1.0								
1,2,3-Trichlorobenzene	ND	1.0								
1,2,4-Trichlorobenzene	ND	1.0								
1,1,1-Trichloroethane	ND	1.0								
1,1,2-Trichloroethane	ND	1.0								
Trichloroethene (TCE)	ND	1.0								
Trichlorofluoromethane	ND	1.0								
1,2,3-Trichloropropane	ND	2.0								

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1806I49**

09-Jul-18

Client: Blagg Engineering

Project: Mudge B 12R

Sample ID **rb**	SampType: **MBLK**	TestCode: **EPA Method 8260B: VOLATILES**
Client ID: **PBW**	Batch ID: **R52521**	RunNo: **52521**
Prep Date:	Analysis Date: **7/6/2018**	SeqNo: **1722669** Units: **µg/L**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Vinyl chloride	ND	1.0								
Xylenes, Total	ND	1.5								
Surr: 1,2-Dichloroethane-d4	9.4		10.00		94.3	70	130			
Surr: 4-Bromofluorobenzene	9.8		10.00		98.1	70	130			
Surr: Dibromofluoromethane	9.2		10.00		92.3	70	130			
Surr: Toluene-d8	9.6		10.00		95.7	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: BLAGG | Work Order Number: 1806149 | RcptNo: 1

Received By: Erin Melendrez 6/30/2018 10:15:00 AM

Completed By: Erin Melendrez 6/30/2018 12:31:10 PM

Reviewed By: ENM 7/2/18

LB: ~~AG~~ 07/02/18

Chain of Custody

1. Is Chain of Custody complete? Yes ☑ No ☐ Not Present ☐
2. How was the sample delivered? Courier

Log In

3. Was an attempt made to cool the samples? Yes ☑ No ☐ NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C Yes ☑ No ☐ NA ☐
5. Sample(s) in proper container(s)? Yes ☑ No ☐
6. Sufficient sample volume for indicated test(s)? Yes ☑ No ☐
7. Are samples (except VOA and ONG) properly preserved? Yes ☑ No ☐
8. Was preservative added to bottles? Yes ☐ No ☑ NA ☐
9. VOA vials have zero headspace? ALL VOAs received w/ Headspace Yes ☑ No ☑ No VOA Vials ☑ ~~AG~~ 07/02/18
10. Were any sample containers received broken? Yes ☐ No ☑
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody) Yes ☑ No ☐
12. Are matrices correctly identified on Chain of Custody? Yes ☑ No ☐
13. Is it clear what analyses were requested? Yes ☑ No ☐
14. Were all holding times able to be met? (If no, notify customer for authorization.) Yes ☑ No ☐

# of preserved bottles checked for pH: _____ (<2 or >12 unless noted)
Adjusted? 07/02/18
Checked by: _____

Special Handling (if applicable)

15. 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: _____

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	3.9	Good	Yes			

Chain-of-Custody Record

Client: BLAGG ENGR. / BP AMERICA

Mailing Address: P.O. BOX 87
BLOOMFIELD, NM 87413

Phone #: (505) 632-1199

email or Fax#:

QA/QC Package:
☑ Standard ☐ Level 4 (Full Validation)

Accreditation:
☐ NELAP ☐ Other
☐ EDD (Type)

Turn-Around Time:
☑ Standard ☐ Rush

Project Name: MUDGE B # 12R

Project #:

Project Manager: STEVE MOSKAL

Sampler: NELSON VELEZ

On Ice: ☒ Yes ☐ No

Sample Temperature: 3.9

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 1806149	BTEX + MTBE + TMB's (8021B)	BTEX + MTBE + TPH (Gas only)	TPH 8015B (GRO / DRO / MRO)	TPH (Method 418.1)	EDB (Method 504.1)	PAH (8310 or 8270SIMS)	RCRA 8 Metals	Anions ($F, Cl, NO_3, NO_2, PO_4, SO_4$)	8081 Pesticides / 8082 PCB's	8260B (VOA)	Cation / Anion Balance	Total Dissolved Solids		Grab sample	5 pt. composite sample	Air Bubbles (Y or N)
6/28/18	0715	WATER	MW # 1	40 ml VOA - 2	HCl & Cool	-001										✓				✓		
6/28/18	0855	WATER	MW # 2	40 ml VOA - 2	HCl & Cool	-002										✓				✓		
6/28/18	0805	WATER	MW # 3	40 ml VOA - 2	HCl & Cool	-003										✓				✓		

Date	Time	Relinquished by:	Received by:	Date	Time
6/29/18	1700			6/29/18	1700
6/29/18	1852			6/30/18	1015

Remarks:
BILL DIRECTLY TO BP:
Contact: Steve Moskal
SIO #: 190040007685
WBS ELEMENT: L1-001CV-E:MUDGEB12R

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

Siting Criteria

SITING AND HYDRO-GEOLOGICAL REPORT FOR MUDGE B 012R

SITING CRITERIA 19.15.17.10 NMAC

Depth to groundwater at the site is approximately 40 feet below ground surface (see Bore Log). A piezometer installed between the pre-existing below-grade tank (**BGT**) (Tank ID: A) and the proposed BGT (Tank ID: B) revealed the groundwater depth previously stated. Local topography and proximity to adjacent water features were also considered. Based on a search of the the New Mexico State Engineer's Office (attached) and multiple database sources provided as an aerial map (Figure 1), there are no freshwater wells or springs used for public or livestock consumption within 200 horizontal feet of the BGT. A topographic map (Figure 2) demonstrates that the BGT is not within 100 feet of any continuously flowing watercourse, significant watercourse, lake bed, sinkhole, wetland or playa lake as measured from the ordinary high water mark. An additional aerial map (Figure 3) with greater detail further illustrates that the BGT is not within the 100 foot setback for the nearest significant watercourse.

LOCAL GEOLOGY AND HYDROLOGY

This particular site is located west of the Animas River between Aztec and Cedar Hill, New Mexico. The Nacimiento Formation of Tertiary age is exposed as interbedded siltstones, shales and sandstones that form steep to gentle slopes. The slopes are dissected by arroyos draining to the Animas River. The Nacimiento Formation is capped to the north by the more resistant cliff-forming sandstones of the San Jose Formation. The site is located greater than 1 mile northwest of the Animas River and greater than 100 feet higher in elevation.

Groundwater at this site has been addressed above.

REGIONAL GEOLOGY AND HYDROLOGY

The San Juan Basin is situated in the Navajo section of the Colorado Plateau and is characterized by broad open valleys, mesas, buttes and hogbacks. Away from major valleys and canyons topographic relief is generally low. Native vegetation is sparse and shrubby. Drainage is mainly by the San Juan River, the only permanent stream in the Navajo Section of the Colorado Plateau. The San Juan River is a tributary of the Colorado River. Major tributaries include the Animas, Chaco and La Plata Rivers. Flow of the San Juan River across the basin is regulated by the Navajo Dam, located about 30 miles northeast of Farmington, New Mexico. The climate is arid to semiarid with an average annual precipitation of 8 to 10 inches. Soils within the basin consist of weathered parent rock derived from predominantly physical means mostly from eolian depositional systems with fluvial having a lesser impact.

Cretaceous and Tertiary sandstones, as well as Quaternary Alluvial deposits, serve as the primary aquifers in the San Juan Basin (Stone et al., 1983). The Nacimiento Formation of Paleocene age occurs at the surface in a broad belt at the western and southern edges of the central San Juan Basin and dips beneath the San Jose Formation in the center. The lower part of the Nacimiento Formation is composed of interbedded black, carbonaceous mudstones and white coarse-grained sandstones. The upper part is comprised of mudstone and sandstone. It is generally slope-forming, even within the sandstone units. Thickness of the Nacimiento ranges from 418 to 2,232 feet. Aquifers within the coarser and continuous sandstone bodies of the Nacimiento Formation are between 0 and 1,000 feet deep in this section of the basin. Wells within these bodies flow from 16 to 100 gallons per minute (gpm), and transmissivities are expected to be 100 ft2/d (Stone et al, 1983). Groundwater within these aquifers flows toward the Animas River.

REFERENCES

Circular 154—Guidebook to coal geology of northwest New Mexico By E. C. Beaumont, J. W. Shomaker, W. J. Stone, and others, 1976

Stone, et al., 1983, Hydrogeology and Water Resources of the San Juan Basin, New Mexico, Socorro, New Mexico Bureau of Mines and Mineral Resources Hydrologic Report 6, 70 p

BLAGG ENGINEERING, INC.
P.O. BOX 87
BLOOMFIELD, NM 87413
(505) 632-1199

GP - 4

BORE / TEST HOLE REPORT

CLIENT:	BP AMERICA PRODUCTION CO.
LOCATION NAME:	MUDGE B # 12R (API #: 3004510792) UNIT A, SEC. 17, T31N, R11W
CONTRACTOR:	BLAGG ENGINEERING, INC. / KYVEK ENERGY SERVICES, INC.
EQUIPMENT USED:	GEOPROBE 200
BORING LOCATION:	115 FEET, S21E FROM WELL HEAD (WEST OF BGT).

BORING #.....	4
MW #.....	NA
PAGE #.....	4
DATE STARTED	09/24/15
DATE FINISHED	09/24/15
OPERATOR.....	KP
LOGGED BY.....	JCB

DEPTH (FT.)	SAMPLE INTERVAL (FT.)	SAMPLE TIME	FIELD OVM (ppm)	TPH (mg/Kg)	BENZENE & TOTAL BTEX (mg/Kg)	FIELD CLASSIFICATION AND REMARKS
						GROUND SURFACE
2						
4	3 - 4	1120	0.0			
6						
8	7 - 8	1125	0.0			
10						
12	11 - 12	1130	0.0			
14						
16	15 - 16	1134	0.0			
18						DARK YELLOWISH ORANGE SILTY SAND, NON COHESIVE, SLIGHTLY MOIST, FIRM, NO APPARENT HYDROCARBON ODOR DETECTED, MOIST BETWEEN 8 - 12 FT. & 28 - 32 FT. B.G. (0.0 - 37.0 FT. B.G.).
20	19 - 20	1137	0.0			
22						
24	23 - 24	1142	0.6			
26						
28	27 - 28	1146	1.0			
30						
32	31 - 32	1150	1.1			
34						
36	35 - 36	1200	1.4			
38	38		6.0	ND	ND ND	SAME AS ABOVE EXCEPT GRAY, VERY SLIGHT APPARENT HYDROCARBON ODOR (37.0 - 38.5 FT. B.G.).
40		1210				
42	42		0.3	ND	ND ND	SAME AS ABOVE EXCEPT DARK YELLOWISH ORANGE, MOIST TO WET, NO APPARENT HYDROCARBON ODOR (38.5 - 44.0 FT. B.G.).
44		1218				
46						
48						
50						
52						
54						
56						
58						
60						

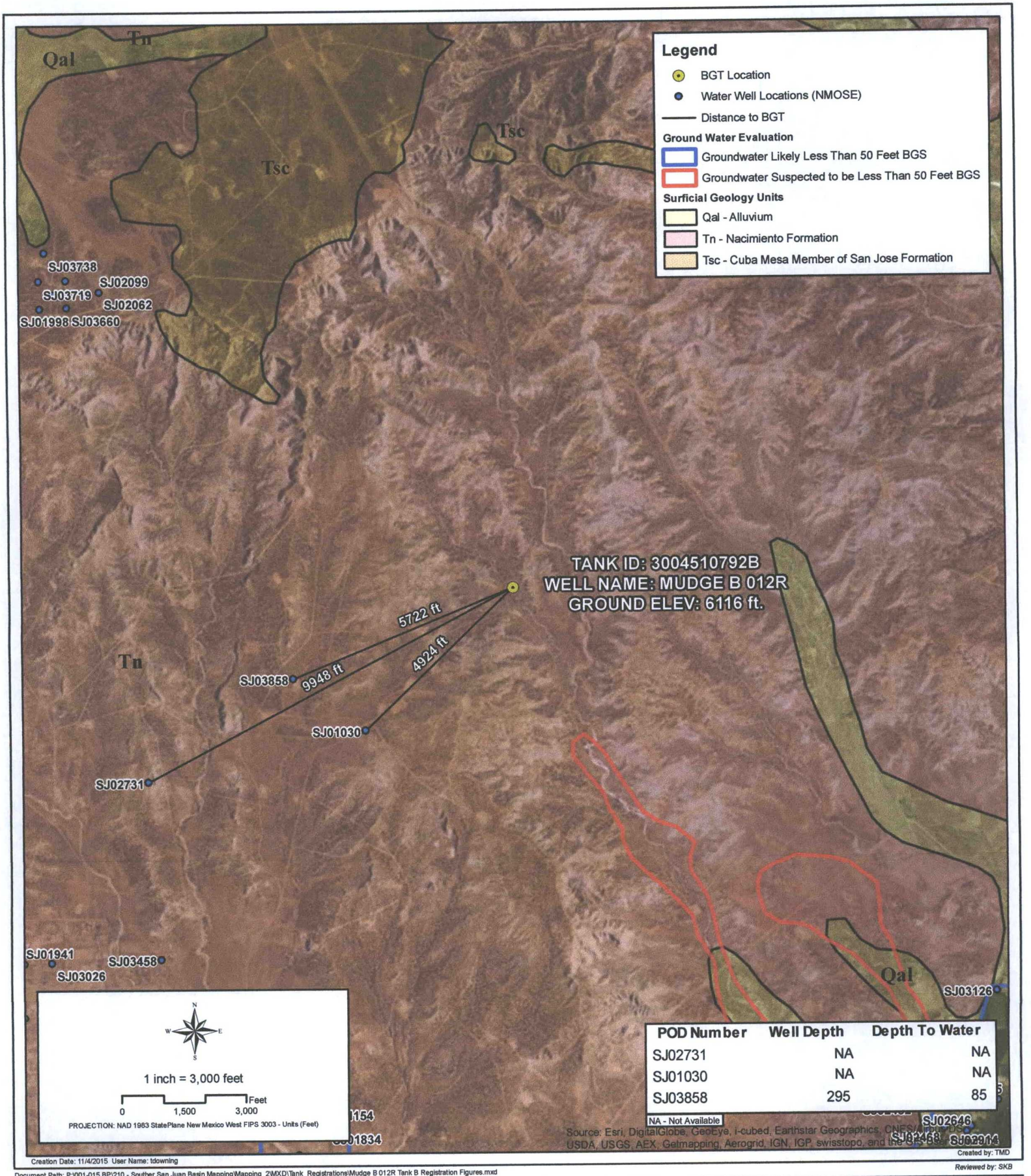
1 INCH PVC CASING, 45 FT. TOTAL LENGTH, TOP OF CASING ~ 2.6 FT. ABOVE GRADE, BOTTOM OF PIPE ~ 42.4 FT. B.G., HOLES MANUALLY DRILLED LAST 6 FT. OF CASING (36.4 - 42.4 FT. B.G.). DEPTH TO WATER ~ 39.95 FT. B.G., MEASURED 9/25/2015.

NOTES: - SILTY SAND.

- OVM - Organic vapor meter or photoionization detector (PID).
- TPH - Total Petroleum Hydrocarbons per US EPA Method 8015B.
- BTEX - Benzene, toluene, ethylbenzene, total xylenes per US EPA Method 8021B.
- ND - Not detected at the Laboratory Reporting Limit
- ppm - Parts per million.
- mg/Kg - Milligram per kilogram.
- B.G. - Below grade.

OVM CALIBRATION
Date: 09/24/2015 Time: 0700
Reading 100.2 ppm
100 ppm calibration gas - isobutylene.
RF = 1.00 (RF = response factor).

DRAWING: MUDGE B 12R GP-4 2015-09-24.SKF | DATE: 10/05/2015 | DWN BY: NJV



POD Number	Well Depth	Depth To Water
SJ02731	NA	NA
SJ01030	NA	NA
SJ03858	295	85

NA - Not Available

Creation Date: 11/4/2015 User Name: tdowning

Document Path: P:\001-015 BP\210 - Souther San Juan Basin Mapping\Mapping_2\MXD\Tank_Registrations\Mudge B 012R Tank B Registration Figures.mxd

Created by: TMD

Reviewed by: SKB

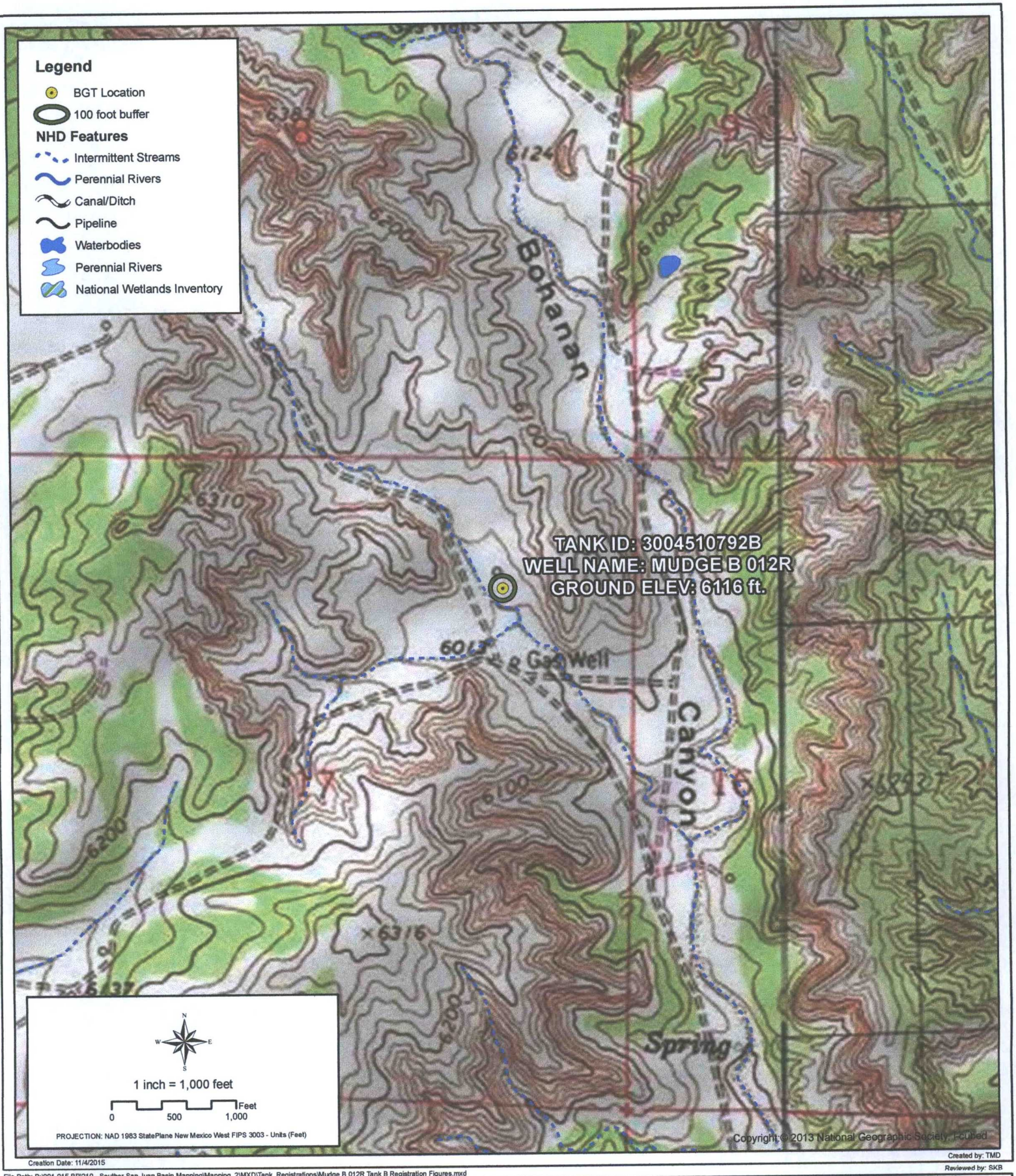
GROUNDWATER AND WATER WELL PROXIMITY

WELL NAME: MUDGE B 012R

API NUMBER: 3004510792 TANK ID: 3004510792B

SECTION 17, TOWNSHIP 31.0N, RANGE 11W, P.M. NM23

FIGURE 1



Creation Date: 11/4/2015

Created by: TMD

Reviewed by: SKB

File Path: P:\001-015 BP\210 - Souther San Juan Basin Mapping\Mapping_2\MXD\Tank_Registrations\Mudge B 012R Tank B Registration Figures.mxd

bp

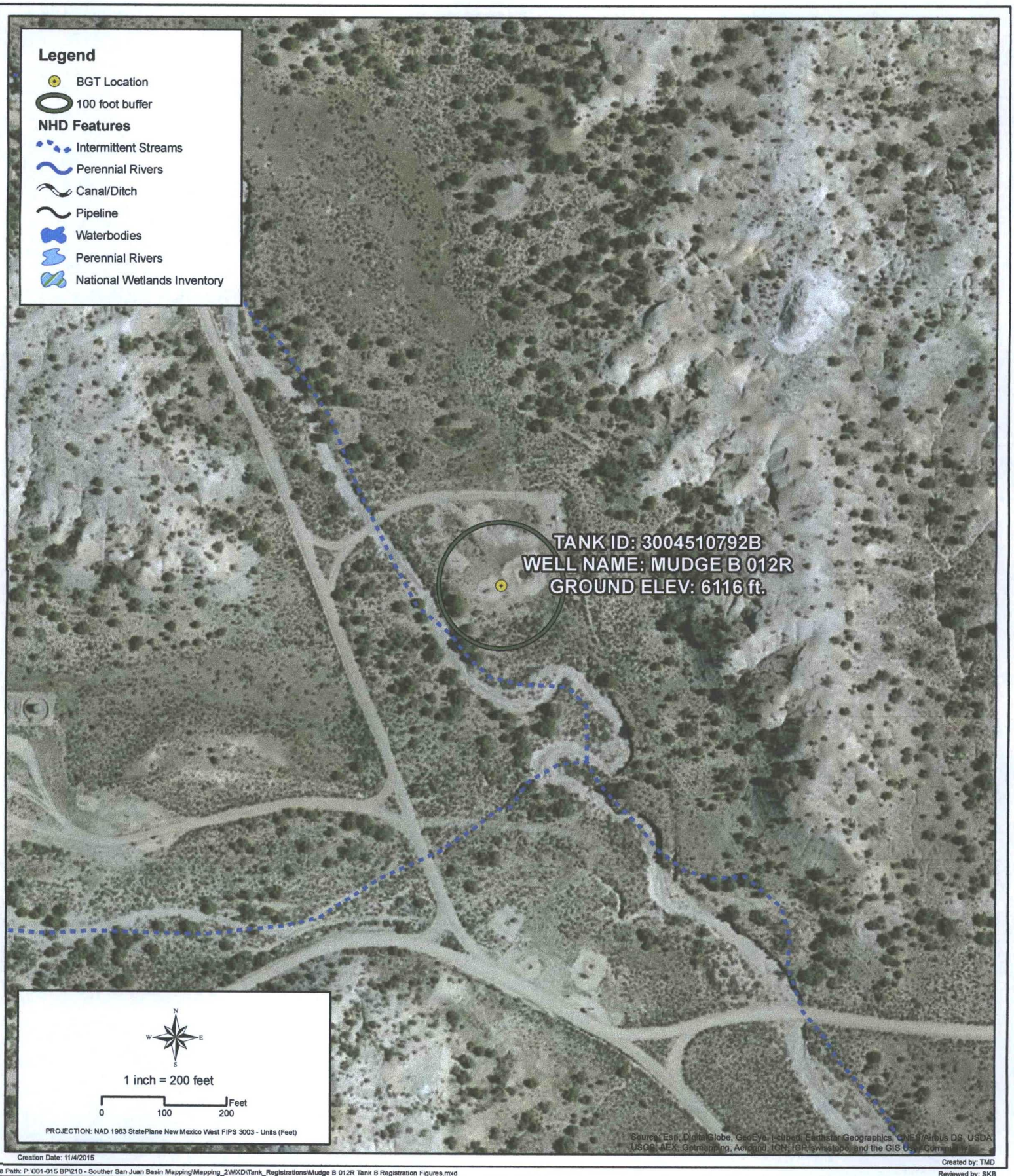
PROXIMITY TO WATERCOURSES AND WETLANDS

WELL NAME: MUDGE B 012R

API NUMBER: 3004510792 TANK ID: 3004510792B

SECTION 17, TOWNSHIP 31.0N, RANGE 11W, P.M. NM23

FIGURE 2



Creation Date: 11/4/2015

Created by: TMD

File Path: P:\001-015 BP\210 - Souther San Juan Basin Mapping\Mapping_2\MXD\Tank_Registrations\Mudge B 012R Tank B Registration Figures.mxd

Reviewed by: SKB

bp

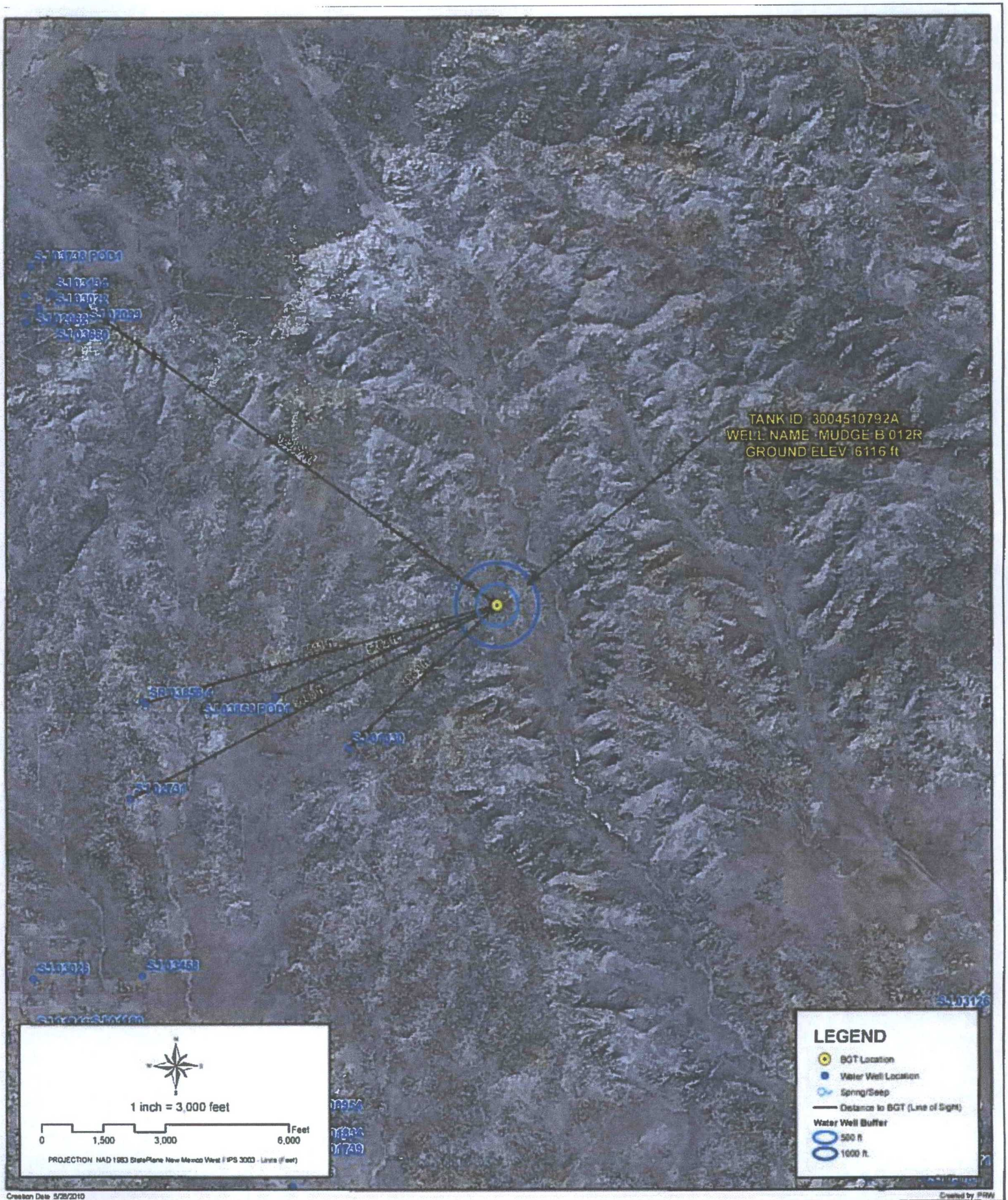
PROXIMITY TO WATERCOURSES AND WETLANDS

WELL NAME: MUDGE B 012R

API NUMBER: 3004510792 TANK ID: 3004510792B

SECTION 17, TOWNSHIP 31.0N, RANGE 11W, P.M. NM23

FIGURE 3



bp

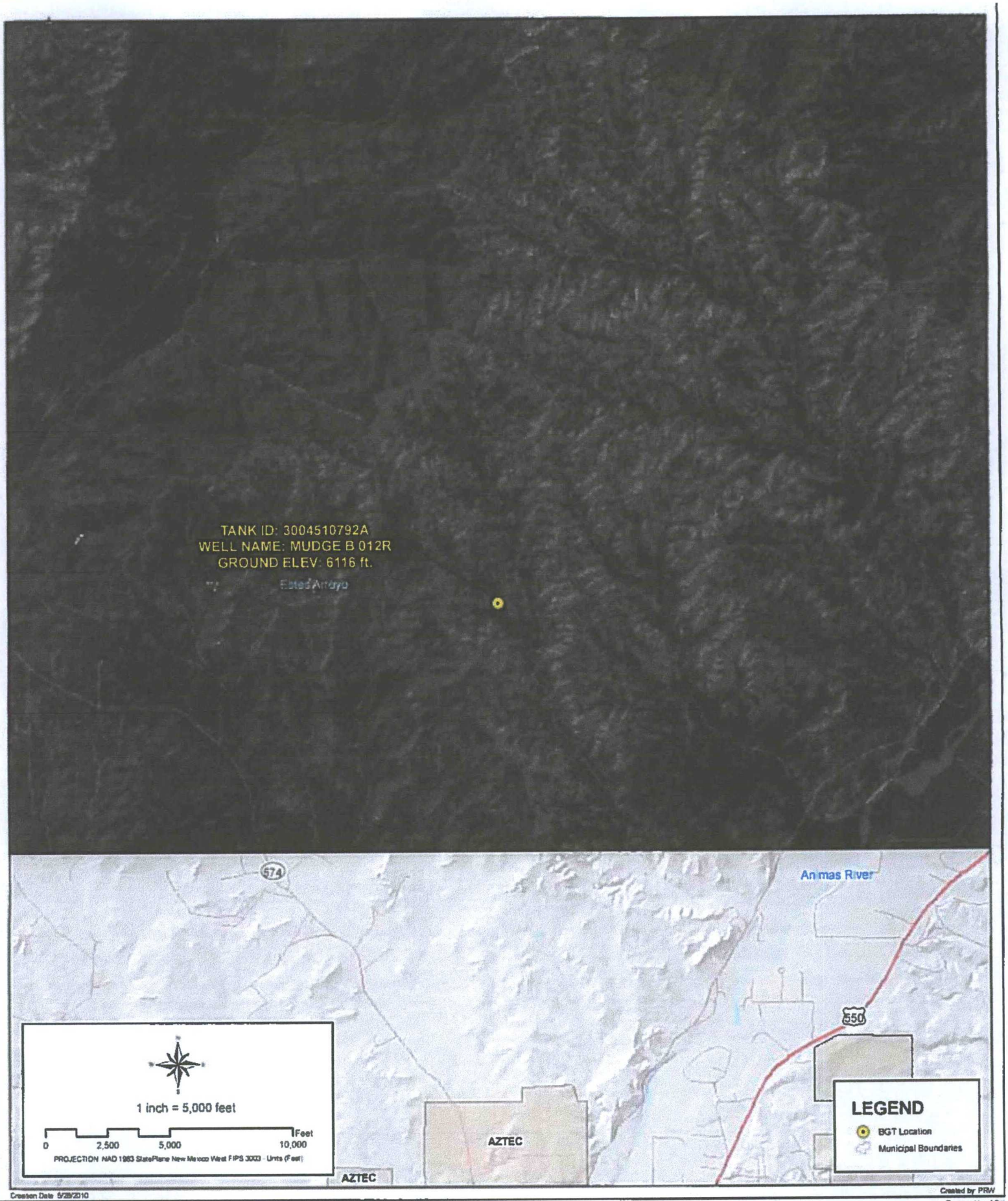
PROXIMITY TO WATER WELLS

WELL NAME: MUDGE B 012R

API NUMBER: 3004510792 TANK ID: 3004510792A

SECTION 17, TOWNSHIP 31.0N, RANGE 11W, P.M. NM23

FIGURE 4



Creation Date: 5/28/2010

Created by: PRW

File Path: X:\BP\LTE_Inspections\FAIL\Sector_2\MXD\3004510792A.mxd

Reviewed by: AGH

bp

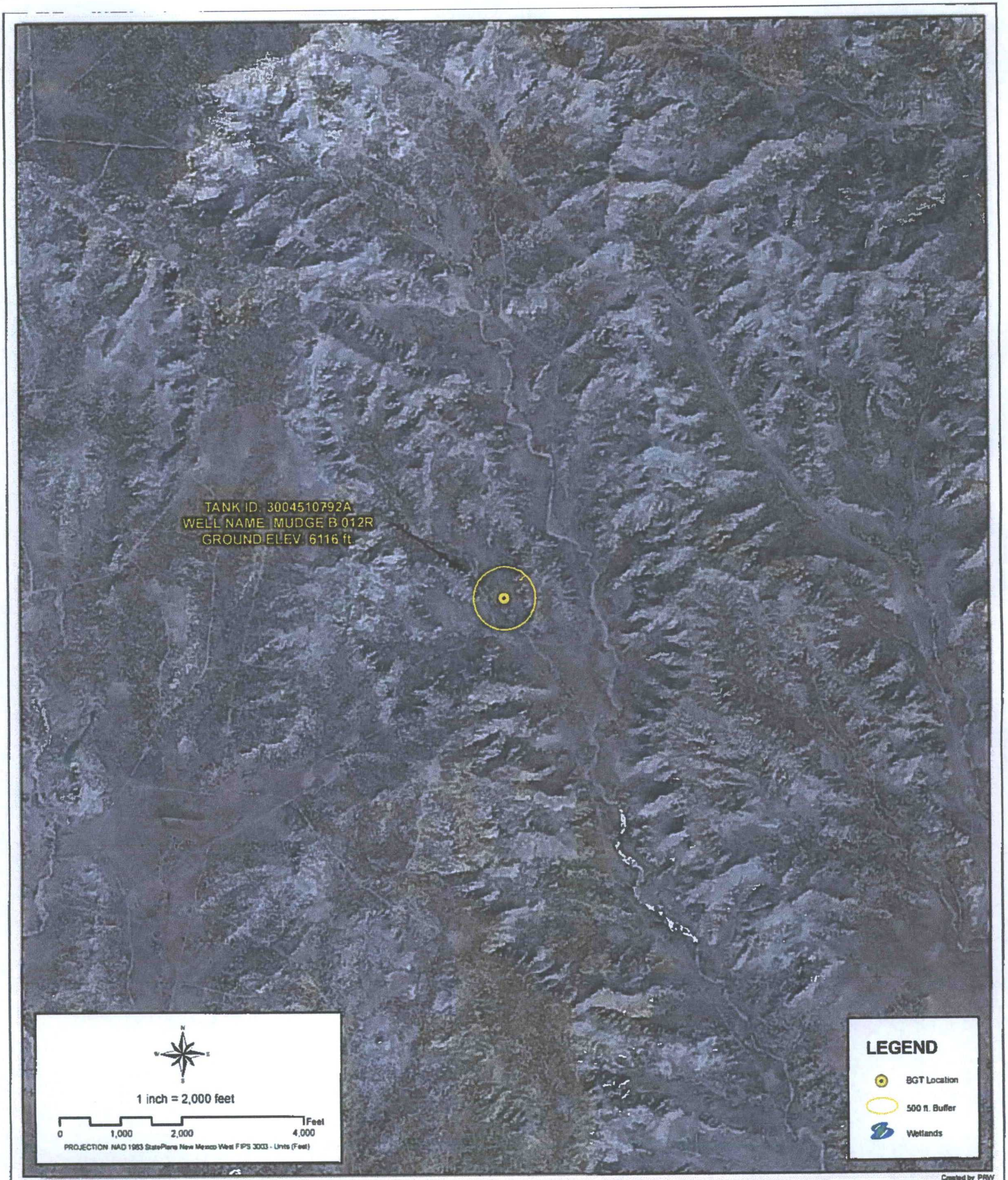
PROXIMITY TO MUNICIPAL BOUNDARY

WELL NAME: MUDGE B 012R

API NUMBER: 3004510792 TANK ID: 3004510792A

SECTION 17, TOWNSHIP 31.0N, RANGE 11W, P.M. NM23

FIGURE 5



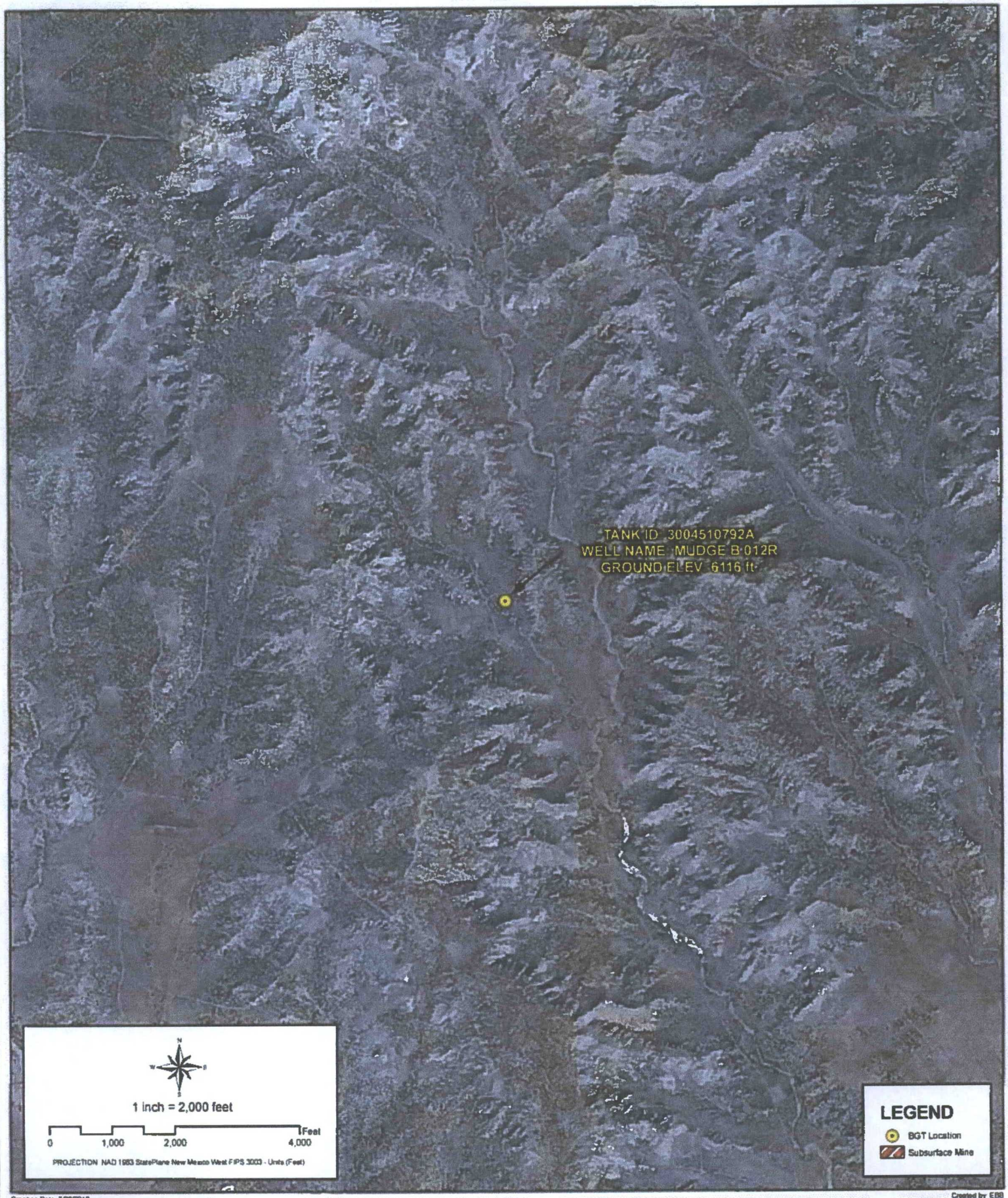
PROXIMITY TO WETLANDS

WELL NAME: MUDGE B 012R

API NUMBER: 3004510792 TANK ID: 3004510792A

SECTION 17, TOWNSHIP 31.0N, RANGE 11W, P.M. NM23

FIGURE 6



Creation Date: 5/28/2010

Created by: EBB

File Path: X:\BPLTE_Inspections\FAIL\Sector_2\MXDs\3004510792A.mxd

Reviewed by: AGH

bp

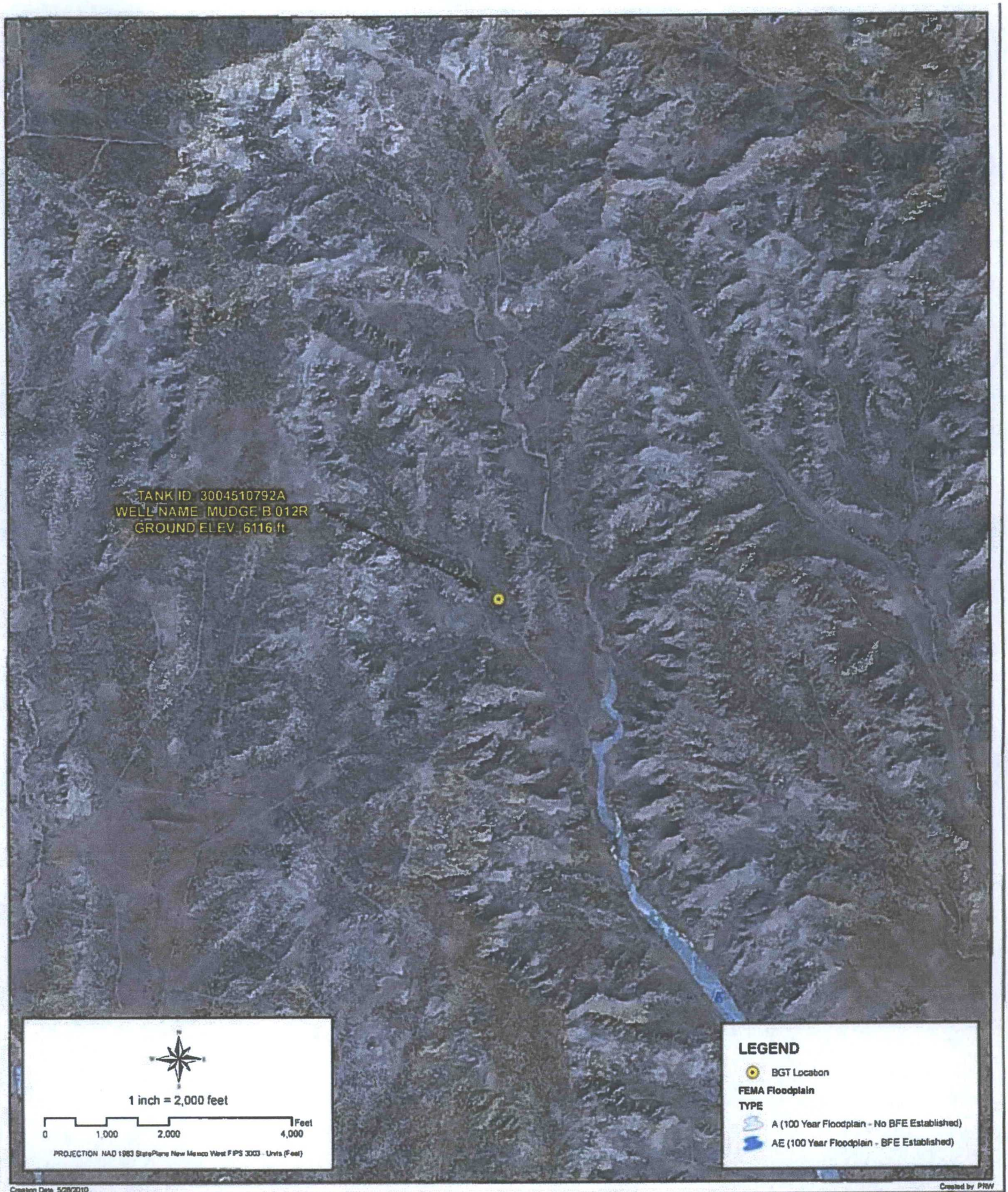
PROXIMITY TO SUBSURFACE MINES

WELL NAME: MUDGE B 012R

API NUMBER: 3004510792 TANK ID: 3004510792A

SECTION 17, TOWNSHIP 31.0N, RANGE 11W, P.M.NM23

FIGURE 7



Creation Date: 5/28/2010 Created by: PRW

File Path: X:\BPLTE_Inspections\FAIL\Sector_2\MXDs\3004510792A.mxd Reviewed by: ACH

bp

PROXIMITY TO FLOODPLAIN

WELL NAME: MUDGE B 012R

API NUMBER: 3004510792 TANK ID: 3004510792A

SECTION 17, TOWNSHIP 31.0N, RANGE 11W, P.M. NM23

FIGURE 8

SOUTHERN SAN JUAN BASIN (SSJB)

Figure Citation List

March 2010

Figure 1: Groundwater Less Than 50 ft.

Layers:

Water Wells: **iWaters Database: NMOSE/ISC (Dec. 2009)**

New Mexico Office of the State Engineer (OSE) /ISC iWaters database. (Data updated: 12/2009. Data received: 03/09/2010). Data available from: http://www.ose.state.nm.us/waters_db_index.html.

Cathodic Wells: **Tierra Corrosion Control, Inc. (Aug. 2008)**

Tierra Corrosion Control, Inc. 1700 Schofield Ln. Farmington, NM 87401. Driller's Data Log. (Data collected: All data are associated with cathodic protection wells installed at BP facilities between 2008-2009. Data received: 05/06/2010).

Hydrogeological Evaluation: **Wright Water Engineers, Inc. (2008)**

Evaluation completed by Wright Water Engineers, Inc. Durango Office. Data created using digital statewide geology at 1:500,000 from USGS in combination with 10m Digital Elevation Model (DEM) from NRCS. (Data compiled: 2008.)

Results: Spatial Polygons representing "Groundwater likely to be less than 50 ft." and "Groundwater suspected to be less than 50 ft.".

Surficial Geology: **USGS (1963/1987)**

Data digitized and rectified by Geospatial Consultants. (Data digitized: 03/23/ 2010). Original hard copy maps sourced from United States Geological Survey (USGS). Data available from: http://pubs.er.usgs.gov/.

Geology, Structure and Uranium Deposits of the Shiprock Quadrangle, New Mexico and Arizonia. 1:250,000. I - 345. Compiled by Robert B. O'Sullivan and Helen M. Beikman. 1963.

Geologic Map of the Aztec 1 x 2 Quadrangle, Northwestern New Mexico and Southern Colorado. 1:250,000. I - 1730. Compiled by Kim Manley, Glenn R. Scott, and Reinhard A. Wobus. 1987.

Aerial Imagery: **Conoco (Summer 2009)**

ConocoPhillips Company. (Flown: Summer 2009). 12 in. High Resolution Orthoimagery. Projected coordinate system name:
NAD_1983_StatePlane_New_Mexico_West_FIPS_3003_Feet.

Provided as tiled .tiff images and indexed using polygon index layer.

Figure 2: Proximity to Watercourses

Layers:

Perennial Streams: **NHD, USGS (2010)**

National Hydrography Dataset (NHD). U.S. Geological Survey. (Data last updated: 02/19/2010. Data received: 03/09/2010). High-resolution: 1:24,000. Digital Representation of USGS 24k Topographic map series with field updates as required. Data available from: http://nhd.usgs.gov/.

Intermittent Streams: **NHD, USGS (2010)**

National Hydrography Dataset (NHD). U.S. Geological Survey. (Data last updated: 02/19/2010. Data received: 03/09/2010). High-resolution: 1:24,000. Digital Representation of USGS 24k Topographic map series with field updates as required. Data available from: http://nhd.usgs.gov/.

Water Bodies: **NHD, USGS (2010)**

National Hydrography Dataset (NHD). U.S. Geological Survey. (Data last updated: 02/19/2010. Data received: 03/09/2010). High-resolution: 1:24,000. Digital representation of USGS 24k Topographic map series with field updates as required. Data available from: http://nhd.usgs.gov/.

USGS Topographic Maps: **USGS (2007)**

USGS 24k Topographic map series. 1:24000. Maps are seamless, scanned images of USGS paper topographic maps. Data available from: http://store.usgs.gov.

Figure 3: Proximity to Permanent Structure

Layers:

Aerial Imagery: **Conoco (Summer 2009)**

ConocoPhillips Company. (Flown: Summer 2009). 12 in. High Resolution Orthoimagery. Projected coordinate system name:
NAD_1983_StatePlane_New_Mexico_West_FIPS_3003_Feet.

Provided as tiled .tiff images and indexed using polygon index layer.

Figure 4: Proximity to Water Wells

Layers:

Water Wells: **iWaters Database: NMOSE/ISC (Dec. 2009)**

New Mexico Office of the State Engineer (OSE) /ISC iWaters database. (Data updated: 12/2009. Data received: 03/09/2010). Data available from: http://www.ose.state.nm.us/waters_db_index.html.

Springs/Seeps: **NHD, USGS (2010)**

National Hydrography Dataset (NHD). U.S. Geological Survey. (Data last updated: 02/19/2010. Data received: 03/09/2010). High-resolution: 1:24,000. Digital representation of USGS 24k Topographic map series with field updates as required. Data available from: http://nhd.usgs.gov/.

Aerial Imagery: **Conoco (Summer 2009)**

ConocoPhillips Company. (Flown: Summer 2009). 12 in. High Resolution Orthoimagery. Projected coordinate system name: NAD_1983_StatePlane_New_Mexico_West_FIPS_3003_Feet.

Provided as tiled .tiff images and indexed using polygon index layer.

Figure 5: Proximity to Municipal Boundary

Layers:

Municipal Boundary: **San Juan County, New Mexico (2010)**

Data provided by San Juan County GIS Division. (Data received: 03/25/2010).

Shaded Relief: **NED, USGS (1999)**

National Elevation Dataset (NED). U.S. Geological Survey, EROS Data Center. (Data created: 1999. Data downloaded: April, 2010). Resolution: 10 meter (1/3 arc-second). Data available from: http://ned.usgs.gov/.

StreetMap North America: **Tele Atlas North America, Inc., ESRI (2008)**

Data derived from Tele Atlas Dynamap/Transportation North America, version 5.2. (Data updated: annually. Data series issue: 2008).

Figure 6: Proximity to Wetlands

Layers:

Wetlands: **NWI (2010)**

National Wetlands Inventory (NWI). U.S Fish and Wildlife Service. (Data last updated: 09/25/2009. Data received: 03/21/2010). Data available from: http://www.fws.gov/wetlands/.

Aerial Imagery: **Conoco (Summer 2009)**

ConocoPhillips Company. (Flown: Summer 2009). 12 in. High Resolution Orthoimagery. Projected coordinate system name:
NAD_1983_StatePlane_New_Mexico_West_FIPS_3003_Feet.

Provided as tiled .tiff images and indexed using polygon index layer.

Figure 7: Proximity to Subsurface Mine

Layers:

Subsurface Mine: **NM Mining and Minerals Division (2010)**

New Mexico Mining and Minerals Division. (Data received: 03/12/2010). Contact: Susan Lucas Kamat, Geologist. Provided PLSS NM locations (Sections) for the two subsurface mines located in San Juan and Rio Arriba counties.

Aerial Imagery: **Conoco (Summer 2009)**

ConocoPhillips Company. (Flown: Summer 2009). 12 in. High Resolution Orthoimagery. Projected coordinate system name:
NAD_1983_StatePlane_New_Mexico_West_FIPS_3003_Feet.

Provided as tiled .tiff images and indexed using polygon index layer.

Figure 8: Proximity to FEMA Floodplain

Layers:

FEMA Floodplain: **FEMA (varying years)**

Data digitized and rectified by Wright Water Engineers, Inc. (Data digitized: August 2008).
Digitized from hard copy Flood Insurance Rate Maps (FIRMs) (varying years) of San Juan County.

Aerial Imagery: **Conoco (Summer 2009)**

ConocoPhillips Company. (Flown: Summer 2009). 12 in. High Resolution Orthoimagery.
Projected coordinate system name:
NAD_1983_StatePlane_New_Mexico_West_FIPS_3003_Feet.

Provided as tiled .tiff images and indexed using polygon index layer.