

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	
Facility ID	
Application ID	

Release Notification

NMOCD

Responsible Party

OCT 16 2018

Responsible Party BP America Production Company	OGRID 778	DISTRICT III
Contact Name Steve Moskal	Contact Telephone 505-330-9179	
Contact email steven.moskal@bpx.com	Incident # (assigned by OCD)	NVE1829836440
Contact mailing address 380 North Airport Road, Durango, CO 81303		

Location of Release Source

Latitude 36.880892 Longitude -107.815735
(NAD 83 in decimal degrees to 5 decimal places)

Site Name BARRETT LS 002A (A)	Site Type Natural Gas Well Site
Date Release Discovered	API# (if applicable) 3004522486

Unit Letter	Section	Township	Range	County
I	19	31N	09W	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)

<input type="checkbox"/> Crude Oil	Volume Released (bbls)	Volume Recovered (bbls)
<input type="checkbox"/> Produced Water	Volume Released (bbls)	Volume Recovered (bbls)
	Is the concentration of total dissolved solids (TDS) in the produced water >10,000 mg/l?	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Condensate	Volume Released (bbls)	Volume Recovered (bbls)
<input type="checkbox"/> Natural Gas	Volume Released (Mcf)	Volume Recovered (Mcf)
<input type="checkbox"/> Other (describe)	Volume/Weight Released (provide units)	Volume/Weight Recovered (provide units)

Cause of Release TPH sampled above the BGT closure standards but below action levels according to NMOCA 19.17.29. The BGT sample only exceeded closure standards for TPH at 126 ppm. The site closure standard of TPH under NMAC 19.17.29 is 2,500. Attached are the field report, lab results and siting criteria.

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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: _____ Title: _____

Signature: _____ Date: _____

email: _____ Telephone: _____

OCD Only

Received by: _____ Date: _____

- Approved
 Approved with Attached Conditions of Approval
 Denied
 Deferral Approved

Signature: _____ Date: _____

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Was this a major release as defined by 19.15.29.7(A) NMAC? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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)? Not required.	

Initial Response

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

<input type="checkbox"/> The source of the release has been stopped. <input type="checkbox"/> The impacted area has been secured to protect human health and the environment. <input type="checkbox"/> Released materials have been contained via the use of berms or dikes, absorbent pads, or other containment devices. <input type="checkbox"/> All free liquids and recoverable materials have been removed and managed appropriately.
If all the actions described above have <u>not</u> been undertaken, explain why: TPH sampled above the BGT closure standards and below action levels based on site criteria following NMAC 19.17.29.
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: _____
<u>OCD Only</u> Received by: _____ Date: _____

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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?	350 (ft bgs)
Did this release impact groundwater or surface water?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 300 feet of a continuously flowing watercourse or any other significant watercourse?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 300 feet of an occupied permanent residence, school, hospital, institution, or church?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 1000 feet of any other fresh water well or spring?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within incorporated municipal boundaries or within a defined municipal fresh water well field?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 300 feet of a wetland?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release overlying a subsurface mine?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release overlying an unstable area such as karst geology?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within a 100-year floodplain?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Did the release impact areas not on an exploration, development, production, or storage site?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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 1/2-mile of the lateral extents of the release
- Boring or excavation logs
- Photographs including date and GIS information
- 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.

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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: _____

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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)

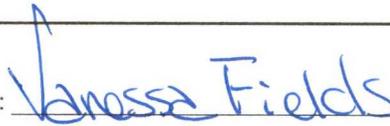
Laboratory analyses of final sampling (Note: appropriate ODC District office must be notified 2 days prior to final sampling)

Description of remediation activities

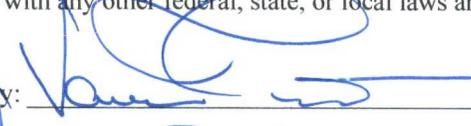
I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public 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: Steve Moskal Title: Environmental Coordinator
 Signature:  Date: October 15, 2018
 email: steven.moskal@bpx.com Telephone: 505-330-9179

OCD Only

Received by:  Date: 10/16/2018

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: 10/25/2018
 Printed Name: Vanessa Fields Title: Environmental Specialist

CLIENT: BP	BLAGG ENGINEERING, INC. P.O. BOX 87, BLOOMFIELD, NM 87413 (505) 632-1199	API #: 3004522486 TANK ID (if applicable): A
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FIELD REPORT: (circle one): <input checked="" type="checkbox"/> BGT CONFIRMATION / <input type="checkbox"/> RELEASE INVESTIGATION / <input type="checkbox"/> OTHER:	PAGE #: 1 of 1
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SITE INFORMATION:	SITE NAME: BARRETT LS # 2A	DATE STARTED: 08/21/18
QUAD/UNIT: I SEC: 19 TWP: 31N RNG: 9W PM: NM CNTY: SJ ST: NM		DATE FINISHED:
1/4 - 1/4 FOOTAGE: 1,500'S / 920'E NE/SE LEASE TYPE: FEDERAL / STATE / FEE / INDIAN		ENVIRONMENTAL SPECIALIST(S): NJV
LEASE #: SF078336B PROD. FORMATION: MV CONTRACTOR: BP - J. GONZALES		

REFERENCE POINT:	WELL HEAD (W.H.) GPS COORD.: 36.88088 X 107.81549 GL ELEV.: 6,529'	
1) 95 BGT (SW/DB)	GPS COORD.: 36.880892 X 107.815735	DISTANCE/BEARING FROM W.H.: 69.5', S78.5W
2)	GPS COORD.:	DISTANCE/BEARING FROM W.H.:
3)	GPS COORD.:	DISTANCE/BEARING FROM W.H.:
4)	GPS COORD.:	DISTANCE/BEARING FROM W.H.:

SAMPLING DATA:	CHAIN OF CUSTODY RECORD(S) # OR LAB USED: HALL	OVM READING (ppm) NA
1) SAMPLE ID: 5PC - TB @ 5' (95)	SAMPLE DATE: 08/21/18 SAMPLE TIME: 1145 LAB ANALYSIS: 8015B/8021B/300.0 (CI)	
2) SAMPLE ID:	SAMPLE DATE: SAMPLE TIME: LAB ANALYSIS:	
3) SAMPLE ID:	SAMPLE DATE: SAMPLE TIME: LAB ANALYSIS:	
4) SAMPLE ID:	SAMPLE DATE: SAMPLE TIME: LAB ANALYSIS:	
5) SAMPLE ID:	SAMPLE DATE: SAMPLE TIME: LAB ANALYSIS:	

SOIL DESCRIPTION:	SOIL TYPE: <input checked="" type="checkbox"/> SAND <input checked="" type="checkbox"/> SILTY SAND / SILT / SILTY CLAY / CLAY / GRAVEL / OTHER
SOIL COLOR: PALE YELLOWISH BROWN	PLASTICITY (CLAYS): NON PLASTIC / SLIGHTLY PLASTIC / COHESIVE / MEDIUM PLASTIC / HIGHLY PLASTIC
COHESION (ALL OTHERS): <input checked="" type="checkbox"/> NON COHESIVE / SLIGHTLY COHESIVE / COHESIVE / HIGHLY COHESIVE	DENSITY (COHESIVE CLAYS & SILTS): SOFT / FIRM / STIFF / VERY STIFF / HARD
CONSISTENCY (NON COHESIVE SOILS): <input checked="" type="checkbox"/> LOOSE <input checked="" type="checkbox"/> FIRM / DENSE / VERY DENSE	HC ODOR DETECTED: YES <input checked="" type="checkbox"/> NO EXPLANATION -
MOISTURE: DRY <input checked="" type="checkbox"/> SLIGHTLY MOIST / MOIST / WET / SATURATED / SUPER SATURATED	ANY AREAS DISPLAYING WETNESS: YES <input checked="" type="checkbox"/> NO EXPLANATION -
SAMPLE TYPE: GRAB <input checked="" type="checkbox"/> COMPOSITE # OF PTS. 5	DISCOLORATION/STAINING OBSERVED: YES <input checked="" type="checkbox"/> NO EXPLANATION -

SITE OBSERVATIONS:	LOST INTEGRITY OF EQUIPMENT: YES <input checked="" type="checkbox"/> NO EXPLANATION -
APPARENT EVIDENCE OF A RELEASE OBSERVED AND/OR OCCURRED: YES <input checked="" type="checkbox"/> NO EXPLANATION -	
EQUIPMENT SET OVER RECLAIMED AREA: YES <input checked="" type="checkbox"/> NO EXPLANATION -	
OTHER: NMOCED REP. PRESENT TO WITNESS CONFIRMATION SAMPLING.	

EXCAVATION DIMENSION ESTIMATION: NA ft. X NA ft. X NA ft. EXCAVATION ESTIMATION (Cubic Yards): NA
DEPTH TO GROUNDWATER: >100' NEAREST WATER SOURCE: >1,000' NEAREST SURFACE WATER: 300' < X < 1,000' NMOCED TPH CLOSURE STD: 2,500 ppm

SITE SKETCH <div style="text-align: center;"> <input type="checkbox"/> BGT Located : off <input checked="" type="checkbox"/> on site <input type="checkbox"/> PLOT PLAN circle: <input checked="" type="checkbox"/> attached </div> <div style="text-align: right; margin-top: 10px;">X - S.P.D.</div>	<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td>OVM CALIB. READ. = NA ppm</td> <td>RF = 1.00</td> </tr> <tr> <td>OVM CALIB. GAS = NA ppm</td> <td></td> </tr> <tr> <td>TIME: NA am/pm</td> <td>DATE: NA</td> </tr> </table> MISCELL. NOTES WO: REF #: P-1007 VID: VHIXONEV11 PJ #: Permit date(s): 06/02/10 OCD Appr. date(s): 03/06/17 <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td>Tank ID</td> <td>OVM = Organic Vapor Meter ppm = parts per million</td> </tr> <tr> <td>A</td> <td>BGT Sidewalls Visible: <input checked="" type="checkbox"/> Y / N</td> </tr> <tr> <td></td> <td>BGT Sidewalls Visible: Y / N</td> </tr> <tr> <td></td> <td>BGT Sidewalls Visible: Y / N</td> </tr> </table> Magnetic declination: 10° E	OVM CALIB. READ. = NA ppm	RF = 1.00	OVM CALIB. GAS = NA ppm		TIME: NA am/pm	DATE: NA	Tank ID	OVM = Organic Vapor Meter ppm = parts per million	A	BGT Sidewalls Visible: <input checked="" type="checkbox"/> Y / N		BGT Sidewalls Visible: Y / N		BGT Sidewalls Visible: Y / N
OVM CALIB. READ. = NA ppm	RF = 1.00														
OVM CALIB. GAS = NA ppm															
TIME: NA am/pm	DATE: NA														
Tank ID	OVM = Organic Vapor Meter ppm = parts per million														
A	BGT Sidewalls Visible: <input checked="" type="checkbox"/> Y / N														
	BGT Sidewalls Visible: Y / N														
	BGT Sidewalls Visible: Y / N														

NOTES: GOOGLE EARTH IMAGERY DATE: 10/5/2016. ONSITE: 08/21/18

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Blagg Engineering

Client Sample ID: 5PC-TB @ 5' (95)

Project: BARRETT LS 2A

Collection Date: 8/21/2018 11:45:00 AM

Lab ID: 1808D13-001

Matrix: SOIL

Received Date: 8/22/2018 8:20:00 AM

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	ND	30		mg/Kg	20	8/22/2018 1:15:53 PM	39934
EPA METHOD 8015D MOD: GASOLINE RANGE							Analyst: AG
Gasoline Range Organics (GRO)	ND	3.8		mg/Kg	1	8/22/2018 12:01:47 PM	A53626
Surr: BFB	103	70-130		%Rec	1	8/22/2018 12:01:47 PM	A53626
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: Irm
Diesel Range Organics (DRO)	27	9.8		mg/Kg	1	8/22/2018 10:46:40 AM	39927
Motor Oil Range Organics (MRO)	99	49		mg/Kg	1	8/22/2018 10:46:40 AM	39927
Surr: DNOP	115	50.6-138		%Rec	1	8/22/2018 10:46:40 AM	39927
EPA METHOD 8260B: VOLATILES SHORT LIST							Analyst: AG
Benzene	ND	0.019		mg/Kg	1	8/22/2018 12:01:47 PM	B53626
Toluene	ND	0.038		mg/Kg	1	8/22/2018 12:01:47 PM	B53626
Ethylbenzene	ND	0.038		mg/Kg	1	8/22/2018 12:01:47 PM	B53626
Xylenes, Total	ND	0.075		mg/Kg	1	8/22/2018 12:01:47 PM	B53626
Surr: 4-Bromofluorobenzene	116	70-130		%Rec	1	8/22/2018 12:01:47 PM	B53626
Surr: Toluene-d8	94.7	70-130		%Rec	1	8/22/2018 12:01:47 PM	B53626

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 Quantitative 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#: 1808D13

24-Aug-18

Client: Blagg Engineering

Project: BARRETT LS 2A

Sample ID	MB-39934	SampType:	mbk	TestCode:	EPA Method 300.0: Anions					
Client ID:	PBS	Batch ID:	39934	RunNo:	53631					
Prep Date:	8/22/2018	Analysis Date:	8/22/2018	SeqNo:	1769709	Units:	mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID	LCS-39934	SampType:	lcs	TestCode:	EPA Method 300.0: Anions					
Client ID:	LCSS	Batch ID:	39934	RunNo:	53631					
Prep Date:	8/22/2018	Analysis Date:	8/22/2018	SeqNo:	1769710	Units:	mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	96.5	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 |
| PQL Practical Quantitative 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#: 1808D13

24-Aug-18

Client: Blagg Engineering
Project: BARRETT LS 2A

Sample ID	MB-39927	SampType:	MBLK	TestCode:	EPA Method 8015M/D: Diesel Range Organics					
Client ID:	PBS	Batch ID:	39927	RunNo:	53618					
Prep Date:	8/22/2018	Analysis Date:	8/22/2018	SeqNo:	1768552	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	11		10.00		110	50.6	138			

Sample ID	LCS-39927	SampType:	LCS	TestCode:	EPA Method 8015M/D: Diesel Range Organics					
Client ID:	LCSS	Batch ID:	39927	RunNo:	53618					
Prep Date:	8/22/2018	Analysis Date:	8/22/2018	SeqNo:	1768553	Units:	mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	45	10	50.00	0	89.3	70	130			
Surr: DNOP	4.6		5.000		92.5	50.6	138			

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
- PQL Practical Quantitative Limit
- 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
- W Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1808D13

24-Aug-18

Client: Blagg Engineering
Project: BARRETT LS 2A

Sample ID	100ng lcs		SampType:	LCS4		TestCode:	EPA Method 8260B: Volatiles Short List				
Client ID:	BatchQC		Batch ID:	B53626		RunNo:	53626				
Prep Date:			Analysis Date:	8/22/2018		SeqNo:	1768679		Units: mg/Kg		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Benzene	1.0	0.025	1.000	0	102	80	120				
Toluene	1.1	0.050	1.000	0	109	80	120				
Ethylbenzene	1.1	0.050	1.000	0	108	80	120				
Xylenes, Total	3.1	0.10	3.000	0	104	80	120				
Surr: 4-Bromofluorobenzene	0.51		0.5000		103	70	130				
Surr: Toluene-d8	0.51		0.5000		102	70	130				

Sample ID	1808d13-001ams		SampType:	MS4		TestCode:	EPA Method 8260B: Volatiles Short List				
Client ID:	5PC-TB @ 5' (95)		Batch ID:	B53626		RunNo:	53626				
Prep Date:			Analysis Date:	8/22/2018		SeqNo:	1768681		Units: mg/Kg		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Benzene	0.70	0.019	0.7524	0	93.0	80	120				
Toluene	0.77	0.038	0.7524	0.005462	101	80	120				
Ethylbenzene	0.79	0.038	0.7524	0	105	82	121				
Xylenes, Total	2.3	0.075	2.257	0.01752	103	80.2	120				
Surr: 4-Bromofluorobenzene	0.42		0.3762		112	70	130				
Surr: Toluene-d8	0.36		0.3762		94.4	70	130				

Sample ID	1808d13-001amsd		SampType:	MSD4		TestCode:	EPA Method 8260B: Volatiles Short List				
Client ID:	5PC-TB @ 5' (95)		Batch ID:	B53626		RunNo:	53626				
Prep Date:			Analysis Date:	8/22/2018		SeqNo:	1768682		Units: mg/Kg		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Benzene	0.70	0.019	0.7524	0	93.3	80	120	0.267	20		
Toluene	0.73	0.038	0.7524	0.005462	96.7	80	120	4.71	20		
Ethylbenzene	0.78	0.038	0.7524	0	103	82	121	1.59	20		
Xylenes, Total	1.9	0.075	2.257	0.01752	85.5	80.2	120	18.2	20		
Surr: 4-Bromofluorobenzene	0.43		0.3762		116	70	130	0	0		
Surr: Toluene-d8	0.35		0.3762		94.2	70	130	0	0		

Sample ID	rb		SampType:	MBLK		TestCode:	EPA Method 8260B: Volatiles Short List				
Client ID:	PBS		Batch ID:	B53626		RunNo:	53626				
Prep Date:			Analysis Date:	8/22/2018		SeqNo:	1768683		Units: mg/Kg		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual	
Benzene	ND	0.025									
Toluene	ND	0.050									
Ethylbenzene	ND	0.050									
Xylenes, Total	ND	0.10									

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
- PQL Practical Quantitative Limit
- 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
- W Sample container temperature is out of limit as specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1808D13

24-Aug-18

Client: Blagg Engineering

Project: BARRETT LS 2A

Sample ID	rb	SampType:	MBLK	TestCode:	EPA Method 8260B: Volatiles Short List					
Client ID:	PBS	Batch ID:	B53626	RunNo:	53626					
Prep Date:		Analysis Date:	8/22/2018	SeqNo:	1768683	Units:	mg/Kg			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Bromofluorobenzene	0.56		0.5000		112	70	130			
Surr: Toluene-d8	0.51		0.5000		102	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 Quantitative 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#: 1808D13

24-Aug-18

Client: Blagg Engineering

Project: BARRETT LS 2A

Sample ID	2.5ug gro lcs	SampType:	LCS	TestCode:	EPA Method 8015D Mod: Gasoline Range					
Client ID:	LCSS	Batch ID:	A53626	RunNo:	53626					
Prep Date:		Analysis Date:	8/22/2018	SeqNo:	1768676	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	99.5	70	130			
Surr: BFB	460		500.0		91.4	70	130			

Sample ID	rb	SampType:	MBLK	TestCode:	EPA Method 8015D Mod: Gasoline Range					
Client ID:	PBS	Batch ID:	A53626	RunNo:	53626					
Prep Date:		Analysis Date:	8/22/2018	SeqNo:	1768677	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	500		500.0		99.7	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 Quantitative 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
 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: **1808D13**

RcptNo: **1**

Received By: **Erin Melendrez** 8/22/2018 8:20:00 AM *[Signature]*

Completed By: **Anne Thorne** 8/22/2018 8:27:25 AM *[Signature]*

Reviewed By: **JAB 08/22/18**

Labeled by: **AT 08/22/18 @ 0835**

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? Yes No
 (Note discrepancies on chain of custody)
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? Yes No
 (If no, notify customer for authorization.)

of preserved bottles checked for pH: _____ (<2 or >12 unless noted)
Adjusted? _____
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: <input type="checkbox"/> eMail <input type="checkbox"/> Phone <input type="checkbox"/> Fax <input type="checkbox"/> In Person
Regarding: _____	
Client Instructions: _____	

16. Additional remarks:

Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	3.8	Good	Yes			

Barrett LS 002A

30-045-22486
(I), S-19, T31N, R9W

BGT GPS :
36.880892°, -107.8157350°

Legend

-  Barrett LS 002A Wellhead
-  BGT Closure Sampling Location

Barrett LS 002A

BGT Closure Sampling Location



300 ft

SITING AND HYDRO-GEOLOGICAL REPORT FOR BARRETT LS 002A

Siting Criteria 19.15.17.10 NMAC

Depth to groundwater at the site is estimated to be greater than 100 feet. This estimation is based on data from Stone and others (1983), and depth to groundwater data obtained from water wells permitted by the New Mexico State Engineer's Office (OSE, Figure 1). Local topography and proximity to adjacent water features is also considered. A topographic map of the site is provided as Figure 2 and demonstrates that the below grade tank (BGT) is not within 300 feet of any continuously flowing watercourse or within 200 feet of any other significant watercourse, lakebed, sinkhole or playa lake as measured from the ordinary high water mark. Figure 3 demonstrates that the BGT is not within 300 feet of a permanent residence, school, hospital, institution or church. Figure 4 demonstrates, based on a search of the OSE database and USGS topographic maps, that there are no freshwater wells or springs within 1000 feet of the BGT. Figure 5 demonstrates that the BGT is not within a municipal boundary or a defined municipal freshwater well field. Figure 6 demonstrates that the BGT is not within 500 feet of a wetland. Figure 7 demonstrates that the BGT is not in an area overlying a subsurface mine. The BGT is not located in an unstable area. Figure 8 demonstrates that the BGT is not within the mapped FEMA 100-year floodplain.

Local Geology and Hydrology

This particular site is located on a slope close to the main channel of Pump Canyon. Regional topography of Pump Canyon is composed of mesas dissected by deep, narrow canyons and arroyos. The more resistant cliff-forming sandstones of the San Jose Formation cap the interbedded siltstones, shales and sandstones of the Nacimiento Formation. Accumulations of talus and eroded sands at the base of canyon walls form steep to gentle slopes that transition into flat-bottomed arroyos within the canyons. Deposits of Quaternary alluvial and aeolian sands occur prominently near the surface of Pump Canyon, especially near streams and washes.

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 system 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 2232 feet. Aquifers within the coarser and continuous sandstone bodies of the Nacimiento Formation are between 0 and 1000 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 San Juan River.

References

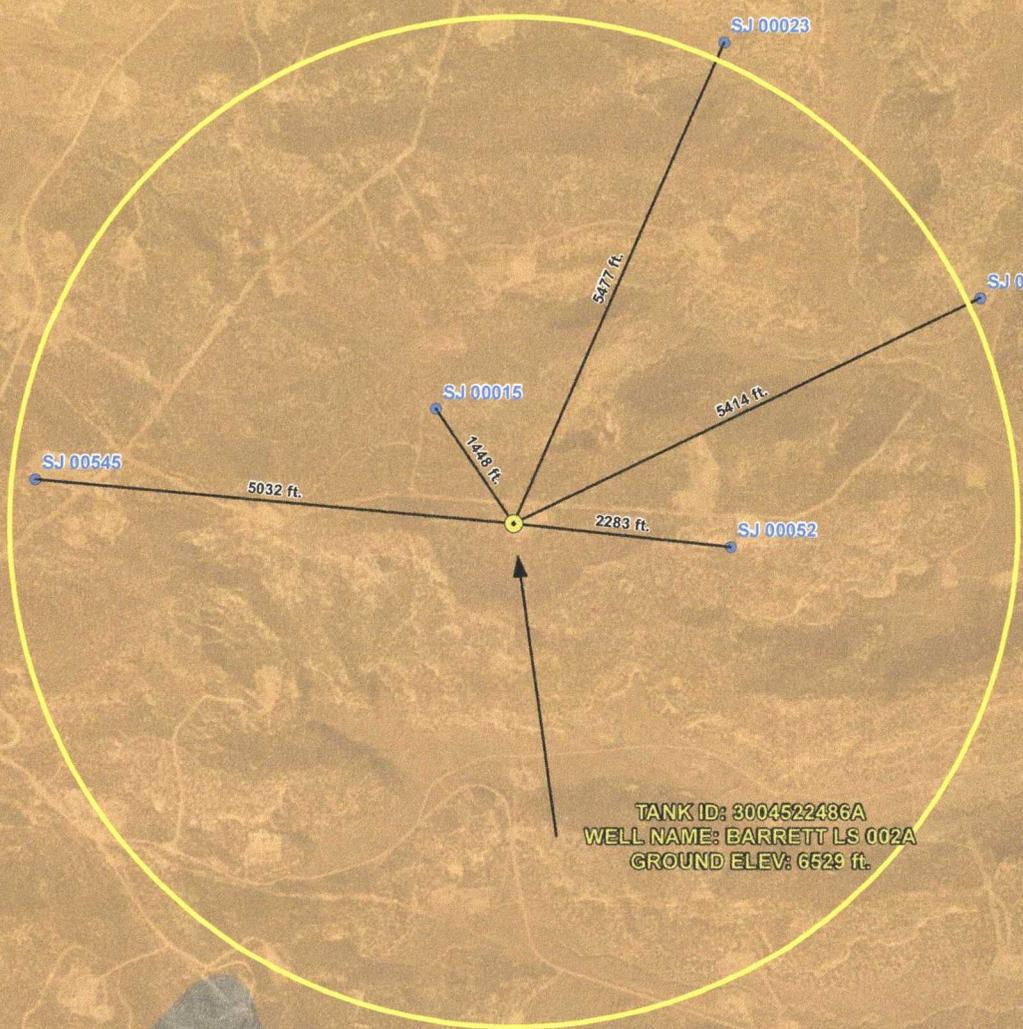
Circular 154—Guidebook to coal geology of northwest New Mexico By E. C. Beaumont, J. W. Shomaker, W. J. Stone, and others, 1976

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

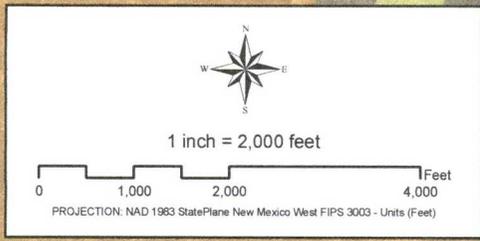
LEGEND

- BGT Location
- Water Well Location
- Distance to BGT (Line of Sight)
- 1 Mile Buffer
- Groundwater Evaluation (Alluvial Geology)**
- Groundwater Likely Less Than 50 Feet BGS
- Groundwater Suspected to be Less Than 50 Feet BGS

- | | | |
|---|---------------------------------|---------------------------|
| Ka - Animas formation | Surficial Geology Units | Qg - Terrace gravel |
| Kch - Cliff House sandstone | Kpc - Pictured Cliffs sandstone | Qgs - Gravelly sand |
| Kf - Fruitland formation | Kpl - Point Lookout sandstone | Qsw - Sheetwash alluvium |
| Kkl - Kirtland shale, lower shale member | Lake | Tbg - Bridgetimber Gravel |
| Kkm - Kirtland shale, Farmington sandstone member | Qa - Alluvium | Ti - Intrusive rocks |
| Kku - Kirtland shale, upper shale member | Qal - Alluvium | Tn - Nacimiento formation |
| Kl - Lewis shale | Qap - Pediment gravel | Tsc - Cuba Mesa Member |
| Kmf - Menefee formation | Qat - Terrace gravel | Tsj - San Jose Formation |
| Koa - Ojo Alamo sandstone | Qes - Eolian sand | Tsr - Regina Member |



TANK ID: 3004522486A
 WELL NAME: BARRETT LS 002A
 GROUND ELEV: 6529 ft.

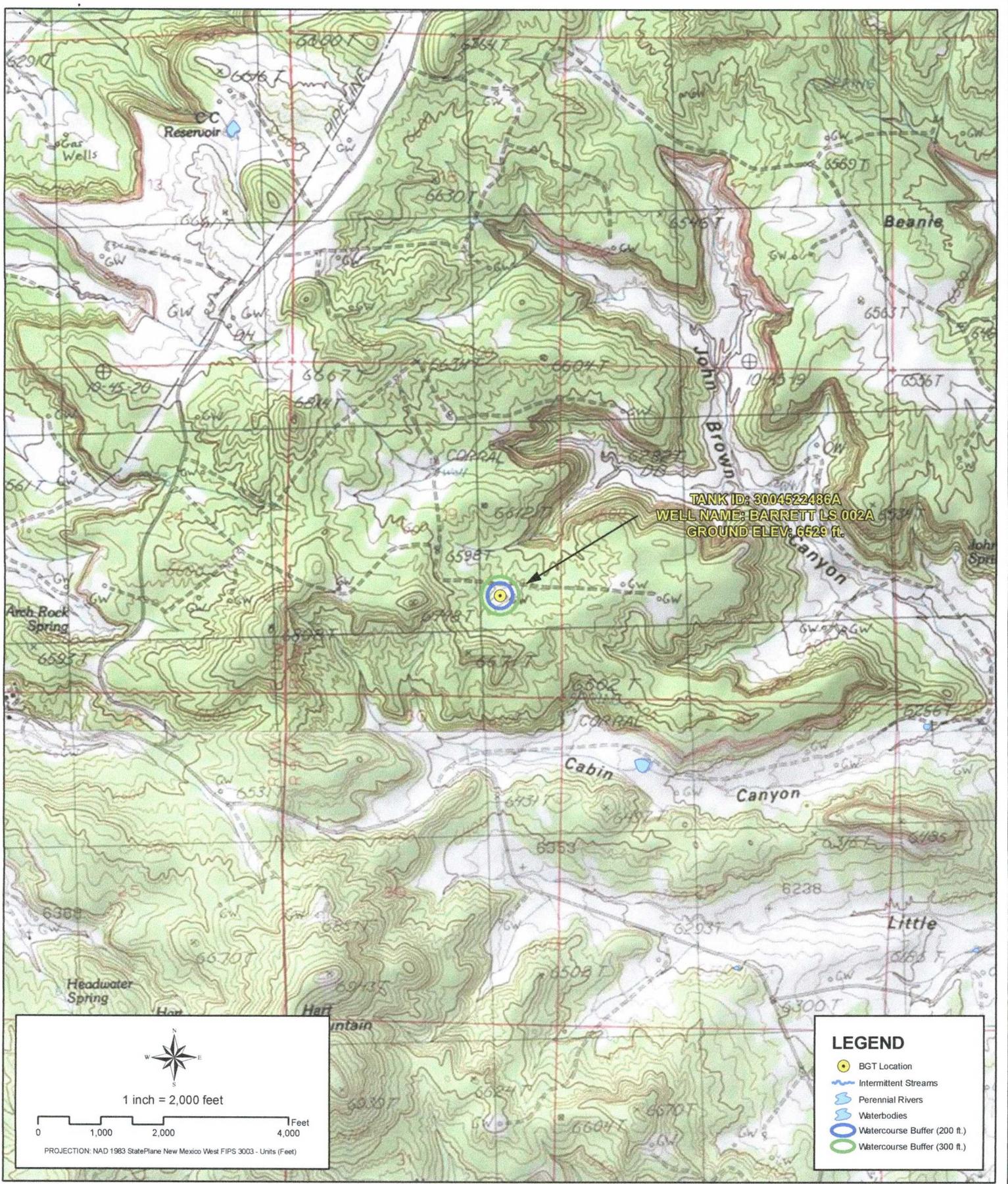


POD Number	Well Depth	Water Depth	Elevation
SJ 00052	510	0	6526
SJ 00545	0	0	6617
SJ 00015	610	0	6585
SJ 00022	202	120	6297
SJ 00023	550	200	6354



GROUNDWATER LESS THAN 50 FT.
WELL NAME: BARRETT LS 002A
 API NUMBER: 3004522486 TANK ID: 3004522486A
 SECTION 19, TOWNSHIP 31.0N, RANGE 09W, P.M. NM23

FIGURE
1

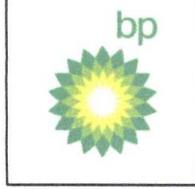


Creation Date: 4/29/2010

Created by: EBB

File Path: X:\BP\PASS\Sector_9\Sector_5\CIMXD\3004522486A.mxd

Reviewed by: AGH



PROXIMITY TO WATERCOURSES

WELL NAME: BARRETT LS 002A

API NUMBER: 3004522486 TANK ID: 3004522486A

SECTION 19, TOWNSHIP 31.0N, RANGE 09W, P.M. NM23

FIGURE

2



Creation Date: 4/26/2010

Created by: EBB

File Path: X:\BP\PASS\Sector_5\Sector_5\CIMXDs\3004522486A.mxd

Reviewed by: AGH



PROXIMITY TO PERMANENT STRUCTURE

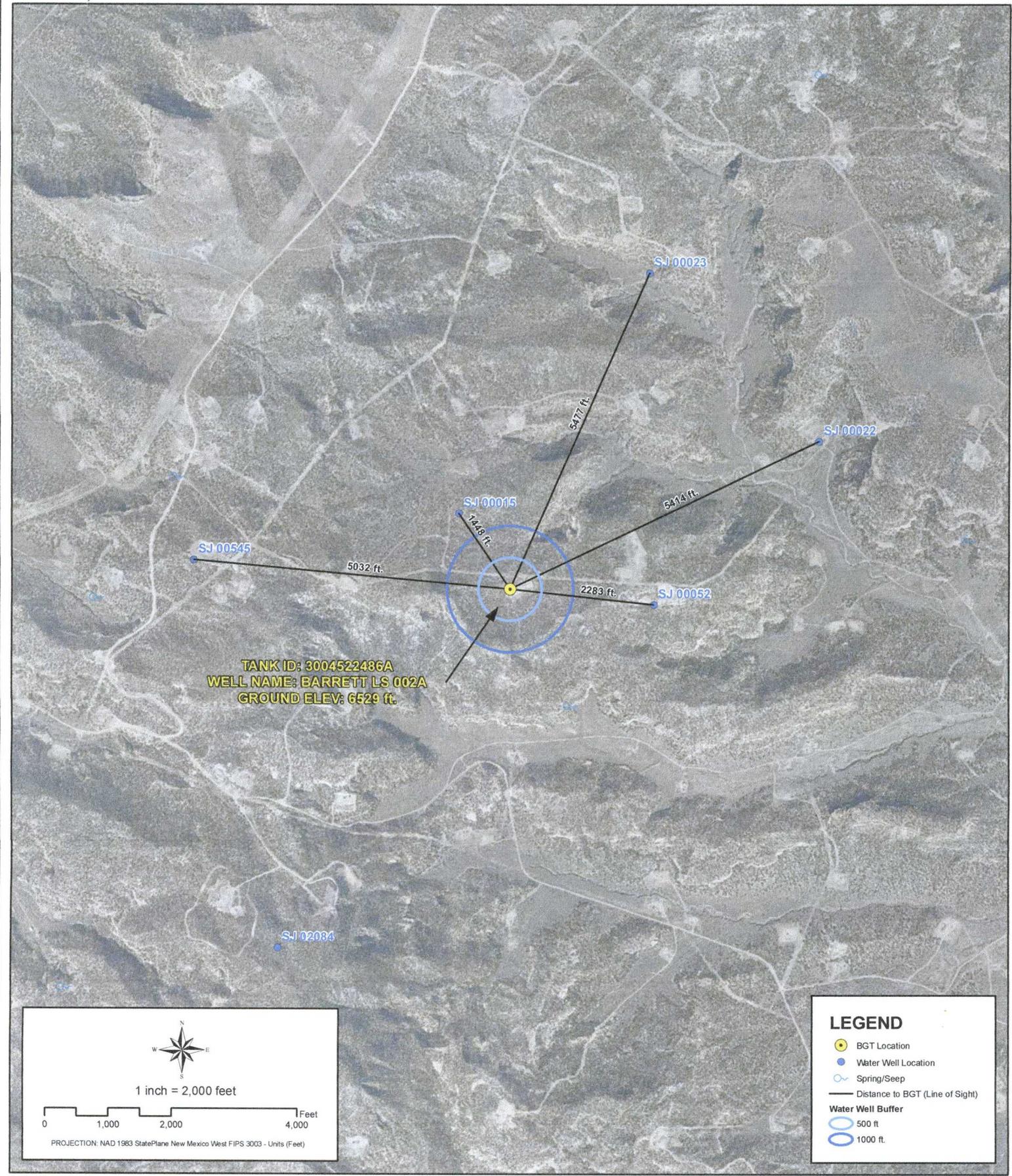
WELL NAME: BARRETT LS 002A

API NUMBER: 3004522486 TANK ID: 3004522486A

SECTION 19, TOWNSHIP 31.0N, RANGE 09W, P.M. NM23

FIGURE

3



PROXIMITY TO WATER WELLS

WELL NAME: BARRETT LS 002A

API NUMBER: 3004522486 TANK ID: 3004522486A

SECTION 19, TOWNSHIP 31.0N, RANGE 09W, P.M. NM23

FIGURE

4



Animas River

TANK ID: 3004522486A
WELL NAME: BARRETT LS 002A
GROUND ELEV: 6629 ft.



1 inch = 5,000 feet

0 2,500 5,000 10,000 Feet

PROJECTION: NAD 1983 StatePlane New Mexico West FIPS 3003 - Units (Feet)

LEGEND

-  BGT Location
-  Municipal Boundaries

Creation Date: 4/26/2010

Created by: EBB

File Path: X:\BP\PASS\Sector_B\Sector_5\CIMXD\3004522486A.mxd

Reviewed by: AGH



PROXIMITY TO MUNICIPAL BOUNDARY

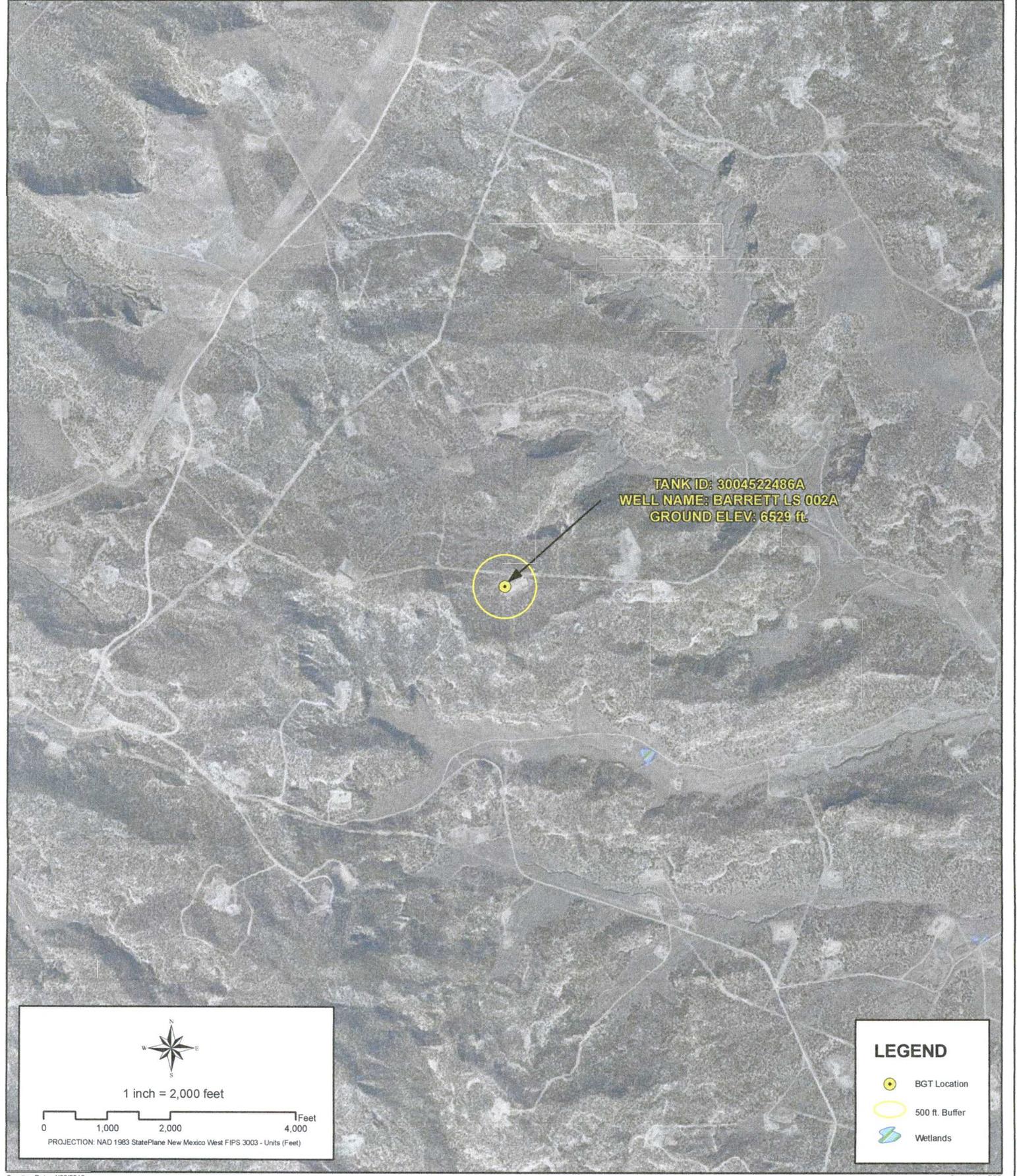
WELL NAME: BARRETT LS 002A

API NUMBER: 3004522486 TANK ID: 3004522486A

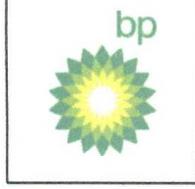
SECTION 19, TOWNSHIP 31.0N, RANGE 09W, P.M. NM23

FIGURE

5

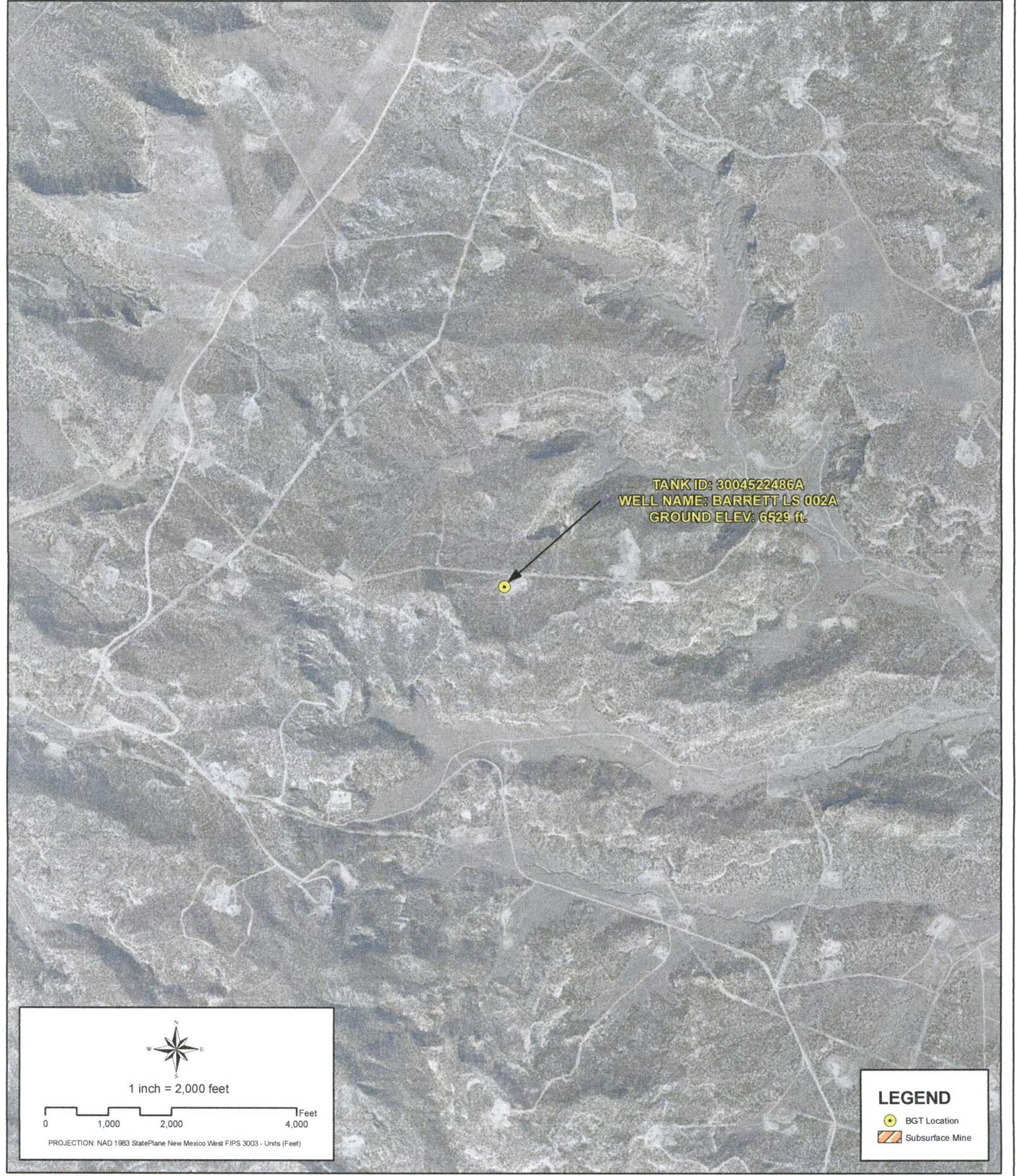


File Path: X:\BPIPAS\S\Sector_9\Sector_5\CWMDa\3004522486A.mxd

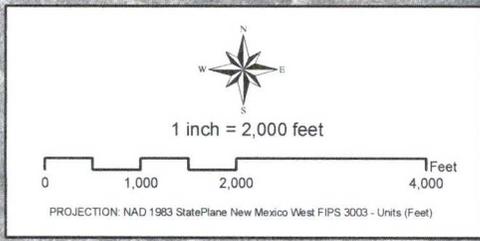


PROXIMITY TO WETLANDS
WELL NAME: BARRETT LS 002A
API NUMBER: 3004522486 TANK ID: 3004522486A
SECTION 19, TOWNSHIP 31.0N, RANGE 09W, P.M. NM23

FIGURE
6



TANK ID: 3004522486A
 WELL NAME: BARRETT LS 002A
 GROUND ELEV: 6529 ft.



LEGEND

-  BGT Location
-  Subsurface Mine

Creation Date: 4/26/2010

Created by: ERB

File Path: X:\BP\PASS\Sector_5\Sector_5C\MXD\3004522486A.mxd

Reviewed by: AGH



PROXIMITY TO SUBSURFACE MINES

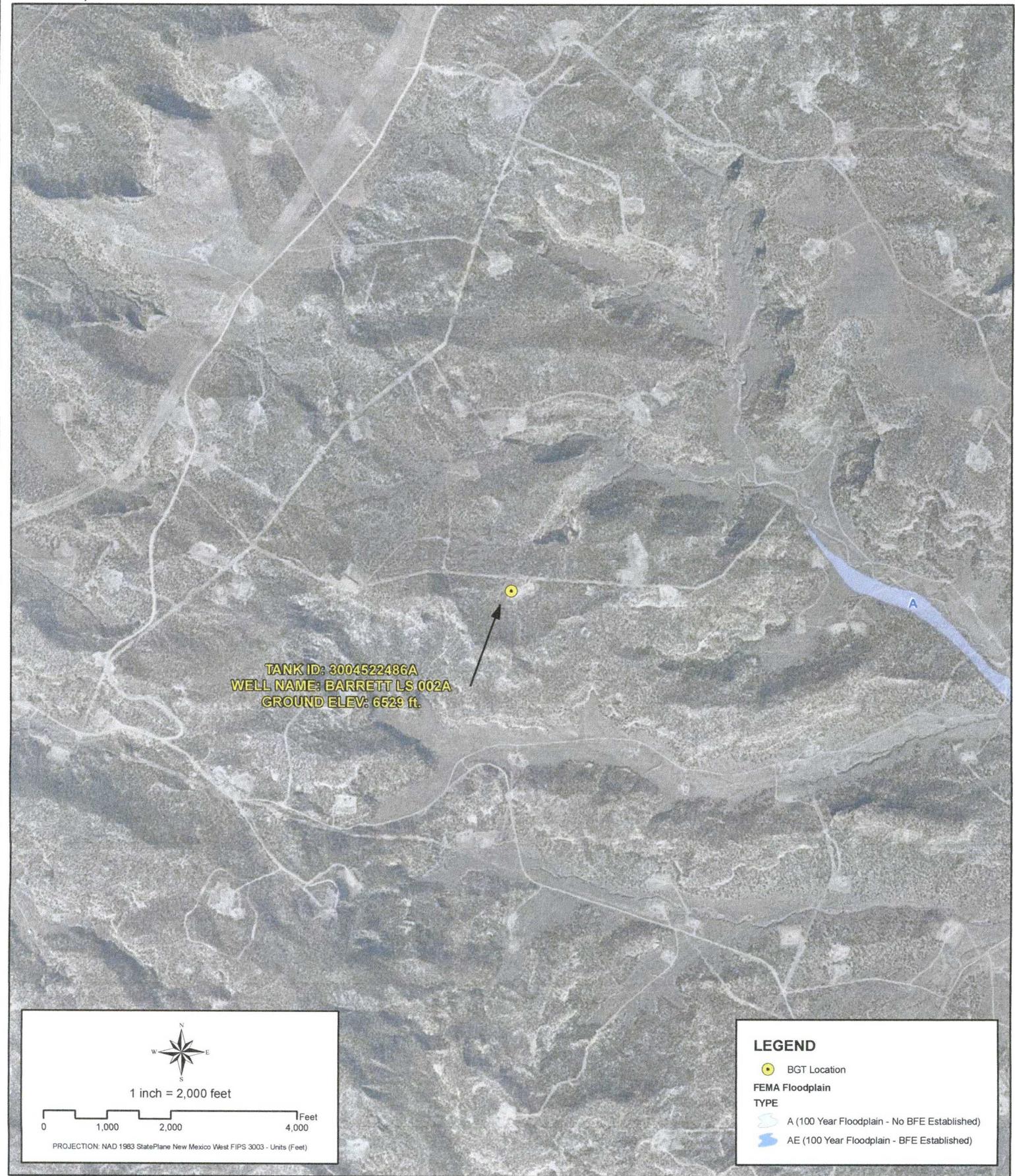
WELL NAME: BARRETT LS 002A

API NUMBER: 3004522486 TANK ID: 3004522486A

SECTION 19, TOWNSHIP 31.0N, RANGE 09W, P.M.NM23

FIGURE

7



File Path: X:\BP\IPASS\Sector_9\Sector_5\CIMXD\3004522486A.mxd



PROXIMITY TO FLOODPLAIN

WELL NAME: BARRETT LS 002A

API NUMBER: 3004522486 TANK ID: 3004522486A

SECTION 19, TOWNSHIP 31.0N, RANGE 09W, P.M. NM23

FIGURE

8



New Mexico Office of the State Engineer

Point of Diversion Summary

		(quarters are 1=NW 2=NE 3=SW 4=SE)				(NAD83 UTM in meters)
		(quarters are smallest to largest)				
Well Tag	POD Number	Q64 Q16 Q4	Sec	Tws	Rng	X Y
	SJ 00023		3	17	31N 09W	249764 4086871*

Driller License:		Driller Company:			
Driller Name:	CONLEY COX				
Drill Start Date:	09/25/1953	Drill Finish Date:	10/26/1953	Plug Date:	
Log File Date:	12/03/1953	PCW Rcv Date:		Source:	Shallow
Pump Type:		Pipe Discharge Size:		Estimated Yield:	
Casing Size:	6.63	Depth Well:	550 feet	Depth Water:	200 feet

Water Bearing Stratifications:	Top	Bottom	Description
	205	245	Sandstone/Gravel/Conglomerate
	370	385	Sandstone/Gravel/Conglomerate

*UTM location was derived from PLSS - see Help

The data is furnished by the NMOSE/ISC and is accepted by the recipient with the expressed understanding that the OSE/ISC make no warranties, expressed or implied, concerning the accuracy, completeness, reliability, usability, or suitability for any particular purpose of the data.

10/24/18 3:21 PM

POINT OF DIVERSION SUMMARY

Surface elevation of SJ0023 - 6,341

Surface Elevation of Barrett LS 002A BGT - 6,542

Estimated depth to water at Barrett LS 002A - 401' below ground surface.



New Mexico Office of the State Engineer

Wells with Well Log Information

)LW##### in the
) suffix indicates
 POD has been
 aced & no longer
 res a water right
)

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

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

(NAD83 UTM in meters)

(in feet)

Well Number	POD Sub-Code	basin	County	Source	6416 4	Sec	Tws	Rng	X	Y	Distance	Start Date	Finish Date	Log File Date	Depth Well	Depth Water	Driller	License Number
10015	SJ	SJ	Shallow		19	31N	09W	248812	4085735*	441	05/20/1953	05/20/1952	11/17/1953	610		CONLEY COX		
10052	SJ	SJ	Shallow		3	20	31N 09W	249738	4085267*	696	10/20/1952	10/20/1952	05/26/1954	510		CONLEY COX		

Word Count: 2

UTM NAD83 Radius Search (in meters):

Easting (X): 249048.13

Northing (Y): 4085361.6

Radius: 1610

M location was derived from PLSS - see Help

data is furnished by the NMOSE/ISC and is accepted by the recipient with the expressed understanding that the OSE/ISC make no warranties, expressed or implied, concerning the accuracy, completeness, reliability, usability, or suitability for any particular purpose of the data.



New Mexico Office of the State Engineer

Wells Without Well Log Information

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

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

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

(NAD83 UTM in meters)

POD Number	POD		County	Source	q q q			Sec	Tws	Rng	X	Y	Distance
	Code	Subbasin			64	16	4						
SJ 00545		SJ	SJ		1	4	24	31N	10W	247525	4085548*		1534

Record Count: 1

UTMNAD83 Radius Search (in meters):

Easting (X): 249048.13

Northing (Y): 4085361.6

Radius: 1610

*UTM location was derived from PLSS - see Help

The data is furnished by the NMOSE/ISC and is accepted by the recipient with the expressed understanding that the OSE/ISC make no warranties, expressed or implied, concerning the accuracy, completeness, reliability, usability, or suitability for any particular purpose of the data.



New Mexico Office of the State Engineer

Point of Diversion with Meter Attached

No PODs found.

UTMNAD83 Radius Search (in meters):

Easting (X): 249048.13

Northing (Y): 4085361.6

Radius: 1610

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 Arizona. 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.