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

Responsible Party

Responsible Party: Dugan Production	OGRID
Contact Name: Neil Haws	Contact Telephone: 505-635-3124
Contact email: neil.haws@duganproduction.com	Incident # NCS1828941804
Contact mailing address : 4100 W. Piedras St. Farmington, NM 87401	

NMOCD
NOV 15 2018
DISTRICT III

Location of Release Source

Latitude 36.445384 Longitude -108.185361
(NAD 83 in decimal degrees to 5 decimal places)

Site Name: West Bisti SWD #1	Site Type
Date Release Discovered: 9-27-18	API# 30-04533828

Unit Letter	Section	Township	Range	County
G	35	26N	13W	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) Approx 10 bbls	Volume Recovered (bbls) Approx 10 bbls or less
☐ 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)	Volume Recovered (bbls)
☐ Natural Gas	Volume Released (Mcf)	Volume Recovered (Mcf)
☐ Other (describe)	Volume/Weight Released (provide units)	Volume/Weight Recovered (provide units)

Cause of Release: System over pressured casing rupture disk on the knockout to rupture. This caused the crude oil to begin dumping into the pit. Pit filled and overflowed onto the ground flowing down grade (NW) approximately 52 feet where it collected in a low spot in the road.

25

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)?

Jean Bia with the Navajo Nation EPA UIC Program was on location and was the person who discovered the spill.
Neil Haws called NMOCD Cory Smith on 9-27-18 at approx. 1533 hrs. and followed up with e-mail later that afternoon.

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: Neil Haws #31 Title: Environmental

Signature: Date: 10-8-18

email: neil.haws@duganproduction.com Telephone: 505-635-3124

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?	85 (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
- ☒ 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	
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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: Neil Haws #31 Title: Environmental

Signature: [signature] Date: 10-22-18

email: neil.haws@dugan production.com Telephone: 505-635-3124

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: Neil Haws #31 Title: Environmental

Signature: [signature] Date: 10-22-18

email: neil.haws@duganproduction.com Telephone: -

OCD Only

Received by: _____ Date: 505-635-3124

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

Signature: _____ Date: _____

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: Neil Haws #31 Title: Environmental

Signature: [signature] Date: 10-22-18

email: neil.haws@duganproduction.com Telephone: 505-635-3124

OCD Only

Received by: OCD Date: 11/15/18

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: [signature] Date: 11/16/18

Printed Name: Cory Title: Environmental Spec.

West Bisti #1 SWD

9-27-18

Remediation plan:

Upon discovery of release, the release was immediately shut off. Area where crude oil collected was a low spot in the dirt roadway and was contained in the low spot. The standing liquids (crude oil) was removed by a water truck. A crew arrived and began removing stained/wet dirt in impacted area for later removal to an approved land farm.

9/28/18

Crew finished removing stained soil from impacted spill area (from pit to roadway)

Further remediation

-Contaminated soil will be removed to an approved land farm

-Soil Samples will be will be conducted with 2 a day notice to NMOCD.

-Upon lab results meeting standards of Table 1 clean soil will be used to backfill area

Continued:

10/3/18

Contaminated soil was removed to Envirotech land farm

10/9/18

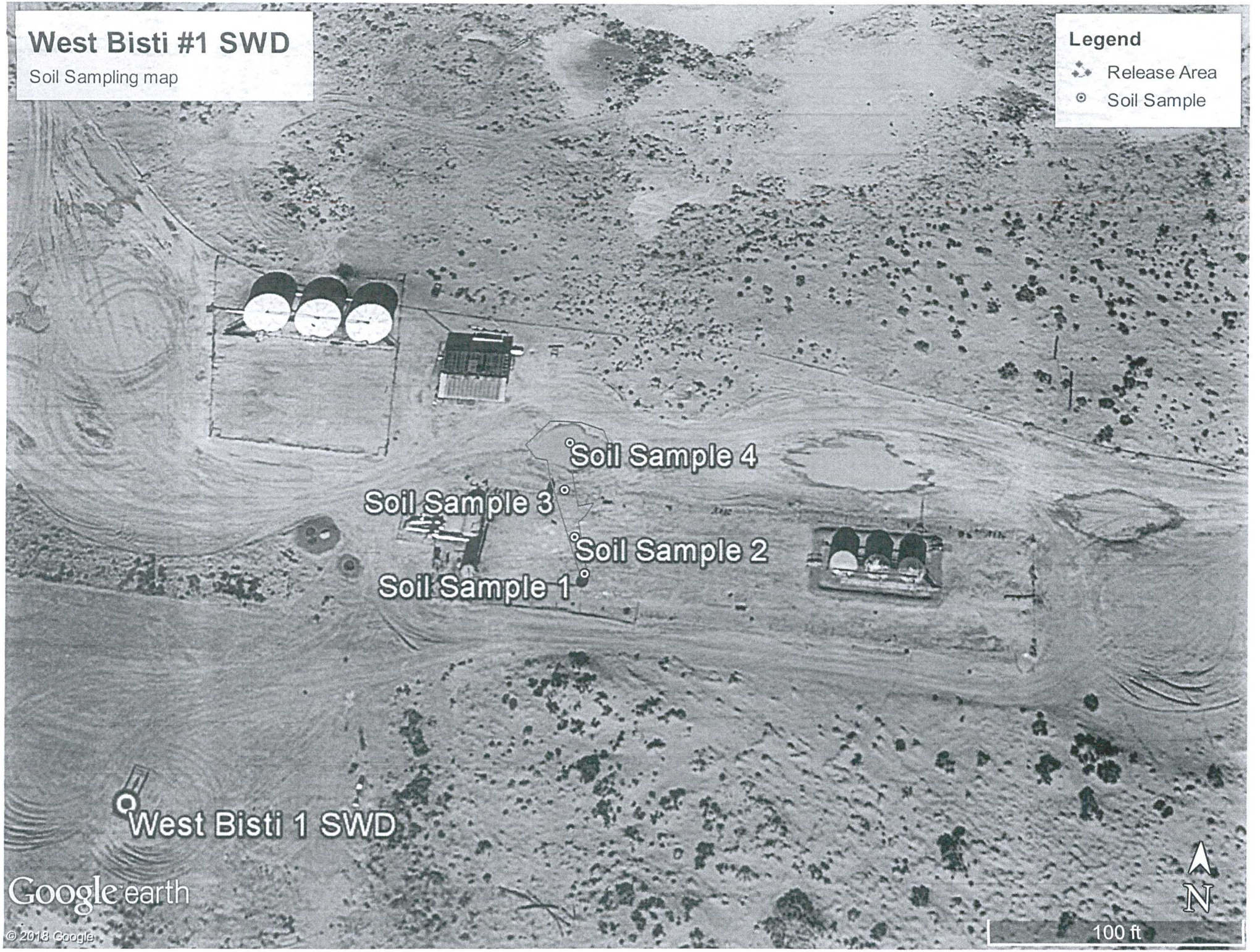
After a verbal sampling notification, soil samples were taken from the affected spill area from 4 different points. Samples sent to Cardinal Laboratories.

10/17/18

Test results received, all sample concentrations are less than parameters listed in table 1.

10/22/18

Site will be backfilled as soon as possible


West Bisti #1 SWD
Soil Sampling map
Legend
Release Area
Soil Sample
Soil Sample 4
Soil Sample 3
Soil Sample 2
Soil Sample 1
West Bisti 1 SWD
Google earth
© 2018 Google
N
100 ft

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

October 17, 2018

MIKE SANDOVAL

DUGAN PRODUCTION

P. O. BOX 420

FARMINGTON, NM 87499

RE: WEST BISTI #1 SWD

Enclosed are the results of analyses for samples received by the laboratory on 10/12/18 12:25.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-18-11. Accreditation applies to drinking water, non-potable water and solid and chemical materials. All accredited analytes are denoted by an asterisk (*). For a complete list of accredited analytes and matrices visit the TCEQ website at www.tceq.texas.gov/field/qa/lab_accred_certif.html.

Cardinal Laboratories is accreditated through the State of Colorado Department of Public Health and Environment for:

Method EPA 552.2	Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.4	Regulated VOCs (V1, V2, V3)

Accreditation applies to public drinking water matrices.

This report meets NELAP requirements and is made up of a cover page, analytical results, and a copy of the original chain-of-custody. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Celey D. Keene

Celey D. Keene

Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

DUGAN PRODUCTION
MIKE SANDOVAL
P. O. BOX 420
FARMINGTON NM, 87499
Fax To: (505) 327-4043

Received:	10/12/2018	Sampling Date:	10/09/2018
Reported:	10/17/2018	Sampling Type:	Soil
Project Name:	WEST BISTI #1 SWD	Sampling Condition:	Cool & Intact
Project Number:	WEST BISTI UNIT #1 SWD	Sample Received By:	Tamara Oldaker
Project Location:	NONE GIVEN		

Sample ID: # 1 WEST BISTI UNIT #1 SWD (H802936-01)

BTEX 8021B mg/kg Analyzed By: ms

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	10/16/2018	ND	2.27	114	2.00	0.142	
Toluene*	<0.050	0.050	10/16/2018	ND	2.14	107	2.00	0.735	
Ethylbenzene*	<0.050	0.050	10/16/2018	ND	2.11	106	2.00	0.142	
Total Xylenes*	<0.150	0.150	10/16/2018	ND	6.33	106	6.00	0.151	
Total BTEX	<0.300	0.300	10/16/2018	ND					

Surrogate: 4-Bromofluorobenzene (PIL *97.4 %* *69.8-142*

Chloride, SM4500Cl-B mg/kg Analyzed By: AC

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**64.0**	16.0	10/16/2018	ND	416	104	400	3.77	

TPH 8015M mg/kg Analyzed By: MS

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	10/15/2018	ND	202	101	200	11.1	
DRO >C10-C28*	**315**	10.0	10/15/2018	ND	211	106	200	7.80	
EXT DRO >C28-C36	**122**	10.0	10/15/2018	ND					

Surrogate: 1-Chlorooctane *93.7 %* *41-142*

Surrogate: 1-Chlorooctadecane *97.3 %* *37.6-147*

Cardinal Laboratories

*=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

DUGAN PRODUCTION
MIKE SANDOVAL
P. O. BOX 420
FARMINGTON NM, 87499
Fax To: (505) 327-4043

Received:	10/12/2018	Sampling Date:	10/09/2018
Reported:	10/17/2018	Sampling Type:	Soil
Project Name:	WEST BISTI #1 SWD	Sampling Condition:	Cool & Intact
Project Number:	WEST BISTI UNIT #1 SWD	Sample Received By:	Tamara Oldaker
Project Location:	NONE GIVEN		

Sample ID: # 2 WEST BISTI UNIT #1 SWD (H802936-02)

BTEX 8021B mg/kg Analyzed By: ms

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	10/16/2018	ND	2.27	114	2.00	0.142	
Toluene*	<0.050	0.050	10/16/2018	ND	2.14	107	2.00	0.735	
Ethylbenzene*	<0.050	0.050	10/16/2018	ND	2.11	106	2.00	0.142	
Total Xylenes*	**0.229**	0.150	10/16/2018	ND	6.33	106	6.00	0.151	
Total BTEX	<0.300	0.300	10/16/2018	ND					

Surrogate: 4-Bromofluorobenzene (PID *102 %* *69.8-142*

Chloride, SM4500Cl-B mg/kg Analyzed By: AC

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**48.0**	16.0	10/16/2018	ND	416	104	400	3.77	

TPH 8015M mg/kg Analyzed By: MS

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	**12.3**	10.0	10/15/2018	ND	202	101	200	11.1	
DRO >C10-C28*	**439**	10.0	10/15/2018	ND	211	106	200	7.80	
EXT DRO >C28-C36	**92.5**	10.0	10/15/2018	ND					

Surrogate: 1-Chlorooctane *85.0 %* *41-142*

Surrogate: 1-Chlorooctadecane *91.4 %* *37.6-147*

Cardinal Laboratories

*=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

DUGAN PRODUCTION
MIKE SANDOVAL
P. O. BOX 420
FARMINGTON NM, 87499
Fax To: (505) 327-4043

Received:	10/12/2018	Sampling Date:	10/09/2018
Reported:	10/17/2018	Sampling Type:	Soil
Project Name:	WEST BISTI #1 SWD	Sampling Condition:	Cool & Intact
Project Number:	WEST BISTI UNIT #1 SWD	Sample Received By:	Tamara Oldaker
Project Location:	NONE GIVEN		

Sample ID: # 3 WEST BISTI UNIT #1 SWD (H802936-03)

BTEX 8021B mg/kg Analyzed By: ms

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	10/16/2018	ND	2.34	117	2.00	2.35	
Toluene*	<0.050	0.050	10/16/2018	ND	2.18	109	2.00	2.14	
Ethylbenzene*	<0.050	0.050	10/16/2018	ND	2.20	110	2.00	0.294	
Total Xylenes*	<0.150	0.150	10/16/2018	ND	6.47	108	6.00	0.785	
Total BTEX	<0.300	0.300	10/16/2018	ND					

Surrogate: 4-Bromofluorobenzene (PIL *96.3 %* *69.8-142*

Chloride, SM4500Cl-B mg/kg Analyzed By: AC

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**48.0**	16.0	10/16/2018	ND	416	104	400	3.77	

TPH 8015M mg/kg Analyzed By: MS

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	10/15/2018	ND	202	101	200	11.1	
DRO >C10-C28*	**16.9**	10.0	10/15/2018	ND	211	106	200	7.80	
EXT DRO >C28-C36	<10.0	10.0	10/15/2018	ND					

Surrogate: 1-Chlorooctane *101 %* *41-142*

Surrogate: 1-Chlorooctadecane *90.9 %* *37.6-147*

Cardinal Laboratories

*=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

DUGAN PRODUCTION
MIKE SANDOVAL
P. O. BOX 420
FARMINGTON NM, 87499
Fax To: (505) 327-4043

Received:	10/12/2018	Sampling Date:	10/09/2018
Reported:	10/17/2018	Sampling Type:	Soil
Project Name:	WEST BISTI #1 SWD	Sampling Condition:	Cool & Intact
Project Number:	WEST BISTI UNIT #1 SWD	Sample Received By:	Tamara Oldaker
Project Location:	NONE GIVEN		

Sample ID: # 4 WEST BISTI UNIT #1 SWD (H802936-04)

BTEX 8021B mg/kg Analyzed By: ms

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	10/16/2018	ND	2.34	117	2.00	2.35	
Toluene*	<0.050	0.050	10/16/2018	ND	2.18	109	2.00	2.14	
Ethylbenzene*	<0.050	0.050	10/16/2018	ND	2.20	110	2.00	0.294	
Total Xylenes*	<0.150	0.150	10/16/2018	ND	6.47	108	6.00	0.785	
Total BTEX	<0.300	0.300	10/16/2018	ND					

Surrogate: 4-Bromofluorobenzene (PIL 96.3 % 69.8-142

Chloride, SM4500Cl-B mg/kg Analyzed By: AC

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	**48.0**	16.0	10/16/2018	ND	416	104	400	3.77	

TPH 8015M mg/kg Analyzed By: MS

Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	10/15/2018	ND	202	101	200	11.1	
DRO >C10-C28*	<10.0	10.0	10/15/2018	ND	211	106	200	7.80	
EXT DRO >C28-C36	<10.0	10.0	10/15/2018	ND					

Surrogate: 1-Chlorooctane 104 % 41-142

Surrogate: 1-Chlorooctadecane 92.5 % 37.6-147

Cardinal Laboratories

*=Accredited Analyte

Celey D. Keene

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Notes and Definitions

ND	Analyte NOT DETECTED at or above the reporting limit
RPD	Relative Percent Difference
**	Samples not received at proper temperature of 6°C or below.
***	Insufficient time to reach temperature.
-	Chloride by SM4500Cl-B does not require samples be received at or below 6°C
	Samples reported on an as received basis (wet) unless otherwise noted on report

Cardinal Laboratories

*=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

Green Analytical Laboratories
(970) 247-4220
Fax: (970) 247-4227
service@greenanalytical.com or dzufelt@greenanalytical.com
75 Suttle St Durango, CO 81303

Company Name(If Applicable): Diggan Production	Bill to (if different):
Contact Person: Mike Sandoval	P.O. #:
Address:	Company:
City: State: Zip:	Attn:
Phone #:	Address:
Email:	City:
Project Name(optional): West Bisti #1 SWD.	State: Zip:
Project Number(optional): West Bisti Unit #1 SWD	Phone #:
Sampler Name (Print): Michael Sandoval	Email:

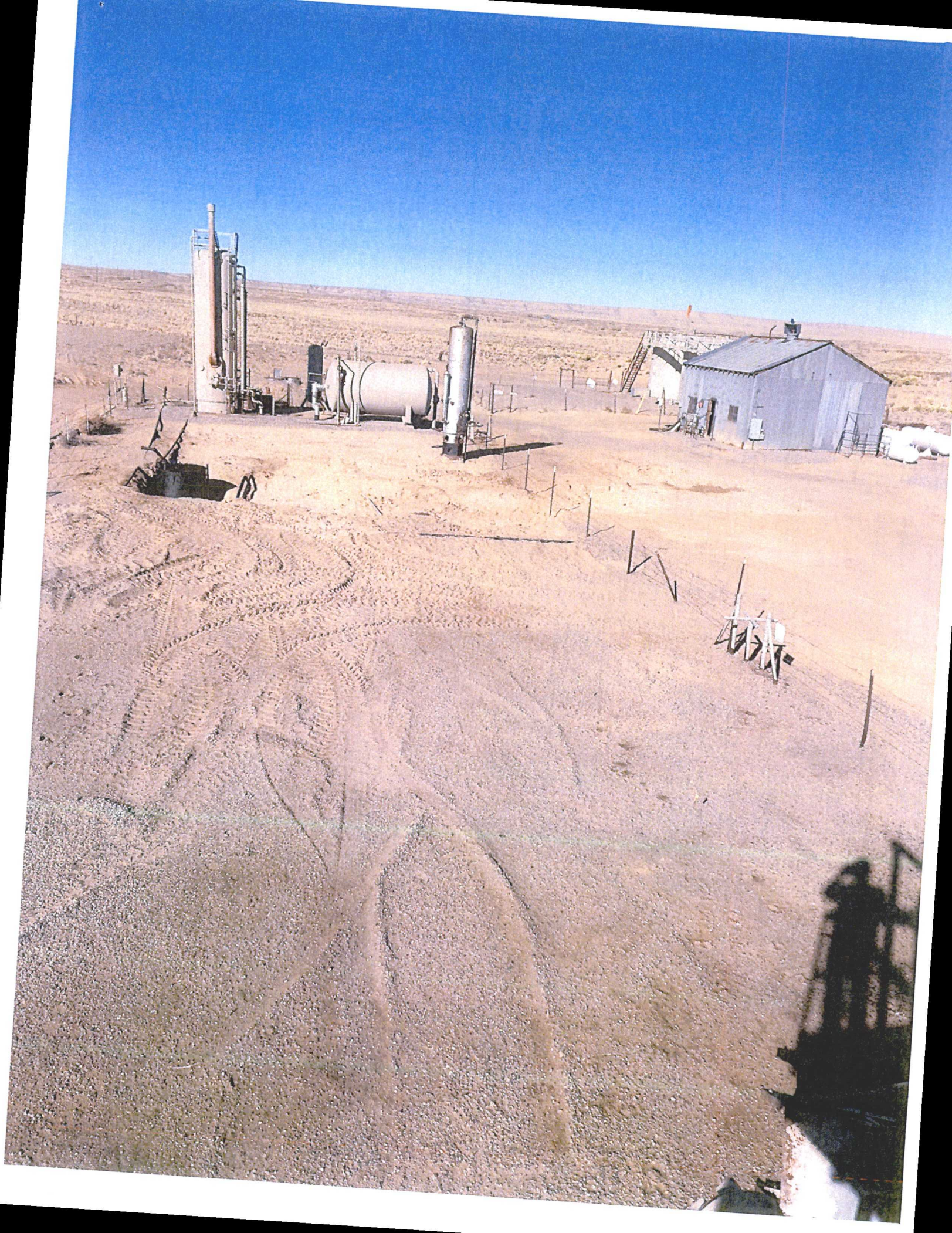
ANALYSIS REQUEST: Benz, TPH, CL, Beta.

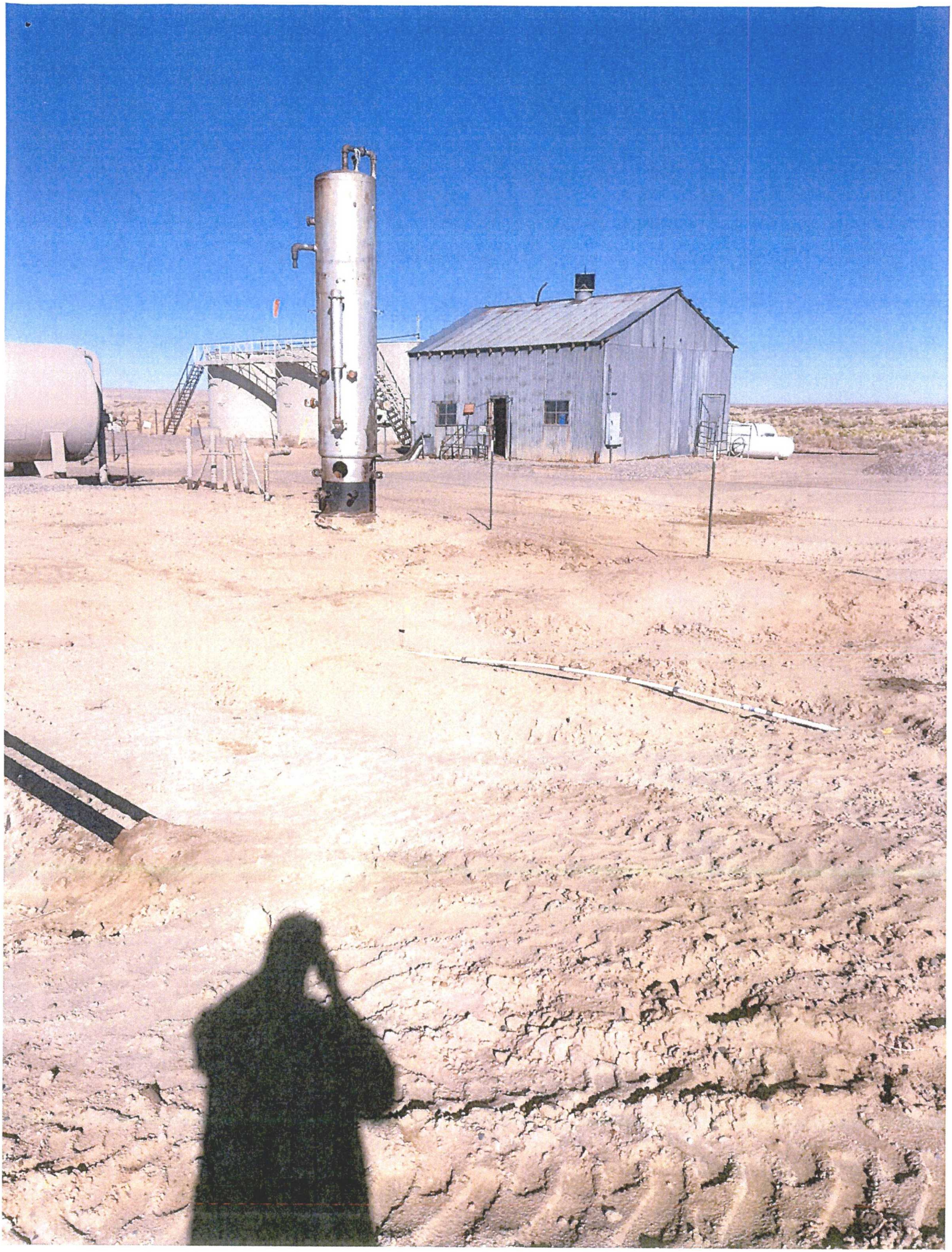
For Lab Use	Sample Name or Location	Collected Date	Collected Time	Matrix (check one): GROUNDWATER	SURFACEWATER	WASTEWATER	PRODUCEDWATER	SOIL	DRINKING WATER	OTHER :	# of containers: No preservation (general)	HNO_3	HCl	H_2SO_4	Other	Other	ANALYSIS REQUEST
H802936																	
1	West Bisti Unit #1 SWD	10-9-18	10:00														✓
2	West Bisti Unit #1 SWD	10-9-18	10:15														✓
3	West Bisti Unit #1 SWD	10-9-18	10:30														✓
4	West Bisti Unit #1 SWD	10-9-18	10:45														✓
	~~West Bisti Unit #1 SWD~~	~~10-9-18~~															
	~~West Bisti Unit #1 SWD~~	~~10-9-18~~															

PLEASE NOTE: GAL's liability and client's exclusive remedy for any claim arising whether based in contract or tort, shall be limited to the amount paid by the client for the analyses. All claims including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by GAL within 30 days after completion. In no event shall GAL be liable for incidental or consequental damages, including without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of services hereunder by GAL, regardless of whether such claim is based upon any of the above stated reasons or otherwise.

Relinquished By:	Date: 10-9-18 Time: 3:55	Received By: Christa Clark	ADDITIONAL REMARKS: Report to State? (Circle) Yes No
Relinquished By: Christa Clark	Date: 10/9/18 Time: 1655	Received By: Kangaroo Express	
Relinquished By: Kangaroo Express	Date: 10/10/18 Time: 0857	Received By:	
Delivered By: (Circle One) Sampler - UPS - FedEx - Kangaroo - Other: Jamara Oldaker 10/12/18 12:35pm	Temperature at reciept: 4.5°C 2.8°	CHECKED BY: a	3.0/2.8°C #1 on ice by DGO

† GAL cannot always accept verbal changes. Please fax or email written change requests.
* Chain of Custody must be signed in "Reliquished By:" as an acceptance of services and all applicable charges.





WBU Tank Battery Hydrogeologic Data

The WBU Tank Battery is located on Navajo Nation Trust Lands within the Navajo Indian Irrigation Project (NIIP), San Juan County, New Mexico. Water used for irrigation on NIIP is transported to the area from Cutter Dam and Navajo Dam over 25-30 miles to the north and east through an elaborate, cement lined canal system. The area is characterized as very arid with abundant dunes surrounding patches of "Badlands" topography with a sparse cover of grass and sage.

A records search of the NM Office of the State Engineer –iWATERS database was conducted on a three square mile area centered on the WBU Tank Battery location (Exhibit 2). No water wells were located in the area of the below grade tank. The results of the search are shown on Exhibit 1.

The main source of stock water in the region is encountered in valley-fill deposits in existing arroyos at shallow depths of approximately 15 – 50 feet below the surface. The proposed below grade tank is not located in an arroyo; the nearest arroyo is located over 1800 feet to the southeast (Exhibit 2).

The Nacimiento Formation extends from the surface down to a depth of approximately 35 feet. The interval is comprised of mudstone, shale and traces of siltstone. The interval is not expected to yield significant volumes of groundwater

The underlying Ojo Alamo Sandstone ranges from 35 feet down to a depth of approximately 135 feet and is comprised of a coarse grained alluvial sandstone inter-bedded with lenses of mudstone and occasional conglomeratic sandstone. There are no shallow Ojo Alamo water wells in the area. The Ojo Alamo is exposed in the outcrop 5-miles west and in Gallegos Wash 3-miles east. The Ojo Alamo may yield marginal quantities of water for livestock, however, the water quality is typically greater than 1,000 ppm total dissolved solids and high in sulfate (Stone, 1983).

The underlying Kirtland Shale ranges from approximately 135 feet down to 1150 feet. The uppermost 300 feet is comprised of shale. The middle sandstone member (Farmington Ss.) is poorly developed from 300-500 and might contain minimal amounts of poor quality ground water.

Based on electric open hole logs, the iWATERS database and literature reviewed, poor quality ground water might be found at a depth of approximately 85-135 feet from the Ojo Alamo Sandstone. Also, the Kirtland sands from 300-500 feet might contain ground water. The Kirtland from 500 down to 1150 is all shale with a trace of siltstone stringers.

Excessive drilling depth, to breeched sands with unpredictable variations in reservoir quality and water quality have discouraged the drilling of water wells in the in the subject area.

This Hydrogeologic Report was prepared by Mr. Kurt Fagrelius, Geologist for Dugan Production. Mr. Fagrelius has been employed as a geologist for Dugan for the past 31-years, received a MS in Geology from NMIMT in Socorro, NM and a BS in Geology from FLC in Durango, CO.

Stone, W.J., Lyford, F.P., Frenzel, P.F., Mizell, N.H., and Padgett, E.T., 1983, Hydrogeology and water resources of San Juan Basin, New Mexico: New Mexico Bureau of Mines and Mineral Resources Hydrologic Report 6, 70 p.

Brown, D.R., and Stone, W.J., 1979, Hydrogeology of Aztec quadrangle, San Juan County, New Mexico: New Mexico Bureau of Mines and Mineral Resources Hydrogeologic Sheet 1.

Levings, G.W., Craigg, S.D., Dam, W.L. Kernodle, J.M., and Thorn, C.R., 1990, Hydrogeology of the San Jose, Nacimiento, and Animas Formations in the San Juan Structural Basin, New Mexico, Colorado, Arizona and Utah: U.S. Geological Survey, Atlas HA-720-A, Sheet 1 and 2.

Thorn, C.R., Levings, G.W., Craigg, S.D., Dam, W.L., and Kernodle, J.M., 1990, Hydrogeology of the Ojo Alamo Sandstone in the San Juan Structural Basin, New Mexico, Colorado, Arizona and Utah: U.S. Geological Survey, Atlas HA-720-B, Sheet 1 and 2.

New Mexico Office of the State Engineer
POD Reports and Downloads

Township: 25N Range: 13W Sections: 1,2,3

NAD27 X: Y: Zone: Search Radius:

County: Basin: Number: Suffix:

Owner Name: (First) (Last) Non-Domestic Domestic All

POD / Surface Data Report Avg Depth to Water Report Water Column Report

Clear Form iWATERS Menu Help

WATER COLUMN REPORT 10/30/2008

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

POD Number	Tws	Rng	Sec	q	q	q	Zone	X	Y	Depth Well	Depth Water	Water Column (in feet)

No Records found, try again

EXHIBIT 1.

New Mexico Office of the State Engineer
POD Reports and Downloads

Township: 26N Range: 13W Sections: 25,26,27,34,35,36

NAD27 X: Y: Zone: Search Radius:

County: Basin: Number: Suffix:

Owner Name: (First) (Last) Non-Domestic Domestic All

POD / Surface Data Report Avg Depth to Water Report Water Column Report

Clear Form iWATERS Menu Help

WATER COLUMN REPORT 10/30/2008

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

POD Number	Tws	Rng	Sec	q	q	q	Zone	X	Y	Depth Well	Depth Water	Water Column (in feet)

No Records found, try again

EXHIBIT 2.

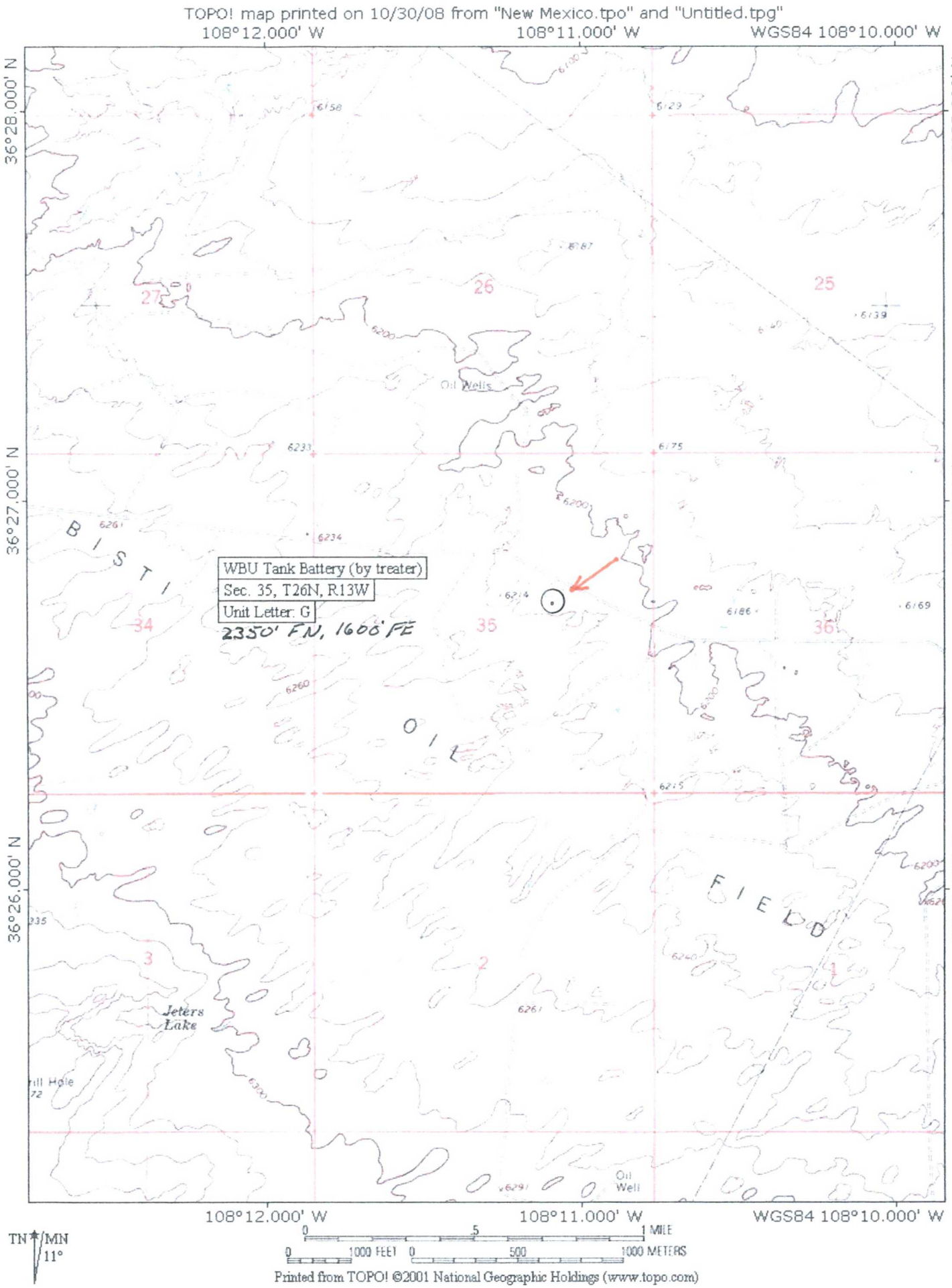

TOPO! map printed on 10/30/08 from "New Mexico.tpo" and "Untitled.tpg"
108°12.000' W
108°11.000' W
WGS84 108°10.000' W
36°28.000' N
36°27.000' N
36°26.000' N
WBU Tank Battery (by treater)
Sec. 35, T26N, R13W
Unit Letter: G
2350' FN, 1600' FE
BISTI
OIL
FIELD
Jeters Lake
Oil Wells
Oil Well
TN 11° MIN
0 .5 1 MILE
0 1000 FEET 0 500 1000 METERS
Printed from TOPO! ©2001 National Geographic Holdings (www.topo.com)

EXHIBIT 3.

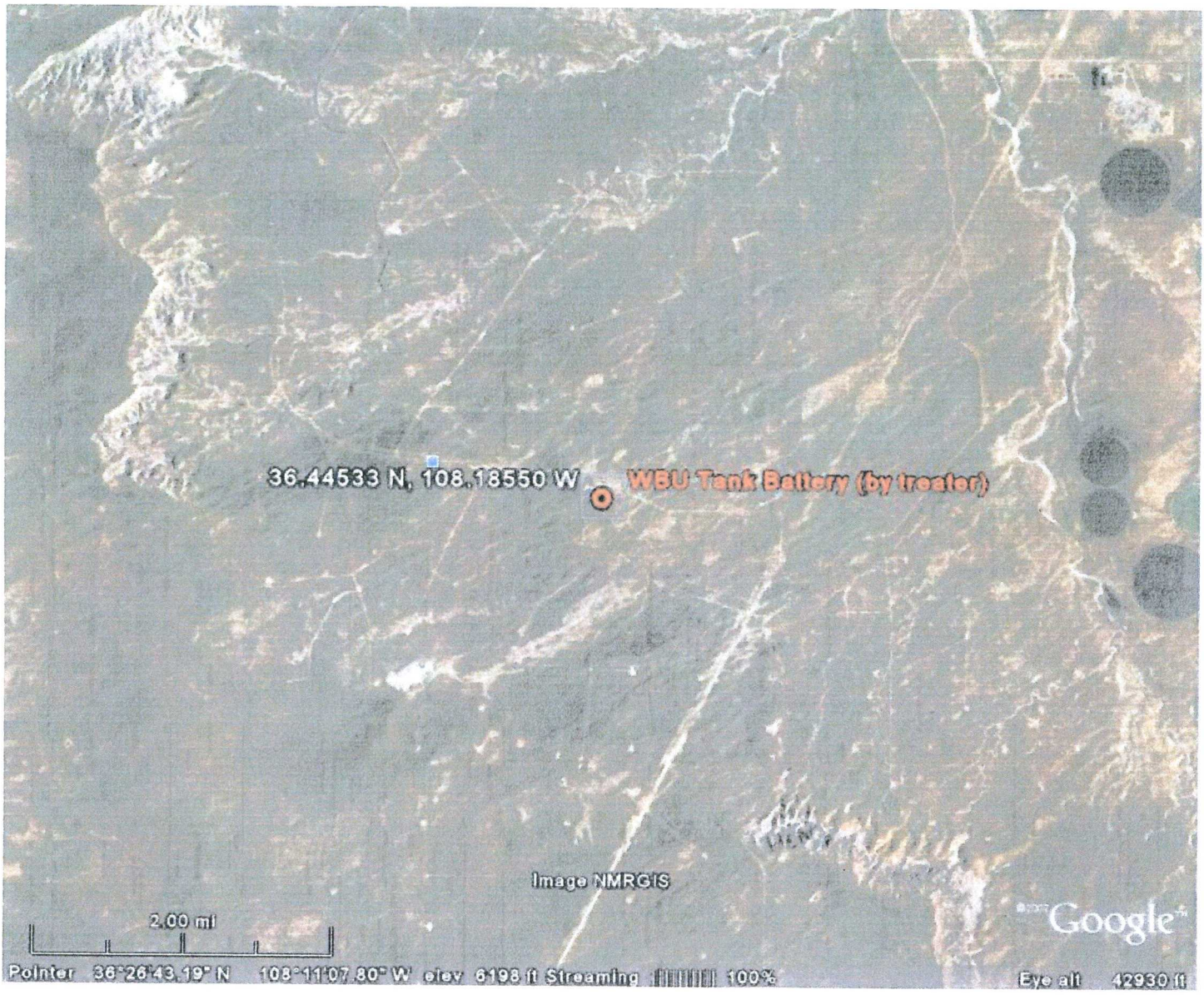

36.44533 N, 108.18550 W
WBU Tank Battery (by treater)
Image NMRGIS
2.00 mi
Google
Pointer 36°26'43.19" N 108°11'07.80" W elev 6198 ft Streaming 100%
Eye alt 42930 ft

EXHIBIT 4.

New Mexico Office of the State Engineer
POD Reports and Downloads

Township: 26N Range: 13W Sections: 35

NAD27 X: Y: Zone: Search Radius:

County: Basin: Number: Suffix:

Owner Name: (First) (Last) Non-Domestic Domestic All

POD / Surface Data Report Avg Depth to Water Report Water Column Report

Clear Form iWATERS Menu Help

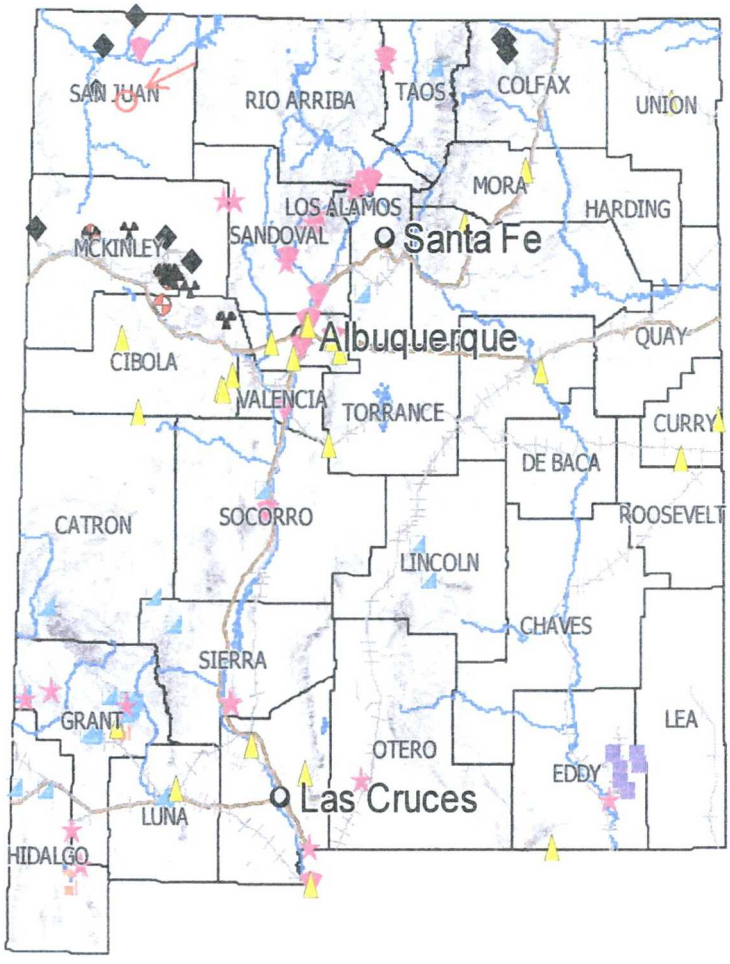
WATER COLUMN REPORT 10/30/2008

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

POD Number	Tws	Rng	Sec	q	q	q	Zone	X	Y	Depth Well	Depth Water	Water Column (in feet)

No Records found, try again

EXHIBIT 5.

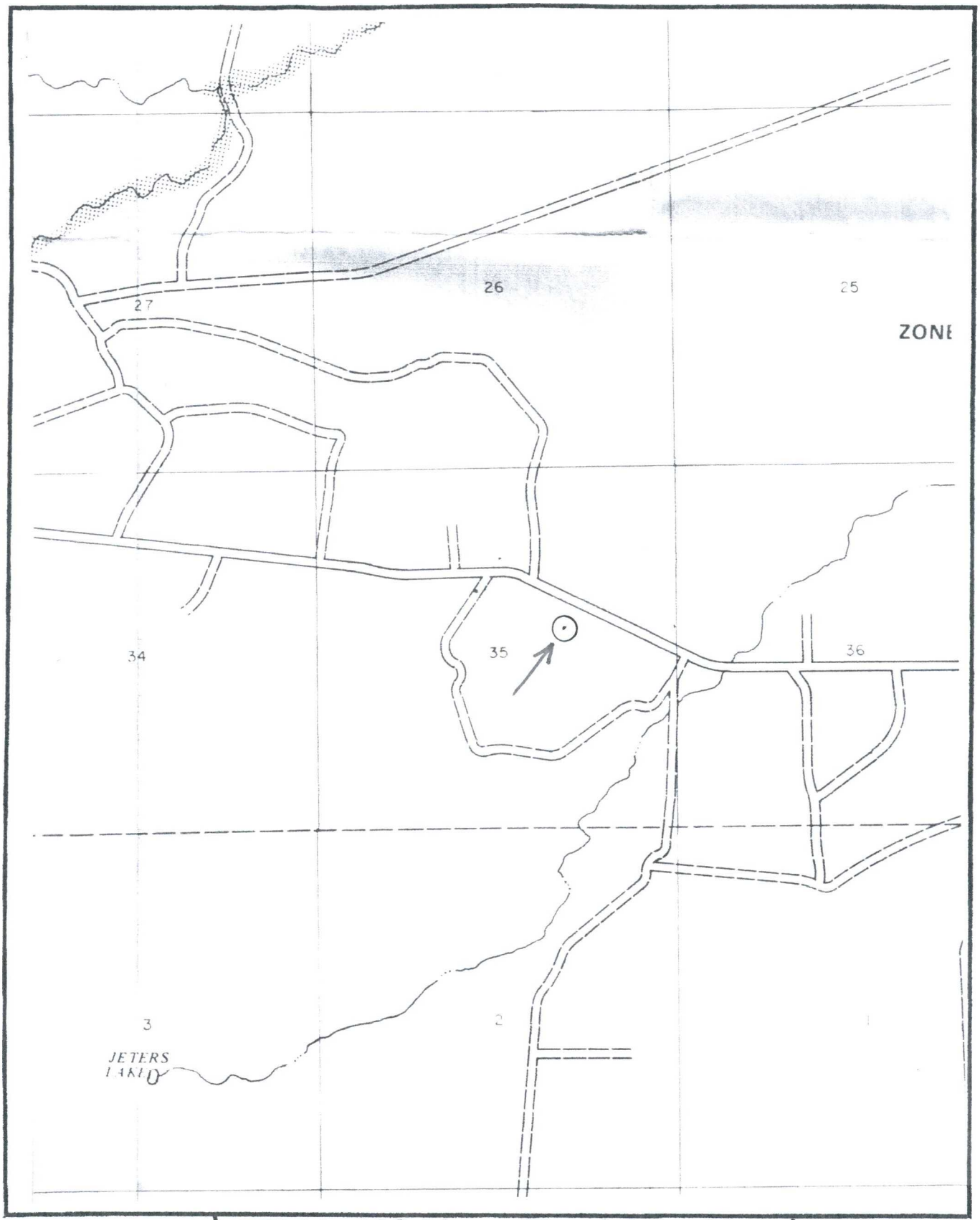


Mine, Mills and Quarry Map of New Mexico

Dugan Production Corp.
WBU Tank Battery
(by treater)

Taken from the New Mexico Energy, Minerals and Natural Resources Department.
Mining and Minerals Division.

EXHIBIT 6.



FEMA 100-Year Floodplain Map
WBU Tank Battery
(by treater)