

**STATE OF NEW MEXICO
DEPARTMENT OF ENERGY, MINERALS AND NATURAL RESOURCES
OIL CONSERVATION DIVISION**

**APPLICATION OF NGL WATER
SOLUTIONS PERMIAN, LLC
TO APPROVE SALT WATER
DISPOSAL WELL IN EDDY
COUNTY, NEW MEXICO.**

CASE NO. 20140

APPLICATION

NGL Water Solutions Permian, LLC ("NGL"), OGRID No. 372338, through its undersigned attorneys, hereby makes this application to the Oil Conservation Division pursuant to the provisions of N.M. Stat. Ann. § 70-2-12, for an order approving drilling of a salt water disposal well in Eddy County, New Mexico. In support of this application, NGL states as follows:

(1) NGL proposes to drill the Quintana SWD #1 well at a surface location 869 feet from the South line and 1730 feet from the East line of Section 36, Township 22 South, Range 26 East, NMPM, Eddy County, New Mexico for the purpose of operating a salt water disposal well.

(2) NGL seeks authority to inject salt water into the Silurian-Devonian formation at a depth of 12,583'-13,656'.

(3) NGL further seeks approval of the use of 7 inch tubing inside the surface and intermediate casings and 5 ½ inch tubing inside the liner and requests that the Division approve a maximum daily injection rate for the well of 50,000 bbls per day.

(4) NGL anticipates using an average pressure of 1,887 psi for this well, and it requests that a maximum pressure of 2,516 psi be approved for the well.

(5) A proposed C-108 for the subject well is attached hereto in Attachment A.

(6) The granting of this application will avoid the drilling of unnecessary wells, will prevent waste, and will protect correlative rights.

WHEREFORE, NGL requests that this application be set for hearing before an Examiner of the Oil Conservation Division on December 6, 2018; and that after notice and hearing, the Division enter its order approving this application.

Respectfully submitted,

MODRALL, SPERLING, ROEHL, HARRIS
& SISK, P.A.

By: Deana M. Bennett
Jennifer Bradfute
Deana Bennett
Post Office Box 2168
500 Fourth Street NW, Suite 1000
Albuquerque, New Mexico 87103-2168
Telephone: 505.848.1800
Attorneys for Applicant

CASE NO. _____: Application of NGL Water Solutions Permian, LLC for approval of salt water disposal well in Eddy County, New Mexico. Applicant seeks an order approving disposal into the Silurian-Devonian formation through the Quintana SWD #1 well at a surface location 869 feet from the South line and 1730 feet from the East line of Section 36, Township 22 South, Range 26 East, NMPM, Eddy County, New Mexico for the purpose of operating a salt water disposal well. NGL seeks authority to inject salt water into the Silurian-Devonian formation at a depth of 12,583'-13,656'. NGL further seeks approval of the use of 7 inch tubing inside the surface and intermediate casings and 5 ½ inch tubing inside the liner and requests that the Division approve a maximum daily injection rate for the well of 50,000 bbls per day. Said area is located approximately 5 miles south of Carlsbad, New Mexico.

RECEIVED:	REVIEWER:	TYPE:	APP NO:
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ABOVE THIS TABLE FOR OCD DIVISION USE ONLY

NEW MEXICO OIL CONSERVATION DIVISION
 - Geological & Engineering Bureau -
 1220 South St. Francis Drive, Santa Fe, NM 87505



ADMINISTRATIVE APPLICATION CHECKLIST

THIS CHECKLIST IS MANDATORY FOR ALL ADMINISTRATIVE APPLICATIONS FOR EXCEPTIONS TO DIVISION RULES AND
 REGULATIONS WHICH REQUIRE PROCESSING AT THE DIVISION LEVEL IN SANTA FE

Applicant: NGL WATER SOLUTIONS PERMIAN LLCOGRID Number: 372338Well Name: QUINTANA SWD #1API: TBDPool: SWD; SILURIAN-DEVONIANPool Code: 96101

**SUBMIT ACCURATE AND COMPLETE INFORMATION REQUIRED TO PROCESS THE TYPE OF APPLICATION
 INDICATED BELOW**

1) **TYPE OF APPLICATION:** Check those which apply for [A]

A. Location - Spacing Unit - Simultaneous Dedication

☐ NSL ☐ NSP (PROJECT AREA) ☐ NSP (PRORATION UNIT) ☐ SD

B. Check one only for [I] or [II]

[I] Commingling - Storage - Measurement

☐ DHC ☐ CTB ☐ PLC ☐ PC ☐ OLS ☐ OLM

[II] Injection - Disposal - Pressure Increase - Enhanced Oil Recovery

☐ WFX ☐ PMX ☒ SWD ☐ IPI ☐ EOR ☐ PPR
2) **NOTIFICATION REQUIRED TO:** Check those which apply.

- A. ☒ Offset operators or lease holders
 B. ☐ Royalty, overriding royalty owners, revenue owners
 C. ☒ Application requires published notice
 D. ☒ Notification and/or concurrent approval by SLO
 E. ☒ Notification and/or concurrent approval by BLM
 F. ☒ Surface owner
 G. ☐ For all of the above, proof of notification or publication is attached, and/or,
 H. ☐ No notice required

FOR OCD ONLY

- ☐ Notice Complete
☐ Application
 Content
 Complete

- 3) **CERTIFICATION:** I hereby certify that the information submitted with this application for administrative approval is **accurate** and **complete** to the best of my knowledge. I also understand that **no action** will be taken on this application until the required information and notifications are submitted to the Division.

Note: Statement must be completed by an individual with managerial and/or supervisory capacity.

CHRIS WEYAND

Print or Type Name

Signature

10/04/2018

Date

512-600-1764

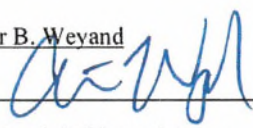
Phone Number

CHRIS@LONQUIST.COM

e-mail Address



APPLICATION FOR AUTHORIZATION TO INJECT

- I. PURPOSE: Secondary Recovery Pressure Maintenance X Disposal Storage
Application qualifies for administrative approval? X Yes No
- II. OPERATOR: NGL WATER SOLUTIONS PERMIAN, LLC
ADDRESS: 1509 W WALL ST // STE 306 // MIDLAND, TX 79701
CONTACT PARTY: SARAH JORDAN PHONE: (432) 685-0005 x1989
- III. WELL DATA: Complete the data required on the reverse side of this form for each well proposed for injection.
Additional sheets may be attached if necessary.
- IV. Is this an expansion of an existing project? Yes X No
If yes, give the Division order number authorizing the project: _____
- V. Attach a map that identifies all wells and leases within two miles of any proposed injection well with a one-half mile radius circle drawn around each proposed injection well. This circle identifies the well's area of review.
- VI. Attach a tabulation of data on all wells of public record within the area of review which penetrate the proposed injection zone. Such data shall include a description of each well's type, construction, date drilled, location, depth, record of completion, and a schematic of any plugged well illustrating all plugging detail.
- VII. Attach data on the proposed operation, including:
1. Proposed average and maximum daily rate and volume of fluids to be injected;
 2. Whether the system is open or closed;
 3. Proposed average and maximum injection pressure;
 4. Sources and an appropriate analysis of injection fluid and compatibility with the receiving formation if other than reinjected produced water; and,
 5. If injection is for disposal purposes into a zone not productive of oil or gas at or within one mile of the proposed well, attach a chemical analysis of the disposal zone formation water (may be measured or inferred from existing literature, studies, nearby wells, etc.).
- *VIII. Attach appropriate geologic data on the injection zone including appropriate lithologic detail, geologic name, thickness, and depth. Give the geologic name, and depth to bottom of all underground sources of drinking water (aquifers containing waters with total dissolved solids concentrations of 10,000 mg/l or less) overlying the proposed injection zone as well as any such sources known to be immediately underlying the injection interval.
- IX. Describe the proposed stimulation program, if any.
- *X. Attach appropriate logging and test data on the well. (If well logs have been filed with the Division, they need not be resubmitted).
- *XI. Attach a chemical analysis of fresh water from two or more fresh water wells (if available and producing) within one mile of any injection or disposal well showing location of wells and dates samples were taken.
- XII. Applicants for disposal wells must make an affirmative statement that they have examined available geologic and engineering data and find no evidence of open faults or any other hydrologic connection between the disposal zone and any underground sources of drinking water.
- XIII. Applicants must complete the "Proof of Notice" section on the reverse side of this form.
- XIV. Certification: I hereby certify that the information submitted with this application is true and correct to the best of my knowledge and belief.
- NAME: Christopher B. Weyand TITLE: Consulting Engineer
SIGNATURE:  DATE: 10/16/2018
E-MAIL ADDRESS: chris@lonquist.com
- * If the information required under Sections VI, VIII, X, and XI above has been previously submitted, it need not be resubmitted. Please show the date and circumstances of the earlier submittal: _____

III. WELL DATA

- A. The following well data must be submitted for each injection well covered by this application. The data must be both in tabular and schematic form and shall include:

- (1) Lease name; Well No.; Location by Section, Township and Range; and footage location within the section.
- (2) Each casing string used with its size, setting depth, sacks of cement used, hole size, top of cement, and how such top was determined.
- (3) A description of the tubing to be used including its size, lining material, and setting depth.
- (4) The name, model, and setting depth of the packer used or a description of any other seal system or assembly used.

Division District Offices have supplies of Well Data Sheets which may be used or which may be used as models for this purpose. Applicants for several identical wells may submit a "typical data sheet" rather than submitting the data for each well.

- B. The following must be submitted for each injection well covered by this application. All items must be addressed for the initial well. Responses for additional wells need be shown only when different. Information shown on schematics need not be repeated.

- (1) The name of the injection formation and, if applicable, the field or pool name.
- (2) The injection interval and whether it is perforated or open-hole.
- (3) State if the well was drilled for injection or, if not, the original purpose of the well.
- (4) Give the depths of any other perforated intervals and detail on the sacks of cement or bridge plugs used to seal off such perforations.
- (5) Give the depth to and the name of the next higher and next lower oil or gas zone in the area of the well, if any.

XIV. PROOF OF NOTICE

All applicants must furnish proof that a copy of the application has been furnished, by certified or registered mail, to the owner of the surface of the land on which the well is to be located and to each leasehold operator within one-half mile of the well location.

Where an application is subject to administrative approval, a proof of publication must be submitted. Such proof shall consist of a copy of the legal advertisement which was published in the county in which the well is located. The contents of such advertisement must include:

- (1) The name, address, phone number, and contact party for the applicant;
- (2) The intended purpose of the injection well; with the exact location of single wells or the Section, Township, and Range location of multiple wells;
- (3) The formation name and depth with expected maximum injection rates and pressures; and,
- (4) A notation that interested parties must file objections or requests for hearing with the Oil Conservation Division, 1220 South St. Francis Dr., Santa Fe, New Mexico 87505, within 15 days.

NO ACTION WILL BE TAKEN ON THE APPLICATION UNTIL PROPER PROOF OF NOTICE HAS BEEN SUBMITTED.

NOTICE: Surface owners or offset operators must file any objections or requests for hearing of administrative applications within 15 days from the date this application was mailed to them.

INJECTION WELL DATA SHEET

OPERATOR: NGL WATER SOLUTIONS PERMIAN, LLC

WELL NAME & NUMBER: QUINTANA SWD #1

WELL LOCATION: 869' FSL & 1,730' FEL O UNIT LETTER 36 SECTION 22S TOWNSHIP 26E RANGE

WELLBORE SCHEMATIC

WELL CONSTRUCTION DATA
Surface Casing

Hole Size: 24.000" Casing Size: 20.000" or ft³
Cemented with: 1.003 sx.
Top of Cement: surface Method Determined: circulation

1st Intermediate Casing

Hole Size: 17.500" Casing Size: 13.375" or ft³
Cemented with: 2.600 sx.
Top of Cement: surface Method Determined: circulation

2nd Intermediate Casing

Hole Size: 12.250" Casing Size: 9.625" or ft³
Cemented with: 2.771 sx.
Top of Cement: surface Method Determined: circulation

Production Liner

Hole Size: 8.500"

Casing Size: 7.625"

Cemented with: 136 sx.

or _____ ft³

Top of Cement: 8,700'

Method Determined: calculation

Total Depth: 13,656'

Injection Interval

12,583 feet to 13,656 feet

(Open Hole)

INJECTION WELL DATA SHEET

Tubing Size: 7", 26 lb/ft, P-110, TCPC from 0'-8,600' and 5,500", 17 lb/ft, P-110 LTC from 8,600'-12,550'
 Lining Material: Duoline

Type of Packer: 7-5/8" x 5" TCPC Permanent Packer with High Temp Elastomer and full Inconel 925 trim

Packer Setting Depth: 12,550'

Other Type of Tubing/Casing Seal (if applicable): _____

Additional Data

1. Is this a new well drilled for injection? X Yes No

If no, for what purpose was the well originally drilled? N/A

2. Name of the Injection Formation: Devonian, Silurian, Fusselman and Montoya (Top 100')

3. Name of Field or Pool (if applicable): SWD; Silurian-Devonian

4. Has the well ever been perforated in any other zone(s)? List all such perforated intervals and give plugging detail, i.e. sacks of cement or plug(s) used. No, new drill.

5. Give the name and depths of any oil or gas zones underlying or overlying the proposed injection zone in this area:

Delaware: 1,946'

Bone Spring: 5,094'

Wolfcamp: 8,968'

Strawn: 9,945'

Atoka: 10,428'

Morrow: 10,953'

 NGL Quintana Eddy County NM Vertical Injection - Devonian, Silurian, Fusselman, Montoya									
Location - Sec 36, Township 22 S, Range 26 E 62W to West Derrick Road, Turn East into location. Lat/Long 32.34290, -104.24333			13,656' 3,218.1		TD GL/KB		Directions to Site - from Carlsbad follow US Hwy 285 Sand US 180/US 62W to West Derrick Road, Turn East into location. Lat/Long 32.34290, -104.24333		
Drill/Complete- \$8.52/MM AFE #			Bit/BHA Mud		Logging Cement (HOLD)		Injection String		
Section Problems Casing			24" Tricone 9-5/8" x 8" MM 9 jts: 8" DC 3 jts: 5" HWDP 5" DP to Surface		450' of 20" 94# J55 BTC Centralizers - bottom 2 joints and every 3rd jt thereafter, Cement basket 5th jt from surface		No Logs		
Surface Drill 24" 0' - 450'. Set and Cement 20" Casing			17-1/2" PDC 8" MM" DC 5" HWDP and 5" DP to Surface 400' Target Radius		5M A Section Casing Bowl 1940' of 13-3/8" 68# L80 BTC Centralizers - bottom jt, every 3rd joint in open hole and 2 jt inside the surface casing		1003 sx of 14.8ppg HALCEM (TM) SYSTEM 1 % Calcium Chloride, Pellet. 60% XS, TT 4hrs. CSD 1000psi after 10hrs Lead - 1274sx of 12.9ppg ECONOCEM (TM) SYSTEM , 0.1250 lbm/sk Poly-E-Flake. TT 4.5hrs 15% XS Tail - 1327 sx 14.8ppg HALCEM (TM) SYSTEM. 15% XS, 3 hrs TT. 1000psi CSD after 10 hrs		
1st Intermediate Drill 1490' of 17-1/2" Hole 450' - 1940" Set and Cement 13-3/8" Casing			Loss Circulation and Hole Cleaning and Wellbore stability in the Red Beds Anhydrite in the Rustler Seepage Losses Possible H2S Anhydrite Salt Losses in the Bell Canyon.		Spud mud Brine with sweeps		Mudlogger on site by 1000' MWD GR Triple combo wireline logs		
2nd Intermediate Drill 7280' of 12-1/4" Hole 1950' - 9200' Set 9-5/8" Intermediate Casing and Cement in 3 Stages			Hard Drilling in the Brushy Canyon. Seepage to complete loss Water flows Some Anhydrite H2S possible Production in the Bone Spring and Wolfcamp Ballooning is possible in Cherry Canyon and Brushy if broken down		10M B Section 9200' of 9-5/8" 53.5# HCL80 BTC DV tool at at 6000' and 1920'. Externally Coated Casing between DV tools (4080'). The rest sandblasted Centralizers - bottom jt, 100' aside of DV tools, every 3rd joint in open hole and 5 within the surface casing		Stage 3 - Lead - 709 sx of 12.9ppg ECONOCEM (TM) SYSTEM . TT 4.5hrs. Tail - 272sx of 14.8ppg HALCEM (TM) SYSTEM. 0% XS, TT 3hrs, CSD 1000psi after 10hrs Stage 2 - Lead - 521 sx of 12.9ppg ECONOCEM (TM) SYSTEM . TT 6hrs. Tail - 443sx of 14.8ppg HALCEM (TM) SYSTEM. 25% XS, TT 4.5hrs, CSD 1000psi after 10hrs Stage 1 - Lead - 443 sx of 12.9ppg ECONOCEM SYSTEM . TT 7hrs. Tail - 384sx of 14.8ppg HALCEM SYSTEM. 25% XS. TT 5hrs, CSD 1000psi after 10hrs		
3rd Intermediate Drill 3383' of 8-1/2" Hole 9200' - 12,583' Set 7-5/8" Liner and Cement in Single Stage			High Pressure (up to 13ppg) and wellbore instability (fracturing) expected in the Wolfcamp. Production in the Wolfcamp, Atoka and Morrow. Hard Drilling in the Morrow Clastic		Weighted OBM		MWD GR Triple combo, CBL of 9-5/8" Casing		
Injection Interval Drill 1073' of 6-1/2" hole 12,583' - 13,656'			Chert is possible. Loss of Circulation is expected. H2S encountered on the Striker 3 well. BHT estimated at 280F		Fresh Water - possible flows		MWD GR Triple Combo with FMI, CBL of 7-5/8"		
TD 13,656'			Permanent Packer with High Temp Elastomer and full Inconel 925 trim		Displace with 3% KCl (or heavier brine if necessary)		3950' of 5-1/2" 17ppf, P110 TCPC Duoline Internally Coated Injection Tubing 7-5/8" x 5" TCPC Permanent Packer with High Temp Elastomer and full Inconel 925 trim		

NGL Water Solutions Permian, LLC

Quintana SWD No. 1

FORM C-108 Supplemental Information

III. Well Data

A. Wellbore Information

1.

Well information	
Lease Name	Quintana SWD
Well No.	1
Location	S-36 T-22S R-26E
Footage Location	869' FSL & 1,730 FEL

2.

a. Wellbore Description

Casing Information				
Type	Surface	Intermediate	Production	Liner
OD	20"	13.375"	9.625"	7.625"
WT	0.500"	0.480"	0.545"	0.500
ID	19.000"	12.415"	8.535"	6.625"
Drift ID	18.812"	12.259"	8.535"	6.500"
COD	21.000"	14.375"	10.625"	7.625"
Weight	106.5 lb/ft	68 lb/ft	53.5 lb/ft	39 lb/ft
Grade	J-55	HCL-80	P-110	Q-125
Hole Size	24"	17.5"	12.25"	8.5"
Depth Set	450'	1,940'	9,200'	8,700' – 12,583'

b. Cementing Program

Cement Information				
Casing String	Surface	Intermediate	Production	Liner
Lead Cement	N/A	ECONOCEM	ECONOCEM	N/A
Lead Cement Volume	N/A	1,274 sx	Stage 1: 443 sx Stage 2: 521 sx Stage 3: 709 sx	
Tail Cement	HALCEM	HALCEM	HALCEM	HALCEM
Tail Cement Volume	1,003 sx	1,327 sx	Stage 1: 384 sx Stage 2: 443 sx Stage 3: 272 sx	136 sx
Cement Excess	60%	15%	25%, 25%, 0%	25%
TOC	Surface	Surface	Surface	8,700'
Method	Circulate to Surface	Circulate to Surface	Circulate to Surface	Logged

3. Tubing Description

Tubing Information		
OD	7"	5.5"
WT	0.362"	0.304"
ID	6.276"	4.892"
Drift ID	7.875"	6.050"
COD	6.151"	4.653"
Weight	26 lb/ft	17 lb/ft
Grade	P-110 TCPC	P-110 TCPC
Depth Set	0'-8,600'	8,600'-12,550'

Tubing will be lined with Duoline.

4. Packer Description

7-5/8" x 5-1/2" TCPC Permanent Packer with High Temp Elastomer and Full Inconel

B. Completion Information

1. Injection Formation: Devonian, Silurian, Fusselman, Montoya (Top 100')
2. Gross Injection Interval: 12,583– 13,656'

Completion Type: Open Hole

3. Drilled for injection.
4. See the attached wellbore schematic.
5. Oil and Gas Bearing Zones within area of well:

Formation	Depth
Delaware	1,946'
Bone Spring	5,094'
Wolfcamp	8,968'
Strawn	9,945'
Atoka	10,428'
Morrow	10,953'

VI. Area of Review

No wells within the area of review penetrate the proposed injection zone.

VII. Proposed Operation Data

1. Proposed Daily Rate of Fluids to be Injection:

Average Volume: 40,000 BPD

Maximum Volume: 50,000 BPD

2. Closed System

3. Anticipated Injection Pressure:

Average Injection Pressure: 1,887 PSI (surface pressure)

Maximum Injection Pressure: 2,516 PSI (surface pressure)

4. The injection fluid is to be locally produced water. Attached are produced water sample analyses taken from the closest wells that feature samples from the Delaware, Bone Spring, Wolfcamp, Strawn, Atoka, and Morrow formations.

5. The disposal interval is non-productive. No water samples are available from the surrounding area.

VIII. Geological Data

The Devonian formation is a dolomitic ramp carbonate that occurs below the Woodford shale and above the Fusselman formation. Strata found in the Devonian formation include two major groups, the Wristen Buildups and the Thirtyone Deepwater Chert, with the Wristen being more abundant. The Wristen Groups is composed of mixed limestone and dolomites with mudstone to grainstone and boundstone textures. Porosity in the Wristen group is a result of both primary and secondary development. Present are moldic, vugular, karstic (including collapse breccia) features that allow for higher porosities and permeabilities. The Thirtyone Formation contains two end-member reservoir facies, skeletal packstones/grainstones and spiculitic chert, with most of the porosity and permeability found in the coarsely crystalline cherty dolomite. These particular characteristics allow for this formation to be a tremendous Salt Water Disposal horizon.

A. Injection Zone: Siluro-Devonian Formation

Formation	Depth
Rustler	Eroded, not present
Salado	379'
Delaware	1,946'
Bone Spring	5,094'
Wolfcamp	8,968'
Penn	9,858'
Atoka	10,428'
Morrow	10,953'
Mississippian Lime	12,105'
Woodford	12,477'
Devonian	12,563'
Fusselman	13,076
Montoya	13,556

B. Underground Sources of Drinking Water

There are several fresh water wells within 1-mile of the proposed Quintana SWD #1 location which appear to be producing from the Cenozoic Alluvium. These are shown on the attached map. Total depth and depth to water were reported for seven of these wells. Total depth ranges from 125 ft to 265 ft with an average of 214 ft. Depth to water ranges from 115 ft to 200 ft with an average of 164 ft. Additionally, the upper Rustler will be protected.

IX. Proposed Stimulation Program

Stimulate with up to 50,000 gallons of acid.

X. Logging and Test Data on the Well

There are no logs or test data on the well. During the process of drilling and completion resistivity, gamma ray, and density logs will be run.

XI. Chemical Analysis of Fresh Water Wells

Quite a few fresh water wells exist within one mile of the well location. Fresh water samples were obtained from two of the wells (**C-00355** and **C-0028 S**). Analysis of these samples, a map, and several Water Rights Summaries from the New Mexico Office of the State Engineer are attached.

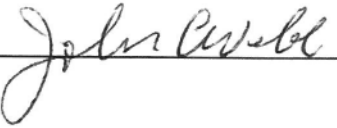
XII. Affirmative Statement of Examination of Geologic and Engineering Data

Based on the available engineering and geologic data we find no evidence of open faults or any other hydrologic connection between the disposal zone (in the proposed **Quintana SWD #1**) and any underground sources of drinking water.

NAME: John C. Webb

TITLE: Sr. Geologist

SIGNATURE: _____



DATE: _____

Oct 17, 2018

District I
1625 N. French Dr., Hobbs, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720
District III
1000 Rio Brazos Road, Aztec, NM 87410
Phone: (505) 334-6178 Fax: (505) 334-6170
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy Minerals and Natural Resources
Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-101
Revised July 18, 2013

☐ AMENDED REPORT

APPLICATION FOR PERMIT TO DRILL, RE-ENTER, DEEPEN, PLUGBACK, OR ADD A ZONE

¹ Operator Name and Address NGL WATER SOLUTIONS PERMIAN, LLC 1509 W WALL ST, STE 306 MIDLAND, TX 79701		⁴ OGRID Number 372338 ³ API Number TBD
⁴ Property Code	² Property Name QUINTANA SWD	⁶ Well No. 1

⁷ Surface Location

UL - Lot	Section	Township	Range	Lot Idn	Feet from	N/S Line	Feet From	E/W Line	County
O	36	22S	26E	N/A	869'	SOUTH	1730'	EAST	EDDY

⁸ Proposed Bottom Hole Location

UL - Lot	Section	Township	Range	Lot Idn	Feet from	N/S Line	Feet From	E/W Line	County
-	-	-	-	-	-	-	-	-	-

⁹ Pool Information

Pool Name SWD; Silurian-Devonian	Pool Code 96101
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Additional Well Information

¹¹ Work Type N	¹² Well Type SWD	¹³ Cable/Rotary R	¹⁴ Lease Type Private	¹⁵ Ground Level Elevation 3218.1
¹⁶ Multiple N	¹⁷ Proposed Depth 13,656'	¹⁸ Formation Siluro-Devonian	¹⁹ Contractor TBD	²⁰ Spud Date ASAP
Depth to Ground water 164'		Distance from nearest fresh water well 2,790'		Distance to nearest surface water 4,650'

☐ We will be using a closed-loop system in lieu of lined pits

²¹ Proposed Casing and Cement Program

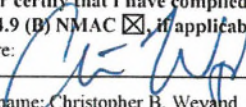
Type	Hole Size	Casing Size	Casing Weight/ft	Setting Depth	Sacks of Cement	Estimated TOC
Surface	24"	20"	94 lb/ft	450'	1,003	Surface
Intermediate	17.5"	13.375"	68 lb/ft	1,940'	2,601	Surface
Production	12.25"	9.625"	53.5lb/ft	9,200'	1,673	Surface
Prod. Liner	8.5"	7.625"	39 lb/ft	8,700' - 12,583'	136	8,700'
Tubing	N/A	7"	26 lb/ft	0' - 8,600'	N/A	N/A
Tubing	N/A	5.5"	17 lb/ft	8,600' - 12,550'	N/A	N/A

Casing/Cement Program: Additional Comments

See attached schematic.

²² Proposed Blowout Prevention Program

Type	Working Pressure	Test Pressure	Manufacturer
Double Hydraulic/Blinds, Pipe	10,000 psi	8,000 psi	TBD - Schaffer/Cameron

²³ I hereby certify that the information given above is true and complete to the best of my knowledge and belief.
I further certify that I have complied with 19.15.14.9 (A) NMAC ☐ and/or 19.15.14.9 (B) NMAC ☒ if applicable.
Signature: 

Printed name: Christopher B. Weyand

Title: Consulting Engineer

E-mail Address: chris@lonquist.com

Date: 10/5/2018

Phone: (512) 600-1764

OIL CONSERVATION DIVISION

Approved By:

Title:

Approved Date:

Expiration Date:

Conditions of Approval Attached

District I
1625 N French Dr., Hobbs, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720
District III
1000 Rio Brazos Road, Artesia, NM 87410
Phone: (505) 334-6178 Fax: (505) 334-6170
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department
OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-102
Revised August 1,
2011

Submit one copy to appropriate
District Office

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

¹ API Number		² Pool Code 96101	³ Pool Name SWD; Silurian-Devonian
⁴ Property Code	⁵ Property Name QUINTANA SWD		⁶ Well Number 1
⁷ OGRID No. 372338	⁸ Operator Name NGL WATER SOLUTIONS PERMIAN, LLC		⁹ Elevation 3218.1'±

¹⁰ Surface Location

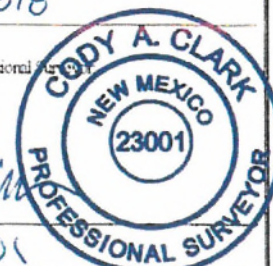
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
O	36	22 S	26 E	N/A	869'	SOUTH	1730'	EAST	EDDY

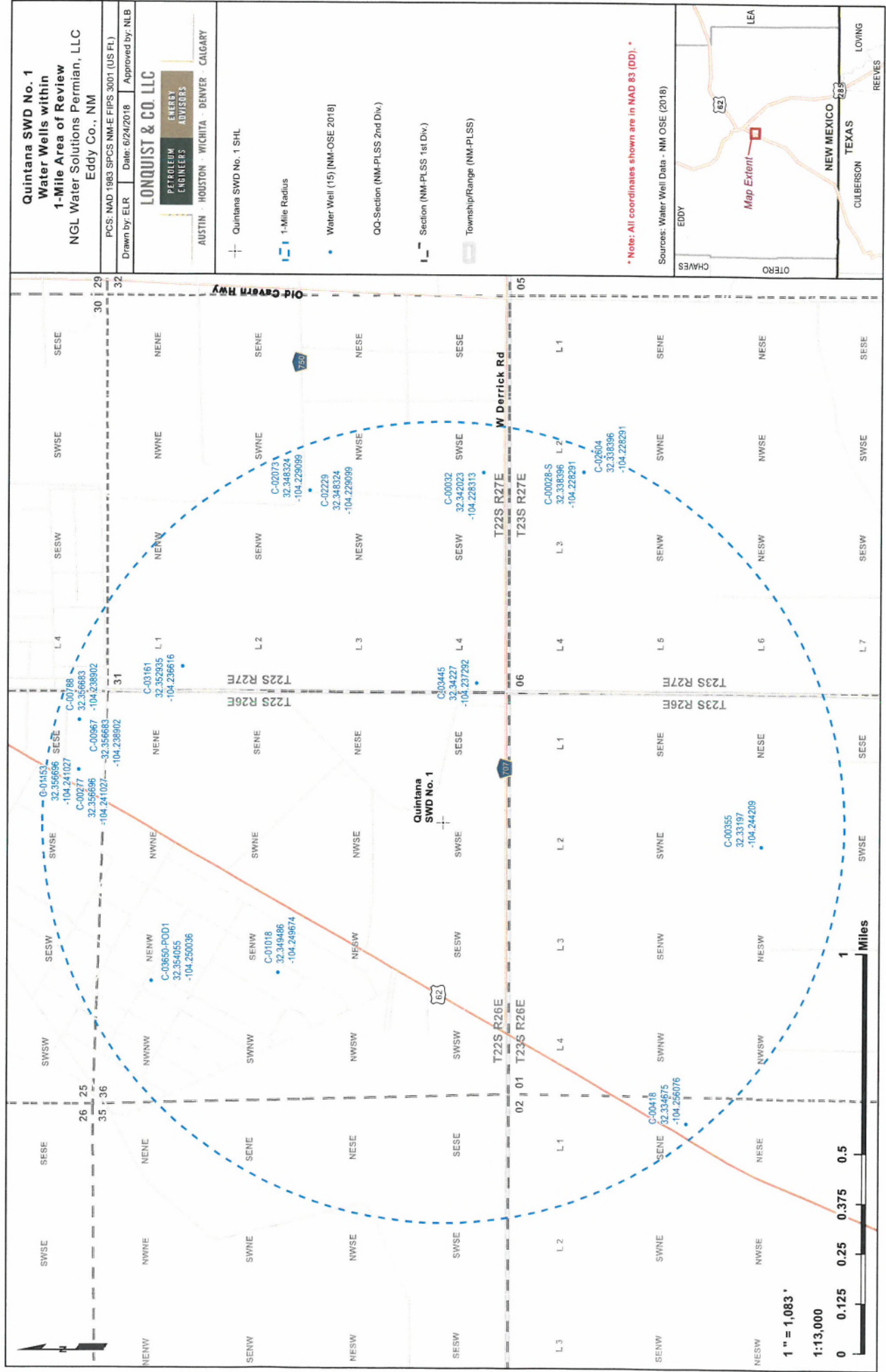
¹¹ Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
¹² Dedicated Acres 10.0	¹³ Joint or Infill	¹⁴ Consolidation Code		¹⁵ Order No.					

No allowable will be assigned to this completion until all interests have been consolidated or a non-standard unit has been approved by the division.

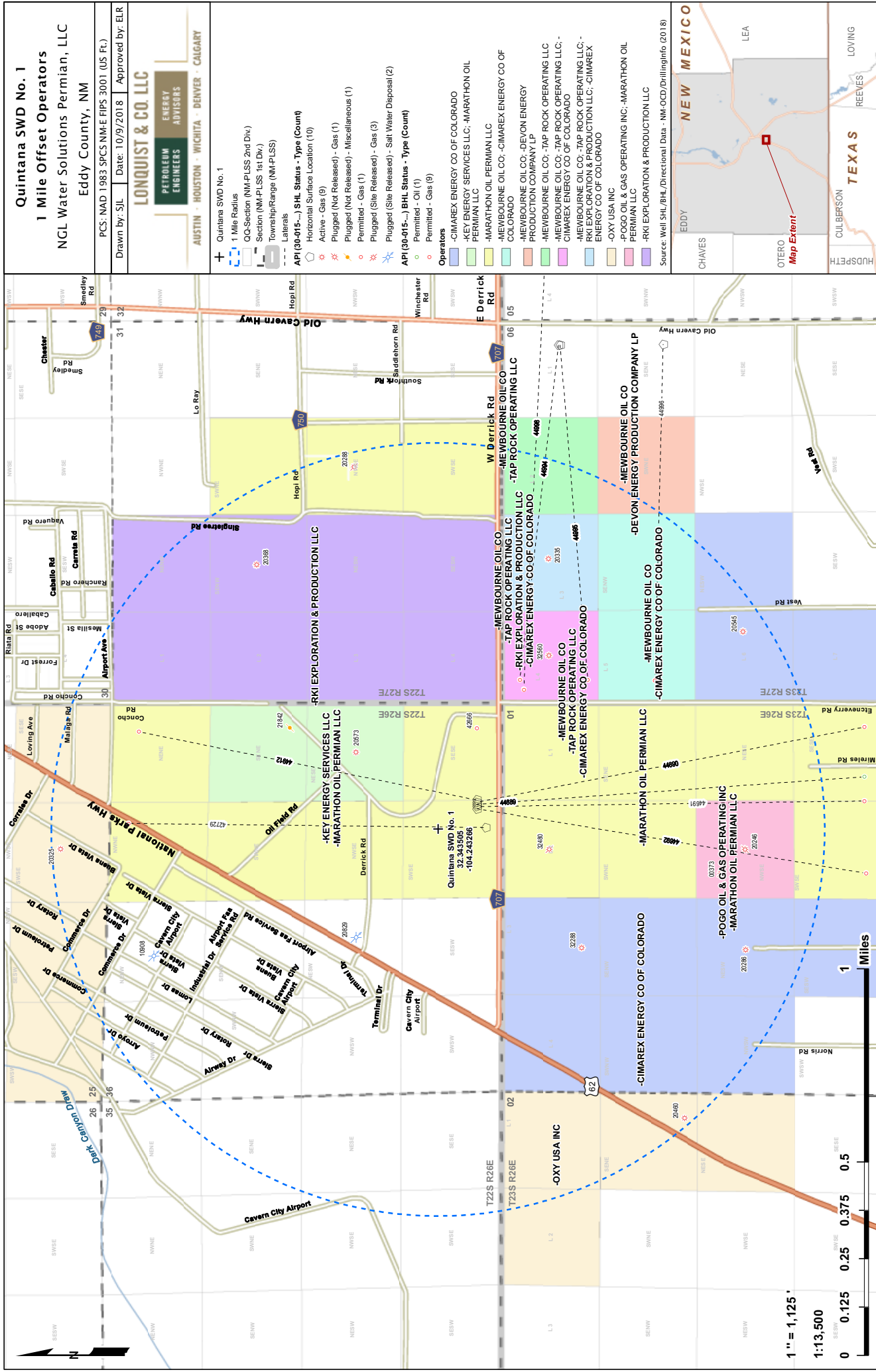
	¹⁷ OPERATOR CERTIFICATION I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division. <i>[Signature]</i> 10/16/2018 Signature Date Chris Weyand Printed Name chris@lonquist.com E-mail Address
	¹⁸ SURVEYOR CERTIFICATION I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief. 7/19/2018 Date of Survey Cody A. Clark Signature and Seal of Professional Cody A. Clark Certificate Number 23001

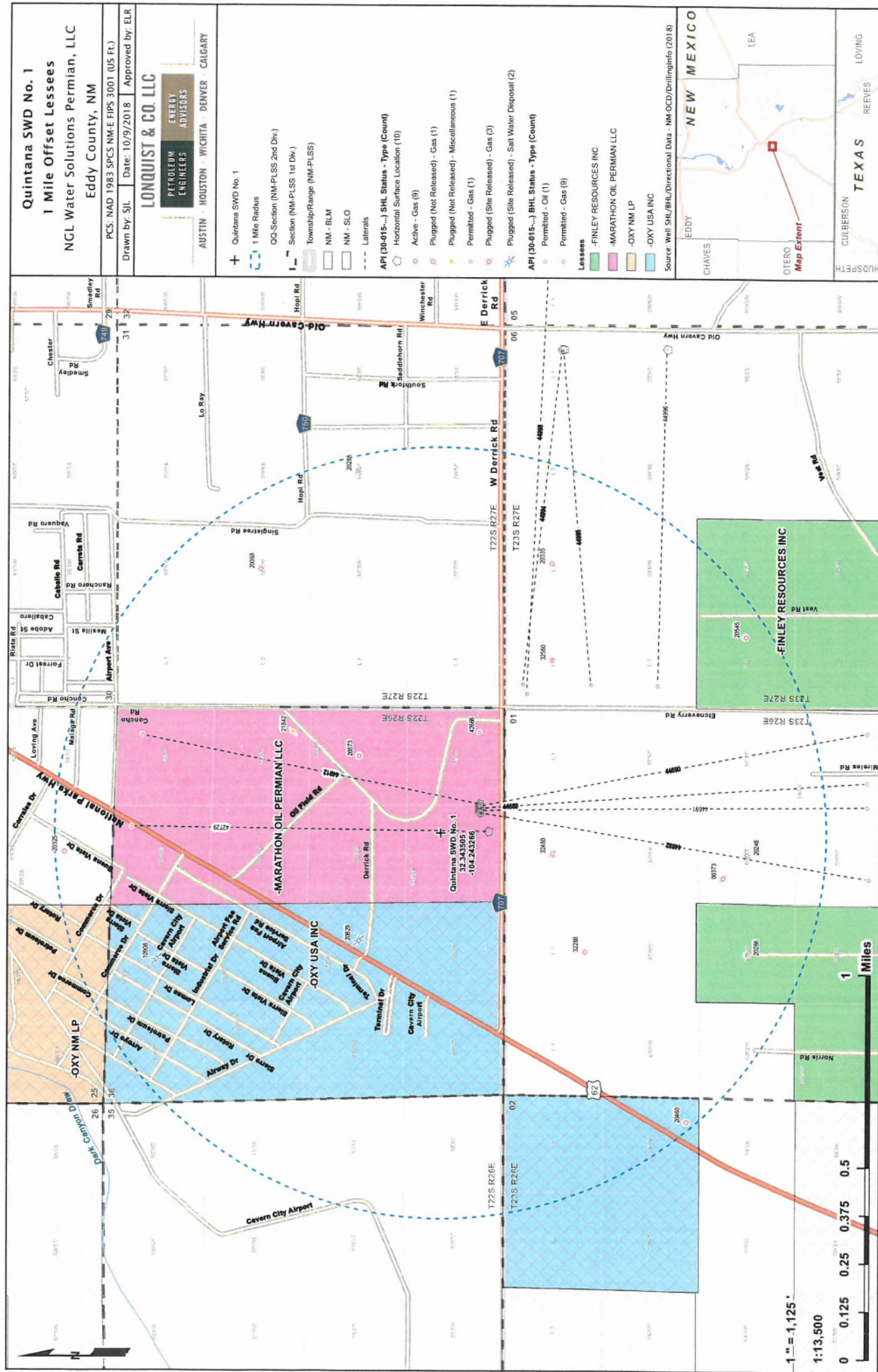




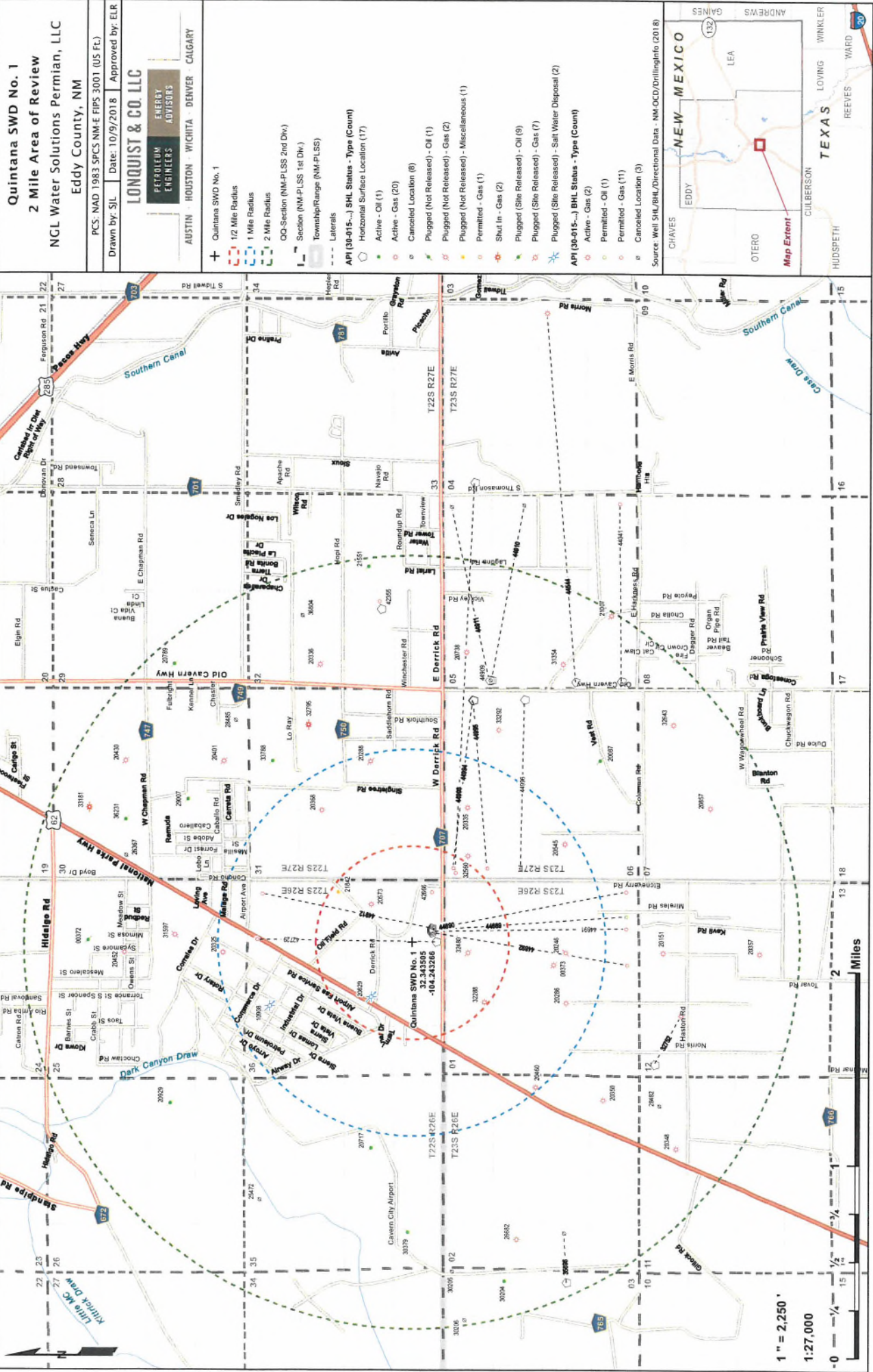
Quintana SWD No. 1
1 Mile Area of Review List

API (30-015-...)	WELL NAME	WELL TYPE	STATUS	OPERATOR	TVD (FT.)	LATITUDE (NAD83 DD)	LONGITUDE (NAD83 DD)	DATE DRILLED
00373	PRE-ONGARD WELL #001	G	P	PRE-ONGARD WELL OPERATOR	0	32.3328896000	-104.245208700	1/1/1900
10908	SALTY BILL SWD #001	S	P	CORINNE GRACE	99999	32.3541756000	-104.248863200	12/31/9999
20246	COLLATT ESTATE COM #001	G	H	POGO OIL & GAS OPERATING, INC	11950	32.3319893000	-104.244140600	8/28/1969
20286	GULF FEDERAL #001	G	A	CIMAREX ENERGY CO. OF COLORADO	12075	32.3319626000	-104.248588600	3/7/1970
20288	ALLEN #001	G	P	SABRE OP INC	11825	32.3466415000	-104.227211000	3/4/1970
20325	CITY OF CARLSBAD COM #001	G	A	OXY USA INC	99999	32.3576775000	-104.244110100	9/15/1970
20335	JOELL #001	G	A	RKI EXPLORATION & PRODUCTION, LLC	10830	32.3393593000	-104.231308000	12/10/1970
20368	LITTLE JEWEL COM #001	G	A	RKI EXPLORATION & PRODUCTION, LLC	99999	32.3503036000	-104.231552100	1/16/1971
20460	GRADONOCO #001	G	A	OXY USA INC	99999	32.3342590000	-104.256034900	6/25/1971
20545	GULF FEDERAL COM #002	G	A	CIMAREX ENERGY CO. OF COLORADO	11833	32.3320503000	-104.2345200000	12/10/1971
20573	GRACE CARLSBAD #001	G	A	KEY ENERGY SERVICES, LLC	11875	32.3465805000	-104.239845300	2/11/1972
20829	AIRPORT GRACE #001	S	P	BOLD ENERGY, L.P.	11956	32.3465767000	-104.248031600	12/31/9999
21842	CITY OF CARLSBAD #001	M	H	KEY ENERGY SERVICES, LLC	9	32.3490677000	-104.238777200	12/31/9999
32288	GULF FEDERAL COM #003	G	A	CIMAREX ENERGY CO. OF COLORADO	12100	32.3381081000	-104.248504600	10/9/2002
32480	COLLATT #002	G	P	CHI OPERATING INC	11970	32.3393211000	-104.2441330000	11/25/2003
32560	GULF FEDERAL COM #004	G	A	CIMAREX ENERGY CO. OF COLORADO	12000	32.3393364000	-104.235580400	10/23/2003
42666	AIRPORT 36 STATE #001	G	N	MARATHON OIL PERMIAN LLC	0	32.3420406952	-104.238790771	12/31/9999
42729	AIRPORT 36 STATE #002H	G	N	MARATHON OIL PERMIAN LLC	0	32.341717186	-104.243183997	12/31/9999
44689	CATAPULT FEE 23 26 1 WA #006H	O	N	MARATHON OIL PERMIAN LLC	0	32.3420430600	-104.242158800	12/31/9999
44690	CATAPULT FEE 23 26 1 WXY #010H	G	N	MARATHON OIL PERMIAN LLC	0	32.3420429900	-104.2420616000	12/31/9999
44691	CATAPULT FEE 23 26 1 WA #005H	G	N	MARATHON OIL PERMIAN LLC	0	32.3420431300	-104.242255900	12/31/9999
44692	CATAPULT FEE 23 26 1 WXY #003H	G	N	MARATHON OIL PERMIAN LLC	0	32.3420432000	-104.242353000	12/31/9999
44912	AIRPORT STATE 22 26 36 WXY #010H	G	N	MARATHON OIL PERMIAN LLC	0	32.3420429200	-104.241964500	12/31/9999
44994	STINGER 6 WOAD FEE #001H	G	N	MEWBOURNE OIL CO	0	32.3389650000	-104.2218440000	12/31/9999
44995	STINGER 6 WOAD FEE #002H	G	N	MEWBOURNE OIL CO	0	32.3389030000	-104.2218390000	12/31/9999
44996	STINGER 6 WOHE FEE #003H	G	N	MEWBOURNE OIL CO	0	32.3350309000	-104.221809000	12/31/9999
44998	PLINY THE ELDER 23527E0605 #201	G	N	TAP ROCK OPERATING, LLC	0	32.3388081000	-104.202629900	12/31/9999





Quintana SWD #1: Offsetting Produced Water Analysis																		
wellname	api	section	township	range	unit	county	formation	ph	tds_mgl	sodium_mgl	calcium_mgl	iron_mgl	magnesium_mgl	manganese_mgl	chloride_mgl	bicarbonate_mgl	sulfate_mgl	co2_mgl
MILLER RANCH UNIT #001	3001520179	18 22S		25E	J	EDDY	DELAWARE		24800							10400	1530	3360
TRACY #001	3001520204	10 22S		27E	C	EDDY	DELAWARE		158000							96200	572	1400
ROOKIE STATE #001	3001510060	7 22S		26E	B	EDDY	BONE SPRING		67985							39150	61	1148
BURTON FLAT DEEP UNIT #058H	3001541057	2 21S		27E	L	EDDY	BONE SPRING 1ST SAND	7	185973	67682	1106.6	162.8	249	1.94	114605.7	59.8	0	350
CERF 10 FEDERAL #003H	3001541058	9 21S		27E	A	EDDY	BONE SPRING 1ST SAND	6.8	178476	68523.6	985	0	241	0	105464	951.6	0	60
CLETUS 28 STATE COM #004H	3001542625	28 23S		26E	P	EDDY	BONE SPRING 2ND SAND	7.3	176249	61583.9	2802.1	19.4	433.4	0	108190.9	1110	0	420
BO DUKE FEDERAL S #003H	3001542693	5 23S		26E	O	EDDY	BONE SPRING 2ND SAND	7.2	165576	57796.7	3162.7	26.6	507.7	0	100583.3	1098	0	340
CONE BUTTE UT #001	3001510007	19 22S		24E	D	EDDY	WOLFCAMP		4104						932	420	1540	
MAHUN STATE #001	3001520138	16 22S		22E	F	EDDY	WOLFCAMP	8	4568						426	695	2100	
COWDEN FEDERAL #001	3001520025	4 21S		29E	K	EDDY	STRAWN	6.1	93824						57400	220	270	
WILLIAMS GAS COM #001	3001522686	25 23S		28E	C	EDDY	ATOKA	7.9	217050						128000	1030	3300	
BIG EDDY UT #001	3001502475	36 21S		28E	C	EDDY	ATOKA		50026						29200	762	1150	
CARNERO PEAK UT #001	3001510053	31 22S		25E	A	EDDY	MORROW		73321						42080	590	505	
MIDWEST L FEDERAL GAS COM #001	3001520828	34 22S		26E	K	EDDY	MORROW	6.3	180083						109000	210	1900	





New Mexico Office of the State Engineer Point of Diversion Summary

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

Well Tag	POD Number	Q64	Q16	Q4	Sec	Tws	Rng	X	Y
	C 00355	1	4	01	23S	26E	571131	3577484*	

Driller License:

Driller Company:

Driller Name: H.W. ETZ, JR.

Drill Start Date: 09/18/1952

Drill Finish Date: 10/24/1952

Plug Date:

Log File Date: 08/11/1958

PCW Rcv Date:

Source:

Pump Type:

Pipe Discharge Size:

Estimated Yield:

Casing Size: 8.63

Depth Well: 2065 feet

Depth Water:

*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.

10/16/18 2:18 PM

POINT OF DIVERSION SUMMARY



New Mexico Office of the State Engineer

Point of Diversion Summary

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

(quarters are smallest to largest)

(NAD83 UTM in meters)

Well Tag	POD Number	Q64 Q16 Q4 Sec Tws Rng	X	Y
C	00028 S	3 1 2 06 23S 27E	572624	3578207*

Driller License: 24 **Driller Company:** BRININSTOOL, M.D.

Driller Name: HEMLER, HOWARD

Drill Start Date: 04/20/1953	Drill Finish Date: 04/30/1953	Plug Date:
Log File Date: 06/09/1953	PCW Rcv Date: 06/09/1953	Source: Shallow
Pump Type: TURBIN	Pipe Discharge Size: 7"	Estimated Yield:
Casing Size: 16.00	Depth Well: 231 feet	Depth Water: 190 feet

Water Bearing Stratifications:	Top	Bottom	Description
	180	197	Limestone/Dolomite/Chalk

Casing Perforations:	Top	Bottom
	70	85

Meter Number: 473	Meter Make: WATER SPEC
Meter Serial Number: 934655	Meter Multiplier: 1.0000
Number of Dials: 3	Meter Type: Diversion
Unit of Measure: Acre-Feet	Return Flow Percent:
Usage Multiplier:	Reading Frequency: Quarterly

Meter Readings (in Acre-Feet)

Read Date	Year	Mtr Reading	Flag	Rdr	Comment	Mtr Amount
12/30/1998	1999	108	A	ms		0
04/29/1999	1999	108	A	ms		0
07/29/1999	1999	197	A	ms		88.656
10/06/1999	1999	288	A	ms		90.837
12/27/1999	1999	304	A	ms		16.287
04/05/2000	2000	316	A	mb		12.558
07/06/2000	2000	440	A	MB		123.926
10/18/2000	2000	529	A	MB		88.095
01/04/2001	2000	529	A	ms		0
04/26/2001	2001	582	A	ms		53.396
07/19/2001	2001	689	A	ms		106.970
11/12/2001	2001	732	A	tg		43.085
04/11/2002	2002	732	A	ms		0
09/24/2002	2002	884	A	ms		151.591
01/02/2003	2002	900	A	ms		16.091

*UTM location was derived from PLSS - see Help

Meter Readings (in Acre-Feet)

Read Date	Year	Mtr Reading	Flag	Rdr	Comment	Mtr Amount
05/15/2003	2003	909	A	ms		9.788
08/26/2003	2003	31	R	ab	Meter Rollover	121.851
10/22/2003	2003	69	A	MS		37.522
02/04/2004	2003	88	A	ab		19.432
04/21/2004	2004	118	A	TW		29.571
07/13/2004	2004	216	A	RM		97.906
10/19/2004	2004	247	A	TW		31.425
05/24/2005	2005	111	A	ms		0
05/24/2005	2005	177	A	ms		65.887
07/05/2005	2005	244	A	JW		66.804
10/12/2005	2005	292	A	TW		48.685
01/04/2006	2005	292	A	TW		0
04/04/2006	2006	304	A	tw		11.593
07/06/2006	2006	413	A	tw		108.712
01/02/2007	2006	545	A	tw		132.489
04/27/2007	2007	591	A	tw		46.004
07/17/2007	2007	703	A	tw		111.499
10/04/2007	2007	764	A	tw		60.981
01/02/2008	2007	770	A	tw		6.849
04/01/2008	2008	770	A	tw		0
07/15/2008	2008	834	A	tw		63.712
10/23/2008	2008	850	A	tw		15.570
01/13/2009	2008	853	A	tw		3.109
01/04/2010	2009	952	A	tw		99.413
04/26/2010	2010	972	A	tw		19.852
07/26/2010	2010	987	A	tw		14.989
01/26/2011	2010	995	A	tw		8.223
09/20/2011	2011	11	R	tw	Meter Rollover	15.227
01/30/2012	2011	11	A	tw		0
04/30/2012	2012	11	A	tw		0
10/03/2012	2012	11	A	tw		0
12/27/2012	2012	11	A	tw		0
01/28/2014	2013	11	A	tw		0
07/25/2014	2014	11	A	tw		0
01/28/2015	2014	11	A	tw		0
01/21/2016	2015	11	A	tw		0
02/10/2017	2016	12	A	tw		1.140

**YTD Meter Amounts:	Year	Amount
	1999	195.780
	2000	224.579
	2001	203.451

**YTD Meter Amounts:	Year	Amount
	2002	167.682
	2003	188.593
	2004	158.902
	2005	181.376
	2006	252.794
	2007	225.333
	2008	82.391
	2009	99.413
	2010	43.064
	2011	15.227
	2012	0
	2013	0
	2014	0
	2015	0
	2016	1.140

Meter Number:	474	Meter Make:	GE
Meter Serial Number:	31361444	Meter Multiplier:	1.0000
Number of Dials:	5	Meter Type:	Power Child
Unit of Measure:	Kilowatt Hours	Return Flow Percent:	
Usage Multiplier:		Reading Frequency:	Quarterly (No Reading Expected)

Meter Readings in (Kilowatt Hours)

Read Date	Year	Mtr Reading	Flag	Rdr	Comment	Mtr Amount
12/20/1998	1999	14307	A	ms		0
04/29/1999	1999	14635	A	ms		328.000
07/20/1999	1999	15314	A	ms		679.000
10/06/1999	1999	16112	A	ms		798.000
12/28/1999	1999	16258	A	ms		146.000
04/05/2000	2000	16387	A	mb		129.000
07/06/2000	2000	17551	A	mb		1164.000
10/18/2000	2000	18498	A	MB		947.000
07/19/2001	2001	29880	A	ms		11382.000
01/05/2005	2004	21744	R	JW	Meter Rollover	91864.000
03/28/2005	2005	21815	A	JW		71.000
05/24/2005	2005	22973	A	JW		1158.000

**YTD Meter Amounts:	Year	Amount
	1999	1951.000
	2000	2240.000
	2001	11382.000
	2004	91864.000
	2005	1229.000



New Mexico Office of the State Engineer

Point of Diversion Summary

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

Well Tag	POD Number	Q64	Q16	Q4	Sec	Tws	Rng	X	Y
	C 03161	3	1	1	31	22S	27E	571829	3579813*

Driller License: 1348

Driller Company: TAYLOR WATER WELL SERVICE

Driller Name:

Drill Start Date: 01/31/2006

Drill Finish Date: 02/03/2006

Plug Date:

Log File Date: 03/13/2006

PCW Rcv Date:

Source:

Pump Type:

Pipe Discharge Size:

Estimated Yield:

Casing Size:

Depth Well: 200 feet

Depth Water:

*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 Summary

		(quarters are 1=NW 2=NE 3=SW 4=SE)			
		(quarters are smallest to largest)		(NAD83 UTM in meters)	
Well Tag	POD Number	Q64 Q16 Q4	Sec Tws Rng	X	Y
C 01018		3 4 1 36 22S 26E		570603	3579422* 

Driller License: 30	Driller Company: BARRON, EMMETT
Driller Name: BARRON, EMMETT	

Drill Start Date: 08/01/1961	Drill Finish Date: 08/03/1961	Plug Date:
Log File Date: 10/25/1961	PCW Rcv Date:	Source: Shallow
Pump Type:	Pipe Discharge Size:	Estimated Yield:
Casing Size: 5.50	Depth Well: 125 feet	Depth Water: 115 feet

Water Bearing Stratifications:	Top	Bottom	Description
	120	125	Sandstone/Gravel/Conglomerate

Casing Perforations:	Top	Bottom
	115	125

*UTM location was derived from PLSS - see Help

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July 10, 2018

CHRIS WEYAND

Lonquist Field Services, LLC

3345 Bee Cave Road, Suite 201

Austin, TX 78746

RE: WATER SAMPLES

Enclosed are the results of analyses for samples received by the laboratory on 07/03/18 15:15.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-17-10. 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 accredited through the State of Colorado Department of Public Health and Environment for:

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

Cardinal Laboratories is accredited through the State of New Mexico Environment Department for:

Method SM 9223-B	Total Coliform and E. coli (Colilert MMO-MUG)
Method EPA 524.2	Regulated VOCs and Total Trihalomethanes (TTHM)
Method EPA 552.2	Total Haloacetic Acids (HAA-5)

Accreditation applies to public drinking water matrices for State of Colorado and New Mexico.

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

Lab Director/Quality Manager

Analytical Results For:

Lonquist Field Services, LLC
3345 Bee Cave Road, Suite 201
Austin TX, 78746

Project: WATER SAMPLES
Project Number: NONE GIVEN
Project Manager: CHRIS WEYAND
Fax To: (512) 732-9816

Reported:
10-Jul-18 17:03

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
C-00355	H801820-01	Water	03-Jul-18 11:00	03-Jul-18 15:15
C-0028 S	H801820-02	Water	03-Jul-18 12:00	03-Jul-18 15:15

Cardinal Laboratories

*=Accredited Analyte

PLEASE NOTE: Liability and Damages. Cardinal'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 client for analyses. All claims, including those for negligence or any other cause whatsoever shall be deemed waived unless made in writing and received by Cardinal within thirty (30) days after completion of the applicable service. In no event shall Cardinal be liable for incidental or consequential damage 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 the services hereunder by Cardinal, regardless of whether such claim is based upon any of the above stated reasons or otherwise. Results relate only to the samples identified above. This report shall not be reproduced except in full with written approval of Cardinal Laboratories.



Caley D. Keene, Lab Director/Quality Manager

Analytical Results For:

Lonquist Field Services, LLC
3345 Bee Cave Road, Suite 201
Austin TX, 78746

Project: WATER SAMPLES
Project Number: NONE GIVEN
Project Manager: CHRIS WEYAND
Fax To: (512) 732-9816

Reported:
10-Jul-18 17:03

C-00355

H801820-01 (Water)

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Analyst	Analyzed	Method	Notes
---------	--------	-----	-----------------	-------	----------	-------	---------	----------	--------	-------

Cardinal Laboratories

Inorganic Compounds

Alkalinity, Bicarbonate	307		5.00	mg/L	1	8062505	AC	05-Jul-18	310.1	
Alkalinity, Carbonate	<1.00		1.00	mg/L	1	8062505	AC	05-Jul-18	310.1	
Chloride*	1480		4.00	mg/L	1	8070302	AC	05-Jul-18	4500-Cl-B	
Conductivity*	6000		1.00	uS/cm	1	8070308	AC	03-Jul-18	120.1	
pH*	7.07		0.100	pH Units	1	8070308	AC	03-Jul-18	150.1	
Resistivity	1.67			Ohms/m	1	8070308	AC	03-Jul-18	120.1	
Specific Gravity @ 60° F	1.007		0.000	[blank]	1	8070505	AC	05-Jul-18	SM 2710F	
Sulfate*	1110		250	mg/L	25	8070315	AC	03-Jul-18	375.4	
TDS*	3970		5.00	mg/L	1	8070311	AC	06-Jul-18	160.1	
Alkalinity, Total*	252		4.00	mg/L	1	8062505	AC	05-Jul-18	310.1	
Sulfide, total	0.0227		0.0100	mg/L	1	8070506	AC	05-Jul-18	376.2	

Green Analytical Laboratories

Total Recoverable Metals by ICP (E200.7)

Barium*	<0.050		0.050	mg/L	1	B807059	JDA	10-Jul-18	EPA200.7	
Calcium*	458		0.100	mg/L	1	B807059	JDA	10-Jul-18	EPA200.7	
Iron*	<0.050		0.050	mg/L	1	B807059	JDA	10-Jul-18	EPA200.7	
Magnesium*	286		1.00	mg/L	10	B807059	JDA	10-Jul-18	EPA200.7	
Potassium*	4.76		1.00	mg/L	1	B807059	JDA	10-Jul-18	EPA200.7	
Sodium*	359		1.00	mg/L	1	B807059	JDA	10-Jul-18	EPA200.7	

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Caley D. Keene, Lab Director/Quality Manager

Analytical Results For:

Lonquist Field Services, LLC
3345 Bee Cave Road, Suite 201
Austin TX, 78746

Project: WATER SAMPLES
Project Number: NONE GIVEN
Project Manager: CHRIS WEYAND
Fax To: (512) 732-9816

Reported:
10-Jul-18 17:03

C-0028 S

H801820-02 (Water)

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Analyst	Analyzed	Method	Notes
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Cardinal Laboratories

Inorganic Compounds

Alkalinity, Bicarbonate	400		5.00	mg/L	1	8062505	AC	05-Jul-18	310.1	
Alkalinity, Carbonate	<1.00		1.00	mg/L	1	8062505	AC	05-Jul-18	310.1	
Chloride*	1700		4.00	mg/L	1	8070302	AC	05-Jul-18	4500-Cl-B	
Conductivity*	6810		1.00	uS/cm	1	8070308	AC	03-Jul-18	120.1	
pH*	7.46		0.100	pH Units	1	8070308	AC	03-Jul-18	150.1	
Resistivity	1.47			Ohms/m	1	8070308	AC	03-Jul-18	120.1	
Specific Gravity @ 60° F	1.003		0.000	[blank]	1	8070505	AC	05-Jul-18	SM 2710F	
Sulfate*	1460		250	mg/L	25	8070315	AC	03-Jul-18	375.4	
TDS*	4290		5.00	mg/L	1	8070311	AC	06-Jul-18	160.1	
Alkalinity, Total*	328		4.00	mg/L	1	8062505	AC	10-Jul-18	310.1	
Sulfide, total	<0.0100		0.0100	mg/L	1	8070506	AC	05-Jul-18	376.2	

Green Analytical Laboratories

Total Recoverable Metals by ICP (E200.7)

Barium*	<0.050		0.050	mg/L	1	B807059	JDA	10-Jul-18	EPA200.7	
Calcium*	469		0.100	mg/L	1	B807059	JDA	10-Jul-18	EPA200.7	
Iron*	0.115		0.050	mg/L	1	B807059	JDA	10-Jul-18	EPA200.7	
Magnesium*	417		1.00	mg/L	10	B807059	JDA	10-Jul-18	EPA200.7	
Potassium*	4.90		1.00	mg/L	1	B807059	JDA	10-Jul-18	EPA200.7	
Sodium*	370		1.00	mg/L	1	B807059	JDA	10-Jul-18	EPA200.7	

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

Lonquist Field Services, LLC
3345 Bee Cave Road, Suite 201
Austin TX, 78746

Project: WATER SAMPLES
Project Number: NONE GIVEN
Project Manager: CHRIS WEYAND
Fax To: (512) 732-9816

Reported:
10-Jul-18 17:03

Inorganic Compounds - Quality Control

Cardinal Laboratories

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 8062505 - General Prep - Wet Chem										
Blank (8062505-BLK1)				Prepared & Analyzed: 25-Jun-18						
Alkalinity, Carbonate	ND	1.00	mg/L							
Alkalinity, Bicarbonate	5.00	5.00	mg/L							
Alkalinity, Total	4.00	4.00	mg/L							
LCS (8062505-BS1)				Prepared & Analyzed: 25-Jun-18						
Alkalinity, Carbonate	ND	2.50	mg/L				80-120			
Alkalinity, Bicarbonate	305	12.5	mg/L				80-120			
Alkalinity, Total	250	10.0	mg/L	250		100	80-120			
LCS Dup (8062505-BSD1)				Prepared & Analyzed: 25-Jun-18						
Alkalinity, Carbonate	ND	2.50	mg/L				80-120		20	
Alkalinity, Bicarbonate	355	12.5	mg/L				80-120	15.2	20	
Alkalinity, Total	290	10.0	mg/L	250		116	80-120	14.8	20	
Batch 8070302 - General Prep - Wet Chem										
Blank (8070302-BLK1)				Prepared & Analyzed: 05-Jul-18						
Chloride	ND	4.00	mg/L							
LCS (8070302-BS1)				Prepared & Analyzed: 05-Jul-18						
Chloride	104	4.00	mg/L	100		104	80-120			
LCS Dup (8070302-BSD1)				Prepared & Analyzed: 05-Jul-18						
Chloride	100	4.00	mg/L	100		100	80-120	3.92	20	
Batch 8070308 - General Prep - Wet Chem										
LCS (8070308-BS1)				Prepared & Analyzed: 03-Jul-18						
Conductivity	482		uS/cm	500		96.4	80-120			
pH	7.08		pH Units	7.00		101	90-110			

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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

Lonquist Field Services, LLC
3345 Bee Cave Road, Suite 201
Austin TX, 78746

Project: WATER SAMPLES
Project Number: NONE GIVEN
Project Manager: CHRIS WEYAND
Fax To: (512) 732-9816

Reported:
10-Jul-18 17:03

Inorganic Compounds - Quality Control

Cardinal Laboratories

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 8070308 - General Prep - Wet Chem

Duplicate (8070308-DUP1)

Source: H801762-01

Prepared & Analyzed: 03-Jul-18

Conductivity	8320	1.00	uS/cm		8390			0.838	20	
pH	6.95	0.100	pH Units		7.19			3.39	20	
Resistivity	1.20		Ohms/m		1.19			0.838	20	

Batch 8070311 - Filtration

Blank (8070311-BLK1)

Prepared: 03-Jul-18 Analyzed: 09-Jul-18

TDS	ND	5.00	mg/L							
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LCS (8070311-BS1)

Prepared: 03-Jul-18 Analyzed: 05-Jul-18

TDS	482	5.00	mg/L	527		91.5	80-120			
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Duplicate (8070311-DUP1)

Source: H801800-02

Prepared: 03-Jul-18 Analyzed: 05-Jul-18

TDS	1730	5.00	mg/L		1720			0.348	20	
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Batch 8070315 - General Prep - Wet Chem

Blank (8070315-BLK1)

Prepared & Analyzed: 03-Jul-18

Sulfate	ND	10.0	mg/L							
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LCS (8070315-BS1)

Prepared & Analyzed: 03-Jul-18

Sulfate	18.1	10.0	mg/L	20.0		90.6	80-120			
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LCS Dup (8070315-BSD1)

Prepared & Analyzed: 03-Jul-18

Sulfate	18.9	10.0	mg/L	20.0		94.4	80-120	4.22	20	
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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

 Lonquist Field Services, LLC
 3345 Bee Cave Road, Suite 201
 Austin TX, 78746

 Project: WATER SAMPLES
 Project Number: NONE GIVEN
 Project Manager: CHRIS WEYAND
 Fax To: (512) 732-9816

 Reported:
 10-Jul-18 17:03

Inorganic Compounds - Quality Control
Cardinal Laboratories

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 8070505 - General Prep - Wet Chem
Duplicate (8070505-DUP1)

Source: H801820-01

Prepared: 03-Jul-18 Analyzed: 05-Jul-18

Specific Gravity @ 60° F	1.006	0.000	[blank]		1.007			0.142	20	
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Batch 8070506 - General Prep - Wet Chem
Blank (8070506-BLK1)

Prepared & Analyzed: 05-Jul-18

Sulfide, total	ND	0.0100	mg/L							
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Duplicate (8070506-DUP1)

Source: H801820-01

Prepared & Analyzed: 05-Jul-18

Sulfide, total	0.0218	0.0100	mg/L		0.0227			3.69	20	
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Celey D. Keene, Lab Director/Quality Manager

Analytical Results For:

Lonquist Field Services, LLC
3345 Bee Cave Road, Suite 201
Austin TX, 78746

Project: WATER SAMPLES
Project Number: NONE GIVEN
Project Manager: CHRIS WEYAND
Fax To: (512) 732-9816

Reported:
10-Jul-18 17:03

Total Recoverable Metals by ICP (E200.7) - Quality Control

Green Analytical Laboratories

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B807059 - Total Rec. 200.7/200.8/200.2

Blank (B807059-BLK1)

Prepared: 09-Jul-18 Analyzed: 10-Jul-18

Sodium	ND	1.00	mg/L							
Magnesium	ND	0.100	mg/L							
Barium	ND	0.050	mg/L							
Calcium	ND	0.100	mg/L							
Potassium	ND	1.00	mg/L							
Iron	ND	0.050	mg/L							

LCS (B807059-BS1)

Prepared: 09-Jul-18 Analyzed: 10-Jul-18

Magnesium	18.7	0.100	mg/L	20.0		93.6	85-115			
Iron	3.67	0.050	mg/L	4.00		91.7	85-115			
Potassium	7.71	1.00	mg/L	8.00		96.3	85-115			
Sodium	3.13	1.00	mg/L	3.24		96.6	85-115			
Barium	1.90	0.050	mg/L	2.00		94.9	85-115			
Calcium	3.78	0.100	mg/L	4.00		94.5	85-115			

LCS Dup (B807059-BSD1)

Prepared: 09-Jul-18 Analyzed: 10-Jul-18

Sodium	3.11	1.00	mg/L	3.24		96.0	85-115	0.589	20	
Potassium	7.56	1.00	mg/L	8.00		94.5	85-115	1.88	20	
Magnesium	18.6	0.100	mg/L	20.0		93.0	85-115	0.545	20	
Barium	1.90	0.050	mg/L	2.00		95.0	85-115	0.0910	20	
Calcium	3.77	0.100	mg/L	4.00		94.2	85-115	0.312	20	
Iron	3.66	0.050	mg/L	4.00		91.6	85-115	0.146	20	

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Celey D. Keene, Lab Director/Quality Manager

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

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Celey D. Keene, Lab Director/Quality Manager

101 East Marland, Hobbs, NM 88240
(575) 393-2326 FAX (575) 393-2476

+ Cardinal cannot accept verbal change Please for written change to 15751 303-2329

Company	:	LONGQUIST FIELD SERVICES
Lease Name	:	WATER SAMPLES
Well Number	:	C-00355 (H801820-01)
Location	:	NOT GIVEN

Date Sampled : 07/03/18
Company Rep. : CHRIS WEYAND

1. pH	7.07				
2. Specific Gravity @ 60/60 F.	1.0070				
3. CaCO3 Saturation Index @ 80 F.	+0.701				
	+1.401				
Dissolved Gasses					
4. Hydrogen Sulfide	0.023	PPM			
5. Carbon Dioxide	ND	PPM			
6. Dissolved Oxygen	ND	PPM			
Cations					
7. Calcium (Ca++)	458.00	/	Eq. Wt.	=	MEQ/L
			20.1	=	22.79
8. Magnesium (Mg++)	286.00	/	12.2	=	23.44
9. Sodium (Na+)	359	/	23.0	=	23.23
10. Barium (Ba++)	0.000	/	68.7	=	0.00
Anions					
11. Hydroxyl (OH-)	0	/	17.0	=	0.00
12. Carbonate (CO3=)	0	/	30.0	=	0.00
13. Bicarbonate (HCO3-)	307	/	61.1	=	5.02
14. Sulfate (SO4=)	1,110	/	48.8	=	22.75
15. Chloride (Cl-)	1,480	/	35.5	=	41.69
Other					
16. Total Iron (Fe)	0.000	/	18.2	=	0.00
17. Total Dissolved Solids	3,970				
18. Total Hardness As CaCO3	2,321.0				
19. Calcium Sulfate Solubility @ 90 F.	2,452				
20. Resistivity (Measured)	1.670	Ohm/Meters			@ 77

COMPOUND	Eq. Wt.	X	MEQ/L	=	mg/L
Ca(HCO ₃) ₂	81.04	X	5.02	=	407
CaSO ₄	68.07	X	17.76	=	1,209
CaCl ₂	55.50	X	0.00	=	0
Mg(HCO ₃) ₂	73.17	X	0.00	=	0
MgSO ₄	60.19	X	0.00	=	0
MgCl ₂	47.62	X	23.44	=	1,116
NaHCO ₃	84.00	X	0.00	=	0
NaSO ₄	71.03	X	4.98	=	354
NaCl	58.46	X	18.25	=	1,067

ND = Not Determined

CARDINAL LABORATORIES
SCALE INDEX WATER ANALYSIS REPORT

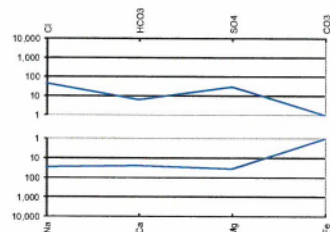
Company : LONGQUIST FIELD SERVICES
 Lease Name : WATER SAMPLES
 Well Number : C-0028 S (H801820-02)
 Location : NOT GIVEN

Date Sampled : 07/03/18
 Company Rep. : CHRIS WEYAND

ANALYSIS

1. pH	7.46				
2. Specific Gravity @ 60/60 F.	1.0030				
3. CaCO3 Saturation Index @ 80 F.	+0.826				'Calcium Carbonate Scale Possible'
	@ 140 F.	+1.526			'Calcium Carbonate Scale Possible'
Dissolved Gasses					
4. Hydrogen Sulfide	0.000	PPM			
5. Carbon Dioxide	ND	PPM			
6. Dissolved Oxygen	ND	PPM			
Cations					
7. Calcium (Ca++)	469.00	/	Eq. Wt.	=	MEQ/L
			20.1	=	23.33
8. Magnesium (Mg++)	417.00	/	12.2	=	34.18
9. Sodium (Na+)	370	/	23.0	=	26.84
10. Barium (Ba++)	0.000	/	68.7	=	0.00
Anions					
11. Hydroxyl (OH-)	0	/	17.0	=	0.00
12. Carbonate (CO3=)	0	/	30.0	=	0.00
13. Bicarbonate (HCO3-)	400	/	61.1	=	6.55
14. Sulfate (SO4=)	1,460	/	48.8	=	29.92
15. Chloride (Cl-)	1,700	/	35.5	=	47.89
Other					
16. Total Iron (Fe)	0.115	/	18.2	=	0.01
17. Total Dissolved Solids	4,290				
18. Total Hardness As CaCO3	2,888.0				
19. Calcium Sulfate Solubility @ 90 F.	2,234				
20. Resistivity (Measured)	1.470	Ohm/Meters	@ 77	Degrees (F)	

Logarithmic Water Pattern



PROBABLE MINERAL COMPOSITION

COMPOUND	Eq. Wt.	X	MEQ/L	=	mg/L
Ca(HCO3)2	81.04	X	6.55	=	531
CaSO4	68.07	X	16.79	=	1,143
CaCl2	55.50	X	0.00	=	0
Mg(HCO3)2	73.17	X	0.00	=	0
MgSO4	60.19	X	13.13	=	790
MgCl2	47.62	X	21.05	=	1,002
NaHCO3	84.00	X	0.00	=	0
NaSO4	71.03	X	0.00	=	0
NaCl	58.46	X	26.84	=	1,569

ND = Not Determined