



STATE OF NEW MEXICO
OFFICE OF THE STATE ENGINEER

AZTEC

Tom Blaine, P.E.
State Engineer

100 Gossett Drive, Suite A
Aztec, New Mexico 87410

December 21, 2018

Andrea Felix
Enduring Resources IV, LLC
332 Road 3100
Aztec, NM 87410

**RE: Permit Approval for Exploratory Well, SJ-4301 POD3; Notice of Intention Aquifer Testing;
West Lybrook Unit 2309-24N WSW, rural San Juan County, New Mexico**

Dear Ms. Felix:

On July 11, 2018, and as subsequently amended, the New Mexico Office of the State Engineer received an application for a permit and an Artesian Plan of Operations from Enduring Resources IV, LLC (Enduring) for the drilling and testing of a proposed exploratory well at the above referenced location. The proposed exploratory well is associated with a concurrently filed Notice of Intention in which Enduring proposes to divert water pursuant to §§ 72-12-25 through -28, NMSA 1978. A receipt for the fees paid was previously provided.

Enclosed is a copy of the above numbered permit that has been approved subject to the conditions set forth on the permit approval page, the approved Artesian Plan of Operations, and in the attached Permit Conditions of Approval. This permit authorizes the drilling and completion of the well, followed by diversion of water solely for initial aquifer testing and well development purposes. Prior to diversion of water from the well for the purposes stated in the associated Notice of Intention filing, verification of the requisite laboratory analytical results and the depth to the top of the producing aquifer will be necessary.

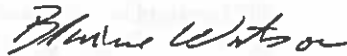
Please be aware that there are a number of permit conditions that apply to the drilling and completion of the proposed well. The approval conditions and the incorporated Artesian Plan of Operations (along with its requirements) are attached to the permit and should be reviewed thoroughly prior to proceeding to ensure they are clearly understood. As noted in Condition 14, please contact Bill Enenbach/Shawn Williams at 505-334-4571 (or Doug Rappuhn at 505-383-4018) in advance to coordinate (including travel directions) the required casing, cementing, and pressure-testing inspections.

Additionally, authorization to divert water as proposed in the NOI is currently subject to the provision of water right offsets by Enduring Resources because NMOSE has previously determined that the proposed diversion will result in impairment of surface water rights on the Rio Gallina. This well, SJ-4301 POD3, will be subject to filing an application for groundwater appropriation if it does not meet the requirements of §§ 72-12-25 through -28, NMSA 1978.

Enduring Resources; SJ-4301 POD3
December 21, 2018
Page 2 of 2

If you have any questions regarding this permitting action, please feel free to contact the District V Office at (505) 334-4571.

Sincerely,



Blaine Watson, P.G.
District Manager
Water Rights Division – District V

Enclosures

cc: Aztec Reading (w/o enclosures)
SJ-4301 File
WATERS

File No. SJ -4301 POD3



NEW MEXICO OFFICE OF THE STATE ENGINEER

WR-07 APPLICATION FOR PERMIT TO DRILL

A WELL WITH NO WATER RIGHT

(check applicable box):

For fees, see State Engineer website: <http://www.ose.state.nm.us/>

- Purpose:
- ☒ Exploratory Well (Pump test) ☐ Pollution Control And/Or Recovery ☐ Ground Source Heat Pump
- ☐ Monitoring Well ☐ Construction Site/Public Works Dewatering ☐ Other(Describe):
- ☐ Mine Dewatering

A separate permit will be required to apply water to beneficial use regardless if use is consumptive or nonconsumptive.

☐ Temporary Request - Requested Start Date:

Requested End Date:

Plugging Plan of Operations Submitted? ☐ Yes ☒ No

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1. APPLICANT(S)

Name: Enduring Resources IV, LLC	Name: Enduring Resources IV, LLC
Contact or Agent: check here if Agent <input type="checkbox"/> Andrea Felix	Contact or Agent: check here if Agent <input type="checkbox"/> John Conley
Mailing Address: 332 Road 3100	Mailing Address: 511 16th Street
City: Aztec	City: Denver
State: NM Zip Code: 87410	State: CO Zip Code: 80202
Phone: 505-386-8205 <input type="checkbox"/> Home <input checked="" type="checkbox"/> Cell Phone (Work):	Phone: 720-878-3266 <input type="checkbox"/> Home <input checked="" type="checkbox"/> Cell Phone (Work):
E-mail (optional): afelix@enduringresources.com	E-mail (optional): jconley@enduringresources.com

FOR OSE INTERNAL USE

Application for Permit, Form WR-07, Rev 11/17/16

File No.: SJ-4301 POD3	Trn. No.:	Receipt No.: 5-6162
Trans Description (optional):		
Sub-Basin:	PCW/LOG Due Date: 12/21/2019	

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2. WELL(S) Describe the well(s) applicable to this application.

Location Required: Coordinate location must be reported in NM State Plane (NAD 83), UTM (NAD 83), or Latitude/Longitude (Lat/Long - WGS84). District II (Roswell) and District VII (Cimarron) customers, provide a PLSS location in addition to above.			
<input type="checkbox"/> NM State Plane (NAD83) (Feet) <input type="checkbox"/> NM West Zone <input type="checkbox"/> NM East Zone <input type="checkbox"/> NM Central Zone		<input type="checkbox"/> UTM (NAD83) (Meters) <input type="checkbox"/> Zone 12N <input type="checkbox"/> Zone 13N	
<input checked="" type="checkbox"/> Lat/Long (WGS84) (to the nearest 1/10 th of second)			
Well Number (If known):	X or Easting or Longitude:	Y or Northing or Latitude:	Provide if known: -Public Land Survey System (PLSS) (Quarters or Halves, Section, Township, Range) OR - Hydrographic Survey Map & Tract; OR - Lot, Block & Subdivision; OR - Land Grant Name
SJ-4301 POD 3	-107 44'27.2080"	36 12'21.4499"	SE/4 SW/4 of Section 24, T23N, R9W
NOTE: If more well locations need to be described, complete form WR-08 (Attachment 1 – POD Descriptions) Additional well descriptions are attached: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, how many _____			
Other description relating well to common landmarks, streets, or other: 37.8 miles South from intersection of US Hwy 550 & US Hwy 64 in Bloomfield, NM			
Well is on land owned by: BLM- DOI			
Well Information: NOTE: If more than one (1) well needs to be described, provide attachment. Attached? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, how many _____			
Approximate depth of well (feet): 6,750'		Outside diameter of well casing (inches): 7"	
Driller Name: Mote Drilling Inc		Driller License Number: 733	

3. ADDITIONAL STATEMENTS OR EXPLANATIONS

Enduring Resources IV, LLC well name: WLU 2309-24N WSW

FOR OSE INTERNAL USE

Application for Permit, Form WR-07

File No.: SJ-4301 POD3

Trm No.:

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4. SPECIFIC REQUIREMENTS: The applicant must include the following, as applicable to each well type. Please check the appropriate boxes, to indicate the information has been included and/or attached to this application:

Exploratory: <input checked="" type="checkbox"/> Include a description of any proposed pump test, if applicable.	Pollution Control and/or Recovery: <input type="checkbox"/> Include a plan for pollution control/recovery, that includes the following: <input type="checkbox"/> A description of the need for the pollution control or recovery operation. <input type="checkbox"/> The estimated maximum period of time for completion of the operation. <input type="checkbox"/> The annual diversion amount. <input type="checkbox"/> The annual consumptive use amount. <input type="checkbox"/> The maximum amount of water to be diverted and injected for the duration of the operation. <input type="checkbox"/> The method and place of discharge. <input type="checkbox"/> The method of measurement of water produced and discharged.	Construction De-Watering: <input type="checkbox"/> Include a description of the proposed dewatering operation, <input type="checkbox"/> The estimated duration of the operation, <input type="checkbox"/> The maximum amount of water to be diverted, <input type="checkbox"/> A description of the need for the dewatering operation, and, <input type="checkbox"/> A description of how the diverted water will be disposed of.	Mine De-Watering: <input type="checkbox"/> Include a plan for pollution control/recovery, that includes the following: <input type="checkbox"/> A description of the need for mine dewatering. <input type="checkbox"/> The estimated maximum period of time for completion of the operation. <input type="checkbox"/> The source(s) of the water to be diverted. <input type="checkbox"/> The geohydrologic characteristics of the aquifer(s). <input type="checkbox"/> The maximum amount of water to be diverted per annum. <input type="checkbox"/> The maximum amount of water to be diverted for the duration of the operation. <input type="checkbox"/> The quality of the water. <input type="checkbox"/> The method of measurement of water diverted.
Monitoring: <input type="checkbox"/> Include the reason for the monitoring well, and, <input type="checkbox"/> The duration of the planned monitoring.	<input type="checkbox"/> The method of measurement of water injected. <input type="checkbox"/> The characteristics of the aquifer. <input type="checkbox"/> The method of determining the resulting annual consumptive use of water and depletion from any related stream system. <input type="checkbox"/> Proof of any permit required from the New Mexico Environment Department. <input type="checkbox"/> An access agreement if the applicant is not the owner of the land on which the pollution plume control or recovery well is to be located.	Ground Source Heat Pump: <input type="checkbox"/> Include a description of the geothermal heat exchange project, <input type="checkbox"/> The number of boreholes for the completed project and required depths. <input type="checkbox"/> The time frame for constructing the geothermal heat exchange project, and, <input type="checkbox"/> The duration of the project. <input type="checkbox"/> Preliminary surveys, design data, and additional information shall be included to provide all essential facts relating to the request.	<input type="checkbox"/> The recharge of water to the aquifer. <input type="checkbox"/> Description of the estimated area of hydrologic effect of the project. <input type="checkbox"/> The method and place of discharge. <input type="checkbox"/> An estimation of the effects on surface water rights and underground water rights from the mine dewatering project. <input type="checkbox"/> A description of the methods employed to estimate effects on surface water rights and underground water rights. <input type="checkbox"/> Information on existing wells, rivers, springs, and wetlands within the area of hydrologic effect.

ACKNOWLEDGEMENT

I, We (name of applicant(s)), Enduring Resources, IV, LLC by Andrea Felix & John Conley

Print Name(s)

affirm that the foregoing statements are true to the best of (my, our) knowledge and belief.

Applicant Signature

Applicant Signature

ACTION OF THE STATE ENGINEER

This application is:

☒ approved

☐ partially approved

☐ denied

provided it is not exercised to the detriment of any others having existing rights, and is not contrary to the conservation of water in New Mexico nor detrimental to the public welfare and further subject to the attached conditions of approval.

Witness my hand and seal this 21st day of December 20 18, for the State Engineer,

Tom Blaine, P.E.

State Engineer

By: Blaine Watson
Signature

Print

Blaine Watson

Title: District V Manager
Print

FOR USE INTERNAL USE

Application for Permit, Form WR-07

File No.: SJ-4301 POD3

Trn No.:



ARTESIAN WELL PLAN OF OPERATIONS

(for new well construction and repairs)



An Artesian Well Plan of Operations shall be filed with and approved by the Office of the State Engineer prior to commencing the drilling or repairing of an artesian well.

A detailed diagram of the proposed artesian well shall be attached to this plan.

I. FILING FEE: There is no filing fee for this form.

II. GENERAL / WELL OWNERSHIP:

Office of the State Engineer POD Number (Well Number) for well (if known): SJ-4301 POD 3

Name of well owner: Enduring Resources IV, LLC

Mailing address: 200 Energy Court

City: Farmington State: NM Zip code: 87401

Phone number: 505-386-8205 Andrea Felix E-mail: afeelix@enduringresources.com

III. WELL DRILLER INFORMATION:

Well Driller contracted to provide drilling services: Mole Drilling Inc.

New Mexico Well Driller License No.: 733 Expiration Date: 6-30-2019

IV. WELL INFORMATION:

- 1) Will this well be used for any type of monitoring program? no If yes, please describe in section V; applicant should be familiar with the need for specialty materials or design required for the monitoring program.
- 2) Will the well tap or penetrate brackish, saline, or otherwise poor quality water? Yes If yes, please provide additional detail in section V.
- 3) Depth of top of the anticipated artesian aquifer: 8250 feet below ground level (bgl).
- 4) Is a flowing artesian head anticipated? No
- 5) Will a pitless adapter be installed in the well? No
- 6) GPS Well Location: Latitude: 36 deg, 12 min, 21 sec
Longitude: -107 deg, 44 min, 27 sec, NAD 83
- 7) Will permanent surface casing be installed? Yes If yes, provide details below. (Note: surface casing is shallow casing generally set above the confining unit overlying the artesian aquifer and is considered optional).
 - a) Diameter of borehole to be drilled for the surface casing: 17.5" 12.25 inches.
 - b) Proposed surface casing depth: 350 feet below ground level.

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- c) Surface casing material, grade: Steel J55
- d) Inside diameter (ID): 8.621 inches. → 12.615"
- e) Outside diameter (OD): 9.625 inches. → 13.375"
- f) Wall thickness: 0.352 inches. → 0.380"
- g) Casing joint connection type (note whether welded, glued, coupled, etc. If coupled, include outside diameter OD and the length in inches, and also the number of threads per inch.):
~~LTC connection, 10.625" OD, 10.500" long, 8 threads per inch~~ → BTC CONNECTION / 14.375" OD / 10.625" long / 5T
- h) Interval of proposed surface casing annular sanitary seal: 0 to 350 feet below ground level.
- i) Surface casing sanitary seal material:
Cement

8) Artesian casing (Note: artesian casing shall be set adequately into the confining unit overlying the artesian aquifer; in some designs this may also be the production casing; NMOSE inspection requirements apply to installing, grouting and testing the artesian casing):

- a) Diameter of borehole to be drilled for the artesian casing: 8.75 inches. ✓ By NMOSE
- b) Proposed artesian casing depth: 6750 feet below ground level. ✓ By NMOSE
- c) Artesian casing material, grade: Steel L80
- d) Inside diameter (ID): 6.276 inches.
- e) Outside diameter (OD): 7.000 inches.
- f) Wall thickness: 0.362 inches.
- g) Casing joint connection type (note whether welded, glued, coupled, etc. If coupled, include outside diameter (OD) and the length in inches, and also the number of threads per inch.)
LTC connection, 7.875" OD, 9.000" long, 8 threads per inch
- h) Type and spacing of artesian casing centralizers:
bow spring, 2 per joint on bottom 3 Jls, 1 per joint to 500' above Entrada, 1 per joint to surface ✓
- i) Manufacturer and model of float shoe: Weatherford Sura-Seal 3 ✓ See ATTACHED INDIVIDUAL RECORDS
- j) Method of annular grout placement: check one ☒ Pressure Grout ☐ Tremmie Pipe ☐ Drilling Ann
- k) Interval of proposed annular grout: 0 to 7,197 ? feet below ground level.
- l) Proposed annular grout mix: _____ gallons of water per 94 pound sack of Portland cement.
- m) Cement type proposed: _____
- n) Theoretical volume of annular grout required: _____
- o) Will the grout be: ☐ batch-mixed and delivered to the site
☒ mixed on site (continuous service)
- p) Grout additives requested, and percent by dry weight relative to cement: (See AWWA Standard A100-06 or Halliburton red book; common additives: calcium chloride, bentonite solution, pozzolan ash):

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q) Additional notes and calculations:

9) Production casing (set through the artesian casing and into the artesian aquifer; may not be necessary if the artesian casing is used as the production casing):

a) Will you be using a production casing within the artesian casing? No If yes, provide a description of the following in section V:

- i. Diameter of borehole to be drilled for production casing; casing joint connection type - note whether coupled, welded, glued, etc.; proposed production casing depth; and inside diameter, outside diameter, wall thickness, casing material, and casing material grade of production casing.
- ii. List the proposed screened/ perforated interval(s) if you plan to use well screen or perforated casing.
- iii. List the vertical intervals and seal or fill material if the annulus between the production casing and artesian casing/borehole is to be sealed/ filled.

V. ADDITIONAL INFORMATION: List additional information below, or on separate sheet(s):

If during the drilling of the well, conditions dictate the need for a cement stage tool, Enduring intends to install that tool in the 7" casing at a depth to be determined based on those conditions. That determination will be made on a well-to-well basis as conditions dictate and will be coordinated with the State Engineer. Enduring does not anticipate that a stage tool will be necessary.

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VI. SIGNATURE:

Enduring
I, Andrea Felix / Craig Mobley ^{MORE}, say that I have carefully read the foregoing Artesian Well Plan of Operations and any attachments which are a part hereof; that I am familiar with the rules and regulations of the State Engineer pertaining to the plugging of wells and will comply with them, and that each and all of the statements in the Artesian Well Plan of Operations and attachments are true to the best of my knowledge and belief.


Signature of Applicant

11-15-2018
Date


Signature of Well driller

11-15-18
Date

Artesian Well Plan of Operations
Revised October 6, 2017
Page 3 of 4

VII. ACTION OF THE STATE ENGINEER:

This Artesian Well Plan of Operations is:

- ☒ Approved subject to the attached conditions. — ~~SE~~ COMMENTS BELOW
- ☐ Not approved for the reasons provided on the attached letter.

Witness my hand and official seal this 12th day of December, 2018TOM BLANE, P.E., State EngineerBy: Douglas H. Rappuhn, P.G.
NMOSE Hydrology Bureau

THIS ARTESIAN WELL PLAN OF OPERATIONS IS APPROVED SUBJECT TO:

- THE CONDITIONS OF NMOSE SJ-4301-POD3 WR-07 APPLICATION FOR PERMIT TO DRILL A WELL WITH NO WATER RIGHT (CURRENTLY PENDING NMOSE APPROVAL)
- ANNOTATIONS MADE TO THIS ARTESIAN PLAN AND TO ATTACHED ENDURING RESOURCES DRILLING PLAN FOR SJ-4301-POD3, AND TO ATTACHED ENDURING RESOURCES CONCEPTUAL WELLBORE DIAGRAM FOR SJ-4301-POD3

THIS APPROVAL IS GRANTED BASED ON REVIEW OF INFORMATION PROVIDED IN THE SUBMITTAL OF THIS ARTESIAN PLAN, ASSOCIATED ENDURING RESOURCES DRILLING PLAN AND CONCEPTUAL WELLBORE DIAGRAM, PARTIAL APPROVAL OF ENDURING RESOURCES SJ-4301-POD3 WELLBORE DESIGN IMPROVEMENT REQUEST FOR VARIANCE, AND RELATED SUBMITTALS PROVIDED TO THE NMOSE AT TIME OF SJ-4301-POD1 PERMITTING REGARDING CASING, CEMENTING, & GENERAL WELL DESIGN.

DHR

DOI: 10.1002/for

: YELLOW-HIGHLIGHTED ENTRIES MAY REQUIRE
RECALCULATION BY PERMITTEE



ENDURING RESOURCES IV, LLC
511 SIXTEENTH STREET, SUITE 700
DENVER, COLORADO 80202

DRILLING PLAN: Drill, complete, and equip water supply well in the Entrada formation

WELL INFORMATION:

Name: West Lybrook Unit 2309-24N WSW (SJ-4301 POD3)

State: New Mexico

County: San Juan

Surface Elevation: 6,878 ft ASL (GL)

6,892 ft ASL (KB)

Surface Location: 24-23N-09W Sec-Twn-Rng TBD ft FNL TBD ft FEL
TBD ° N latitude TBD ° W longitude (NAD 83)

BH Location: 24-23N-09W Sec-Twn-Rng TBD ft FNL TBD ft FWL
TBD ° N latitude TBD ° W longitude (NAD 83)

Driving Directions: From the intersection of US Hwy 550 & US Hwy 64 in Bloomfield, NM: south on 550 for approximately 50 miles to Enduring Gallup field. Exact directions TBD.

GEOLOGIC AND RESERVOIR INFORMATION:

Prognosis:	Formation Tops	TVD (ft ASL)	TVD (ft KB)	MD (ft KB)	O / G / W	Pressure
	Ojo Alamo	6,797	95	95	W	normal
	Kirtland	6,577	315	315	W	normal
	Fruitland	6,467	425	425	G, W	sub
	Pictured Cliffs	6,167	725	725	G, W	sub
	Lewls	5,992	900	900	G, W	normal
	Chacra	5,827	1,065	1,065	G, W	normal
	Cliff House	5,442	1,450	1,450	G, W	sub
	Menefee	4,692	2,200	2,200	G, W	normal
	Point Lookout	3,767	3,125	3,125	G, W	normal
	Mancos	3,542	3,350	3,350	O, G	normal
	Gallup	3,342	3,550	3,550	O, G	normal
	Base Greenhorn	1,827	5,065	5,065	G, W	normal
	Dakota	1,777	5,115	5,115	G, W	normal
	Morrison	1,517	5,375	5,375	G, W	normal
	Todilto	697	6,195	6,195	G, W	normal
	Entrada	642	6,250	6,250	O, G, W	normal
	TOTAL DEPTH	142	6,750	6,750	O, G, W	normal

Surface: Nacimiento

Oil & Gas Zones: Several gas bearing zones will be encountered; target formation is the Entrada

Pressure: Normal (0.43 psi/ft) or sub-normal pressure gradient anticipated in all formations

Max. pressure gradient: 0.43 psi/ft Evacuated hole gradient: 0.22 psi/ft

Maximum anticipated BH pressure, assuming maximum pressure gradient: 2,690 psi

Maximum anticipated surface pressure, assuming partially evacuated hole: 1,320 psi

Temperature: Maximum anticipated BHT is 205° F or less

H₂S INFORMATION:

H₂S Zones: Encountering hydrogen-sulfide bearing zones is NOT anticipated.

Safety: Sensors and alarms will be placed in the substructure, on the rig floor, above the pits, and at the shakers.

LOGGING, CORING, AND TESTING:

Mud Logs: Mud logging and cuttings sampling from drillout of 9-5/8" casing to TD; total gas chromatograph will be run from drillout of 9-5/8" casing to TD

MWD / LWD: None planned

Open Hole Logs: Triple-Combo log from TD of 8-3/4" hole to surface

Testing: None planned

Coring: None planned

Cased Hole Logs: CBL on 7" casing from PBTD to surface

DRILLING RIG INFORMATION:

Contractor: Mo-Te

Rig No.: Aztec 920

Draw Works: TSM-850, 1,000 hp

Mast: 106', 440,000 lbs

Top Drive: Tesco 250 ton

Prime Movers: 2 CAT C-18

Pumps: 2 - RSF-1300 (3,000 psi)

BOPE 1: Double Gate Ram (11" 3,000 psi)

BOPE 2: Annular Preventer (11" 3,000 psi)

Choke 3" x 5,000 psi

KB-GL (ft): 14

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See attached diagram for details regarding BOPE specifications and configuration.

- 1) Rig will be equipped with upper and lower kelly cocks with handles available.
- 2) Inside BOP and TIW valves will be available to use on all sizes and threads of drill pipe used while drilling the well.
- 2) BOP accumulator will have enough capacity to open the HCR valve, close all rams and annular preventer, and retain minimum of 200 psi above precharge on the closing manifold without the use of closing pumps. The fluid reservoir capacity shall be at least double the usable fluid volume of the accumulator system capacity, and the fluid level shall be maintained at manufacturer's recommendation. There will be two additional sources of power for the closing pumps (electric and air). Sufficient nitrogen bottles will be available and will be recharged when pressure falls below manufacturer's recommended minimum.
- 3) BOP testing shall be conducted (a) when initially installed, (b) whenever any seal is broken or repaired, (c) if the time since the previous test exceeds 30 days. Tests will be conducted using a test plug. BOP ram preventers will be tested to 3,000 psi for 10 minutes, and the annular preventer will be tested to 1,500 psi for 10 minutes. Ram and annular preventers will be tested to 250 psi for 5 minutes. Additionally, BOP and casing strings will be tested to .22 psi/ft (or 1,500 psi minimum) for 30 minutes, prior to drilling out 9-5/8" Rams and hydraulically operated remote choke line valve will be function tested daily at a minimum.
- 4) Remote valve for BOP rams, HCR, and choke shall be placed in a location that is readily available to the driller. The remote BOP valve shall be capable of closing and opening the rams.
- 5) Manual locking devices (hand wheels) shall be intalled on rams. A valve will be installed on the annular preventer's closing line as close as possible to the preventer to act as a locking device. The valve will be maintained in the open position and shall only be closed when there is no power to the accumulator.

FLUIDS AND SOLIDS CONTROL PROGRAM:

Fluid Measurement: Pumps shall be equipped with stroke counters with displays in the dog-house. Slow pump speed shall be recorded daily and after mudding up, at a minimum, on drilling report. A Pit Volume Totalizer will be installed and the readout will be displayed in the dog-house. Gas-detecting equipment will be installed at the shakers, and readouts will be available in the dog-house and the in the geologist's work-station.

Closed-Loop System: A fully, closed-loop system will be utilized. The system will consist of above-ground piping and above-ground storage tanks and bins. The system will not entail any earthen pits, below-grade storage, or drying pads. All equipment will be disassembled and removed from the site when drilling operations cease. The system will be capable of storing all fluids and generated cuttings and of preventing uncontrolled releases of the same. The system will be operated in an efficient manner to allow the recycling and reuse of as much fluid as possible and to minimize the amount of fluids and solids that require disposal.

Fluid Disposal: Fluids that cannot be reused, recycled, or returned to the supplier will be hauled to and disposed of at an approved disposal site (Industrial Ecosystem, Inc. or Envirotech, Inc.).

Solids Disposal: Drilling solids will be stored (until haul-off) on-site in separate containers with no other waste, debris, or garbage products. Waste solids will be hauled to and disposed of at an approved disposal site (Industrial Ecosystem, Inc. or Envirotech, Inc.).

Fluid Program: See "Detailed Drilling Plan" section for specifics.

DETAILED DRILLING PLAN:

SURFACE: Drill vertically to casing setting depth, run casing, install wellhead, cement casing to surface.

0 ft (MD)	to	350 ft (MD)	Hole Section Length:	350 ft
0 ft (TVD)	to	350 ft (TVD)	Casing Required:	350 ft

Note: Surface hole may be drilled, cased, and cemented with a smaller rig in advance of the drilling rig.

Fluid:	Type	MW (ppg)	FL (mL/30 min)	PV (cp)	YP (lb/100 sqft)	pH	Comments
	Fresh Water	8.4	N/C	2 - 8	2 - 12	9.0	Spud mud

Hole Size: ~~12 1/4"~~ → 17 1/2"

Bit / Motor: Mill Tooth or PDC, no motor

MWD / Survey: No MWD, run deviation survey in 100' stations after drilling

Logging: None

Casing Specs:	13.375	Wt (lb/ft) 54.5	Grade	STC Conn.	Collapse (psi)	Burst (psi)	Tens. Body (lbs)	Tens. Conn (lbs)
Specs	9.625	36.0	J-55	LTC	2,020	3,520	564,000	394,000
Loading					153	1,520	110,988	110,988
Min. S.F.					13.21	2.32	5.08	3.55

Assumptions: Collapse: fully evacuated casing with 8.4 ppg equivalent external pressure gradient

Burst: maximum anticipated surface pressure or maximum test pressure with 9.5 ppg fluid inside casing while drilling production hole and 8.4 ppg equivalent external pressure gradient

Tension: buoyed weight in 8.4 ppg fluid with 100,000 lbs over-pull

MU Torque (ft lbs): Minimum: 3,400 Optimum: 4,530 Maximum: 5,660

Casing Details: Guide shoe, float collar, 1 jt casing, float collar, landing collar, casing to surface, API-certified wellhead

Centralizers: 2 centralizers per jt stop-banded 10' from each collar on bottom 3 jts, 1 centralizer per 2 jts to surface

Cement:	Type	Weight (ppg)	Yield (cuft/sk)	Water (gal/sk)	% Excess	Planned TOC (ft MD)	Total Cmt (sx)
	Class G	15.8	1.174	5.15	100%	0	187

Annular Capacity 0.698 cuft/ft (12 1/4" hole x 9 5/8" casing annulus) 17 1/2" Hole x 13 3/8" Casing Annulus

Calculated cement volumes assume gauge hole and the excess noted in table

Halliburton HALCEM surface cementing blend

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JULIA GAVEN OFFICE
AZTEC, NEW MEXICO

PRODUCTION: Drill to TD following directional plan, run casing, cement casing to surface.

350 ft (MD)	to	6,750 ft (MD)	Hole Section Length:	6,400 ft
350 ft (TVD)	to	6,750 ft (TVD)	Casing Required:	6,750 ft

Fluid:	Type	MW (ppg)	FL (mL/30')	PV (cp)	YP (lb/100 ft ²)	pH	Comments
	KCl Fluid	8.8 - 9.5	20	8 - 14	8 - 14	9.0 - 9.5	

Hole Size: 8-3/4"

Bit / Motor: PDC w/mud motor

MWD / Survey: No MWD planned, deviation survey

Logging: Triple Combo OH logs

Procedure: NU BOPE and test (as noted above); pressure test ^{13 3/8" / DMC} 9-5/8" casing to 1,500 psi for 30 minutes.

Drill vertically to TD. After reaching TD, make wiper trip(s) as dictated by hole conditions to condition hole for logs and casing running. TOH. Run OH logs from TD to surface. Run casing as described below. Space out casing as close to TD as possible. Pump cement as detailed below. Note cement volume circulated to surface.

Casing Specs:	Size (in)	Wt (lb/ft)	Grade	Conn.	Collapse (psi)	Burst (psi)	Tens. Body (lbs)	Tens. Conn (lbs)
Specs	7.000	26.0	HCL-80	LTC	7,800	7,240	604,000	570,000
Loading					2,948	4,983	251,975	251,975
Min. S.F.					2.65	1.45	2.40	2.26

Assumptions: Collapse: fully evacuated casing with 8.4 ppg equivalent external pressure gradient in the annulus
 Burst: 4,000 psi maximum surface treating pressure with 11.2 ppg equivalent mud weight sand laden fluid during fracturing operations with 8.4 ppg equivalent external pressure gradient
 Tension: buoyed weight in 8.8 ppg fluid with 100,000 lbs over-pull

MU Torque (ft lbs): Minimum: 3,830 Optimum: 5,110 Maximum: 6,390

Casing Details:

Float shoe, float collar, 2 jt casing, float collar, casing to surface with 1 - 20' marker joint 100' above the Entrada top

Centralizers: 2 centralizers per joint stop-banded 10' from each collar on bottom 3 joints, 1 centralizer per joint to 500' above the Entrada top, 1 centralizer per joint to surface

Cement:	Type	Weight (ppg)	Yield (cuft/sk)	Water (gal/sk)	% Excess	Planned TOC (ft MD)	Total Cmt (sx)
Lead	G:POZ blend	12.3	1.987	10.16	40%	0	380
Tail	G:POZ blend	13.3	1.354	5.94	10%	3,550	391

Annular Capacity

8-1658

cuft/ft

(9-5/8" casing x 7" casing annulus)

(13 3/8" casing x 7" casing annulus)

0.1503

cuft/ft

(8-3/4" hole x 7" casing annulus)

Calculated cement volumes assume gauge hole and the excess noted in table

Halliburton ECONOCEM & EXTENDACEM cementing blend

Approx
0.6001

FINISH WELL: ND BOP, NU WH, RDMO.

Procedure: ND BOP. NU WH. RDMO. Hand well over to Completions.

COMPLETION AND PRODUCTION PLAN:

MINIMUM INHIB (COORDINATE W/ OSE) / DMC

Completion: Pressure test 7" casing. Run CBL to from TD to surface. Perforate Entrada. TIH with packer and break down Entrada perforations. Swab back load water and collect formation water sample. Perform complete water analysis.
 Perforations may be acidized or fracture stimulated to improve inflow.

Production: Well will produce up 3-1/2" production tubing via ESP into water storage facility.

ESTIMATED START DATES:

Drilling: 12/1/2017
 Completion: 12/16/2017
 Production: 12/31/2017

Prepared by: Alec Bridge 5/4/2018

Updated by: Alec Bridge 11/13/2018 -updated hole size, updated 7" casing weight

NMOSE Permit to Explore Underground Water – Conditions of Approval SJ-4301 (POD3)

The New Mexico Office of the State Engineer (NMOSE) has determined that existing water rights will not be permanently impaired by this exploratory activity. This application is approved without publication provided it is not exercised to the detriment of any others having existing rights, and is not contrary to the conservation of water in New Mexico nor detrimental to the public welfare of the state. This application approval (i.e., permit) is further subject to the following conditions of approval.

1. This permit is approved as follows:

Permittee(s): Enduring Resources IV, LLC
Attn: Andrea Felix
332 CR 3100
Aztec, NM 87410

File Number: SJ-4301 POD3

Application File Date: July 11, 2018, as amended

Priority: N/A

Source: Entrada Formation Aquifer associated with the San Juan Underground Water Basin

Point(s) of Diversion: One point of diversion (POD), SJ-4301 POD3, is proposed. The proposed well will be located on land owned by the United States Department of Interior Bureau of Land Management in San Juan County, New Mexico. The well will be located within the SE/4 SW/4 of Section 24, Township 23 North, Range 9 West, NMPM, at the following approximate point location (Long/Lat, WGS84).

POD Number and (Owner's Well Name)	Casing: Diameter (inches) and Depth (feet)		Longitude (deg/min/sec)	Latitude (deg/min/sec)
SJ-4301 POD3 (WLU 2309-24N WSW)	7	6750	107° 44' 27.2080" W	36° 12' 21.4499" N

Purpose of Use: Aquifer Testing and Well Development; related to Notice of Intention process

Place of Use: N/A

Amount of Water: Aquifer testing and Well Development; not to exceed 10 cumulative days in length

2. The temporary appropriation of water authorized by this permit does not establish a water right.
3. Unless approved pursuant to a separate permit or other authorization granted by the State Engineer, water shall only be diverted from the well(s)/boreholes(s) for aquifer testing, well development, and water quality sampling purposes.
4. This permit authorizes the drilling and completion of a well for purposes of temporary diversion of groundwater to conduct aquifer testing, well development, and water sampling needed to determine

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the suitability for future use of the well to appropriate water in accordance with Deep Non-Potable Water statutes at §§ 72-12-25 through -28, NMSA 1978.

5. Pursuant to § 72-8-1 NMSA 1978, the Permittee shall allow the State Engineer and his representative entry upon private property for the performance of their respective duties.
6. The well shall be constructed, maintained, and operated to prevent inter-aquifer exchange of water and to prevent loss of hydraulic head between hydrogeologic zones.
7. Lithologic samples ("drill cuttings") shall be collected during drilling and preserved for submission to the New Mexico Bureau of Geology upon completion of the well. Samples shall be collected and labeled, at a minimum, with well/POD identification information, collection date, and sample depth. Approximate two-ounce samples are required, collected at twenty-foot intervals through drilled depth for this well.
8. The NMOSE must see evidence that SJ-4301 POD3 is in compliance with NMSA 1978, §§ 72-12-25 and 72-12-27 prior to diversion for any purpose other than aquifer testing or well development. Groundwater samples representative of normal aquifer conditions shall be collected for laboratory analyses to determine initial chemistry of the target formation water and statutory non-potable status. At a minimum, laboratory analyses shall include the following: pH, specific conductance, alkalinity, total dissolved solids, and major cations/anions. Analyses shall be conducted by an accredited analytical laboratory, and laboratory analytical results shall be provided to NMOSE along with originals or copies of the full laboratory report. Field measurement of sample pH, temperature, and specific conductance is also required.
9. Groundwater diverted during the authorized aquifer testing and well development may be used by the applicant, if suitable, or it may be stored for later use or disposal. If no use is anticipated, the water may be disposed in accordance with applicable local, state, and federal requirements. Prior to placing any aquifer testing or development water to use or disposing of the water, the permittee shall notify the NMOSE in writing of the specific method of use (or disposal). No notification is required for interim treatment and storage of the water.
10. The well shall be equipped with an NMOSE approved totalizing meter designed to continuously and digitally record the pumping/flow rate. The meter shall be installed before the first branch of the discharge line from the well and the installation shall be acceptable to the NMOSE. No water shall be pumped or allowed to flow from any well not equipped with a functional totalizing meter. Records of the amount of water diverted from the well during the three preceding calendar months shall be submitted in writing to the NMOSE District V office in Aztec on or before the 10th day of January, April, July, and October of each year. The NMOSE District V mailing address is 100 Gossett Drive, Suite A, Aztec, NM 87410. The meter reporting form (WR-26) can be found at the following web address: <http://www.ose.state.nm.us/Meter/index.php>.
11. Water well drilling and well drilling activities, including well plugging, are regulated under NMOSE Regulations 19.27.4 NMAC. These regulations apply, and provide both general and specific direction regarding the drilling of wells in New Mexico. Note that the construction of any well that allows groundwater to flow uncontrolled to the land surface or to move appreciably between hydrogeologic units is prohibited.
12. In accordance with Subsection A of 19.27.4.29 NMAC, on-site supervision of well drilling/plugging by the holder of a New Mexico Well Driller License or a NMOSE-registered Drill Rig Supervisor is

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- required. The New Mexico licensed Well Driller shall ensure that well drilling activities are completed in accordance with 19.27.4.29, 19.27.4.30, 19.27.4.31, and 19.27.4.33 NMAC. While conducting the well drilling activities, the Well Driller shall maintain a copy of the approved permit, conditions, and Artesian Plan of Operations on site and available for inspection upon request.
13. The permittee has submitted an Artesian Plan of Operations concurrently with this permit application. The approved Artesian Plan provides specific approved methods, materials, and drilling approaches that shall be followed by the permittee for the drilling and completion of this well. All rules and regulations pertaining to the drilling, casing and plugging of artesian wells provided for in 19.27.4.29, 19.27.4.31, and 19.27.4.33 NMAC shall be followed.
 14. The pre-installation inspection of well casing set to / into artesian aquifers, witnessing of the annular cementing of well casing set to / into artesian aquifers, and pressure testing of casing set to / into artesian aquifers shall be attended by an authorized representative of the State Engineer. Please contact Bill Enenbach or Shawn Williams at 505-334-4571 (or Doug Rappuhn at 505-383-4018) to coordinate the required inspections, and allow reasonable lead time for NMOSE representatives to schedule staff and arrive at remote locations. Alternatives to onsite witnessing may be utilized at the discretion of the State Engineer.
 15. At the request of the permittee, the NMOSE has granted a variance to Subsection F of 19.27.4.31 NMAC, and authorizes installation of 7-inch OD artesian casing within an 8.75-inch borehole. Installation of casing centralizers is therefore required at every casing coupling (nominal 42-foot intervals).
 16. No variance to Subsection F of 19.27.4.31 NMAC (minimum annular lateral dimension) has been authorized for installation of the surface casing. By December 19, 2018 e-mail, Enduring Resources acknowledged final well design will consist of 13.375-inch OD J-55 steel casing within a 17.5-inch borehole.
 17. Integration of a stage-cementing tool in the well casing may be requested by the applicant upon substantiation of downhole conditions warranting its use. The determination of installation or deployment of stage-cementing tools shall be coordinated with and approved by the NMOSE.
 18. Downhole pressure differentials created by the placement of cement slurries may collapse casing pipe and related tubing in unbalanced wells. NMOSE approval of Artesian Plan of Operations does not imply NMOSE responsibility for the improper balancing of fluids or over-pressurization of casing or tubing during any phase of drilling, testing, or other operations.
 19. Cement bond logging of the proposed 7-inch OD artesian casing is required to verify adequate placement and bonding of the annular cement. Written professional evaluation of bond log results, ascertaining the competency of bonding within the 7.0-inch X 8.75-inch cemented interval, shall be provided to the NMOSE. Any determination of inadequate bonding shall be resolved to the satisfaction of the NMOSE. Actual bond log copy shall be provided to the NMOSE immediately upon completion of bond logging, accompanied by copies of all open-hole geophysical logs not yet tendered for the well.
 20. The State Engineer may require additional comprehensive data filings related to well construction, testing, and sampling to assess applicant assertions the well complies with §§ 72-12-25 through -28, NMSA 1978, and relevant portions of 19.27.4. NMAC. These include, but are not limited to driller daily logs, detailed lithologic descriptions recorded, geophysical logs, cementing reports, water

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chemistry analyses, and test-pumping records. Provision of periodic lithologic log updates and prompt submittal of geophysical logs and cementing reports will be required.

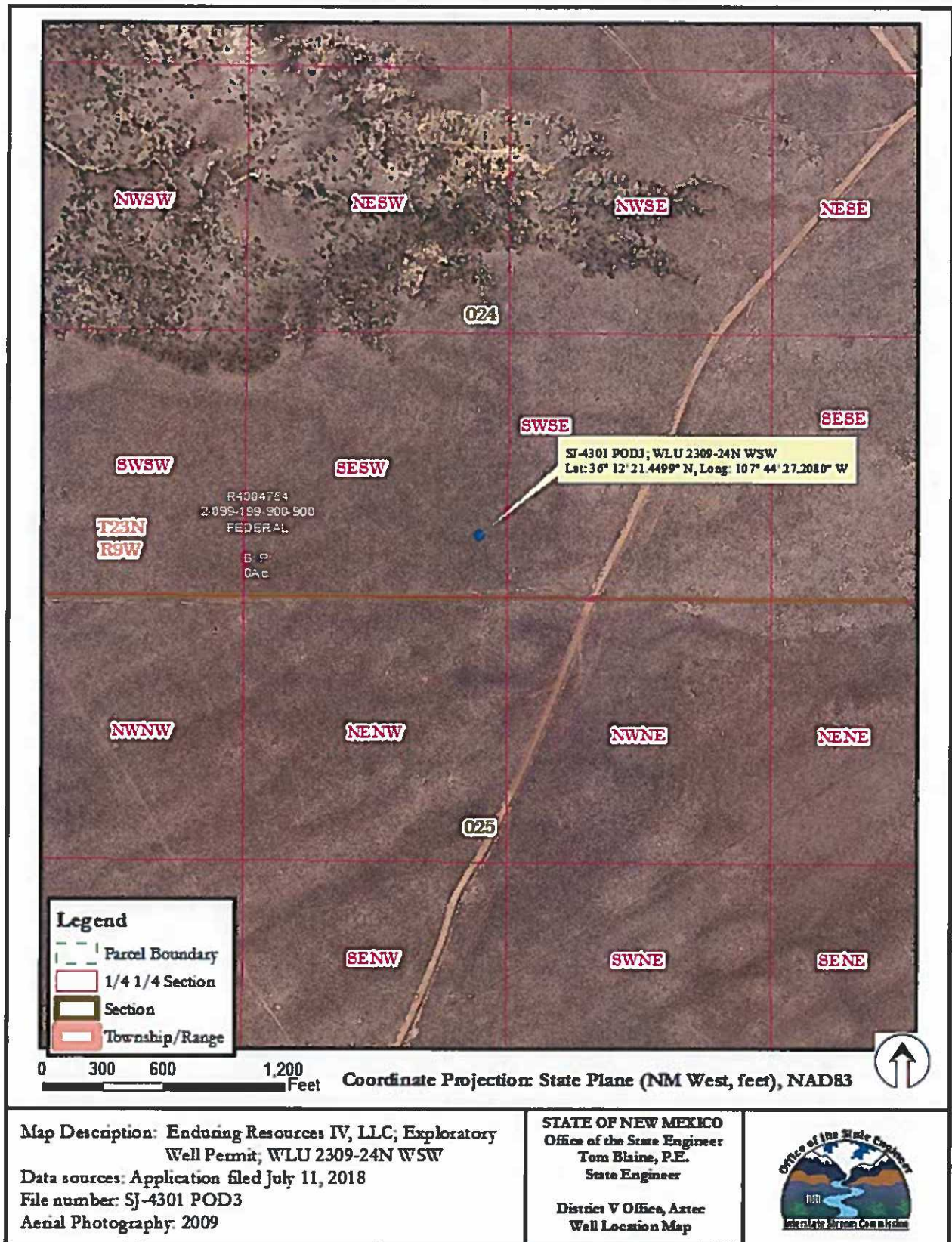
21. If this permit expires and the permittee has not either applied for or obtained a separate permit or authorization to use water from the well, the NMOSE may require the well to either be permanently plugged or capped. In the event a permit or authorization to use water has been applied for before this permit expires and is then denied after this permit would otherwise have expired, the NMOSE may require the well to be permanently plugged or capped.
22. A Well Record shall be filed for the completed well in accordance with Subsection N of 19.27.4.29 NMAC. **Well Records shall be filed with the State Engineer (NMOSE District V, 100 Gossett Drive, Suite A, Aztec, NM, 87410) within 30 days after completion of the well(s).**
23. Should permanent decommissioning of the well be required, plugging shall be performed under the supervision of a New Mexico licensed Well Driller. Due to the existence of artesian conditions, the well shall be plugged pursuant to Subsection K of 19.27.4.31 NMAC. A Well Plugging Plan of Operations shall be submitted, and NMOSE approval obtained, *prior* to the initiation of *any* well plugging activities involving artesian wells.
24. Within 30 days after completion of well plugging, a complete Well Plugging Record shall be filed with the State Engineer in accordance with Subsection K of 19.27.4.31 NMAC. The Well Plugging Record shall be filed with the NMOSE District V Office, 100 Gossett Drive, Suite A, Aztec, NM 87410. The required Well Plugging Record (form WD-11) is available at <http://www.ose.state.nm.us/STST/wdForms.php>
25. Should another regulatory agency sharing jurisdiction of the project have additional requirements than those stated herein, the approval granted herein does not relieve the permittee from any such requirements.
26. Pursuant to 72-12-3 NMSA 1978, the applicant may or may not have provided written documentation with the application, which the applicant claims as confirmation that access has been granted for the aforementioned well(s) to be located on property owned by someone other than the well owner/applicant. NMOSE approval of this permit in no way implies the right of access to land not owned by the well owner/applicant.
27. The State Engineer retains jurisdiction of this permit.
28. **This permit shall automatically expire one year from the date of approval.**

This application to explore groundwater, submitted on July 11, 2018, and as subsequently amended, is hereby approved with the aforesaid conditions applied, when signed by an authorized designee of the State Engineer:

Witness my hand and seal this 21st day of December, A.D. 2018.
Tom Blaine, P.E., State Engineer

By:


Blaine Watson, Manager
Water Rights Division, District V

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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 Rd., Aztec, NM 87410
Phone:(505) 334-6178 Fax:(505) 334-6170
District IV
1220 S. St Francis Dr., Santa Fe, NM 87505
Phone:(505) 476-3470 Fax:(505) 476-3462

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

CONDITIONS

Action 346076

CONDITIONS

Operator: NEW MEXICO ENERGY MINERALS & NATURAL RESOURCE 1220 S St Francis Dr Santa Fe , NM 87504	OGRID: 264235
	Action Number: 346076
	Action Type: [IM-SD] Well File Support Doc (ENG) (IM-AWF)

CONDITIONS

Created By	Condition	Condition Date
pgoetze	None	5/20/2024