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

APPLICATION OF OXY USA INC. FOR APPROVAL OF A PRESSURE MAINTENANCE PROJECT, EDDY COUNTY, NEW MEXICO.

CASE NO. 20194

APPLICATION

OXY USA Inc. ("OXY"), through its undersigned attorneys, hereby files this application with the Oil Conservation Division for an order approving a pressure maintenance project in the Bone Spring formation underlying a project area comprised of the S/2 of Section 27 and the S/2 of Section 28, Township 24 South, Range 29 East, NMPM, Eddy County, New Mexico. In support of its application, OXY states:

1. OXY USA Inc., (OGRID No. 16696) is the operator of the following five horizontal wells drilled and completed in the Second Bone Spring interval of the Pierce Crossing Bone Spring, East Pool (Pool Code 96473) underlying the S/2 of Section 27 and the S/2 of Section 28, Township 24 South, Range 29 East, NMPM, Eddy County, New Mexico:

- The Cedar Canyon 28-27 Federal Com 5H well (30-015-43645) dedicated to the N/2 S/2 of Section 28 and the N/2 S/2 of Section 27;
- The Cedar Canyon 27 Federal 6H well (30-015-43232) dedicated to the N/2 S/2 of Section 27;
- The Cedar Canyon 28 Federal 6H well (30-015-43234) dedicated to the N/2 S/2 of Section 28;
- The Cedar Canyon 27 Federal 7H well (30-015-43233) dedicated to the S/2 S/2 of Section 27; and
- The Cedar Canyon 28 Federal 7H well (30-015-43238) dedicated to the S/2 S/2 of Section 28.

2. OXY seeks approval to inject produced gas, produced water and carbon dioxide into the Second Bone Spring interval through the **Cedar Canyon 27 Federal 6H well** a total vertical depth of approximately 8718 feet to approximately 8778 feet and the **Cedar Canyon 28 Federal 6H well** at a total vertical depth of approximately 8619 feet to approximately 8697 feet along the horizontal portion of these wellbores. Oxy anticipates injection through these wells will provide pressure maintenance support for the offsetting Cedar Canyon 28-27 Federal Com 5H, Cedar Canyon 27 Federal 7H, and the Cedar Canyon 28 Federal 7H wells.

3. Oxy seeks authority to inject produced gas, produced water and carbon dioxide at the following maximum surface injection pressures:

Produced gas:	4,350 psi
Produced water:	1,720 psi
Carbon dioxide:	2300 psi

The source of the produced gas and the produced water will be the Bone Spring and Delaware formations. The source of the carbon dioxide is unknown.

4. Oxy seeks to place the packer in the vertical portion of the production casing which is significantly above the first perforations. Oxy therefore seeks an exception to the 100-foot packer setting depth requirement applied to vertical injection wells.

5. Oxy requests allowance to use unlined tubing in the injection well, which has previously been approved by the Division for a similar injection project. *See* Order R-14322.

6. A copy of the Form C-108 for this injection project is provided with this application as Attachment A.

7. A copy of this Application has been provided to all affected parties as required by Division Rules and notice of the hearing on this application will be provided in a newspaper of general circulation in Eddy County.

8. Approval of this pressure maintenance project will result in the production of substantially more hydrocarbons from the project area than would otherwise be produced, will prevent waste and will not impair correlative rights.

WHEREFORE, OXY USA, Inc. requests that this application be set for hearing before an Examiner of the Oil Conservation Division on January 10, 2019, and, after notice and hearing as required by law, the Division approve this application.

Respectfully submitted,

HOLLAND & HART LLP

By: _____

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ATTORNEYS FOR OXY USA, INC.

Case No.: **Application of OXY USA Inc. for Approval of a Pressure Maintenance Project, Eddy County, New Mexico.** Applicant in the above-styled cause seeks an order approving a pressure maintenance project in the Bone Spring formation (Pierce Crossing, Bone Spring, East Pool (96473)) underlying a project area comprised of the S/2 of Section 27 and the S/2 of Section 28, Township 24 South, Range 29 East, NMPM, Eddy County, New Mexico. Produced gas, produced water and carbon dioxide may be injected into the Second Bone Spring interval through the **Cedar Canyon 27 Federal 6H well** (API No. 30-015-43232) at a total vertical depth of approximately 8718 feet to approximately 8778 feet and the **Cedar Canyon 28 Federal 6H well** (API No. 30-015-43234) at a total vertical depth of approximately 8619 feet to approximately 8697 feet along the horizontal portion of these wellbores. Oxy seeks approval to inject at the following surface injection pressures:

Produced gas:	4,350 psi
Produced water:	1,720 psi
Carbon dioxide:	2300 psi

The source of the produced gas and produced water will be the Bone Spring and Delaware formations. The source of the carbon dioxide is unknown. Oxy also seeks an exception to the packer setting depth for these injection wells and for allowance to use unlined tubing. The proposed project is located approximately ten miles southeast of Loving, New Mexico.

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL
RESOURCES DEPARTMENT

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

FORM C-108
Revised June 10, 2003

APPLICATION FOR AUTHORIZATION TO INJECT

I. PURPOSE: ___ Secondary Recovery X Pressure Maintenance _____ Disposal _____ Storage
Application qualifies for administrative approval? _____ Yes X No

II. OPERATOR: Oxy USA Inc.

ADDRESS: P.O. Box 4294 Houston, TX 77210

CONTACT PARTY: Kelley Montgomery PHONE: 713-366-5716

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: Kelley Montgomery TITLE: Regulatory Mgr.

SIGNATURE: Kelley Montgomery DATE: 11-30-19

E-MAIL ADDRESS: Kelley_Montgomery@oxy.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: _____

DISTRIBUTION: Original and one copy to Santa Fe with one copy to the appropriate District Office

ATTACHMENT – A

C-108 Application
OXY USA Inc.
Cedar Canyon 27 Federal 6H & Cedar Canyon 28 Federal 6H
Eddy County, NM

I. This is a pressure maintenance project.

II. OXY USA Inc.
P.O. Box 4294
Houston, TX 77210
Contact Party: Kelley Montgomery, Oxy (713) 366-5716

III. Injection well data sheets and wellbore schematic diagrams have been attached for the injection wells covered by this application.

IV. This is not an expansion of an existing project.

V. The map with a two-mile radius surrounding the injection wells and a one-half mile radius for area of review is attached.

VI. The tabular format of the area of review is attached.

VII. The proposed operation data sheet is attached.

VIII. Please see attached signed statement on geologic data for the Bone Spring formation.

IX. The proposed Cedar Canon 27 Federal 6H injection well is an existing horizontal producing well that was hydraulically fractured with 1,540,218 gal of slick water, 41,800 gal of 7.5% HCL and 3,757,478 gal of 15# BXL with 10,578,900# of sand.
The proposed Cedar Canyon 28 Federal 6H injection well is an existing horizontal producing well that was hydraulically fractured with 201,239 gal of slick water, 46,737 gal of 5% HCl and 2,408,017 gal of 15# BXL with 5,209,500# sand.

X. Logs were filed for the existing well at the time of drilling.

Well Name	Date Submitted
Cedar Canyon 27 Federal 6H	01/20/2016
Cedar Canyon 28 Federal 6H	12/22/2015

XI. Per our field personnel, no fresh water wells were found within one-mile of these wells.

XII. N/A. These are not disposal wells.

XIII. Attached please find the Proof of Notice.

1/20

Side 1

INJECTION WELL DATA SHEET

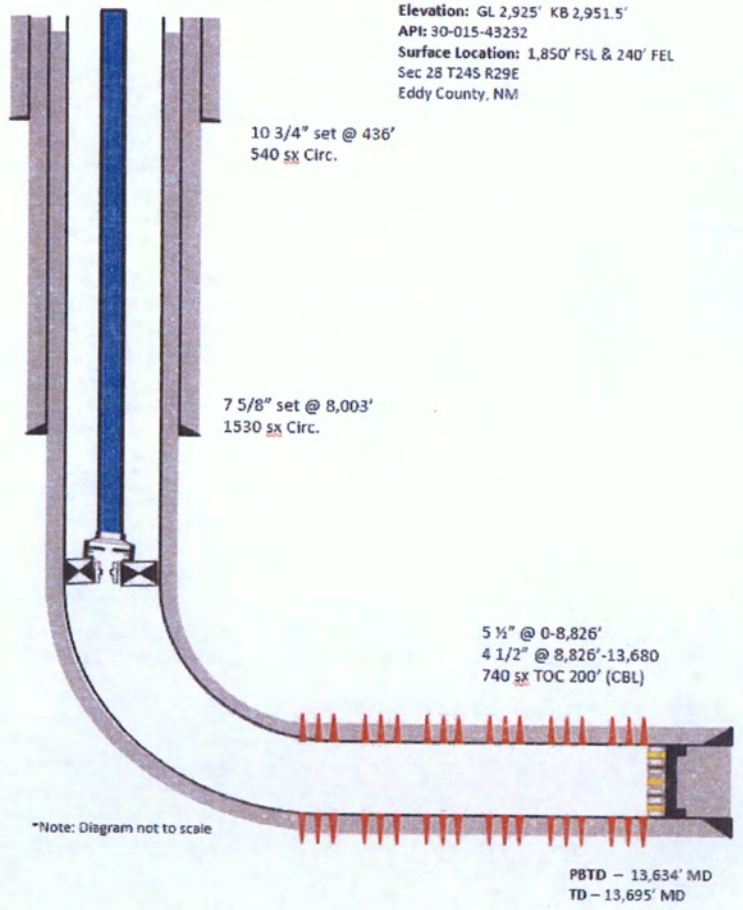
OPERATOR: _OXY USA Inc. _____

WELL NAME & NUMBER: __Cedar Canyon 27 Federal 6H_____

WELL LOCATION: ___ 1850 FSL 240 FEL_____I_____ 28_____24S_____29E__
FOOTAGE LOCATION UNIT LETTER SECTION TOWNSHIP RANGE

WELLBORE SCHEMATIC

Cedar Canyon 27 Federal 6H Proposed Wellbore Diagram



WELL CONSTRUCTION DATA

Surface Casing

Hole Size: ___14 3/4"_____ Casing Size:__10 3/4" _____

Cemented with: __540_____ sx. *or* _____ ft^3

Top of Cement: __Surface_____ Method Determined: _Circulated__

Intermediate Casing

Hole Size: ___9 7/8"_____ Casing Size:__7 5/8"_____

Cemented with: __1530_____ sx. *or* _____ ft^3

Top of Cement: _Surface_____ Method Determined: _Circulated__

Production Casing

Hole Size: __6 3/4"_____ Casing Size:___5 1/2"/4 ½"___

Cemented with: __740_____ sx. *or* _____ ft^3

Top of Cement: _200'_____ Method Determined: _CBL (2015)__

Total Depth: __13695' MD_8778' TVD__

Injection Interval

9257'MD/8718' TVD To 13441'MD/8778' TVD_____

(Perforated)

420

INJECTION WELL DATA SHEET

Tubing Size: 2 7/8" PH6 7.90# L-80 tubing Lining Material: None (will use lined tubing when injecting water)

Type of Packer: 5-1/2" Weatherford 10k AS1X Nickel coated packer

Packer Setting Depth: 8030' (Set packer in vertical section of well)

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

Additional Data

1. Is this a new well drilled for injection? ____Yes ___X___No

   If no, for what purpose was the well originally drilled? Producer-Oil

2. Name of the Injection Formation: Bone Spring

3. Name of Field or Pool (if applicable): Pierce Crossing Bone Spring, East

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_____

5. Give the name and depths of any oil or gas zones underlying or overlying the proposed injection zone in this area: __
   Brushy Canyon Formation (Delaware) (overlying) (5099')

   Wolfcamp Formation (underlying) (9955')

3/20

Side 1

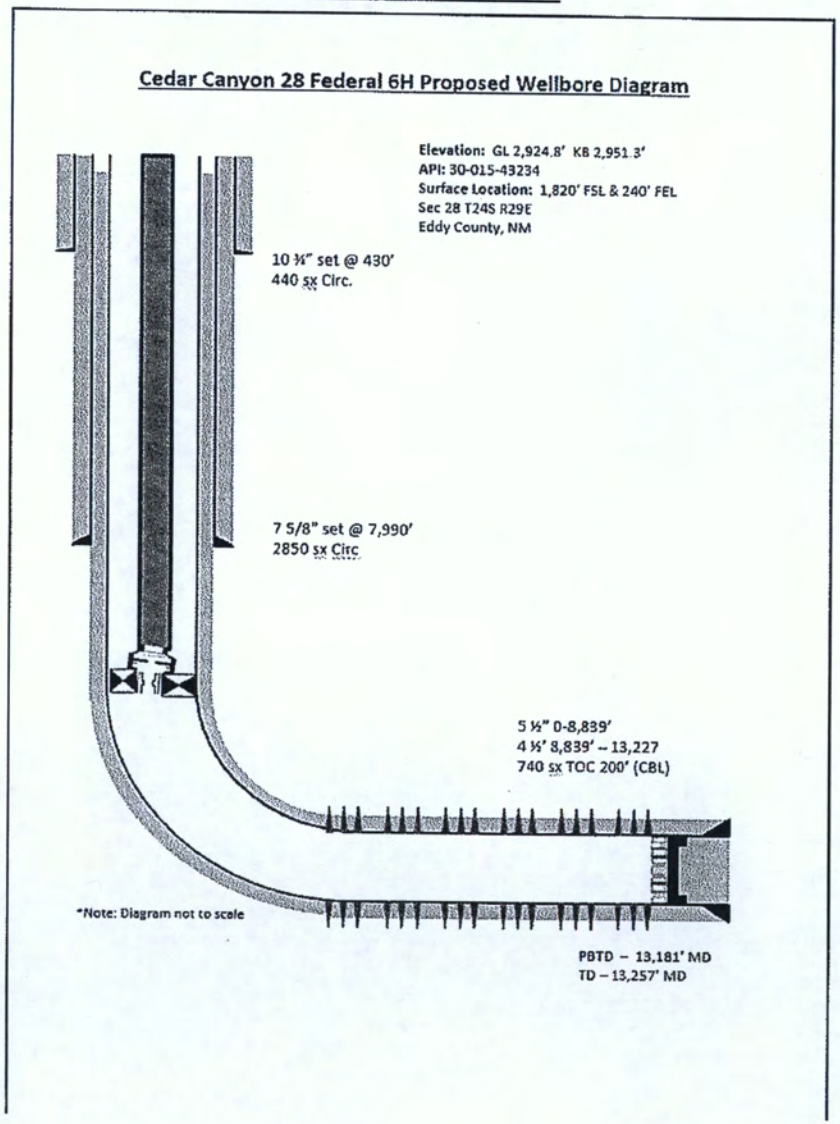
INJECTION WELL DATA SHEET

OPERATOR: _OXY USA Inc. _____

WELL NAME & NUMBER: __Cedar Canyon 28 Federal 6H_____

WELL LOCATION: ___1820 FSL 240 FEL_____I_____28_____24S_____29E__
FOOTAGE LOCATION | UNIT LETTER | SECTION | TOWNSHIP | RANGE

WELLBORE SCHEMATIC



WELL CONSTRUCTION DATA

Surface Casing

Hole Size: ___14 3/4"_____ Casing Size:__10 3/4" _____

Cemented with: __440_____ sx. *or* _____ ft^3

Top of Cement: __Surface_____ Method Determined: _Circulated__

Intermediate Casing

Hole Size: ___9 7/8"_____ Casing Size:__7 5/8"_____

Cemented with: __2850_____ sx. *or* _____ ft^3

Top of Cement: _Surface_____ Method Determined: _Circulated__

Production Casing

Hole Size: __6 3/4"_____ Casing Size:___4 ½"/5 1/2"_____

Cemented with: __740_____ sx. *or* _____ ft^3

Top of Cement: _200'_____ Method Determined: _CBL (2015)__

Total Depth: __13257' MD_8697' TVD__

Injection Interval

____8898'MD/8619' TVD____feet To 13,127'MD/8697' TVD_____

(Perforated)

4120

INJECTION WELL DATA SHEET

Tubing Size: 2 7/8" PH6 7.90# L-80 tubing Lining Material: None (will used lined tubing when injecting water)

Type of Packer: 5-1/2" Weatherford 10K AS1X Nickel coated packer

Packer Setting Depth: 8000' (Set packer in vertical portion of well)

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

Additional Data

1. Is this a new well drilled for injection? _____Yes ___X___No

   If no, for what purpose was the well originally drilled? Producer-Oil

2. Name of the Injection Formation: Bone Spring

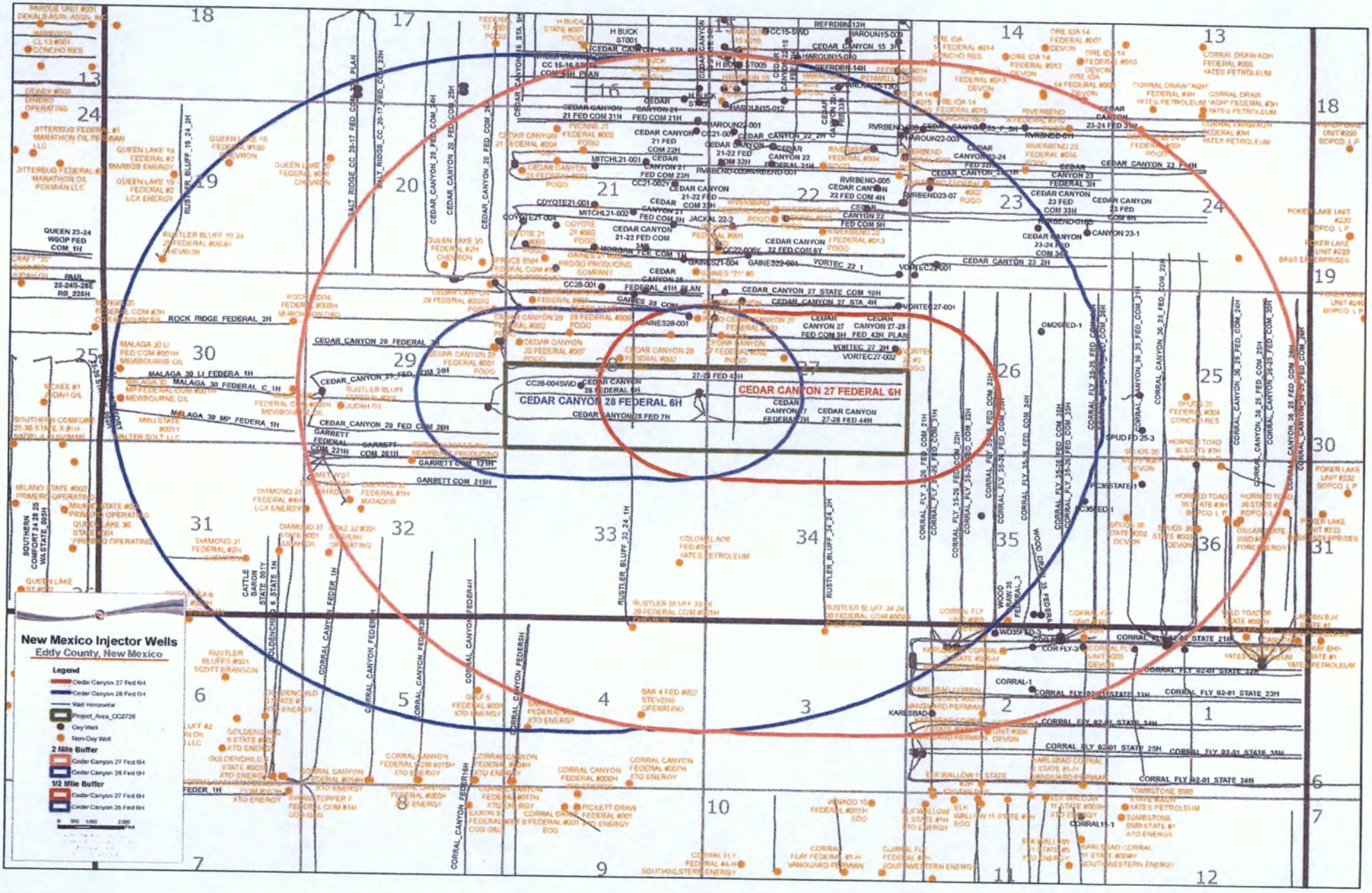
3. Name of Field or Pool (if applicable): Pierce Crossing Bone Spring, East

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_____

5. Give the name and depths of any oil or gas zones underlying or overlying the proposed injection zone in this area: __
   Brushy Canyon Formation (Delaware) (overlying) (5098')

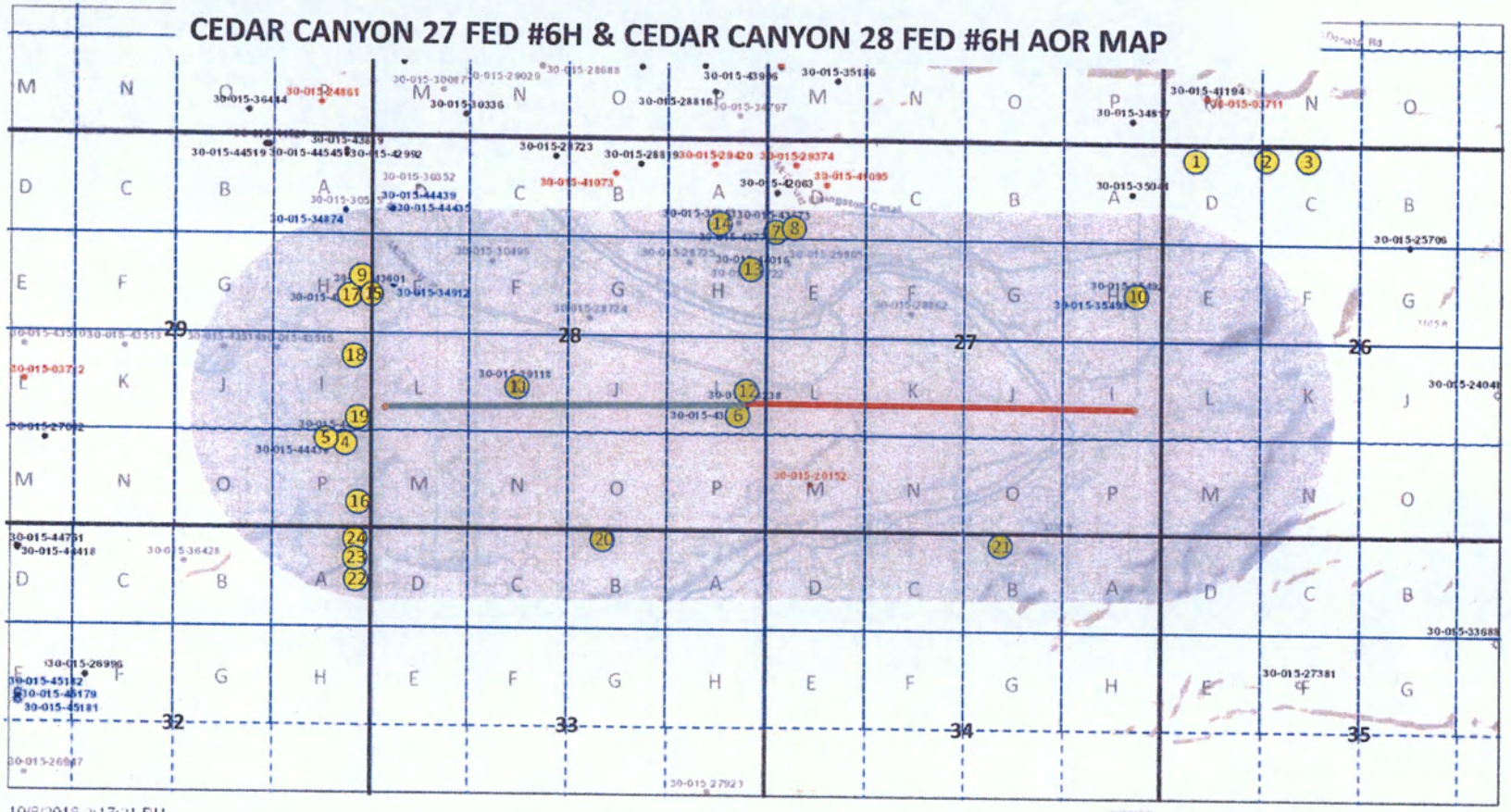
   Wolfcamp Formation (underlying) (9763')

S/2D


CEDAR CANYON 28 FEDERAL 6H
CEDAR CANYON 27 FEDERAL 6H
New Mexico Injector Wells
Eddy County, New Mexico
Legend
Cedar Canyon 27 Fed 6H
Cedar Canyon 28 Fed 6H
Well Horizontal
Project_Area_CC2728
Oxy Well
Non-Oxy Well
2 Mile Buffer
Cedar Canyon 27 Fed 6H
Cedar Canyon 28 Fed 6H
1/2 Mile Buffer
Cedar Canyon 27 Fed 6H
Cedar Canyon 28 Fed 6H

Q12a

CEDAR CANYON 27 FED #6H & CEDAR CANYON 28 FED #6H AOR MAP



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Override 1

Well Locations - Small Scale
- Active
- New
- Plugged
- Cancelled
- Temporarily Abandoned

Well Locations - Large Scale
- Miscellaneous
- CO2 Active
- CO2 Cancelled
- CO2 New
- CO2, Plugged
- CO2, Temporarily Abandoned

- Gas Active
- Gas, Cancelled, Never Drilled
- Gas, New
- Gas, Plugged
- Gas, Temporarily Abandoned
- Injection, Active
- Injection, Cancelled
- Injection, New
- Injection, Plugged
- Injection, Temporarily Abandoned
- Oil, Active
- Oil, Cancelled
- Oil, New
- Oil, Plugged
- Oil, Temporarily Abandoned
- Salt Water Injection, Active
- Salt Water Injection, Cancelled
- Salt Water Injection, New
- Salt Water Injection, Plugged
- Salt Water Injection Temporarily Abandoned
- Water, Active
- Water, Cancelled
- Water, New
- Water, Plugged

½ Mile Area of Review

13 Well ID on AOR Table

Cedar Canyon 27 Fed #6H

Cedar Canyon 28 Fed #6H

New Mexico Oil Conservation Division

NM OCD Oil and Gas Map: http://wwwemnrd.maps.arcgis.com/apps/webappviewer/ New Mexico Oil Conservation Division

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AOR for Injector: Cedar Canyon 27 Federal #6H (API#30-015-43232) and Cedar Canyon 28 Federal #6H (API#30-015-43234)
Top of BS is 6665' TVD in CC 27 Fed 6H and 6653' TVD in CC 28 Fed 6H

WELL ID NUMBER	API NUMBER	OPERATOR	LEASE NAME	WELL NO.	WELL TYPE	STATUS	Surface Location FTG N/S	FTG E/W	UNIT	SEC	TWSP	RNG	DATE DRILLED	TOTAL TVD	TOTAL MD	HOLE SIZE	CSG SIZE	SET AT	SX CMT	CMT TOP	HOW MEASURED	DVT	CURRENT PROD POOL	CURRENT COMPLETION	ADDITIONAL INFORMATION
1	30-015-44702	OXY USA INC.	CORRAL FLY 35 26 FEDERAL COM	21H	OIL	ACTIVE	694' FNL	1248' FWL	D	2	25 S	29 E	07/19/2018	8928'	19584'	14 3/4"	10 3/4"	412'	416	Surf	Circ		PIERCE CROSSING BONE SPRING, EAST	9509' - 19388'	Wellbore goes through AOR
																9 7/8"	7 5/8"	8168'	1885	Surf	Circ	3208'			
																6 3/4"	5 1/2"	19519'	848	7637'	Calc				
2	30-015-44703	OXY USA INC.	CORRAL FLY 35 26 FEDERAL COM	22H	OIL	ACTIVE	694' FNL	1278' FWL	D	2	25 S	29 E	07/19/2018	8930'	19410'	14 3/4"	10 3/4"	382'	836	Surf	Circ		PIERCE CROSSING BONE SPRING, EAST	9373' - 19248'	Wellbore goes through AOR
																9 7/8"	7 5/8"	8302'	1859	Surf	Circ	3216'			
																6 3/4"	5 1/2"	19394'	883	7802'	Calc				
3	30-015-44704	OXY USA INC.	CORRAL FLY 35 26 FEDERAL COM	23H	OIL	ACTIVE	694' FNL	1308' FWL	D	2	25 S	29 E	07/19/2018	8949'	19480'	14 3/4"	10 3/4"	490'	416	Surf	Circ		PIERCE CROSSING BONE SPRING, EAST	9483' - 19338'	Wellbore goes through AOR
																9 7/8"	7 5/8"	8405'	1737	Surf	Circ	3197'			
																6 3/4"	5 1/2"	19470'	850	7803'	Calc				
4	30-015-44437	OXY USA INC.	CEDAR CANYON 27 28 FEDERAL	43H	GAS	ACTIVE	1278' FSL	405' FEL	P	29	24 S	29 E	01/03/2018	10097'	20870'	17 1/2"	13 3/8"	766'	965	Surf	Circ		PURPLE SAGE WOLFCAMP GAS	10265' - 21110'	
																12 1/4"	9 5/8"	9485'	3387	Surf	Circ	2937'			
																8 1/2"	5 1/2"	20257'	2312	8485	Calc				
5	30-015-44436	OXY USA INC.	CEDAR CANYON 27 28 FEDERAL	44H	GAS	ACTIVE	1245' FSL	465' FEL	P	29	24 S	29 E	01/03/2018	10106'	20285'	17 1/2"	13 3/8"	784'	965	Surf	Circ		PURPLE SAGE WOLFCAMP GAS	10303' - 20187'	
																12 1/4"	9 5/8"	9354'	3086	Surf	Circ	2849'			
																8 1/2"	5 1/2"	20275'	2288	8345'	Calc				
6	30-015-43233	OXY USA INC.	CEDAR CANYON 27 FEDERAL	7H	OIL	ACTIVE	1745' FSL	200 FEL	I	28	24 S	28 E	01/13/2016	8769'	13900'	14 3/4"	10 3/4"	438'	640	Surf	Circ		PIERCE CROSSING BONE SPRING, EAST	9483' - 13788'	
																9 7/8"	7 5/8"	7997'	1580	Surf	Circ				
																6 3/4"	5 1/2" X 4 1/2"	13888'	610	5010'	CBL				5 1/2 " crosses over to 4 1/2" csg @
7	30-015-43775	OXY USA INC.	CEDAR CANYON 27 FEDERAL	6H	OIL	ACTIVE	1154' FNL	161' FWL	D	27	24 S	29 E	07/29/2016	8819'	13743'	14 3/4"	10 3/4"	518'	530	Surf	Circ		PIERCE CROSSING BONE SPRING, EAST	9079' - 13563'	
																9 7/8"	7 5/8"	8102'	1500	Surf	Circ				
																6 3/4"	5 1/2" X 4 1/2"	13734'	600	6350'	CBL				5 1/2 " crosses over to 4 1/2" csg @
8	30-015-43673	OXY USA INC.	CEDAR CANYON 27 STATE COM	10H	GAS	ACTIVE	1164' FNL	121' FWL	D	27	24 S	29 E	07/29/2016	10125'	14680'	14 3/4"	10 3/4"	500'	530	Surf	Circ		PURPLE SAGE WOLFCAMP GAS	10136' - 14712'	Only surface location is in AOR. Pilot hole drilled through Bone Spring and plugged with cement.
																9 7/8"	7 5/8"	9032'	1640	Surf	Circ				
																6 3/4"	5 1/2" X 4 1/2"	14870'	590	8000'	CBL				5 1/2 " crosses over to 4 1/2" csg @
9	30-015-43645	OXY USA INC.	CEDAR CANYON 28 27 FEDERAL COM	5H	OIL	ACTIVE	1990' FNL	180' FEL	H	29	24 S	29 E	04/09/2017	8733'	18714'	17 1/2"	13 3/8"	667'	735	Surf	Circ		PIERCE CROSSING BONE SPRING, EAST	9628' - 18462'	
																12 1/4"	9 5/8"	8190'	2620	960'	CBL	2966'			Ran CBL 1st stage TOC=6800', 2nd stage at 960'.
																8 1/2"	5 1/2"	18704'	1790	8055'	Circ				Top of liner @ 8055'.
10	30-015-38492	OXY USA INC.	VORTEC 27	2H	OIL	ACTIVE	2010' FNL	380' FEL	H	27	24 S	29 E	11/06/2007	7300'	11376'	17 1/2"	13 3/8"	550'	500	Surf	Circ		PIERCE CROSSING BONE SPRING, EAST	7981'- 11180'	
																12 1/4"	9 5/8"	2920'	950	Surf	Circ				
																8 1/2" X 7 7/8	5 1/2"	11376'	2250	2400'	CBL				
11	30-015-29118	OXY USA INC.	CEDAR CANYON 28 FEDERAL	4	SWD	ACTIVE	1980' FSL	1980' FWL	K	28	24 S	28 E	09/10/1996	6850'	6850'	14 3/4"	10 3/4"	808'	810	Surf	Circ			3070' - 4216'	Well originally drilled into Bone Spring and plugged back with cement. Recompleted as an SWD well in the Bell Canyon - Cherry
																9 5/8"	7 5/8"	2790'	1525	Surf	Circ				
																6 3/4"	4 1/2"	6850'	685	1050'	CBL		4008'		
12	30-015-43238	OXY USA INC.	CEDAR CANYON 28 FEDERAL	7H	OIL	ACTIVE	1760' FSL	240' FEL	I	28	24 S	28 E	01/13/2016	8597'	13460'	14 3/4"	10 3/4"	435'	440	Surf	Circ		PIERCE CROSSING BONE SPRING, EAST	9001' - 13265'	
																9 7/8"	7 5/8"	6010'	2425	Surf	Circ	3027'			
																6 3/4"	5 1/2" X 4 1/2"	13447'	610	4000'	CBL				5 1/2 " crosses over to 4 1/2" csg @
13	30-015-44016	OXY USA INC.	CEDAR CANYON 28 FEDERAL	8H	OIL	ACTIVE	1990' FNL	120' FEL	H	29	24 S	29 E	04/09/2017	8708'	13839'	14 3/4"	10 3/4"	672'	700	Surf	Circ		PIERCE CROSSING BONE SPRING, EAST	9079' - 13637'	
																9 7/8"	7 5/8"	7980'	2140	Surf	Circ	2955'			
																6 3/4"	4 1/2"	13822'	550	7829'	Calc				
																	6 1/2"	7829'							Top of liner @ 7829'
																									5 1/2" tie back string was run 3/10/2017 from TOL to surf
14	30-015-38393	OXY USA INC.	GAINES 28 COM	1	OIL	ACTIVE	1120' FNL	530' FEL	A	28	24 S	29 E	05/21/2007	10575'	10575'	17 1/2"	13 3/8"	550'	725	Surf	Circ		PIERCE CROSSING BONE SPRING, EAST	8264' - 10400'	
																12 1/4"	9 5/8"	2873'	1050	Surf	Circ				
																8 1/2" X 7 7/8	5 1/2"	10575'	2100	710'	CBL				
15	30-015-43601	OXY USA INC.	CEDAR CANYON 28 FEDERAL	21H	OIL	ACTIVE	1989' FNL	180' FEL	H	29	24 S	29 E	04/09/2017	8527'	13480'	14 3/4"	10 3/4"	665'	610	Surf	Circ		PIERCE CROSSING BONE SPRING	8719' - 13274'	
																9 7/8"	7 5/8"	8096'	2020	Surf	Circ	3044'			
																6 3/4"	4 1/2"	13470'	550	7972'	Calc				
																	5 1/2"	7972'							Top of liner @ 7972'
																									5 1/2" tie back string was run 3/7/2017 from TOL to surf

6/20

WELL ID NUMBER	API NUMBER	OPERATOR	LEASE NAME	WELL NO.	WELL TYPE	STATUS	FTG N/S	FTG E/W	UNIT	SEC	TWSP	RNG	DATE DRILLED	TOTAL TVD	TOTAL MD	HOLE SIZE	CSG SIZE	SET AT	SX CMT	CMT TOP	HOW MEASURED	DTV	CURRENT PROD POOL	CURRENT COMPLETION	ADDITIONAL INFORMATION
16	30-015-44523	OXY USA INC.	CEDAR CANYON 29 FEDERAL	29H	OIL	ACTIVE	1610' FSL	420' FWL	L	29	24 S	29 E	02/09/2018	8630'	13395'	14 3/4"	10 3/4"	616'	680	Surf	Circ		PIERCE CROSSING BONE SPRING	8633' - 13231'	BHL is in AOR
																9 7/8"	7 5/8"	8012'	1663	Surf	Circ	2844'			
																6 3/4"	4 1/2"	13390'	678	7809'	Circ				
																	5 1/2"	7809'							Top of liner @ 7809'
																									5 1/2" tie back string was run 1/16/2018 from TOL to surf
17	30-015-42993	OXY USA INC.	CEDAR CANYON 29 FEDERAL COM	3H	OIL	ACTIVE	1990' FNL	210' FEL	H	29	24 S	29 E	04/09/2017	8563'	13345'	14 3/4"	10 3/4"	670'	700	Surf	Circ		PIERCE CROSSING BONE SPRING	8682' - 13135'	
																9 7/8"	7 5/8"	8088'	1216	Surf	Circ				
																6 3/4"	4 1/2"	13340'	550	7991'	Calc				
																	5 1/2"	7991'							Top of liner @ 7991'
																									5 1/2" tie back string was run 3/9/2017 from TOL to surf
18	30-015-44521	OXY USA INC.	CEDAR CANYON 29 FEDERAL COM	24H	OIL	ACTIVE	1670' FNL	420' FWL	L	29	24 S	29 E	02/09/2018	8600'	13370'	14 3/4"	10 3/4"	484'	526	Surf	Circ		PIERCE CROSSING BONE SPRING	8623' - 13221'	
																9 7/8"	7 5/8"	7936'	1562	Surf	Circ	2844'			
																6 3/4"	4 1/2"	13357'	709	7776'	Circ				
																	5 1/2"	7776'							Top of liner @ 7776'
																									5 1/2" tie back string was run from TOL to surf
19	30-015-44522	OXY USA INC.	CEDAR CANYON 29 FEDERAL COM	26H	OIL	ACTIVE	1640' FSL	420' FWL	L	29	24 S	29 E	02/09/2018	8612'	13320'	14 3/4"	10 3/4"	612'	913	Surf	Circ		PIERCE CROSSING BONE SPRING	8575' - 13170'	
																9 7/8"	7 5/8"	7835'	1605	Surf	Circ	2824'			
																6 3/4"	4 1/2"	13357'	683	7736'	Circ				
																	5 1/2"	7731'							Top of liner @ 7731'
																									5 1/2" tie back string was run from TOL to surf
20	30-015-42670	CHEVRON USA INC	RUSTLER BLUFF 33 24 29 FEDERAL	1H	OIL	ACTIVE	225' FNL	1980' FEL	B	4	25 S	29 E	07/17/2015	8687'	13942'	17 1/2"	13 3/8"	430'	585	Surf	Circ		WILLOW LAKE BONE SPRING SOUTHEAST	9246' - 13858'	BHL is in AOR
																12 1/4"	9 5/8"	2889'	1100	Surf	Circ				
																8 3/4"	5 1/2"	13920'	2045	2670'	CBL				
21	30-015-42671	CHEVRON USA INC	RUSTLER BLUFF 34 24 29 FEDERAL	2H	OIL	ACTIVE	276' FNL	2205' FEL	B	3	25 S	29 E	10/19/2015	8611'	14000'	17 1/2"	13 3/8"	409'	460	Surf	Circ		WILLOW LAKE BONE SPRING SOUTHEAST	9303' - 13717'	BHL is in AOR
																12 1/4"	9 5/8"	2893'	1100	Surf	Circ				
																8 3/4"	5 1/2"	13879'	2455	1900'	CBL				
22	30-015-44751	MATADOR PRODUCTION COMPANY	GARRETT STATE COM	121H	OIL	ACTIVE	310' FNL	570' FWL	D	32	24 S	29 E	07/24/2018	8614'	13311'	17 1/2"	13 3/8"	586'	618	Surf	Circ		WILLOW LAKE BONE SPRING	8691' - 13179'	BHL is in AOR
																12 1/4"	9 5/8"	2900'	861	Surf	Circ				
																8 3/4"	5 1/2"	13311'	2355	Surf	Circ				
23	30-015-44418	MATADOR PRODUCTION COMPANY	GARRETT STATE COM	201H	GAS	ACTIVE	250' FNL	570' FWL	D	32	24 S	29 E	01/21/2018	9949'	14573'	17 1/2"	13 3/8"	605'	857	Surf	Circ		PURPLE SAGE WOLFCAMP GAS	10165' - 14573'	BHL is in AOR
																12 1/4"	9 5/8"	2895'	881	Surf	Circ				
																8 3/4"	7 5/8" X 7"	10163'	796	Surf	Circ				
																6 1/8"	5" X 4 1/2"	14560'	507	9950'	Calc				7 5/8" crosses over to 7" @ 8129'
24	30-015-44256	MATADOR PRODUCTION COMPANY	GARRETT STATE COM	221H	GAS	ACTIVE	220' FNL	570' FWL	D	32	24 S	29 E	01/21/2018	11048'	18758'	17 1/2"	13 3/8"	597'	838	Surf	Circ		PURPLE SAGE WOLFCAMP GAS	11051' - 18611'	6 1/2" crosses over to 4 1/2" @9016' BHL is in AOR
																12 1/4"	9 5/8"	2908'	743	Surf	Circ				
																8 3/4"	7"	10899'	865	Surf	Circ				
																6 1/8"	4 1/2"	18740'	819	9850	Calc				

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Item VII
Proposed Operations

The Cedar Canyon 27 Federal 6H and Cedar Canyon 28 Federal 6H will inject into the 2nd Bone Spring.

Gas Injection

1.

Well Name	Average Daily Rate of Gas to be Injected	Maximum Daily Rate of Gas to be Injected
Cedar Canyon 27 Fed 006H	9000 MCFD	20,000 MCFD
Cedar Canyon 28 Fed 006H	9000 MCFD	20,000 MCFD

2. This will be a closed system
3.

Well Name	Average Injection Pressure	Maximum Injection Pressure
Cedar Canyon 27 Fed 006H	4000 psi	4350 psi
Cedar Canyon 28 Fed 006H	4000 psi	4350 psi

4. The source of the injected gas will be produced gas from the Cedar Canyon Central Delivery Point integration system which is comprised of nearby Delaware, 1st and 2nd Bone Spring wells. Please see the attached gas analysis.
5. N/A

Water Injection

1.

Well Name	Average Daily Rate of Water to be Injected	Maximum Daily Rate of Water to be Injected
Cedar Canyon 27 Fed 006H	5000 BWIPD	10,000 BWIPD
Cedar Canyon 28 Fed 006H	5000 BWIPD	10,000 BWIPD

2. This will be a closed system

3.

Well Name	Average Injection Pressure	Maximum Injection Pressure
Cedar Canyon 27 Fed 006H	1500 psi	1720 psi
Cedar Canyon 28 Fed 006H	1500 psi	1720 psi

4. Water used for injection will be treated produced water from wells drilled in the Bone Springs and Delaware Formations. Water is treated chemically to reduce scale. Please see the attached water compatibility study.
5. N/A

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Item VII
Proposed Operations

CO2 Injection

1.

Well Name	Average Daily Rate of Water to be Injected	Maximum Daily Rate of Water to be Injected
Cedar Canyon 27 Fed 006H	9000 MCFD	20,000 MCFD
Cedar Canyon 28 Fed 006H	9000 MCFD	20,000 BWIPD

2. This will be a closed system

3.

Well Name	Average Injection Pressure	Maximum Injection Pressure
Cedar Canyon 27 Fed 006H	2000 psi	2300 psi
Cedar Canyon 28 Fed 006H	2000 psi	2300 psi

4. Oxy currently does not have a source for CO2 for this project area. However, Oxy would like to have the ability to inject CO2 when a source becomes available.

5. N/A

Calculation for Surface Injection Pressure Limits

For Water Injection:

Calculation for surface pressure limit: 0.2 psi/ft * 8619 ft (shallowest perf of two injectors) = 1723 psi.

Produced Gas and CO2 Injection:

Based on the surface pressure limit for water and assuming a fresh water gradient of 0.433 psi/ft. The bottom hole pressure (BHP) limit is 1723 + 0.433 * 8619 = 5455 psi (or 0.633 psi/ft)

A Petroleum Expert Prosper Model was used to calculate the surface pressure with 2.875" tubing, reservoir depth, injection gas composition and the BHP limit shown above.

*Prosper Model is an industrial standard nodal analysis software for pressure calculation and includes phase behavior change and friction loss.

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Atchafalaya Measurement, Inc.

Injection Gas Sample

416 East Main Street
Artesia, NM 88210 575-746-3481

Sample Information

	Sample Information
Sample Name	OXY__Cedar Canyon 16 State 12H LP__GC1-110117-06
Station Number	14910TD
Lease Name	Cedar Canyon 16 State 12H LP
Analysis for	OXY USA
Producer	OXY USA
Field Name	NM South
County	Eddy
State	NM
Frequency	Spot
Sample Deg F	52
Atmos Deg F	46
Flow Rate	2155.9
LinePSIG	123
Date Sampled	10/31/17
Sampled By	Jacob Marquez
Analysis By	Chris Myers
Report Date	2017-11-01 10:13:39

Component Results

Component Name	Ret. Time	Peak Area	Norm%	PPMV	GPM (Dry) (Gal. / 1000 cu.ft.)
Nitrogen	21.960	8052.1	1.62059	16205.900	0.178
H2S	46.000	0.0	0.00000	0.000	0.000
Methane	22.780	299373.1	77.19299	771929.900	13.058
Carbon Dioxide	26.480	1127.8	0.18594	1859.400	0.032
Ethane	36.800	81412.7	12.57474	125747.400	3.356
Propane	79.140	48829.2	5.73143	57314.300	1.576
i-Butane	28.720	41559.0	0.58209	5820.900	0.190
n-Butane	30.320	97200.6	1.33268	13326.800	0.419
i-Pentane	35.360	20267.2	0.24488	2448.800	0.089
n-Pentane	37.420	20835.3	0.24103	2410.300	0.087
Hexanes Plus	120.000	27727.0	0.29363	2936.300	0.127
Total:			100.00000	1000000.000	19.112

Results Summary

Result	Dry	Sat. (Base)
Total Raw Mole% (Dry)	101.22347	
Pressure Base (psia)	14.650	
Temperature Base	60.0	
Gross Heating Value (BTU / Ideal cu.ft.)	1239.4	1217.7
Gross Heating Value (BTU / Real cu.ft.)	1243.8	1222.5
Relative Density (G), Ideal	0.7239	0.7221
Relative Density (G), Real	0.7261	0.7246
Compressibility (Z) Factor	0.9965	0.9961

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Water Compatibility Analysis

Scale precipitation due to incompatibility of mixing different waters is simulated using ScaleSoftPitzer™ (SSP) developed by Rice University Brine Chemistry Consortium. Compatibility simulations between (a) 1st Bone Spring (BS) formation water and treated produced water (TPW) from Cedar Canyon Water Treatment Facility (CC WTF), (b) 2nd BS formation water and TPW, and (c) 3rd BS formation water and TPW were performed. Table 1 shows the water analysis from the 4 waters.

Table 1. Water analysis from 1st, 2nd and 3rd BS water and TPW from CC WTF

Cations / Anions (mg/L)	1st BS	2nd BS	3rd BS	CC15 SWD Treatment Facility
Na^+	62,308	53,400	38,000	46,315
Mg^{2+}	360	1,320	767	1,399
Ca^{2+}	1,098	9,220	4,970	9,569
Sr^{2+}	267	688	1,030	893
Ba^{2+}	0.84	1.15	3.45	2.6
Fe^{2+}	15.9	40.6	19.1	25.3
Cl^-	90,167	98,451	74,630	97,632
SO_4^{2-}	531	417	236	389
$HCO3^-$	561.2	146.4	109.8	119
TDS	155,309	165,620	119,767	157,193
pH	7	7	6.8	5.3

The various waters are input into SSP at different ratios to calculate scaling index (SI) and potential precipitation (ppt) in pound per thousand barrels (ptb). Bottom hole temperature of 122 F and bottom hole pressures of 5,000 psi were used in the modeling. Results are summarized in Tables 2 to 4.

1st BS + Treated Produced Water:

In general, there is a slight, inherent calcite scaling tendency with the 1st BS water itself. The predicted SI is 0.87 as shown in Table 2. Any scaling index above zero indicates a supersaturation condition of the scale. By mixing TPW with the 1st BS formation it is observed that the scaling index of calcite became slightly higher first at 25% TPW and 75% 1st BS and then becoming smaller as the ratio of TPW increases. However, the maximum, predicted precipitation is less than 50 ptb. Therefore, a slight amount of scale inhibitor is recommended for the injection of the TWP into the 1st BS. The exact amount of scale inhibitor can be determined by lab tests. Both Barite and Celestite are not expected to precipitate at all ratios of mixing.

Table 2. Prediction of Scaling Index (SI) and potential precipitation (PPT) of 3 common oilfield scales by mixing the 1st BS water and TPW at different ratios

	Cypress 33-3H	Calcite		Barite		Celestite	
% treated PW	% 1st BS	SI	ppt (ptb)	SI	ppt (ptb)	SI	ppt (ptb)
100	0	-1.49	0.0	-0.28	0.0	-0.54	0.0
75	25	0.13	4.2	-0.22	0.0	-0.44	0.0
50	50	0.66	29.8	-0.18	0.0	-0.36	0.0
25	75	0.95	49.1	-0.18	0.0	-0.30	0.0
0	100	0.87	41.8	-0.22	0.0	-0.25	0.0

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2nd BS + Treated Produced Water:

In general, there is an inherent calcite scaling tendency with the 2nd BS water itself. The predicted SI is 1.21 and the predicted precipitation is 18.6 ptb as shown in Table 3. By mixing TPW with the 2nd BS formation it is observed that the scaling index of calcite becomes smaller as the ratio of TPW increases. In other words, by injecting TPW we expect a reduction of incompatibility between the two waters. Both Barite and Celestite are not expected to precipitate at all ratios of mixing.

Table 3. Prediction of SI and potential PPT of 3 common oilfield scales by mixing the 2nd BS water and TPW at different ratios

	CC20-25H	Calcite		Barite		Celestite	
% treated PW	% 2nd BS	SI	ppt (ptb)	SI	ppt (ptb)	SI	ppt (ptb)
100	0	-1.49	0.0	-0.28	0.0	-0.54	0.0
75	25	-0.69	0.0	-0.56	0.0	-0.39	0.0
50	50	-0.15	0.0	-0.55	0.0	-0.26	0.0
25	75	0.43	7.7	-0.54	0.0	-0.15	0.0
0	100	1.21	18.6	-0.53	0.0	-0.05	0.0

3rd BS + Treated Produced Water:

In general, there is a slight, inherent calcite scaling tendency with the 3rd BS water itself. The predicted SI is 0.59 and the predicted precipitation is 8.8 ptb as shown in Table 4. By mixing TPW with the 3rd BS formation it is observed that the scaling index of calcite becomes smaller as the ratio of TPW increases. In other words, by injecting TPW we expect a reduction of incompatibility between the two waters. Both Barite and Celestite are not expected to precipitate at all ratios of mixing.

Table 4. Prediction of SI and potential PPT of 3 common oilfield scales by mixing the 3rd BS water and TPW at different ratios

	CC22-15 32H	Calcite		Barite		Celestite	
% treated PW	% 3rd BS	SI	ppt (ptb)	SI	ppt (ptb)	SI	ppt (ptb)
100	0	-1.49	0.0	-0.28	0.0	-0.54	0.0
75	25	-0.88	0.0	-0.56	0.0	-0.39	0.0
50	50	-0.44	0.0	-0.12	0.0	-0.28	0.0
25	75	0.02	0.3	-0.04	0.0	-0.18	0.0
0	100	0.59	8.8	0.05	0.2	-0.08	0.0

Treated Produced Water for Injection

BAKER HUGHES

Permian Basin Area Laboratory
2101 Market Street,
Midland, Texas 79703

Upstream Chemicals

REPORT DATE: 2/8/2017

COMPLETE WATER ANALYSIS REPORT SSP v.2010

CUSTOMER:	OXY USA INCORPORATED	ACCOUNT REP:	LARRY G HINES
DISTRICT:	WATER MANAGEMENT - PERMIAN	SAMPLE ID:	201701004772
AREA/LEASE:	CC	SAMPLE DATE:	2/2/2017
SAMPLE POINT NAME	CC15SWD	ANALYSIS DATE:	2/8/2017
SITE TYPE:	FACILITY	ANALYST:	JK
SAMPLE POINT DESCRIPTION:	NOT PROVIDED		

OXY USA INCORPORATED, CC, CC15SWD

FIELD DATA

Initial Temperature (°F):	
Final Temperature (°F):	
Initial Pressure (psi):	
Final Pressure (psi):	
pH:	
pH at time of sampling:	

ALKALINITY BY TITRATION:	mg/L	meq/L
Bicarbonate (HCO_3^-):	119.4	2.0
Carbonate (CO_3^{2-}):	ND	
Hydroxide (OH^-):	ND	

aqueous CO_2 (ppm):	
aqueous H_2S (ppm):	
aqueous O2 (ppb):	
Calculated TDS (mg/L):	157193
Density/Specific Gravity (g/cm³):	1.1015
Measured Specific Gravity	1.1114
Conductivity (mmhos):	ND
Resistivity:	ND
MCF/D:	No Data
BOPD:	No Data
BWPD:	No Data

ANALYSIS OF SAMPLE

	ANIONS:	mg/L	meq/L
250	Chloride (Cl^-):	97631.8	2754.1
80	Sulfate (SO_4^{2-}):	389.2	8.1
100	Borate (H_3BO_3):	319.4	5.2
15	Fluoride (F^-):	ND	
	Bromide (Br^-):	ND	
	Nitrite (NO_2^-):	ND	
5.3	Nitrate (NO_3^-):	ND	
	Phosphate (PO_4^{3-}):	ND	
	Silica (SiO_2):	ND	

	ORGANIC ACIDS:	mg/L	meq/L
ND	Formic Acid:	ND	
ND	Acetic Acid:	ND	
ND	Propionic Acid:	ND	
	Butyric Acid:	ND	
	Valeric Acid:	ND	

CATIONS:	mg/L	meq/L
Sodium (Na^+):	46314.8	2015.4
Potassium (K^+):	846.2	21.6
Magnesium (Mg^{2+}):	1399.5	115.2
Calcium (Ca^{2+}):	9568.9	477.5
Strontium (Sr^{2+}):	893.0	20.4
Barium (Ba^{2+}):	2.6	0.0
Iron (Fe^{2+}):	25.3	0.9
Manganese (Mn^{2+}):	2.4	0.1
Lead (Pb^{2+}):	0.0	0.0
Zinc (Zn^{2+}):	0.0	0.0
Aluminum (Al^{3+}):	0.0	0.0
Chromium (Cr^{3+}):	ND	
Cobalt (Co^{2+}):	ND	
Copper (Cu^{2+}):	0.0	0.0
Molybdenum (Mo^{2+}):	0.0	0.0
Nickel (Ni^{2+}):	ND	
Tin (Sn^{2+}):	ND	
Titanium (Ti^{2+}):	ND	
Vanadium (V^{2+}):	ND	
Zirconium (Zr^{2+}):	ND	
Total Hardness:	30708	N/A

Anion/Cation Ratio: 1.04

ND = Not Determined

SCALE PREDICTIONS BASED ON FIELD PROVIDED DATA; FUTHER MODELING MAY BE REQUIRED FOR VALIDATION OF SCALE PREDICTION RESULTS.

Conditions		Barite ($BaSO_4$)		Calcite ($CaCO_3$)		Gypsum ($CaSO_4 \cdot 2H_2O$)		Anhydrite ($CaSO_4$)	
Temp	Press.	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)
80°F	15 psi	0.48	1.023	-0.24	0.000	-0.49	0.000	-0.65	0.000
99°F	24 psi	0.35	0.854	-0.19	0.000	-0.48	0.000	-0.56	0.000
118°F	34 psi	0.24	0.650	-0.12	0.000	-0.47	0.000	-0.46	0.000
137°F	43 psi	0.14	0.415	-0.03	0.000	-0.46	0.000	-0.36	0.000
156°F	53 psi	0.04	0.150	0.06	2.244	-0.45	0.000	-0.26	0.000
174°F	62 psi	-0.04	0.000	0.15	5.282	-0.44	0.000	-0.16	0.000
193°F	72 psi	-0.11	0.000	0.24	8.298	-0.43	0.000	-0.05	0.000
212°F	81 psi	-0.18	0.000	0.34	11.016	-0.43	0.000	0.06	23.450
231°F	91 psi	-0.24	0.000	0.43	13.409	-0.42	0.000	0.17	60.325
250°F	100 psi	-0.29	0.000	0.53	15.533	-0.42	0.000	0.27	88.895

Conditions		Celestite ($SrSO_4$)		Halite (NaCl)		Iron Sulfide (FeS)		Iron Carbonate ($FeCO_3$)	
Temp	Press.	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)
80°F	15 psi	0.22	82.616	-1.07	0.000	-10.65	0.000	-1.19	0.000
99°F	24 psi	0.24	86.393	-1.08	0.000	-10.71	0.000	-1.09	0.000
118°F	34 psi	0.25	89.399	-1.09	0.000	-10.69	0.000	-0.96	0.000
137°F	43 psi	0.26	92.391	-1.10	0.000	-10.66	0.000	-0.84	0.000
156°F	53 psi	0.27	95.852	-1.11	0.000	-10.61	0.000	-0.74	0.000
174°F	62 psi	0.28	100.037	-1.11	0.000	-10.55	0.000	-0.65	0.000
193°F	72 psi	0.30	105.016	-1.12	0.000	-10.48	0.000	-0.56	0.000
212°F	81 psi	0.32	110.708	-1.12	0.000	-10.41	0.000	-0.48	0.000
231°F	91 psi	0.34	116.922	-1.12	0.000	-10.34	0.000	-0.42	0.000
250°F	100 psi	0.37	123.390	-1.13	0.000	-10.27	0.000	-0.37	0.000

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered

Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the eight (8) scales.

Note 3: Saturation Index predictions on this sheet use pH and alkalinity; $\%CO_2$ is not included in the calculations.

ScaleSoftPitzer™ SSP2010

Comments: W2C3

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1 of 15.5.
Native Water

NALCO Champion
An Ecolab Company

Water Analysis Report

Attention:ljsandmann@ecolab.com

Location Code: **374553**

Sample ID: **AK17198**

Login Batch: **2018-02-05-001_ACC**

Collection Date: **01/29/2018**

Receive Date: **02/02/2018**

Report Date: **02/07/2018**

Customer: **OXY USA WTP LP**

Region: **Carlsbad NM**

Location: **Cypress 33 Federal Lease**

System: **Production System**

Equipment: **Well 003H**

Lab ID: **ABU-1031**

Sample Point: **Well Head**

Analyses	Result	Unit
Calculated pH	7.00	
Dissolved CO2	270	mg/L
Dissolved H2S	0	mg/L
Gas per Day	169	Mcf/D
Oil per Day	31	B/D
Pressure	500	psi
Temperature	61	° F
Water per Day	37	B/D

Analyses	Result	Unit
Bicarbonate	561.2	mg/L
Conductivity (Calculated)	242645	µS - cm3
Ionic Strength	2.73	
Resistivity	0.041	ohms - m
Specific Gravity	1.110	
Total Dissolved Solids	155309.3	mg/L

Cations	Result	Unit
Iron	15.89	mg/L
Manganese	0.38	mg/L
Barium	0.84	mg/L
Strontium	266.6	mg/L
Calcium	1097.65	mg/L
Magnesium	360.47	mg/L
Sodium	62308.26	mg/L
Potassium	1273.71	mg/L
Boron	13.92	mg/L
Lithium	92.65	mg/L
Copper	0.05	mg/L
Zinc	0.01	mg/L
Lead	0.09	mg/L
Cobalt	0.03	mg/L
Chromium	0.03	mg/L
Silicon	8.07	mg/L
Aluminum	0.05	mg/L
Molybdenum	0.04	mg/L
Phosphorus	0.06	mg/L

Anions	Result	Unit
Bromide	879	mg/L
Chloride	90167	mg/L
Sulfate	531	mg/L

Scaling predictions calculated using Scale Soft Pitzer 2017

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2.3 B.S.
Native Water

NALCO Champion
An Ecolab Company

Water Analysis Report

Attention: Ramon.Artalejo@ecolab.com

Location Code: **395860**

Sample ID: **AL86756**

Login Batch: **2018-10-30-001 GC**

Collection Date: **10/18/2018**

Receive Date: **10/30/2018**

Report Date: **10/31/2018**

Customer: **OXY PERMIAN RES - NEW MEXICO**

Region: **Delaware Basin**

Location: **Cedar Canyon 20 Lease**

System: **Production System**

Equipment: **Cedar Canyon 20-25H**

Lab ID: **ABU-1031**

Sample Point: **Wellhead**

Analyses	Result	Unit
Dissolved CO2	400	mg/L
Dissolved H2S	0.1	mg/L
pH	7.0	
Pressure	160	psi
Temperature	54	° F

Analyses	Result	Unit
Bicarbonate	146.4	mg/L
Conductivity (Calculated)	255694	µS - cm3
Ionic Strength	3.14	
Resistivity	0.039	ohms - m
Specific Gravity	1.119	
Total Dissolved Solids	165620	mg/L

Cations	Result	Unit
Iron	40.6	mg/L
Manganese	0.972	mg/L
Barium	1.15	mg/L
Strontium	688	mg/L
Calcium	9220	mg/L
Magnesium	1320	mg/L
Sodium	53400.00	mg/L
Potassium	890	mg/L
Boron	41.8	mg/L
Lithium	29.3	mg/L
Copper	0.042	mg/L
Zinc	0.171	mg/L
Lead	0.128	mg/L
Cobalt	0.022	mg/L
Chromium	0.014	mg/L
Silicon	6.44	mg/L
Aluminum	Not Detected	mg/L
Molybdenum	0.03	mg/L
Phosphorus	Not Detected	mg/L

Anions	Result	Unit
Bromide	964.15	mg/L
Chloride	98451.27	mg/L
Fluoride	2.4470	mg/L
Sulfate	417.39	mg/L

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3rd B.S.
Native Water

NALCO Champion
An Ecolab Company

Complete Water Analysis Report

Customer: OXY USA WTP LP
Region: Delaware Basin
Location: Cedar Canyon 22 Lease
System: Production System

Equipment: Cedar Canyon 22-15 Fee 32H
Sample Point: Wellhead
Sample ID: AL71401
Acct Rep Email: Ramon.Artalejo@ecolab.com

Collection Date: 10/03/2018
Receive Date: 10/04/2018
Report Date: 10/12/2018
Location Code: 394555

Field Analysis

Bicarbonate	109.8 mg/L	Dissolved CO2	280 mg/L	Dissolved H2S	8.55 mg/L
Pressure Surface	200 psi	Temperature	83 ° F	pH of Water	6.8

Sample Analysis

Calculated Gaseous CO2	0.62 %	Calculated pH	6.80	Conductivity (Calculated)	187104 µS - cm3
Ionic Strength	2.22	Resistivity	0.053 ohms - m	Specific Gravity	1.085
Total Dissolved Solids	119766.6 mg/L				

Cations

Iron	19.1 mg/L	Manganese	0.899 mg/L	Barium	3.45 mg/L
Strontium	1030 mg/L	Calcium	4970 mg/L	Magnesium	767 mg/L
Sodium	38000.00 mg/L	Potassium	664 mg/L	Boron	87.3 mg/L
Lithium	20.6 mg/L	Copper	0.328 mg/L	Nickel	0.042 mg/L
Zinc	0.396 mg/L	Lead	0.144 mg/L	Cobalt	0.021 mg/L
Chromium	0.004 mg/L	Silicon	10.2 mg/L	Aluminum	Not Detected mg/L
Molybdenum	0.012 mg/L	Phosphorus	0.1 mg/L		

Anions

Bromide	575.661 mg/L	Chloride	74630 mg/L	Sulfate	236.327 mg/L

PTB Value

	Barite PTB	Calcite PTB	Celestite PTB	Gypsum PTB	Halite PTB	Iron Carbonate PTB	Iron Sulfide PTB
50°	1.74	7.35	16.12	0.00	0.00	0.00	7.70
75°	1.51	10.25	17.01	0.00	0.00	0.00	7.70
100°	1.19	12.64	23.75	0.00	0.00	0.00	7.83
125°	0.78	14.64	33.70	0.00	0.00	0.00	8.02
150°	0.29	16.35	45.15	0.00	0.00	0.00	8.25
175°	0.00	17.85	56.88	0.00	0.00	1.84	8.48
200°	0.00	19.20	68.07	0.00	0.00	3.48	8.72
225°	0.00	20.42	78.34	0.00	0.00	4.76	8.95
250°	0.00	21.54	87.50	0.00	0.00	5.76	9.17
275°	0.00	22.59	95.55	0.00	0.00	6.51	9.37
300°	0.00	23.55	102.58	0.00	0.00	7.03	9.55
325°	0.00	24.43	108.73	0.00	0.00	7.35	9.70
350°	0.00	25.22	114.10	0.00	0.00	7.46	9.83
375°	0.00	25.92	118.76	0.00	0.00	7.34	9.93
400°	0.00	26.86	122.72	0.00	0.00	7.76	9.89

Saturation Index

	Barite SI	Calcite SI	Celestite SI	Gypsum SI	Halite SI	Iron Carbonate SI	Iron Sulfide SI
50°	0.82	0.31	0.06	-0.91	-1.32	-0.78	1.45
75°	0.58	0.44	0.06	-0.93	-1.34	-0.55	1.39
100°	0.38	0.56	0.08	-0.93	-1.35	-0.35	1.37
125°	0.21	0.67	0.12	-0.92	-1.36	-0.17	1.38
150°	0.07	0.78	0.17	-0.91	-1.37	-0.02	1.40
175°	-0.05	0.89	0.23	-0.92	-1.38	0.12	1.44
200°	-0.14	1.00	0.23	-0.94	-1.38	0.24	1.50
225°	-0.22	1.11	0.34	-0.97	-1.38	0.35	1.55
250°	-0.30	1.22	0.40	-1.01	-1.38	0.43	1.64
275°	-0.36	1.33	0.46	-1.05	-1.37	0.50	1.72
300°	-0.42	1.43	0.52	-1.08	-1.37	0.55	1.80
325°	-0.48	1.53	0.57	-1.08	-1.36	0.58	1.88
350°	-0.55	1.63	0.62	-1.04	-1.35	0.58	1.96
375°	-0.62	1.71	0.68	-0.93	-1.33	0.56	2.03
400°	-0.70	1.86	0.72	-0.73	-1.32	0.60	2.16

Scaling predictions calculated using Scale Soft Pitzer 2017
Scaling predictions dependent on provided field data. Incomplete/partial field data may impact results generated by scaling software.

10/12/2018

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Part VIII- Geologic Information for Cedar Canyon 27 Federal 6H and Cedar Canyon 28 Federal 6H

The Cedar Canyon 27 Federal 6H and the Cedar Canyon Federal 28 6H will be injecting into the 2nd Bone Spring Sandstone of the Bone Spring Formation. The Cedar Canyon 27 Federal 6H has a TVD of approximately 8,778 ft. with a lateral length of approximately 4,963 ft. The Cedar Canyon 28 Federal 6H has a TVD of 8,697 ft. with a lateral length of approximately 4,652 ft. They will be injecting into a reservoir composed of tight siltstone. Core data indicates that the grain sizes range from coarse siltstone to very-fine-grained subarkose (Folk, 1980) sandstone. Samples show evidence of moderate compaction. Minor amounts of illite and smectite clays are found throughout the samples ranging from 5% to 15%. Cements are Fe-calcite, Fe-dolomite, with some quartz overgrowths. Minor amounts of pyrite (<1%) are present. The resulting reservoir rock has porosity of 8-18% with an average porosity of 11.7%. Permeability measured by injection fall-off tests conducted within the reservoir ranges from 0.02 millidarcies to 0.001 millidarcies.

The injection area for these wells are bounded by producing wells in the same reservoir interval that is 360 ft. thick. Low-permeability barriers act as seals above and below the reservoir. These barriers consist of carbonate mudstone and dolomudstone that are 485 ft. thick above and 775 ft. thick below. Laterally the injection will be primarily contained by the reservoir volume that has been previously and partially depleted by the adjacent producing wells. The tight low-permeability reservoir and the production from the adjacent wells will be the primary constraints on the conformance of the injection to the project area and are expected to contain the injected gas.

The top of the Bone Spring Formation is at 6,682 ft. (log depth) with over 2,000 ft. of carbonate mudstones and shales acting as permeability barriers to upward migration of injected gas. Above that the Delaware Mountain Group consists of connate-water bearing and hydrocarbon-bearing sands, with minor limestone and shale intervals and is 3,700 ft. thick. Above that is the Castile Formation consisting of very low permeability anhydrite, gypsum, and calcite that acts as another 1,500 ft. thick barrier to upward movement of fluids. The Salado overlies the Castile and forms a 1,000 ft. thick barrier of salt. The top of the Salado is at 500 ft. and the deep aquifers found just above the Salado at the base of the Rustler are saline water. The top of Rustler Formation is at 370 ft. The Rustler top is a continuous anhydrite layer that acts as another permeability barrier creating a perched aquifer above it that is the lowest level where fresh water is known in the area. Water wells drilled in the area typically have not reached this depth. Because of the thickness of multiple impermeable rock layers above the injection reservoir there is no possible path for migration upward into freshwater aquifers where they exist.

Locate freshwater wells within two miles:
An investigation of existing shallow water wells has not found any freshwater wells within a one-mile radius of these injectors.

I hereby certify that the information presented above is true and correct to the best of my knowledge and belief.

Tony Troutman
Geological Advisor

11/30/2018
Date

19/29

C-108 Injection Application
Item XIII - Proof of Notice
OXY USA Inc.
Cedar Canyon 27 Federal 6H
Cedar Canyon 28 Federal 6H

New Mexico Oil Conservation Division
811 S. First St.
Artesia, NM 88210

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

United State Dept of Interior
Bureau of Land Management
620 E. Greene Street
Carlsbad, NM 88220

State of New Mexico
P.O. Box 1148
Santa Fe, NM 87504

XTO Energy Inc.
810 Houston Street
Ft. Worth, TX 76102

Edward K Gaylord II
P.O. Box 3366
Edmond, OK 73083

COG Operating, LLC
600 W. Illinois Avenue
Midland, TX 75284

Chevron USA Inc.
6301 Deauville
Midland, TX 79706

Kona, Ltd.
1302 West Avenue
Austin, TX 78701

Eleven Sands Exploration, Inc.
P.O. Box 3366
Edmond, OK 73083

Legacy Reserves Operating, LP
303 W. Wall Street, Ste 1800
Midland, TX 79701

MRC Permian Company
5400 LBJ Freeway, Ste 1500
Dallas, TX 75240

WPX Energy Permian LLC
25061 Network Pl
Chicago, Il 60673