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

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

Form C-101
Revised July 18, 2013

NM OIL CONSERVATION
ARTESIA DISTRICT
AUG 30 2018
RECEIVED

☐ AMENDED REPORT

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

1. Operator Name and Address	2. OGRID Number
Lilystream Water Solutions, LLC 1308 West Ave. N Lovington, NM 88260	373500
	3. API Number 30-015-45221

4. Property Code	5. Property Name	6. Well No.
322315 (TBD)	Rose SWD	1

7. Surface Location
(To be verified by field survey)

UL - Lot	Section	Township	Range	Lot Idn	Feet from	N/S Line	Feet From	E/W Line	County
E	14	23S	27E		2019	FNL	617	FWL	EDDY

8. Proposed Bottom Hole Location
(To be verified by field survey)

UL - Lot	Section	Township	Range	Lot Idn	Feet from	N/S Line	Feet From	E/W Line	County
E	14	23S	27E		2019	FNL	617	FWL	EDDY

9. Pool Information

Pool Name	Pool Code
SWD; Devonian-Silurian	97869

Additional Well Information

11. Work Type	12. Well Type	13. Cable/Rotary	14. Lease Type	15. Ground Level Elevation
N	SWD	R	P	3118'
16. Multiple	**17. Proposed Depth**	**18. Formation**	**19. Contractor**	**20. Spud Date**
No	14,500'	Devonian	Silver Oak	11/15/2018

Depth to Ground water	Distance from nearest fresh water well	Distance to nearest surface water
~115' avg	440'	615' (Southern Canal)

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

21. Proposed Casing and Cement Program

Type	Hole Size	Casing Size	Casing Weight/ft	Setting Depth	Sacks of Cement	Estimated TOC
Surface	26.5"	20.0"	94.0 lb/ft	550'	1600	SURFACE
Intermdt	17.5"	13.375"	68.0 lb/ft	2750'	1525	SURFACE
Production	12.25"	9.625"	53.5 lb/ft	9,600'	1800	SURFACE
Liner	8.5	7.625"	39.0 lb/ft	9,300'-13,150'	400	TOL

Casing/Cement Program: Additional Comments

22. Proposed Blowout Prevention Program

Type	Working Pressure	Test Pressure	Manufacturer
Double Hydraulic/Blinds, Pipe	5000	8000	Shaffer, Cameron, Equivalent

23. I hereby certify that the information given above is true and complete to the best of my knowledge and belief. **I further certify that I have complied with 19.15.14.9 (A) NMAC ☐ and/or 19.15.14.9 (B) NMAC ☐, if applicable.** Signature: Ben Stone	OIL CONSERVATION DIVISION
Printed name: Ben Stone	Approved By: Raymond W. Podany
Title: Agent for Lilystream Water Solutions, LLC	Title: Geologist
E-mail Address: ben@sosconsulting.us	Approved Date: 9-10-18 Expiration Date: 9-10-2020
Date: 8/30/2017 Phone: 903-488-9850	Conditions of Approval Attached: APPROVED C-108

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

NM OIL CONSERVATION
ARTESIA DISTRICT
AUG 30 2018
RECEIVED

Form C-102
Revised August 1, 2011
Submit one copy to appropriate District Office
☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

[1] API Number	[2] Pool Code	[3] Pool Name
	97869	SWD; Devonian-Silurian

[4] Property Code	[5] Property Name	[6] Well Number
322315	Rose SWD	1

[7] OGRID No.	[8] Operator Name	[9] Elevation
373500	Lilystream Water Solutions, LLC	3118'

[10] Surface Location

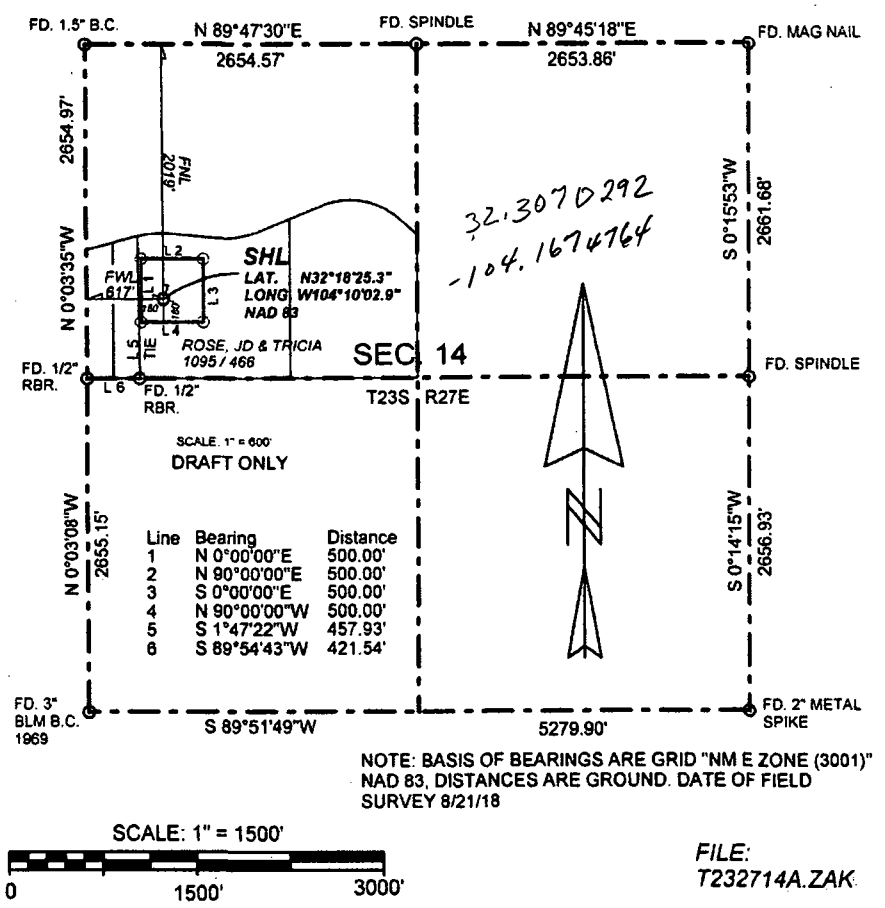
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
E	14	23S	27E		2019'	NORTH	617'	WEST	EDDY

[11] Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County

[12] Dedicated Acres	[13] Joint or Infill	[14] Consolidation Code	[15] Order No.

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



[17] OPERATOR CERTIFICATION

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

Signature — Date: 8/30/2018

Ben Stone
Printed Name

ben@sosconsulting.us
E-mail Address

[18] SURVEYOR CERTIFICATION

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

8/21/18
Date of Survey

Signature and Seal of Professional Surveyor

MATTHEW D. NORMAN
NEW MEXICO
17821
REGISTERED PROFESSIONAL SURVEYOR

17821
Certificate Number

Lilystream Water Solutions, LLC

Rose SWD Well No.1
2019' FNL & 617' FWL
Section 14, Twp 23-S, Rng 27-E
Eddy County, New Mexico

Well Program - New Drill

Objective: Drill new well for commercial salt water disposal into the Devonian and Silurian; mudlogging and e-logging to determine final depths.

1. **Geologic Information** - Devonian Formation

The Devonian and Silurian both consist of carbonates including light colored dolomite and chert intervals interspersed with some tight limestone intervals. Several thick sections of porous dolomite capable of taking water are present within the subject formations in the area. Depth control data was inferred from deep wells to the north, south and east. If the base of Devonian and top of Silurian and/or Ordovician rocks come in as expected the well will only be drilled deep enough for adequate logging rathole.

Estimated Formation Tops:

B/Fresh Water	240'
Salado	400'
Delaware Sand	2440'
Cherry Canyon	3300'
Bone Spring	5950'
Wolfcamp	9200'
Strawn	10800'
Atoka	11000'
Morrow	11850'
Woodford Shale	12550'
Devonian	13150'
Silurian TD	14500'
Ellenburger (est.)	16500'

2. **Drilling Procedure**

a. MIRU drilling rig and associated equipment. Set up H_2S wind direction indicators; brief all personnel on Emergency Evacuation Routes.
b. All contractors conduct safety meeting prior to current task. All equipment inspected daily. Repair / replace as required.
c. Well spud operations commence.
d. Mud logger monitoring returns; cuttings & waste hauled to specified facility. (Sundance, Lea County)
e. After surface casing set/drilled; if H_2S levels >20ppm detected, implement H_2S Plan accordingly. (e.g., cease operations, shut in well, employ H_2S safety trailer & personnel safety devices, install flare line, etc. - refer to plan.)
f. Spills contained & cleaned up immediately. Repair or otherwise correct the situation within 48 hours before resuming operations. Notify OCD within 24 hours. Remediation started ASAP if required. Operator shall comply with 19.15.29 NMAC and 19.15.30 NMAC, as appropriate.
g. Sundry forms filed as needed - casing, cement, etc. - operations continue to completion.

Well Program - New Drill (cont.)

3. **Casing program** - Casing designed as follows:

STRING	HOLE SZ	DEPTH	CSG SZ	COND	WT/GRD	CLLPS/BRS	TNSN
						(Minimum Safety Factors)	
Surface	26.5"	0-550'	20.0"	New	94.0 lb. J/K-55	1.125/1.1	1.8
Intermediate	17.5"	0-2750'	13.375"	New	68.0 lb. K-55	1.125/1.1	1.8
2nd Inter	12.25"	0-9,600'	9.625"	New	53.5 lb. P-110	1.125/1.1	1.8
Prod/ Liner*	8.5"	9,300'-13,150'	7.625"	New	39.0 lb. P-110	1.125/1.1	1.8
Openhole*	6.5" hole	13,150'-14,500'	OH	n/a	n/a	n/a	n/a

Notes:

- ✓ On both Intermediate casing strings, the cement will be designed to circulate to surface. Both strings will have cement bond logs run (radial, CET or equivalent) to surface.
- ✓ While running all casing strings, the pipe will be kept a minimum of 1/3 full at all times to avoid approaching the collapse pressure of casing.
- ✓ Based on mudlogging and e-logs, 7.625" casing shoe is expected to be set at 13,150'. TD may be from 14,200' to 14,500' as determined by logging and suitable porosity has been exposed. IN ANY EVENT, maximum openhole interval would be from 13,150' to 14,500' and sundry notice will document such events and a C-105 completion report filed within 60 days.

4. **Cementing Program:**

Surface – LEAD Slurry: 1,300 sacks of Class C containing 4% gel + 2% CaCl2 + .4 pps defoamer + .125 pps cello flake + 3 pps Koal Seal. Weight 13.7 ppg, yield 1.68 ft3/sack; TAIL Slurry: 300 sacks of Class C Neet containing 2% CaCl2. Weight 14.8 ppg, yield 1.34 ft3/sack; 100% excess, circulate to surface.

1st Intermediate – LEAD Slurry: 1,325 sacks of Class C containing 4% gel + .4 pps defoamer + .125 pps cello flake + 5% NaCl. Weight 13.2 ppg, yield 1.83 ft3/sack; TAIL Slurry: 200 sacks of Class C Neet. Weight 14.8 ppg, yield 1.32 ft3/sack; 50% excess, circulate to surface.

Production – LEAD Slurry: 1,285 sacks of Class H containing 10% gel + .4 pps defoamer + .125 pps cello flake + 1 pps Koal Seal + 5% NaCL. Weight 11.9 ppg, yield 2.473 ft3/sack; TAIL Slurry: 515 sacks of Class H containing 2% retarder + .2 pps defoamer. Weight 15.6 ppg, yield 1.18 ft3/sack; 30% excess, circulate to surface.

Liner – Slurry: 400 sacks of Class H containing .3% retarder + .7% fluid loss additive + .2% dispersant + .4 pps defoamer +.1% Anti-Settling agent. Weight 15.2 ppg, yield 1.32 ft3/sack. 30% excess; TOC calculated @ Top of Liner 9,300'.

5. **Pressure Control** - BOP diagram is attached to this application. All BOP and related equipment shall comply with well control requirements as described NMOCD Rules and Regulations and API RP 53, Section 17. Minimum working pressure of the BOP and related equipment required for the drilling shall be 5000 psi. The NMOCD Artesia district office shall be notified a minimum of 4 hours in advance for a representative to witness BOP pressure tests. The test shall be performed by an independent service

Well Program - New Drill (cont.)

company utilizing a test plug (no cup or J-packer). The results of the test shall be recorded on a calibrated test chart submitted to the OCD district office. Test shall be conducted at:

a. Installation;
b. after equipment or configuration changes;
c. at 30 days from any previous test, and;
d. anytime operations warrant, such as well conditions

6. **Mud Program & Monitoring** - Mud will be balanced for all operations as follows:

DEPTH	MUD TYPE	WEIGHT	FV	PV	YP	FL	Ph
0-550'	FW Spud Mud	8.5-9.2	70-40	20	12	NC	10.0
550'-2750'	Brine Water	9.8-10.2	28-32	NC	NC	NC	10.0
2750'-9,600'	FW/Gel	8.7-9.0	28-32	NC	NC	NC	9.5-10.5
9,600'-13,150'	XCD Brine Mud	11.0-12.5	45-48	20	10	<5	9.5-10.5
13,150'-14,500'	FW Mud	8.4-8.6	28-30	NC	NC	NC	9.5-10.5

Mud and all cuttings monitored w/ cuttings recovered for disposal. Returns shall be visually and electronically monitored. In the event of H_2S, mud shall be adjusted appropriately by weight and H_2S scavengers.

7. **Auxiliary Well Control and Monitoring** – Hydraulic remote BOP operation, mudlogging to monitor returns.

8. **H_2S Safety** - This well and related facilities are not expected to have H_2S releases. However, there may be H_2S in the area. There are no private residences or pubic facilities in the area but a contingency plan has been developed. Lilystream Water Solutions, LLC will have a company representative available to personnel throughout all operations. If H_2S levels greater than 10ppm are detected or suspected, the Lilystream Water Solutions H_2S Contingency Plan will be implemented at the appropriate level.

H2S Safety - There is a low risk of H_2S in this area. The operator will comply with the provisions of NMAC 19.15.11 and BLM Onshore Oil and Gas Order #6.

a) Monitoring - all personnel will wear monitoring devices.

b) Warning Sign - a highly visible H_2S warning sign will be placed for obvious viewing at the vehicular entrance point onto location.

c) Wind Detection - two (2) wind direction socks will be placed on location.

d) Communications - will be via cellular phones and/or radios located within reach of the driller, the rig floor and safety trailer when applicable.

e) Alarms - will be located at the rig floor, circulating pump / reverse unit area and the flareline and will be set for visual (red flashing light) at 15 ppm and visual and audible (115 decibel siren) at 20 ppm.

f) Mud program - If H_2S levels require, proper mud weight, safe drilling practices and H_2S scavengers will minimize potential hazards.

Well Program - New Drill (cont.)

g) Metallurgy - all tublars, pressure control equipment, flowlines, valves, manifolds and related equipment will be rated for H_2S service if required.

The Lilystream Water Solutions H_2S Contingency Plan will be implemented if levels greater than 10ppm H_2S are detected.

9. **Logging, Coring and Testing** – Lilystream Water Solutions, LLC expects to run;

a. Mud logging through the interval will ensure the target interval remains Devonian and Silurian.
b. CBL (Radial, CET or equivalent) on both intermediate casing strings.
c. Standard porosity log suite from TD to approximately 8,000'.
d. No corings or drill tests will be conducted. (The well may potentially be step rate tested in the future if additional injection pressures are required.)

10. **Potential Hazards** - No abnormal pressures or temperatures are expected.

No loss of circulation is expected to occur with the exception of drilling into the target disposal zone. All personnel will be familiar with the safe operation of the equipment being used to drill this well.

The maximum anticipated bottom-hole pressure is 6500 psi and the maximum anticipated bottom-hole temperature is 150° F.

11. **Waste Management** - All drill cuttings and other wastes associated with and drilling operations will be transported to the Lea County Sundance facility (or alternate), permitted by the Environmental Bureau of the New Mexico Oil Conservation Division.

12. **Anticipated Start Date** - Upon approval of all permits for SWD, operations would begin within 30 days. Completion of the well operations will take six to seven weeks. Installation of the tank battery, berms, plumbing and other and associated equipment would be occurring during the same interval. In any event, it is not expected for the construction phase of the project to last more than 60 days, depending on availability of contractors and equipment. At the time of this submittal, and subject to the availability of the drilling contractor, the anticipated start date is:

November 15, 2018.

13. **Configure for Salt Water Disposal** – Subsequent to SWD permit approval from OCD and prior to commencing any work, an NOI sundry(ies) will be submitted to configure the well for SWD and will detail the completion workover including all work otherwise described above, any change to the procedure noted herein and to perform mechanical integrity pressure test per BLM and OCD test procedures. (Notify NMOCD 24 hours prior.) The casing/tubing annulus will be monitored for communication with injection fluid or loss of casing integrity. Anticipated daily maximum volume is 25,000 bpd and average of 15,000 bpd at a maximum surface injection pressure of 2630 psi (0.2 psi/ft to uppermost injection interval, i.e., casing shoe). If satisfactory disposals rates cannot be achieved at default pressure of .2 psi/ft, Lilystream Water Solutions, LLC will conduct a step-rate test and apply for an injection pressure increase 50 psi below parting pressure.

SILVER OAK
DRILLING

RIG #7

New Build - March, 2007

(RIG 10 SIMILAR CONFIGURATION)

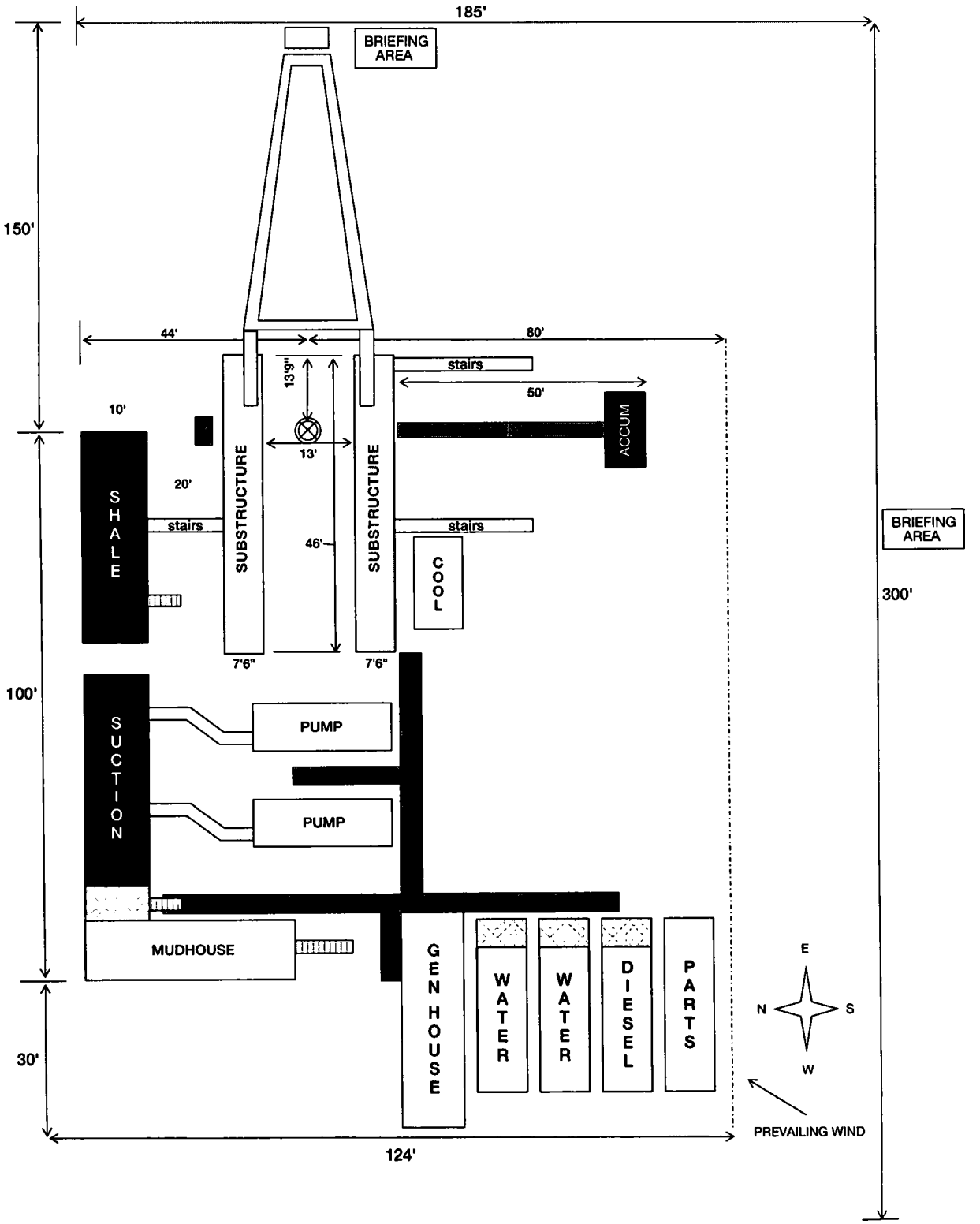
Drawworks	55 National Drawworks Powered by 2 - C18 CAT with Oilworks Torque Converters WPT 324 Water Cooled Air Brake
Approx. Drilling Depth	14,000'
Mud Pumps	(2) F1600 EMSCO Triplex Mud Pumps (Chinese) Powered by 3512 CAT
Mast & Sub	142' United Derrick, 750,000# 46' x 28' x 18' 750,000# Substructure
KB	21'
Block & Hook	Arctic 350 TON Blocks for 1-1/4" Drilling Line
Optional Top Drive	TESCO HXI 250 TON 700 HP
Rotary Table	20-1/2" RC ZP275 Rotary Table (Chinese)
Swivel	Sentry 350 Ton 46' x 5 1/4" Square Kelly
Air Hoist(s)	3 - Ingersoll Rand Air Hoists
BOP	13-5/8" Shaffer LWS, 5000# Double RAM BOP (Chinese) 13-5/8" Shaffer 5000# Annular BOP (Chinese) OCO 6 Station Hydraulic Closing Unit Scarbrough Inc. 5000# 5 Valve Manifold w/2 Chokes
Wireline Machine	Oilworks Hydraulic Wireline Machine
Drilling Recorder	Pason Drilling Recorder and Automatic Driller
Drill Collar	25 - 6-1/2" x 31' Drill Collars 10 - 8" x 30' Drill Collars
Drill Pipe	14,000' - 4-1/2" XH, 16.60# Grade G Drill Pipe
Gen House	2 - 455 KW C-15 CAT, Housed
Mud Pits w/ Shale Shaker	8' x 10' x 40' Steel Pits w/5 Agitators and 2 - 5 x 6 Centrifugal Pumps MI Swaco Mongoose Shale Shaker Optional 3rd Mud Pit - 8' x 10' x 50'
Doghouse	45' Doghouse/Changing Room
Mudhouse	8' x 30' Mudhouse
Toolhouse	8' x 30' Toolhouse
Water Storage	2 - 500 bbl. Water Tanks with 2 - 3 x 4 Centrifugal Pumps and Lubester
Diesel Tank	8000 gal. Diesel Tank w/2 Electric Pumps
Pipe Racks	5 sets - 30' x 42" Triangle Pipe Racks
Catwalks	2 - 30' x 5' x 42" Catwalks
Pusher's House	10' x 40' ATCO Tool Pusher's House

SILVER OAK DRILLING

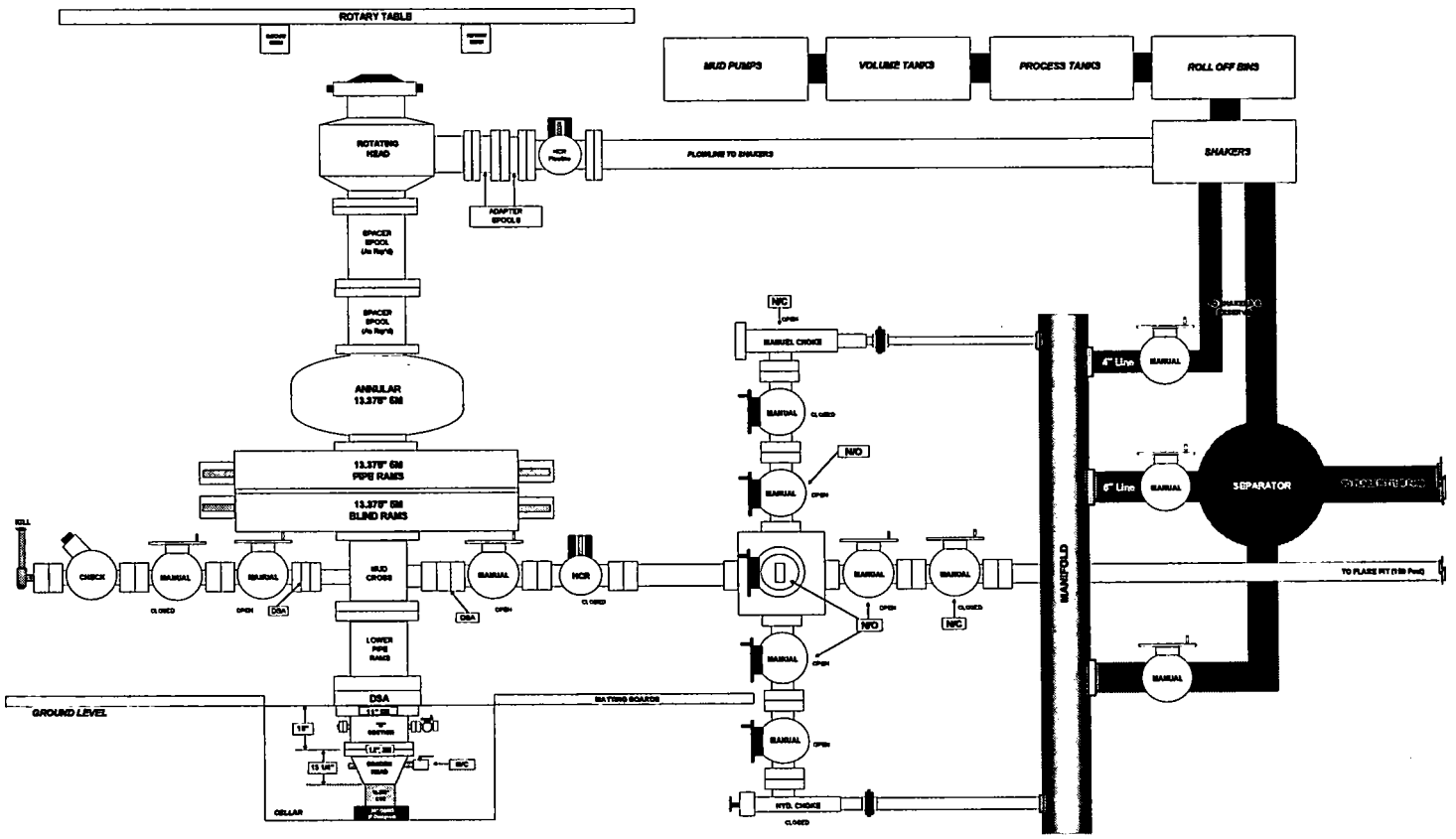
RIG #7
LOCATION LAYOUT

New Build - March, 2007

(RIG 10 SIMILAR CONFIGURATION)



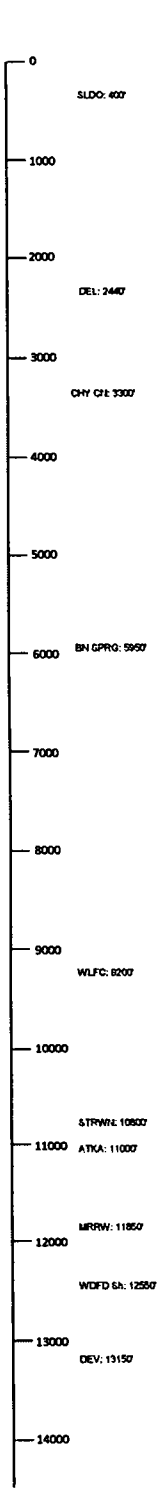
BOPE 5K & Closed-Loop Schematic
(w/ 13.375" Rams)



WELL SCHEMATIC - PROPOSED
Rose SWD Well No.1

API 30-015-xxxxx
2019' FNL & 617' FWL, SEC. 14-T24S-R27E
EDDY COUNTY, NEW MEXICO

SWD; Devonian-Silurian (97869)
Spud Date: 11/15/2018
SWD Config Dt: 12/15/2018



Annulus Monitored or open to atomosphere

Injection Pressure Regulated and Volumes Reported
2630 psi Max. Surface (0.2 psi per foot)

550'

2750'

Annulus Loaded w/ Inert Packer Fluid

TOL @ 9300'
9600'

Split String Tubing Transition ~9340'

13150'

DTD @ ~14,500'

Surface Casing
20.0", 94.0# J-55 Csg. (26.0" Hole) @ 550'
1600 sx - Circulated to Surface

Intermediate Casing
13.375", 68.0# Csg. (17.5" Hole) @ 2750'
1525 sx - Circulated to Surface

Lilystream Water Solutions, LLC

Drill and set casing as designed w/ all strings cemented to surface. Install 7.625" liner @ ~13,150 w/ 400 sx to TOL. Drill 6.5" openhole to approx. 14,500' TD w/ mudlog for interval/ formation verification. Acidize formation; Run 5.5" (5.0" FJ inside liner) injection TBG on PKR set at 13,050'.+ Conduct OCD witnessed MIT. Well ready for injection upon completion of surface facilities.

Production Casing
9.625", 53.5# P-110 Csg. (12.25" Hole) @ 9600'
1800 sx - Staged; Circulate to Surface
(DV @ 6000')

5.5" to liner w/ 5.0" Flush Joint inside liner
IPC Tubing set in PKR ~13,050'
(Within 100' of Uppermost Disposal Interval)

Liner Casing
7.625", 39.0# P-110 Csg (8.5" Hole) 9300' to 13,150'
400 sx Cls H - TOC @ Top of LNR

6.5" Openhole Interval: 13,150' to 14,500' (Maximum)

SOS Consulting, LLC
Drawn by: Ben Stone, 8/30/2018