

# Additional Information

Received July 7, 2023

Ray Westall Operating, Inc.  
**Greenwood Federal SWD #1 - C-108**  
**Action ID: 102781 – C-108 submitted April 2022.**

***Amendment Items Requested by OCD June 2023***  
***Current Status: Application is in queue for admin review.***

A cursory review (per Phillip Goetze) of the applications finds the following:

- No wellbore diagram of the current well.  
*Attached.*
- Issues with the plugback; should be a plug at the top of Wolfcamp and one for the top of Bone Spring.  
*Attached. Proposed Wellbore Diagram revised to show appropriate plugs between zones.*
- The proposed perforations are to go through both the intermediate and production casing. What placement are proposed the perms for around the shoe of the intermediate casing such the shoe is not compromised?  
*Ray Westall Operating will not perforate within 3 feet above or below the casing shoe depth.*
- Need a little more correlation work on the stratigraphic units. Delaware doesn't mean much as this is a DMG –SA transition that represents an unconformity. Could be confining or could be a conduit. So what is the lower confining layer or zone?  
*The proposed pool (SWD; San Andres-Delaware, Pool ID #96125) is an OCD designated pool. See attached log cross-section and additional geologic description. RWO will run annual radioactive tracer/ temperature logs for 5 years to ensure fluid is not migrating or communicating below intended interval. If injectate placement is appropriate for 3 years, tracer logs could be scheduled for every-other or every 3<sup>rd</sup> year.*
- What manufacturer/model/type of packer is to be used in the well.  
*Ray Westall Operating is installing Arrowset 1-XE packers in all its SWDs and injection wells. A diagram is attached.*

## C-108 - Item VIII

### Geological Data - *Amended*

The San Andres offers the best choice for a long-life disposal in this well bore. The San Andres formation consists of limestone and arkosic sands, is up to several hundred feet thick and grades upward and away from the reef into crystalline dolomite. The texture of the dolomites becomes finer on the Northwestern shelf as the proportion of chemically precipitated dolomite increases, and anhydrite becomes present the section, first as small blobs, then as beds (*Jones, 1953*).

The Delaware Mountain Group (DMG) of the Delaware Basin of Texas and New Mexico comprises up to 4,500 ft (1,375 m) of Guadalupian-age arkosic to subarkosic sandstone, siltstone, and detrital limestone that was deposited in deep water, mainly during lowstand and early transgressive sea-level stages. Primary depositional processes include density-current flow and suspension settling. Regionally extensive organic-rich siltstones record largely highstand deposition and provided hydrocarbons to sandstone reservoirs. Authigenic illite and chlorite are present, but there is little detrital clay. The DMG is restricted to the slope and basin, was sourced from shelf-sediment source areas through poorly exposed incised valleys, and generally is not depositionally correlative with siliciclastics on the shelf. Interbedded carbonate units thicken shelfward and are typically correlative to "reef"-margin-complex carbonate sources along the shelf margin (*Nance, 2006*).

*Active [Shugart] Delaware producing wells to the north are miles away from the proposed SWD. Others have been P&A'd or recompleted to [Shugart] Yates, Seven Rivers and Queen formations. To the south, in T19S-R31E, there are only 3 Delaware completed wells. The closest at over 3 miles distance is the Kitty Hawk Federal #1 making less than 1 bopd. The Rainmaker Federal #1, also over 3 miles away is making good oil at around 30 bopd but again, it is quite a distance. With the modest injection rates proposed, Ray Westall Operating does not believe the SWD will impact any offset operations.*

The sands of the Delaware Mountain Group below the San Andres formation indicate porosity on the density log, but experience has shown that these sands have a low permeability and will not accept a lot of water without increased pressure still, the desired upper interval represents a reasonable chance of additional capacity.

*RWO believes there is little risk of upward migration through injection into the lower portion of the San Andres interval. The log cross-section shows low porosity above the requested zone and the last CBL confirms good cement above the interval.*

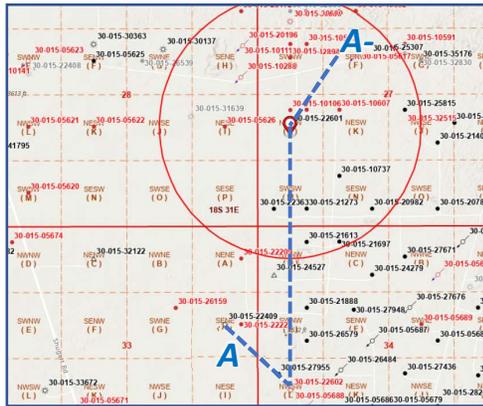
*Understanding there is not a classic sealing strata layers, RWO proposes running annual radioactive tracer/ temperature logs to ensure the injectates are remaining in the intended target interval and are not migrating or communicating downward. If after 3 years of target confirmation by tracer log, RWO would continue the logs at every-other or every third year with approval by NMOCD.*

Overall, the requested interval of 4075 feet to 5206 feet has a good probability of achieving the average desired capacity of 2500 bwpd.

# Ray Westall Operating, Inc. – Greenwood Federal SWD #1

## Log Cross-Section for San Andres/ Delaware Target Interval

Logs from 3 offsetting wells were reviewed and correlated with the subject interval as goal. Based on the correlation, RWO, Inc. is targeting an overall injection interval from approximately 4075 feet to 5206 feet. Specific selectively perforated intervals will be determined upon further log analyses.

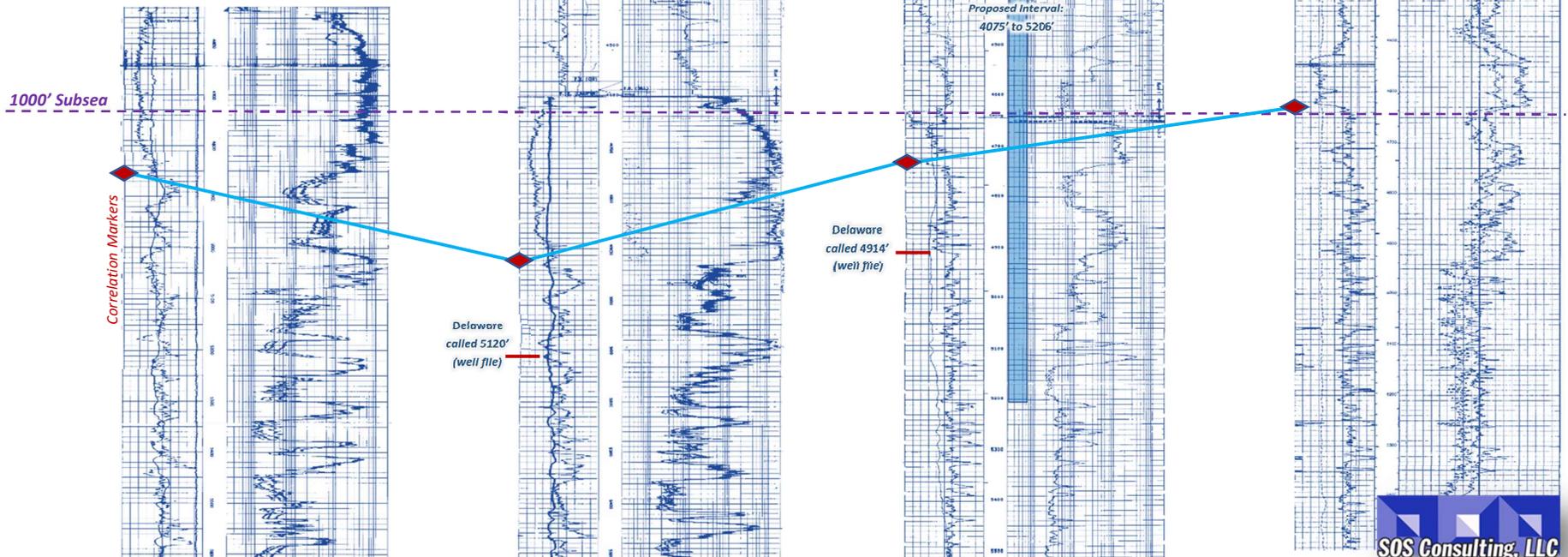


**Greenwood Pre-Grbg Unit #11**  
 30-015-22602  
 GL: 3614'; KB 15.0 feet  
 ~5255' South of Subject Well

**Subject Well**  
 Greenwood Federal SWD #1  
 30-015-22601  
 GL: 3614'; KB 15.0 feet

**Principal Federal #2**  
 30-015-32843  
 GL: 3630'; KB 14.0 feet  
 ~1850' NE of Subject Well

**Keohane Fed Com #1**  
 30-015-22409  
 GL: 3611'; KB 17.0 feet  
 ~4173' S/SW of Subject Well





# WELL SCHEMATIC - CURRENT Greenwood Federal SWD Well No.1

API 30-015-22601

1980' FSL & 660' FWL, SEC. 27-T18S-R31E  
EDDY COUNTY, NEW MEXICO

SWD; Penn-Strawn (Not designated.)

Current Permit: SWD-1664

Spud Date: 12/06/1978  
Config SWD Dt: 3/22/2017

Annulus Monitored  
or open to atmosphere

Injection Pressure Regulated  
and Volumes Reported  
2043 psi Max. Surface (0.2 psi/ft)

**Surface Casing**

13.375", 54.5# Csg. (17.5" Hole) @ 724'  
800 sx - 65 sx Circulated to Surface

**Intermediate Casing**

9.625", 36.0# K-55 Csg. (12.25" Hole) @ 4644'  
1800 sx - 75 sx Circulated to Surface

**RAY WESTALL OPERATING, INC.**

Converted to SWD Feb.-March 2017.  
Spot 25 sx plug & tag @ 10838'. Ran CIT & CBL - TOC  
~2260'. Pressure test plug w/ BLM witness. Perforate well  
10450' to 10769' (310 holes). Acidize w/ 5000 gals. 15% HCl  
w/ ball sealers; flow & swab clean. No HCs.  
Run 2-7/8" PC Tubing and set PKR @ 10370'. Notify BLM &  
OCD Dist 2. to witness MIT & conducted 3/24/2017.

Commence Disposal Operations.

Annulus Loaded  
w/ Inert Packer Fluid

3.5" IC Tubing (or smaller)

PKR ~10370' Note: PKR Set 100' Above Final Uppermost Perf Interval.

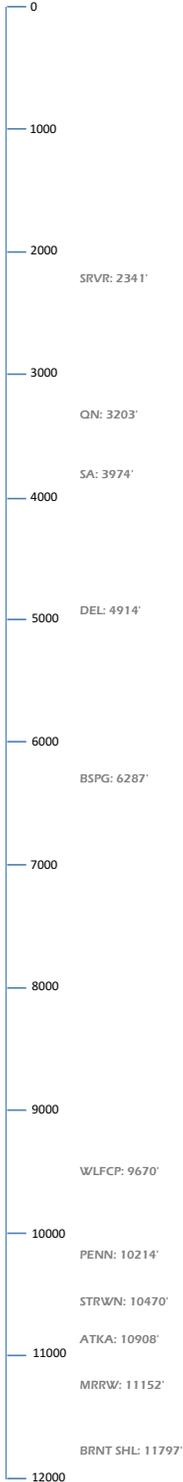
PENN Perfs 10450'-769'

CIBP @ 11,000'  
(Cap w/ 25 sx Cmt. ->  
Tag @ 10838')  
Org. Perfs: 11594'-11762'

**Production Casing**

5.5", 17.0/20.0# N-80 Csg. (7.875" Hole) @ 11,950'  
2300 sx - TOC @ 2260' by CBL 2/22/2017

DTD @ 11950'



**LOG STRIP**



Drawn by: Ben Stone, Rvs'd 7/07/2023





### WELL SCHEMATIC - PROPOSED Greenwood Federal SWD Well No.1

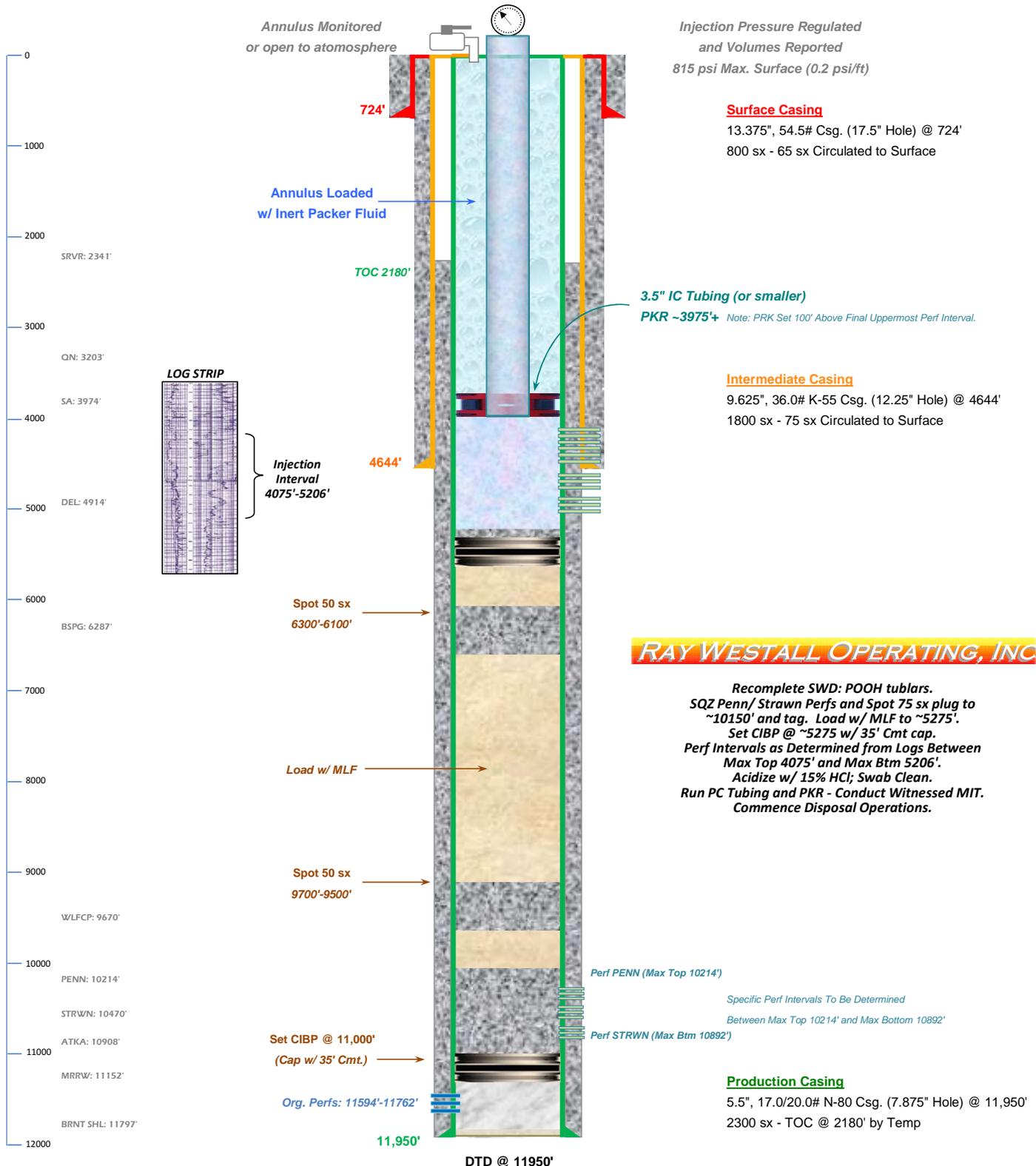
SWD; San Andres-Delaware (PROPOSED)

API 30-015-22601

1980' FSL & 660' FWL, SEC. 27-T18S-R31E  
EDDY COUNTY, NEW MEXICO

Spud Date: 12/06/1978

Config SWD Dt (Est): -6/15/2



**RAY WESTALL OPERATING, INC.**

**Recomplete SWD: POOH tublars.**  
SQZ Penn/ Strawn Perfs and Spot 75 sx plug to ~10150' and tag. Load w/ MLF to ~5275'.  
Set CIBP @ ~5275 w/ 35' Cmt cap.  
Perf Intervals as Determined from Logs Between Max Top 4075' and Max Btm 5206'.  
Acidize w/ 15% HCl; Swab Clean.  
Run PC Tubing and PKR - Conduct Witnessed MIT.  
Commence Disposal Operations.

Drawn by: Ben Stone, Rvs'd 7/07/2023



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

CONDITIONS

Action 251356

**CONDITIONS**

Operator: RAY WESTALL OPERATING, INC. P.O. Box 4 Loco Hills, NM 88255	OGRID: 119305
	Action Number: 251356
	Action Type: [IM-SD] Admin Order Support Doc (ENG) (IM-AAO)

**CONDITIONS**

Created By	Condition	Condition Date
pgoetze	None	8/12/2023