Submit 1 Copy To Appropriate District Office
District I – (575) 393-6161
1625 N. French Dr., Hobbs, NM 88240
District II – (575) 748-1283
811 S. First St., Artesia, NM 88210
District III – (505) 334-6178
1000 Rio Brazos Rd., Aztec, NM 87410
District IV – (505) 476-3460
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals and Natural Resources

OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-103
Revised July 18, 2013

WELL API NO. **30-015-44406**

5. Indicate Type of Lease STATE ☐ FEE ☒

6. State Oil & Gas Lease No. **319421**

SUNDRY NOTICES AND REPORTS ON WELLS
(DO NOT USE THIS FORM FOR PROPOSALS TO DRILL OR TO DEEPEN OR PLUG BACK TO A DIFFERENT RESERVOIR. USE "APPLICATION FOR PERMIT" (FORM C-101) FOR SUCH PROPOSALS.)

7. Lease Name or Unit Agreement Name **STRIKER 1 SWD**

1. Type of Well: Oil Well ☐ Gas Well ☐ Other **Saltwater Disposal**

8. Well Number **001**

2. Name of Operator **NGL WATER SOLUTIONS PERMIAN, LLC**

9. OGRID Number **372338**

3. Address of Operator **865 N. ALBION ST. STE 400 DENVER, CO 80220**

10. Pool name or Wildcat

4. Well Location
Unit Letter **B** : **1015** feet from the **N** line and **1395** feet from the **E** line
Section **15** Township **23S** Range **28E** NMPM **6th** County **EDDY**

11. Elevation *(Show whether DR, RKB, RT, GR, etc.)*

12. Check Appropriate Box to Indicate Nature of Notice, Report or Other Data

| NOTICE OF INTENTION TO: | | | | SUBSEQUENT REPORT OF: | | | |
|---|---|---|---|---|---|---|---|
| PERFORM REMEDIAL WORK | ☐ | PLUG AND ABANDON | ☐ | REMEDIAL WORK | ☐ | ALTERING CASING | ☐ |
| TEMPORARILY ABANDON | ☐ | CHANGE PLANS | ☐ | COMMENCE DRILLING OPNS. | ☐ | P AND A | ☐ |
| PULL OR ALTER CASING | ☐ | MULTIPLE COMPL | ☐ | CASING/CEMENT JOB | ☐ | | |
| DOWNHOLE COMMINGLE | ☐ | | | | | | |
| CLOSED-LOOP SYSTEM | ☐ | | | | | | |
| OTHER: | ☒ | | | OTHER: | ☐ | | |

13. Describe proposed or completed operations. (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work). SEE RULE 19.15.7.14 NMAC. For Multiple Completions: Attach wellbore diagram of proposed completion or recompletion.

**The Solar Produced Water Desalination Pilot Demonstration seeks to recover approximately 50% of clean water from a flow of 2 gpm of produced water using solar-generated steam as the energy input to a hybrid (membrane plus evaporator) system to separate the clean water from the brine. No water will be discharged; instead, the clean water and concentrated wastewater streams will be recombined and returned to the SWD well for disposal. This process receives a waste stream that is unique to the exploration and production of oil and gas, causes some separation of that stream, and then recombines the two streams prior to disposal. The process and resulting waste stream is and remains uniquely associated with the exploration and production of oil and gas and does not introduce any new waste streams.**

**Operation is expected to start on 9/01/2023 and be completed after twelve months. Two phases of testing are anticipated: a first phase lasting approximately six months that includes a chemical pre-treatment train, and a second phase that bypasses the pre-treatment and includes only the addition of anti-scalant. A sample of clean water (distillate) will be taken on approximately a monthly basis for chemical and Whole Effluent Toxicity analysis by the NMPWRC. The purpose of either the pre-treatment train or anti-scalant addition is to reduce the scaling of the membrane that would inhibit separation of clean water from the brine.**

Spud Date: 12/25/2018 Rig Release Date: 02/23/2019

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

SIGNATURE _____ TITLE **REGULATORY DIRECTOR** DATE **2.20.2023**

Type or print name **JOSEPH VARGO** E-mail address: **JOSEPH.VARGO@NGLEP.COM** PHONE: **303-815-1010**

**For State Use Only**

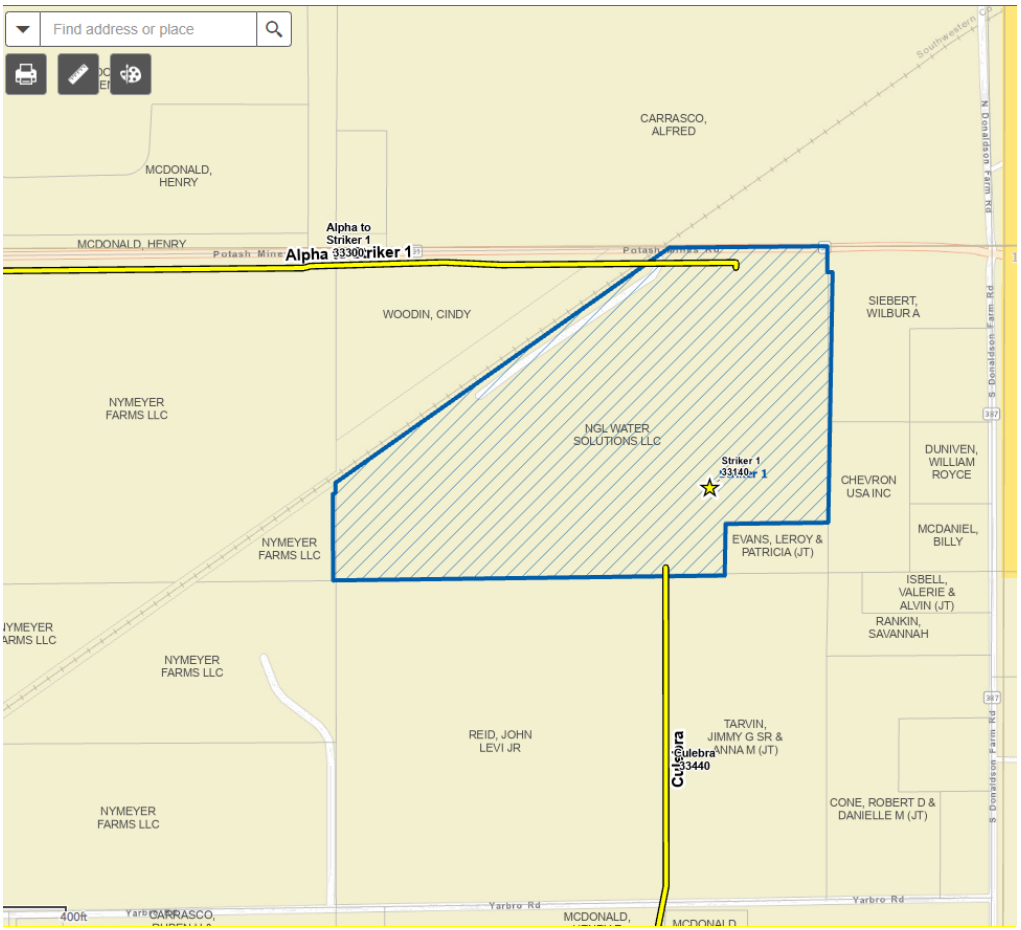
APPROVED BY: _____ TITLE UIC Manager DATE 02/21/2023
Conditions of Approval (if any):

# INFORMATION SHARING PLAN

1. Name of Company (the "Applicant"): Sunvapor, Inc.
2. Address: 145 N Sierra Madre Blvd, Suite 3, Pasadena, CA 91107
3. Contact person and information: Philip Gleckman, email: philip.gleckman@sunvapor.net, Telephone: (650) 625-7818
4. Type of Project: Solar Produced Water Desalination Pilot Demonstration
5. The Applicant affirms that the project will be conducted as a closed loop system
6. Basin of origin of produced water to be used: Permian Basin
7. Project: The technology testing takes place adjacent to a Salt Water Disposal Well which serves oil and gas produced water
8. The proposed use of the treated produced water is for analysis only, to provide information to support the NMPWRC's efforts to evaluate the potential for future re-use outside of the oil and gas field.
9. The funding will be provided by the Department of Energy's Solar Desalination Prize, if awarded.
10. Company description: Founded in 2014, Sunvapor is a leading solar process heat company that has developed solar steam, energy storage, and desalination technologies with several awards from the US Department of Energy. Based in Pasadena, CA, Sunvapor designed, built, and operates the country's only operating solar boiler for industrial process heat. Sunvapor has won the first two phases of the prestigious Solar Desalination Prize from the US Department of Energy for its patented hybrid membrane process. Website: http://www.sunvapor.net/
11. Executive Summary: The planned pilot demonstration represents the final phase of the US Department of Energy's Solar Desalination Prize and is intended to provide data on the performance of the patented hybrid solar desalination system when applied to produced water. The equipment to be installed includes a solar thermal heat collection and steam generation system engineered by Sunvapor, a pre-treatment train to condition the raw produced water for use in the hybrid desalination system proven in the laboratory of Prof. Childress at USC, and the hybrid desalination process itself involving coupling commercial membrane distillation modules supplied by Aquastill to a falling film evaporator designed by Veolia. The equipment will be installed on land owned by NGL Energy Partners associated with an existing SWD well and produced water treatment train. Prior to injection in the well, produced water pretreated at NGL will be further treated by Sunvapor's process to create a concentrated brine stream and a distillate stream, and substantially all of it will be recombined and returned to the SWD well for disposal. A very small portion of the Sunvapor system distillate and the feedwater to the Sunvapor system (pre-treated produced water) will be sampled for evaluation by the NM Produced Water Research Consortium to evaluate the suitability of the distillate for future re-use and to establish the performance of the solar desalination system relative to performance metrics. The intent of the project is to operate the facility for at least one year, monitor performance, provide samples for evaluation, and invite stakeholders including the DOE and the Consortium to validate the performance as part of Sunvapor's application for the "Test" phase Prize at the conclusion of the demonstration period. Information gained from the pilot demonstration will inform the design of a future commercial upscale of Sunvapor's Hybrid Solar

Desalination process, provide data on treated water suitability for reuse, and allow NGL and other Consortium members to evaluate the process.

12. The Project Goals are to:
    (a) Demonstrate at least 1 year of successful operation of the solar hybrid desalination process
    (b) Provide at least monthly samples of distillate and feedwater for evaluation
    (c) Meet or exceed estimated Technology Performance Metrics (See Metrics below))
    (d) Develop feasibility level (+/- 25% accuracy) estimate of levelized cost of produced water
13. Site location: Property is located at 32.310 N, -104.070 W, API-30-015-44406
14. Driving instruction from Albuquerque
    285 south past Carlsbad, 31 East, just before bridge over Pecos.
15. Site description: The site is an existing SWD well facility used for produced water treatment and disposal.
16. Land status: NGL Owned, 46 acres.
17. No parts of the project will be conducted or sourced within the exterior boundaries of a Native American reservation
18. List of all landowners adjacent to proposed project location
    Alfred Carrasco, Cindy Woodin, Nymeyer Farms LLC, John Levi Reid Jr, Jimmy G Sr. and Anna M Tarvin, Leroy and Patricia Evans, Chevron USA Inc., Wilbur A Siebert



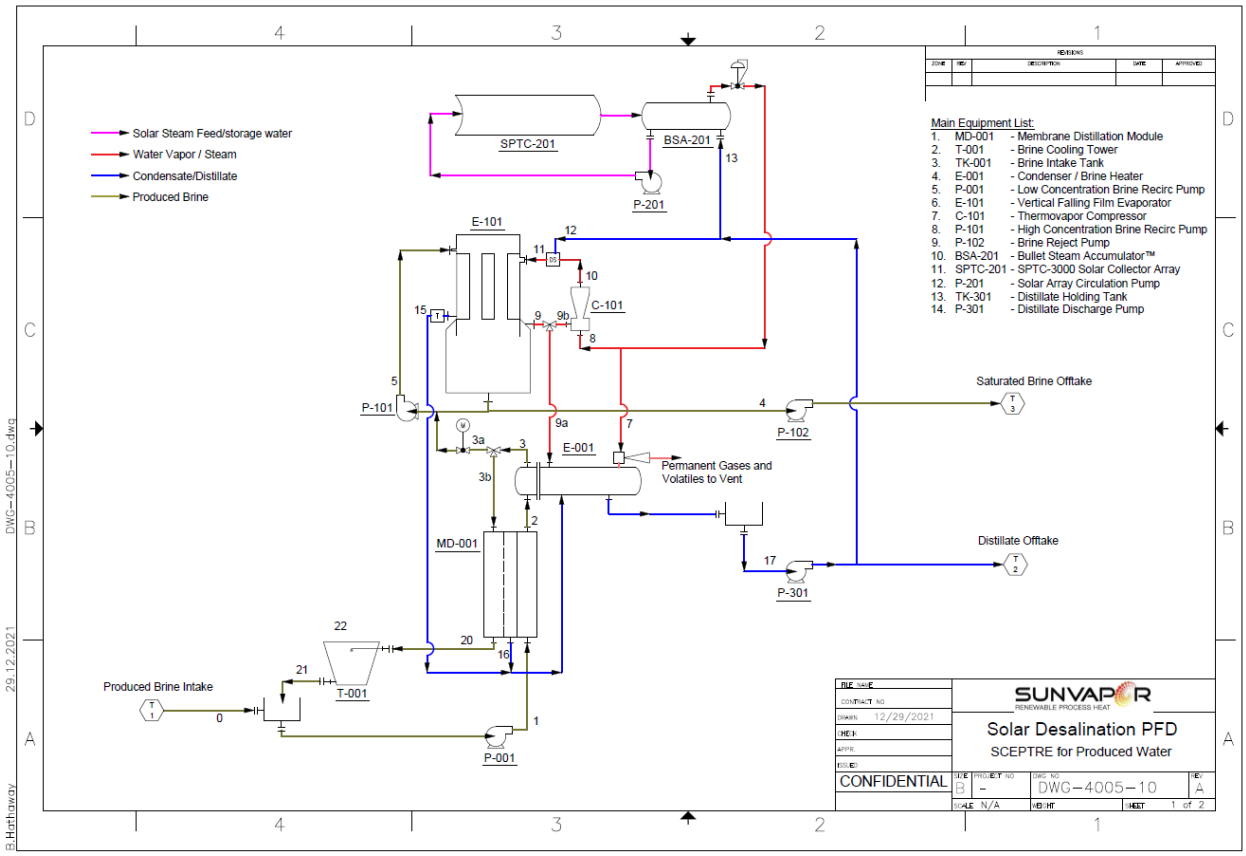

19. The source of the adjacent landowner data

The data is from NGL GIS

20. The Applicant confirms that adjacent owners have been notified regarding the proposed project
21. Proposed schedule for testing; dates and duration:

| Task Name | Duration | Start | Finish |
|---|---|---|---|
| **Testing Phase** | **290 days** | **Tue 6/7/23** | **Mon 7/15/24** |
| Baseline Operation | 140 days | Tue 6/7/23 | Mon 12/18/23 |
| Initial Performance Assessment and Tuning | 5 days | Tue 6/14/23 | Mon 6/20/23 |
| 3 Month Detailed Performance Assessment | 10 days | Tue 8/30/23 | Mon 9/12/23 |
| 6 Month Detailed Performance Assessment | 10 days | Tue 11/22/23 | Mon 12/4/23 |
| Minimal PT Operation | 140 days | Tue 12/19/23 | Mon 7/1/24 |
| Minimal PT Initial Performance Assessment and G/NG | 5 days | Tue 12/26/23 | Mon 1/2/24 |
| 9 Month Detailed Performance Assessment | 10 days | Tue 3/12/24 | Mon 3/25/24 |
| Final (12 Month) Detailed Performance Assessment | 10 days | Tue 7/2/24 | Mon 7/15/24 |
| NREL/DOE Observation and Assessment of System Operation | 5 days | Tue 5/20/24 | Mon 5/26/24 |

22. Technology Performance Metrics
    (a) Water Recovery >62%
    (b) Gain output ratio (GOR) >4.5
    (c) Distillate TDS <300 ppm
    (d) Distillate TOC <1 ppm
    (These Values assume 100,000 ppm TDS feed. Values given here may be adjusted for actual observed feed TDS level.)
23. Treatment system design and process
    A process flow diagram of the core portion of the treatment system is shown below (pre-treatment and final polishing and recombination and reinjection portions of the process are not shown but are described below).




Pretreated produced water feed from NGL which would normally be injected as-as will be further pre-treated[1] ("pre" because it will be fed into the membranes) to reduce levels of iron, sulfate, and suspended solids using hydrogen peroxide, followed by addition of coagulant to bring colloids out of suspension, and flocculant to agglomerate suspended materials together. The resulting scum/sludge solids will be removed from a settling tank, and then disposed of as solid waste. The clarified produced water will continue on through a particulate filter to catch any residual solids before moving on to the hybrid solar desalination treatment process itself at tie-in point "T1" shown in the PFD drawing. The hybrid solar desalination process primarily consists of two unit processes. The feed will enter as make-up to a recirculating loop of brine in the initial bottoming membrane distillation (MD) process (MD-001), which is driven by the thermal energy content of the excess vapors from the topping evaporator process being condensed in the heat exchanger E-001. The MD process will extract distillate from the feed and increase the TDS concentration from the make-up feed value of ~100,000 ppm to ~154,000 ppm. A portion of this recirculating loop will be bled off and fed into the topping process consisting of a vertical falling film evaporator (E-101) that is heated from its own recompressed vapors in a thermal vapor recompression (TVR) evaporator system. This evaporator brings the TDS level of the brine from the bottoming process' concentration of ~154,000 ppm up to the final desired concentration of ~260,000 ppm while producing vapors that are either condensed

[1] The Project expects to use the following pretreatment chemicals in the following amounts: Hydrogen Peroxide, 34% - oxidizer - 55 gallons/year, Barium Chloride - sulfate eliminator - 2000 lb/year, Polyaluminum Chloride - coagulant - 92 lbs/year, Anionic Polymer - flocculant - 10 gallons/year, Anti-scalant (proprietary) - 2.5 gallons/year

into distillate within the evaporator's steam-jacketed region (state point 15), or are condensed in the condensing heat exchanger (state point 9a) and used to provide heat to the MD process. The distillate streams are combined in the condenser (E-001) where they are exposed to a mild vacuum and elevated temperatures which will assist in liberation of volatile organic compounds before being pumped up to atmospheric pressure (P-301) and passed through a filter containing granular activated carbon (GAC) as a final polishing step. A portion may be used for desuperheating (state point 12) or as feedwater for solar steam generation (state point 13) that will remain within the treatment system. Measurements or samples will be taken from the final distillate product, after which both the distillate and concentrate streams will be recombined and send back to the SWD well facility for ultimate disposal via injection into the well.

24. Emergency response plan for spills or releases of produced water or treated produced water The Project will adhere to NGL's existing SPCC plan
25. Disposal and decommissioning plan: Before removal from the site, all equipment that has come into contact with produced water will be rinsed with the resulting water collected for disposal in the well.
26. The Applicant certifies to fully comply with all Consortium requirements and guidance documents related to Guidance on Produced Water Sampling Procedure, and Guidance on Produced Water Treatment Research, Development, and Demonstration Testing and Evaluation

**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 188334

## CONDITIONS

| | |
|---|---|
| Operator:<br>NGL WATER SOLUTIONS PERMIAN, LLC<br>865 North Albion Street<br>Denver, CO 80220 | OGRID:<br>372338 |
| | Action Number:<br>188334 |
| | Action Type:<br>[C-103] NOI General Sundry (C-103X) |

**CONDITIONS**

| Created By | Condition | Condition Date |
|---|---|---|
| pgoetze | Operator shall provide Subsequent Reports (Form C-103Z) for the following activities: 1. commencement of injection into the disposal well from the pilot project; 2. notice of completion of injection from the pilot project; and 3. provide a copy of the final report of the pilot project for inclusion in the well file. | 2/21/2023 |