



For Department Use Only:

Agency Interest Number \_\_\_\_\_  
PRD Assigned \_\_\_\_\_

**1. Name and mailing address of person or group performing research (Responsible Person):**

Nyle Khan  
Kanalıs Group, LLC  
19925 Stevens Creek Blvd, 100  
Cupertino, CA 95014

Work Phone: (505) 379-0282

Home Phone: n/a \_\_\_\_\_

Fax: n/a \_\_\_\_\_

Email: nk@kanalısgroup.com

**2. Name and position of person completing form:**

Avery Barnebey  
Kanalıs Group, LLC  
19925 Stevens Creek Blvd, 100  
Cupertino, CA 95014

Work Phone: (310) 806-1493

Cell/Home Phone: n/a \_\_\_\_\_

Fax: n/a \_\_\_\_\_

Email: avery.barnebey@kanalısgroup.com

**3. Research Focus (PWRC Category):** Evaluate produced water as non-traditional water source for reuse in future regional and state water planning.

**4. Kanalıs would site all equipment related to its use of treated produced water on the current OCD and BLM approved wellpad (no new surface disturbance) in its Eagle Springs oil & gas field.**

**5. Does the location for testing the technology take place inside or outside of the oil and gas field?**  
All testing will be conducted within the Eagle Springs oil & gas field on the current wellpad..

**6. Physical location of the research site including size and boundaries of site (include, street address, township, range, section, county, distance from closest town or landmark, directions to facility. Provide as an attachment.** Please see attachment for relevant locational information.

**7. Topographic and aerial map(s) showing:**

- land status and adjacent land status
- 100-year flood plain,
- dwellings and occupied establishments,
- watercourses including irrigation ditches, wetlands, lakes, karst and soils
- water wells (types) or springs
- site security
- site plan showing locations of relevant structures

The Eagle Springs field is approximately 20 miles west, southwest of Cuba NM, Sandoval County. There are no structures of any substance, save for the field facilities, for several miles. The land nearby is barren. There are no water wells within a at least a one-mile radius of the field. The site plan is shown in the attachment.

**8. List any regulatory, governmental, and non-governmental agencies, including municipalities or counties that have authority on the testing location. Provide as an attachment.**

Governmental bodies with authority over the field include the Federal Bureau of Land Management, and the New Mexico Department of Environment and Natural Resources, and the Oil & Gas Conservation Division (OCD). The New Mexico Produced Water Research Consortium also has authority over the project. Please see attachment.

**9. Provide a description of your signage plan for the testing site. Provide as an attachment.**

In addition to signage associated with oil & gas operations, greenhouse signage will be posted per our signage plan in the attachment.

**10. Provide a description of your site security plan, including training and site restriction methods.**



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Security plan – the skid mounted reverse osmosis filtration system will be located in the warehouse under lock and key. The greenhouse facility will be under lock and key. All employees are well versed in facility security. The broader well pad area is under 24-hour surveillance. The reverse osmosis process will only be conducted during daylight hours and monitored by on-site personnel. Please see attachment.

11. List of adjacent landowners and confirmation that adjacent landowners have been notified of the proposed pilot project. Provide as an attachment. Please see attachment

12. List the source(s) of the produced water including basin of origin. Describe how the produced water will be transported to and from the site including origin and disposal locations and onsite storage safety precautionary methods. Provide as an attachment.

The source of the water will be the water produced from the wells along with the oil. The oil and water are separated at the lease site and the water is then reinjected into the same reservoir through the reinjection well which is about a mile west of the production site. See attachments.

13. Provide the disposal and decommissioning plan for the expected byproducts, waste products and other potentially contaminated materials. Plan should include disposition of equipment, soils, plants and piping requiring disposal and the expected disposal locations for each. Provide as an attachment.

Disposal and decommissioning plans include disposal off all greenhouse organic material through EnviroTech. All extra water will be disposed of in the SWD. Hardware materials will be cleaned and reused within the oil field or disposed of as appropriate. Please see attachment.

14. Describe the expected contaminants in the untreated produced water and the treated produced water (e.g. contaminants being studied, known contaminants, known additives). Include estimated concentrations if known, and copies of laboratory analyses of untreated and treated produced water. Provide as an attachment.

Known contaminants are listed in the attached Hall Environmental water test reports. We have conducted extensive water testing to identify both contaminants and effective methods for mitigation of contaminants through effective filtrations. Please see attachments.

15. Describe all components of the produced water processing, treatment, storage, secondary containment, and produced water system (e.g., pre-treatment units, above ground storage tanks, etc.). Include sizes, site layout map, closed loop processing plans, and specifications. Provide as an attachment.

The water transportation and processing system is an entirely a closed loop system. Please see attachment.

16. Describe your disposal plan for all produced water, treated produced water, permeate or brine concentrate into a SWD. Provide as an attachment.

We will continue to use our fully permitted, existing SWD system. Please see attachment.

17. Describe your final closure plan after completion of the pilot project. Provide as an attachment.

Our closure plan is described in item 13 above. Please see attachment.

18. Estimated depth to ground water (ft): 480 feet Source of information: Gamma ray and resistivity logs

Direction of groundwater flow: \_\_\_\_\_ Source of information \_\_\_\_\_  
Covered at length in the attachments.

19. Current Total Dissolved Solids Concentration in Groundwater- Approximately 8600 - 10,000 TDS as reported by Hall Environmental water test reports

Signature: \_\_\_\_\_

Date: 3/9/2023

Printed name: Nyle Khan \_\_\_\_\_

Title: Manager \_\_\_\_\_



New Mexico Environment Department  
Ground Water Quality Bureau

**Produced Water Pilot Project  
Notice of Intent to Discharge**

**For Department Use Only:**

Agency Interest Number \_\_\_\_\_

PRD Assigned \_\_\_\_\_

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**Certification by Responsible Person**

I, \_\_\_\_\_, hereby certify that the information and data submitted in this application are true and accurate as possible, to the best of my knowledge and professional expertise and experience.

Signed this \_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_, upon my oath or affirmation, before a notary of the State of \_\_\_\_\_

**SEE ATTACHED  
JURAT  
FROM NOTARY**

Please return this form to:

NMED Ground Water Quality Bureau  
P.O. Box 5469  
Santa Fe, New Mexico 87502-5469

Telephone: 505-827-2900  
Fax: 505-827-2965



**CALIFORNIA JURAT WITH AFFIANT STATEMENT**

**GOVERNMENT CODE § 8202**

- See Attached Document (Notary to cross out lines 1-6 below)
- See Statement Below (Lines 1-6 to be completed only by document signer[s], *not* Notary)

1 \_\_\_\_\_

2 \_\_\_\_\_

3 \_\_\_\_\_

4 \_\_\_\_\_

5 \_\_\_\_\_

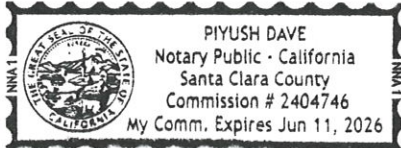
6 \_\_\_\_\_

*Signature of Document Signer No. 1*                      *Signature of Document Signer No. 2 (if any)*

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California  
 County of Santa Clara

Subscribed and sworn to (or affirmed) before me  
 on this 9<sup>th</sup> day of March, 2023,  
 by                      Nyle Khan  
 (1) \_\_\_\_\_



(and (2) \_\_\_\_\_),  
*Name(s) of Signer(s)*

proved to me on the basis of satisfactory evidence  
 to be the person(s) who appeared before me.

Signature \_\_\_\_\_  
*Signature of Notary Public*

*Seal*  
 Place Notary Seal Above

**OPTIONAL**

*Though this section is optional, completing this information can deter alteration of the document or fraudulent reattachment of this form to an unintended document.*

**Description of Attached Document**

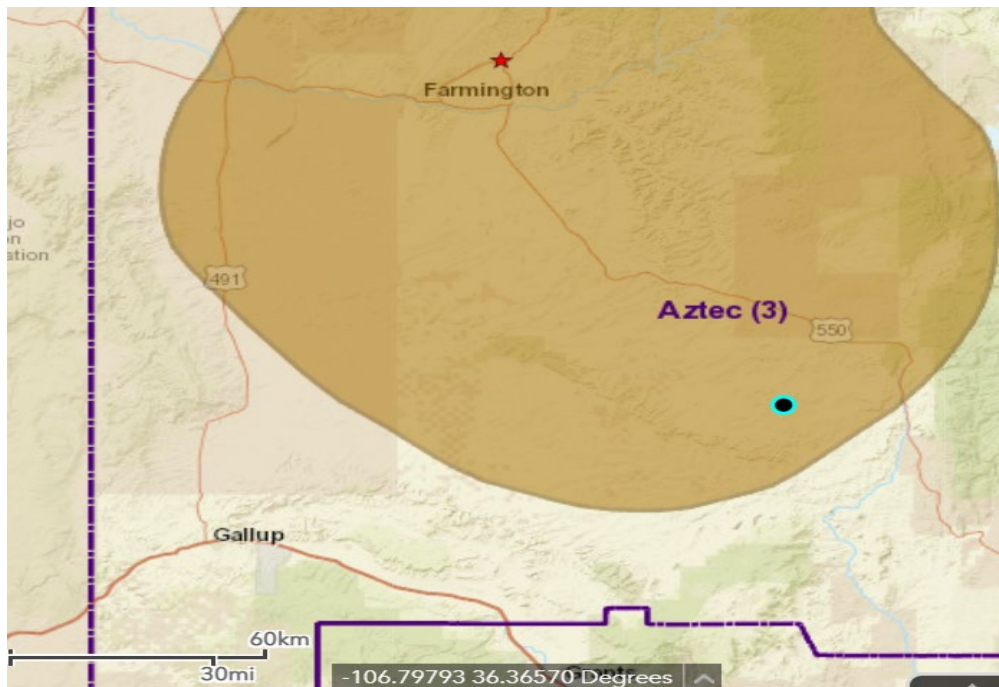
Title or Type of Document: Notice of Intent to Discharge      Document Date: 3/9/2023  
 Number of Pages: 3      Signer(s) Other Than Named Above: \_\_\_\_\_

# Physical Location of Test Site – Eagle Springs Field

## Question #6

Physical Location :           330' FNL, 2310' FEL  
  Section 8 T19N R4W  
  Sandoval County NM 99705

The Eagle Springs field is approximately 20 miles west, southwest of Cuba NM, Sandoval County. There are no structures of any substance, save for the field facilities, for several miles. The land nearby is barren. There are no water wells within a at least a one-mile radius of the field. There are no active water sources nearby. The field location is shown below.

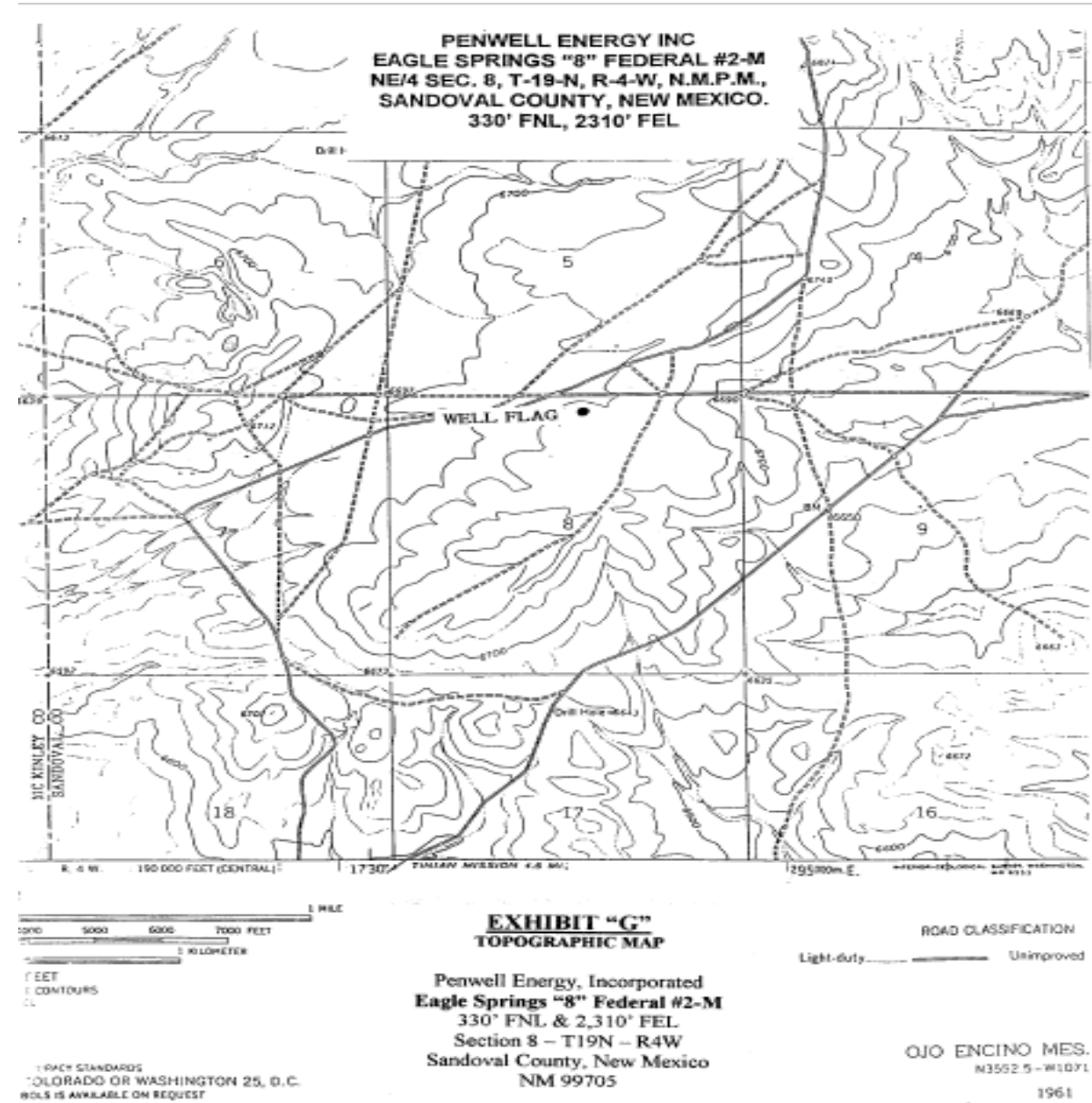




# Question #7 PW-NOI

## Topographic Map

- Greenhouse Pilot (pilot) is located on an OCD Site/BLM oil&gas lease wellpad. No new surface disturbance will be required
- The pilot is nowhere near a dwelling or occupied establishment
- The pilot is not within a 100 year floodplain (see Approved Drill Permit document below)
- The pilot is not within 300 feet of a continuously flowing or irrigation ditch, nor within 200 feet of any other watercourse
- The pilot is not within 300 feet of an existing spring or fresh water well serving livestock
- The pilot is not within 300 feet of a wetland or playa
- The pilot is in a very remote area far from living structures or population areas
- The pilot will be above ground, “closed loop”, contained in enclosed facilities or 60mil lined berm, and fully inspectable
- The pilot materials will all be compatible with produced water and able to contain 1.5X the volume of the closed loop water system
- The pilot will be designed by a New Mexico licensed engineer (most likely Molzen Corbin and Agratech) and constructed and installed by a licensed professional
- The secondary containment system will be inclusive of all critical points in the treatment process



Topographic map of Eagle Springs prepared by previous operator included in original application for drilling to the US Bureau of Land Management

# Eagle Springs SWD System – Extracts from NM OCD Well Files for Eagle Springs SWD Well Files - Question #7

District I  
1625 N. French Dr., Hobbs, NM 88240  
District II  
1301 W. Grand Avenue, Artesia, NM 88210  
District III  
1000 Rio Brazos Road, Aztec, NM 87410  
District IV  
1220 S. St. Francis Dr., Santa Fe, NM 87505

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

Form C-144  
June 24, 2008

For temporary pits, closed-loop systems, and below-grade tanks, submit to the appropriate NMOCD District Office.  
For permanent pits and exceptions submit to the Santa Fe Environmental Bureau office and provide a copy to the appropriate NMOCD District Office.

## Pit, Closed-Loop System, Below-Grade Tank, or Proposed Alternative Method Permit or Closure Plan Application

Type of action:  Permit of a pit, closed-loop system, below-grade tank, or proposed alternative method  
 Closure of a pit, closed-loop system, below-grade tank, or proposed alternative method

**Instructions: Please submit one application (Form C-144) per individual pit, closed-loop system, below-grade tank or alternative request**

Please be advised that approval of this request does not relieve the operator of liability should operations result in pollution of surface water, ground water or the environment. Nor does approval relieve the operator of its responsibility to comply with any other applicable governmental authority's rules, regulations or ordinances.

Operator: High Plains Operating Company, LLC OGRID #: 246238  
Address: 32700 Aspen Drive, Buena Vista Colorado 81211  
Facility or well name: Eagle Springs 9 Federal #1  
API Number: 30-043- (To be determined) 21065 OCD Permit Number: \_\_\_\_\_  
U/L or Qtr/Qtr D (NW/NW) Section 9 Township 19N Range 4W County: Sandoval  
Center of Proposed Design: Latitude 35.89807 deg N Longitude 107.27178 W NAD:  1927  1983  
Surface Owner:  Federal  State  Private  Tribal Trust or Indian Allotment

<input checked="" type="checkbox"/> <b>Pit:</b> Subsection F or G of 19.15.17.11 NMAC Temporary: <input checked="" type="checkbox"/> Drilling <input type="checkbox"/> Workover <input type="checkbox"/> Permanent <input type="checkbox"/> Emergency <input type="checkbox"/> Cavitation <input type="checkbox"/> Steel Pit <input checked="" type="checkbox"/> Lined <input type="checkbox"/> Unlined Liner type: Thickness <u>20</u> mil <input checked="" type="checkbox"/> LLDPE <input type="checkbox"/> HDPE <input type="checkbox"/> PVC <input type="checkbox"/> Other _____ <input checked="" type="checkbox"/> String-Reinforced Seams: <input checked="" type="checkbox"/> Welded <input checked="" type="checkbox"/> Factory <input type="checkbox"/> Other _____ Volume: <u>8,500</u> bbl Dimensions: L <u>80'</u> x W <u>60'</u> x D <u>10'</u>	<input checked="" type="checkbox"/> <b>Closed-loop System:</b> Subsection H of 19.15.17.11 NMAC <input type="checkbox"/> Drying Pad <input checked="" type="checkbox"/> Tanks <input type="checkbox"/> Haul-off Bins <input type="checkbox"/> Other _____ <input type="checkbox"/> Lined <input type="checkbox"/> Unlined Liner type: Thickness _____ mil <input type="checkbox"/> LLDPE <input type="checkbox"/> HDPE <input type="checkbox"/> PVC <input type="checkbox"/> Other _____ Seams: <input type="checkbox"/> Welded <input type="checkbox"/> Factory <input type="checkbox"/> Other _____ Volume: <u>500</u> bbl <u>104</u> yd <sup>3</sup> Dimensions: Length <u>47</u> ft x Width <u>10</u> ft x Height <u>6</u> ft
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<input type="checkbox"/> <b>Below-grade tank:</b> Subsection I of 19.15.17.11 NMAC Volume: _____ bbl Type of fluid: _____ Tank Construction material: _____ <input type="checkbox"/> Secondary containment with leak detection <input type="checkbox"/> Visible sidewalls, liner, 6-inch lift and automatic overflow shut-off <input type="checkbox"/> Visible sidewalls and liner <input type="checkbox"/> Visible sidewalls only <input type="checkbox"/> Other _____ Liner type: Thickness _____ mil <input type="checkbox"/> HDPE <input type="checkbox"/> PVC <input type="checkbox"/> Other _____	<input type="checkbox"/> <b>Fencing:</b> Subsection D of 19.15.17.11 NMAC <input type="checkbox"/> Chain link, six feet in height, two strands of barbed wire at top <input checked="" type="checkbox"/> Four foot height, four strands of barbed wire evenly spaced between one and four feet <input type="checkbox"/> <b>Netting:</b> Subsection E of 19.15.17.11 NMAC <input type="checkbox"/> Screen <input type="checkbox"/> Netting <input type="checkbox"/> Other _____ <input type="checkbox"/> Monthly inspections <input type="checkbox"/> <b>Signs:</b> Subsection C of 19.15.17.11 NMAC <input type="checkbox"/> 12"x24", 2' lettering, providing Operator's name, site location, and emergency telephone numbers <input checked="" type="checkbox"/> Signed in compliance with 19.15.3.103 NMAC
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<input type="checkbox"/> <b>Alternative Method:</b> Submittal of an exception request is required. Exceptions must be submitted to the Santa Fe Environmental Bureau office for consideration of approval.	<b>Administrative Approvals and Exceptions:</b> Justifications and/or demonstrations of equivalency are required. Please refer to 19.15.17 NMAC for guidance. <b>Please check a box if one or more of the following is requested, if not leave blank:</b> <input type="checkbox"/> Administrative approval(s): Requests must be submitted to the appropriate division district or the Santa Fe Environmental Bureau office for consideration of approval. <input type="checkbox"/> Exception(s): Requests must be submitted to the Santa Fe Environmental Bureau office for consideration of approval.
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**Siting Criteria (regarding permitting):** 19.15.17.10 NMAC  
**Instructions:** The applicant must demonstrate compliance for each siting criteria below in the application. Recommendations of acceptable source material are provided below. Requests regarding changes to certain siting criteria may require administrative approval from the appropriate district office or may be considered an exception which must be submitted to the Santa Fe Environmental Bureau office for consideration of approval. Applicant must attach justification for request. Please refer to 19.15.17.10 NMAC for guidance. Siting criteria does not apply to drying pads or above-grade tanks associated with a closed-loop system.

Ground water is less than 50 feet below the bottom of the temporary pit, permanent pit, or below-grade tank. - NM Office of the State Engineer - iWATERS database search; USGS, Data obtained from nearby wells	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Within 300 feet of a continuously flowing watercourse, or 200 feet of any other significant watercourse or lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark). - Topographic map, Visual inspection (certification) of the proposed site	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Within 300 feet from a permanent residence, school, hospital, institution, or church in existence at the time of initial application. (Applies to temporary, emergency, or construction pits and below-grade tanks) - Visual inspection (certification) of the proposed site; Aerial photo; Satellite image	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> NA
Within 1000 feet from a permanent residence, school, hospital, institution, or church in existence at the time of initial application. (Applies to permanent pits) - Visual inspection (certification) of the proposed site; Aerial photo; Satellite image	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA
Within 500 horizontal feet of a private, domestic fresh water well or spring that less than five households use for domestic or stock watering purposes, or within 1000 horizontal feet of any other fresh water well or spring, in existence at the time of initial application. - NM Office of the State Engineer - iWATERS database search; Visual inspection (certification) of the proposed site	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Within incorporated municipal boundaries or within a defined municipal fresh water well field covered under a municipal ordinance adopted pursuant to NMSA 1978, Section 3-27-3, as amended. - Written confirmation or verification from the municipality; Written approval obtained from the municipality	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Within 500 feet of a wetland. - US Fish and Wildlife Wetland Identification map; Topographic map; Visual inspection (certification) of the proposed site	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Within the area overlying a subsurface mine. - Written confirmation or verification or map from the NM EMNRD-Mining and Mineral Division	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Within an unstable area. - Engineering measures incorporated into the design; NM Bureau of Geology & Mineral Resources; USGS; NM Geological Society; Topographic map	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Within a 100-year floodplain. - FEMA map	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

**Temporary Pits, Emergency Pits, and Below-grade Tanks Permit Application Attachment Checklist:** Subsection I of 19.15.17.9 NMAC  
**Instructions:** Each of the following items must be attached to the application. Please indicate, by a check mark in the box, that the documents are attached.

<input type="checkbox"/> Hydrogeologic Report (Below-grade Tanks) - based upon the requirements of Paragraph (4) of Subsection B of 19.15.17.9 NMAC <input checked="" type="checkbox"/> Hydrogeologic Data (Temporary and Emergency Pits) - based upon the requirements of Paragraph (2) of Subsection B of 19.15.17.9 NMAC <input checked="" type="checkbox"/> Siting Criteria Compliance Demonstrations - based upon the appropriate requirements of 19.15.17.10 NMAC <input checked="" type="checkbox"/> Design Plan - based upon the appropriate requirements of 19.15.17.11 NMAC <input checked="" type="checkbox"/> Operating and Maintenance Plan - based upon the appropriate requirements of 19.15.17.12 NMAC <input checked="" type="checkbox"/> Closure Plan - based upon the appropriate requirements of Subsection C of 19.15.17.9 NMAC and 19.15.17.13 NMAC	<input type="checkbox"/> Previously Approved Design (attach copy of design) API Number: _____ or Permit Number: _____
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# Eagle Springs SWD System – Extracts from NM OCD Well Files for Eagle Springs SWD Well Files - Question #7

<b>Operator Application Certification:</b> I hereby certify that the information submitted with this application is true, accurate and complete to the best of my knowledge and belief.	
Name (Print): <u>Arthur W. Butler III</u>	Title: <u>Managing Partner</u>
Signature: <u>[Handwritten Signature]</u>	Date: <u>July 11, 2008</u>
e-mail address: <u>abutler@highplainsop.com</u>	Telephone: <u>719-395-8059 (Office), 719-207-0164 (Cell)</u>
<b>OCD Approval:</b> <input checked="" type="checkbox"/> Permit Application (including closure plan) <input type="checkbox"/> Closure Plan (only)	
OCD Representative Signature: <u>[Handwritten Signature]</u>	Approval Date: <u>8-8-08</u>
Title: <u>Environment</u>	OCD Permit Number: _____
<b>Closure Report (required within 60 days of closure completion):</b> Subsection K of 19.15.17.13 NMAC <input type="checkbox"/> Closure Completion Date: _____	
<b>Closure Method:</b> <input type="checkbox"/> Waste Excavation and Removal <input type="checkbox"/> On-Site Closure Method <input type="checkbox"/> Alternative Closure Method <input type="checkbox"/> If different from approved plan, please explain.	
<b>Closure Report Attachment Checklist:</b> Instructions: Each of the following items must be attached to the closure report. Please indicate, by a check mark in the box, that the documents are attached.	
<input type="checkbox"/> Proof of Closure Notice <input type="checkbox"/> Proof of Deed Notice (if applicable) <input type="checkbox"/> Plot Plan <input type="checkbox"/> Confirmation Sampling Analytical Results <input type="checkbox"/> Waste Material Sampling Analytical Results <input type="checkbox"/> Disposal Facility Name and Permit Number <input type="checkbox"/> Soil Backfilling and Cover Installation <input type="checkbox"/> Re-vegetation Application Rates and Seeding Technique <input type="checkbox"/> Site Reclamation (Photo Documentation)	
On-site Closure Location: Latitude _____	Longitude _____ NAD: <input type="checkbox"/> 1927 <input type="checkbox"/> 1983
<b>Operator Closure Certification:</b> I hereby certify that the information and attachments submitted with this closure report is true, accurate and complete to the best of my knowledge and belief. I also certify that the closure complies with all applicable closure requirements and conditions specified in the approved closure plan.	
Name (Print): _____	Title: _____
Signature: _____	Date: _____
e-mail address: _____	Telephone: _____



# Eagle Springs Oil Well Pads & Greenhouse Proposed Locating - Question #7

**NM OCD OIL AND GAS MAP** New Mexico Oil Conservation Division NM OCD Oil and Gas Map User Guide

Search: ijo Encino Chapter, NM, USA X Q  
Show search results for Ojo En...

The final dimensions of the Greenhouse will be at or less than 180ft x 90ft depending on final engineering plans. It will be divided into 2 separate sections:

- First section will be for control tree seedlings watered with fresh water purchased from Tim Johnson's ranch.
- Second smaller section will be for tree seedlings watered with treated produced water.

Map Labels: 8 Fed 1H, 8 Fed 2M, NWNE (C), NWNE (B), 08

Legend:  
Fresh Water (Green)  
Produced Water (Light Blue)

Scale: 20m, 100ft  
Coordinates: -107.28245 35.89846 Degrees

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# Eagle Springs Location - Facilities

Question #7, #12





# Eagle Springs Location – Existing Facilities

## Question #7

### Eagle Springs Pumphouse & Tankage



### Eagle Springs Production Facilities



### Eagle Springs Disposal Well





## **Eagle Springs Proposed Greenhouse Facilities Narrative**

### **System Design Forthcoming from Molzen & Corben - Question #7, #12 and #15**

#### **Greenhouse Exterior:**

Fluid is produced from wells 1H and 2M. The oil and water are separated and piped to dedicated tankage.

The separated produced water will be cooled in a second water tank and then fed through a 5 micron filter and 2 stage activated carbon filter, then into the RO unit (the RO unit will be housed within the pumphouse – which has a concrete floor and secondary containment).

The rejected water will be reinjected into the SWD well while the permeate will be transferred to a new, clean treated produced water tank.

All tanks, (oil, produced water, and clean water), are located in a 60 MM lined berm.

#### **Greenhouse Interior:**

Permeate Water from the clean water tank will be piped to the greenhouse for use in the produced water section only.

Seedlings will be grown in tubes located in tube holding containers placed in dedicated drip irrigation trays. No water will be sprayed anywhere.

The irrigation trays will be placed in secondary water spillage/containment trays on raised benches stationed on a concrete floor. This will provide spillage prevention redundancy.

The floor of the produced water section of the greenhouse will be have a 60 MM liner.

Fresh water, bought from local suppliers (Timothy Johnson – local rancher), will be pumped into a new clean water tank.

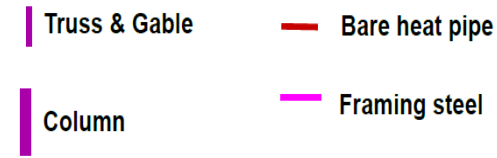
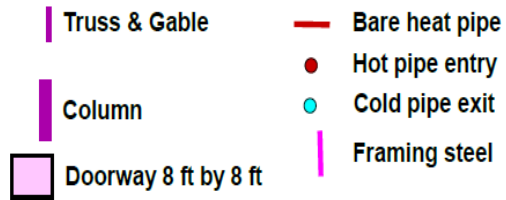
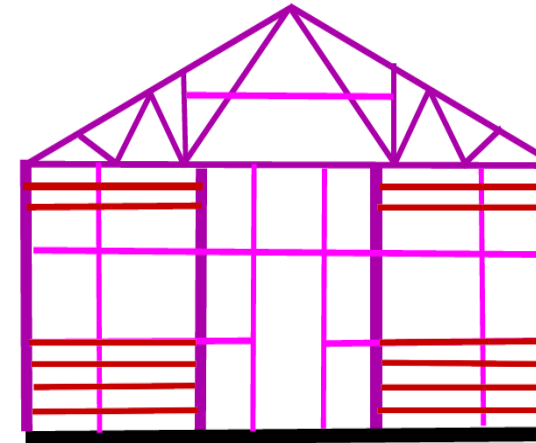
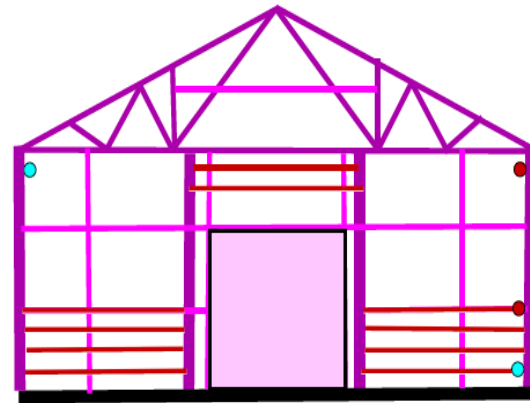
This fresh water will be pumped to the greenhouse to grow the control group of plants in the control group section.

Any excess permeate will be disposed of through reinjection into the SWD well.

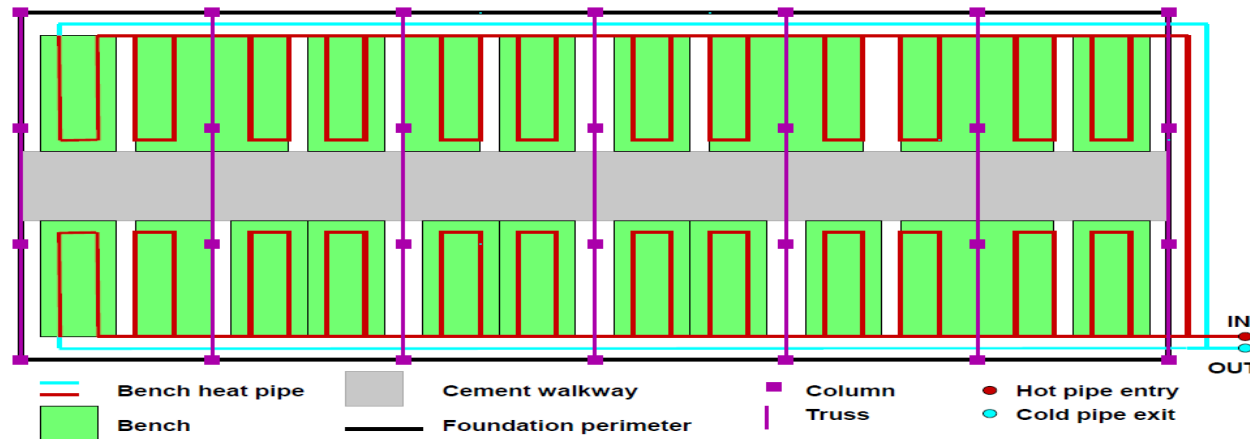
# Eagle Springs Illustrative Greenhouse Facilities Diagram (not to scale) Final Design Forthcoming from Agratech - Question #7

HEADHOUSE END OF 30 ft by 60 ft GREENHOUSE BAY

OUTSIDE END OF 30 ft by 60 ft GREENHOUSE BAY



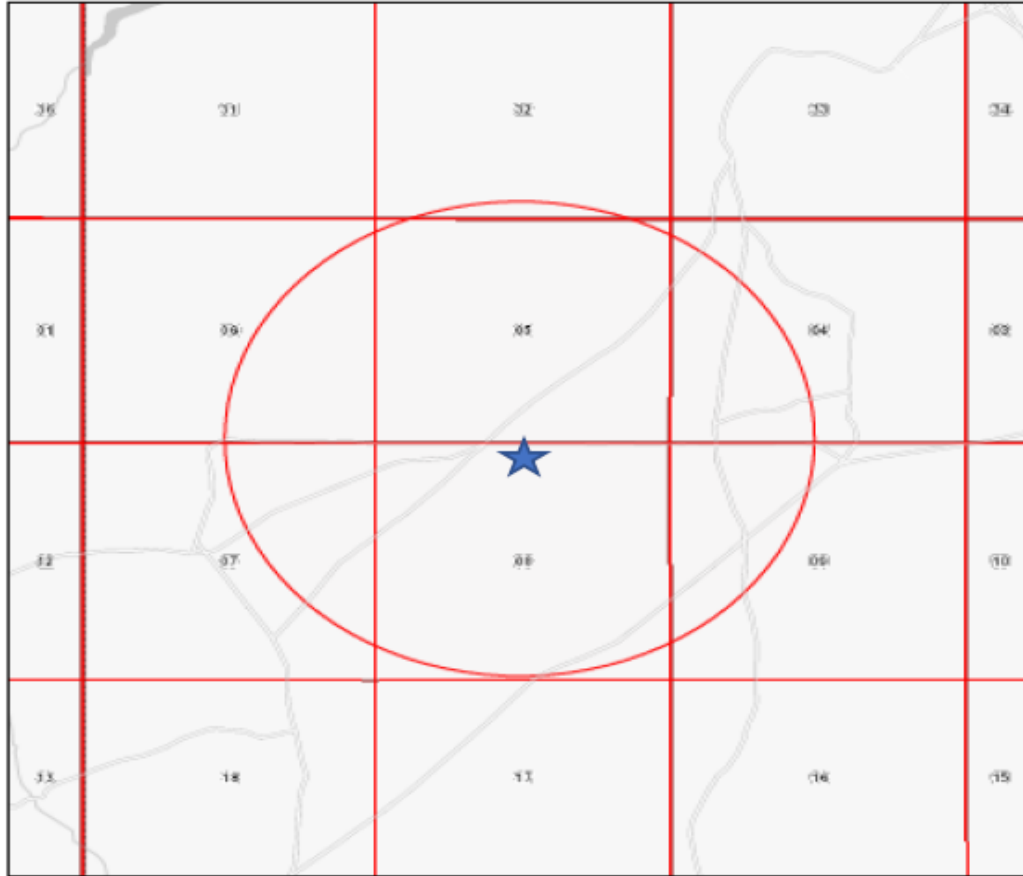
PLAN VIEW OF 30 ft by 60 ft GREENHOUSE BAY OF BENCHES AND BENCH BARE PIPE HEATING



# Eagle Springs Location – Office of State Engineer Diagrams

## Question #7

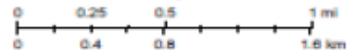
Eagle Springs One Mile Radius No PODS - OSE POD Location Map



3/30/2022, 9:49:44 AM

1:36,112

- PLSSFirstDivision
- PLSSTownship
- BLM Land Grant

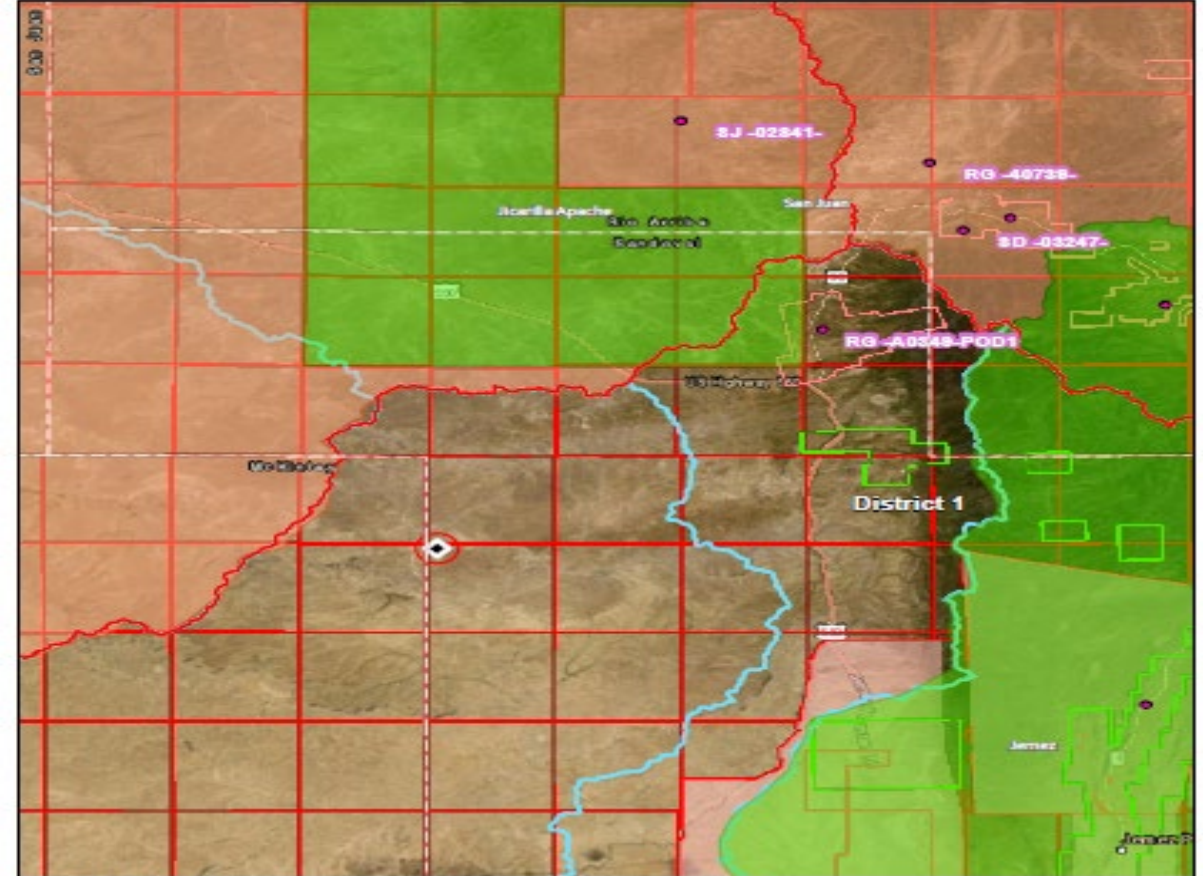


Source: Esri, HERE, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community BLM

Unofficial Online Map

These maps are distributed "as is" without warranty of any kind.

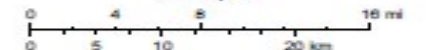
OSE POD Map - Eagle Springs - Wide View Eastern PODS



3/30/2022, 8:07:10 AM

1:577,791

- Recently Edited PODs
- OSE District Boundary
- Adjudication Areas
- On-going
- Completed
- Surface Water Sub Basins
- Hydro Survey Boundary
- <all other values>
- None
- All
- Partial
- PLSSTownship
- BLM Land Grant



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Unofficial Online Map

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**There are no water wells within a one-mile radius of Eagle Springs**



## **Governmental Bodies and Non-Governmental Bodies with Authority over Testing – Question #8**

1. New Mexico Environment Department
2. EMNRD Oil and Gas Conservation Division
3. Bureau of Land Management
4. New Mexico Produced Water Research Consortium

## Signage Plan – Question #9

1. Signage complies with Approved Application of Permit to Drill (AAPD) and includes the following:
  - I. Operator Name
  - II. Well Name/Location
  - III. Contact Information for emergencies.
  
2. Security Signage includes:
  - I. Notification of Surveillance
  - II. No Trespassing
  
1. Signage will be posted as follows:
  - I. Security signage at
    - i. Entrance gate to the Eagle Springs Lease
    - ii. Greenhouse facility
    - iii. Pump house
  - II. AAPD Signage at Well Heads and Production Tanks

## Security Plan – Question #10

1. Security plan – the skid mounted reverse osmosis filtration system will be located in the warehouse under lock and key.
2. The greenhouse facility will be under lock and key.
3. The broader well pad area is under 24 hour surveillance.
4. The reverse osmosis process will only be conducted during daylight hours and monitored by onsite staff.
5. Facility staffing is on a 24/7 basis.
6. Staff will be physically onsite during all greenhouse watering activities.
7. Staff will undergo appropriate training to ensure safety of personal and equipment.



# Security Plan Diagram – Question #10

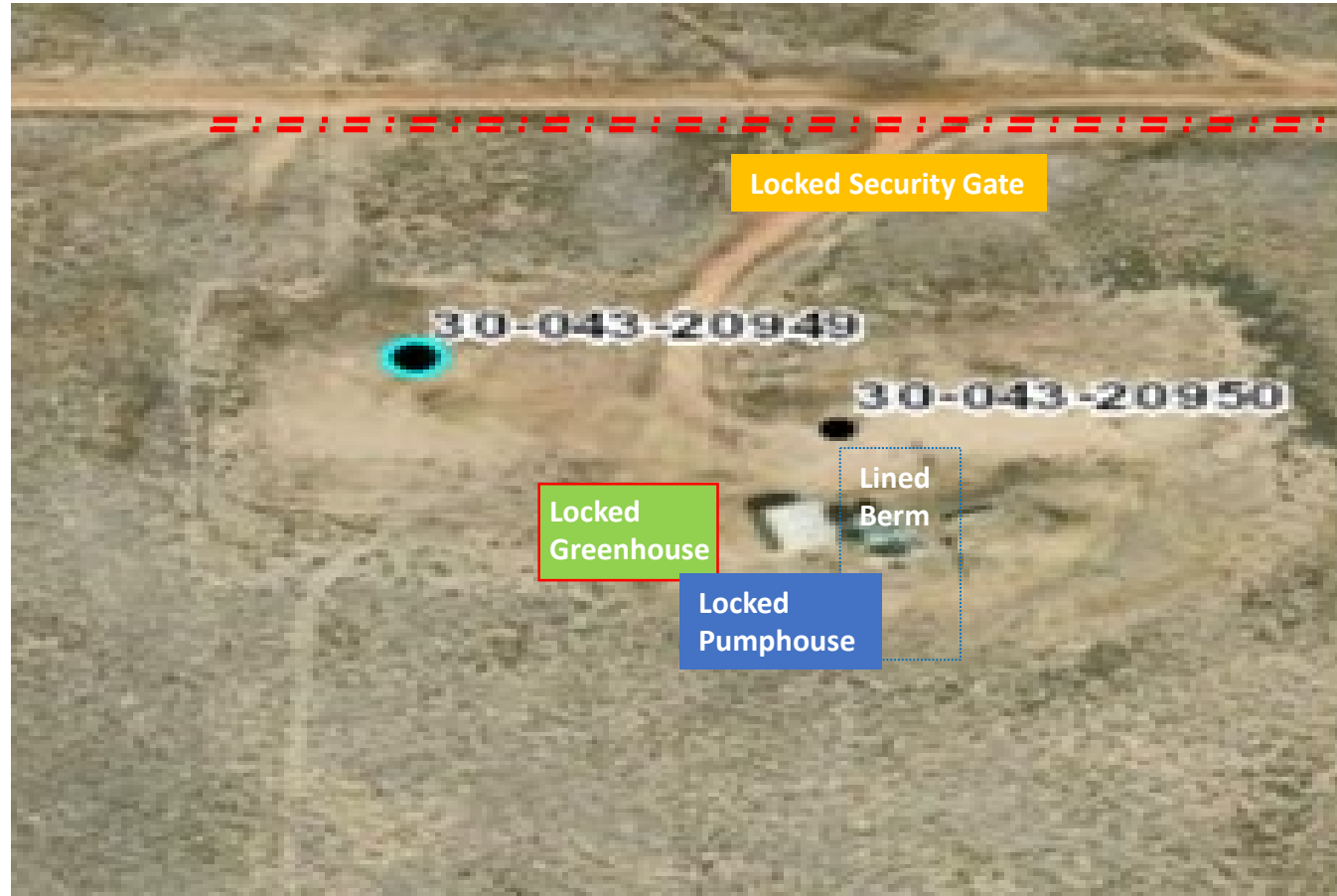
Locked Security Gate

24 Video Surveillance

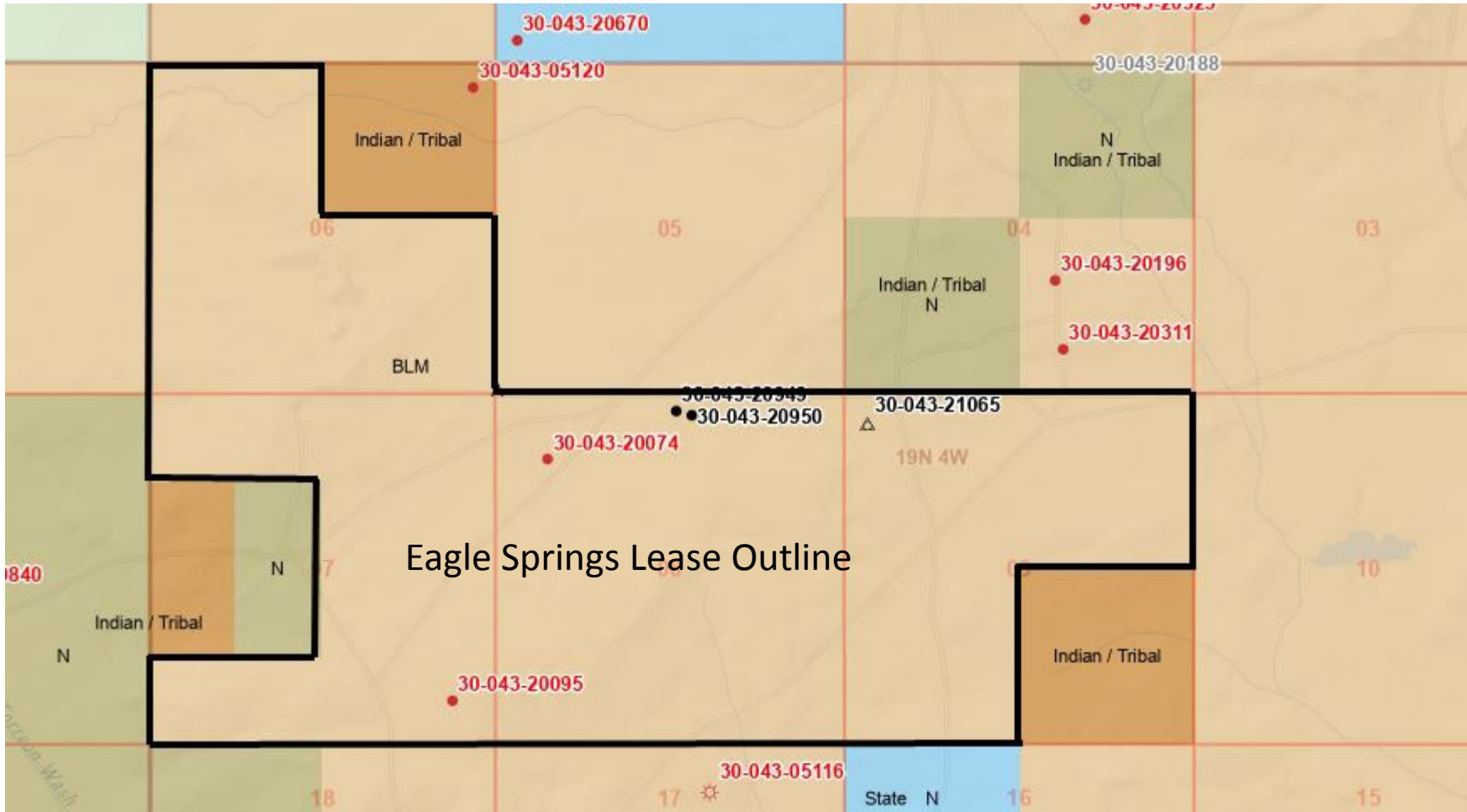
Lined Berm for Tanks

Locked Greenhouse

Locked Pumphouse



# Landholder Notification – Question #11



- Navajo Tribe EPA will be notified once the NOI is approved by NMED
- NM State Land Office will be notified once the NOI is approved by NMED
- BLM was notified via Sundry Notice on Dec 2022

## Water Source & Disposal – Question #12

1. The source of produced water for the project comes from wells 8 Federal 1H and 8 Federal 2M. The produced water is separated onsite from the oil and reinjected into a pipeline and then transported to 9 Federal SWD 1, which is about a mile away due east.
2. Please see the slide #24 illustrating the wells and SWD location.
3. This is entirely a closed loop system.
4. Both the oil and water are produced from the Entrada formation.
5. There is ample tankage for water onsite and the facility has automatic control systems and shut-off valves to prevent spillage.

# Disposal and Decommissioning Plan For any portion of the Pilot using Treated Produced Water – Question #13 and #17

## 1. Disposal at Envirotech

- I. Ground Soil (after interior of Greenhouse has been cleaned)
- II. Plant Soil
- III. Growing trays
- IV. Tree Seedlings

## 2. Hardware & equipment will be inspected, cleaned, and reused in oil field applications as needed

- I. Metal Pipe
- II. Metal Growing Benches – If no use is found in oil field, then this will be resold.
- III. Rubber Hoses
- IV. Pumps
- V. Plastic Liner
- VI. RO Unit – Will be returned to rental company

## 3. Greenhouse Structure

- I. After cleaning, the structure will be dismantled and sold off if appropriate



## Known Contaminants – Question #14

We have conducted extensive testing of our produced water in conjunction with Hall Environmental Laboratory to both identify contaminants in our produced water exceeding regulatory standards as well as to identify effective filtration mitigants. A summary of our testing follows:

Hall Environmental Analysis Laboratory (Hall) performed three separate detailed evaluations of Eagle Springs produced water. Each of these water sample tests were analyzed according to EPA procedures or equivalent as directed by the Produced Water Consortium. Kanalis sought to treat the Eagle Springs produced water to comply with standards appropriate for rangeland and agricultural applications, but was also interested if the treated produced water would meet federal primary and secondary drinking water standards. Those different analytical analysis efforts are summarized below and discussed in detail.

Hall Report 1 (March 2021) – This first report analyzed pre-treated produced water quality from Eagle Springs. At Eagle Springs, upon delivery from the produced water storage tank, the produced water is treated with a five-micron filter and then pumped through a treated charcoal filter prior to reinjection. Therefore, this first sample of produced water given to Hall for analysis included the above pre-treatment. In all subsequent produced water testing, the produced water used was also collected after the above pre-treatment filtration.

The raw produced water quality results from Eagle springs showed that arsenic, ethylbenzene, radium 226/228 (combined), and toluene levels exceeded primary drinking water standards. Chloride, fluoride, iron, manganese, sulfate, and the TDS levels exceeded secondary drinking water standards, and boron exceeded irrigation water standards. This is not surprising for an untreated produced water. Surprisingly, many common constituents in the Eagle Springs produced water were actually below current discharge standards, highlighting the general good quality of the Eagle Springs produced water.

## Known Contaminants – Question #14

Hall Report 2 (February 2022) - In this analysis, the permeate of the treated produced water using a Toray 710 RO membrane, was collected and analyzed. This second round of analytical results found that the RO treated produced water passed all EPA primary and secondary drinking water standards. Boron levels passed Class 2 agricultural standards of  $\leq$  2 ppm boron.

Hall Report 3 (March 2022) – The produced water desalination permeate from a Toray 810 SWRO membrane was evaluated for both a one-pass and a two-pass process. This testing demonstrated reduction in boron levels to WQCC NMAC 20.6.2.3103 **STANDARDS FOR GROUND WATER OF 10,000 mg/l TDS CONCENTRATION OR LESS.**

# Known Contaminants – Question #14

## Summary Exceptions Table

Exceptions to Reporting Standards		Hall Mar 2021	Hall Feb 2022	Hall Mar 2022 One RO Pass	Hall Mar 2022 v2 Two Passes
<b>EPA National Primary Drinking Water Regulations</b>					
	<b>Standard</b>				
Contaminant	Limit (mg/L)	<b>Exceptions</b>			
Arsenic	0.0100	0.0150	0.0021	No further test	
Ethylbenzene	0.7000	1.6000	Not Detected	No further test	
Radium 226/228	5.0000 (pCi/L)	7.0900	4.4980	No further test	
Toluene	1.0000	2.2000	Not Detected	No further test	
<b>EPA Secondary Drinking Water Regulations</b>					
Chloride	250.0000	890.0000	29.0000	7.1000	Not Detected
Fluoride	2.0000	3.2000	0.1700	Not Detected	Not Detected
Iron	0.3000	1.2000	Not Detected	No further test	
Manganese	0.0500	0.0740	Not Detected	No further test	
Sulfate	250.0000	6,400.0000	82.0000	7.1000	Not Detected
Total Dissolved Solids	500.0000	10,200.0000	224.0000	35.0000	Not Detected
<b>WQCC Irrigation Water Regulations</b>					
Boron	0.7500	3.5000	2.0000	0.8500	0.3400
<b>Hall Environmental Analysis Laboratory Evaluations - Eagle Springs</b>					



# Known Contaminants – Question #14

## Testing Plan

The permeate water will be tested:

1. To WQCC NMAC 20.6.2.3103 **STANDARDS FOR GROUND WATER OF 10,000 mg/l TDS CONCENTRATION OR LESS** and National Primary/Secondary drinking water standards once a month for the first three months the RO system is operational.
2. Once quarterly for the next 1 year, if the tests in #1 perform to specifications, after which the testing program will be reevaluated for any changes to ensure long term compliance.
3. For conductivity three times a week to ensure proper RO Filtration. The RO membranes will be replaced as frequently as necessary to ensure compliance with the standards above.

# Produced Water Handling System - Question #15

The reverse osmosis skid will be a three 8" Toray 810 Seawater filter design with a carbon pre-filter located within the pump house. It will process up to 25 gpm at 500psi (subject to final design). This should yield approx. 65% permeate water that exceeds WQCC NMAC 20.6.2.3103 **STANDARDS FOR GROUND WATER OF 10,000 mg/l TDS CONCENTRATION OR LESS** and National Primary/Secondary drinking water standards with a single pass.

The source water for the RO skid will be pre-filtered in the pump house prior to entry into the RO Unit. The water originates in the existing surge tank as raw produced water. From the surge tank, the water will fill the water-cooling tank, and then be pumped to the RO skid using a small charge pump, through a 5-micron filter, then through a 2-stage high flow activated carbon filter to remove any organics present.

The output of the RO skid will be permeate (filtered clean water) and the concentrate (reject water). The permeate will be pumped out of the skid to 1 or 2 400bbl storage water tank(s) through Sch40 PVC (or metal) pipe. depending on irrigation needs. The concentrate will be pumped directly into the injection line input to the H-pump (injection pump) and disposed of into the Eagle Springs Federal 9 SWD 1 well.

The permeate will be stored in tanks located in the lined berm. When needed, this water will be fed via gravity through piping to the greenhouse. The greenhouse will have taps located along the walls that connect to various feed hoses that feed the drip system to the growing trays located on the raised benches. The growing trays will be placed in large secondary containment trays on the benches incase of spillage in the growing trays. Additionally, the floor of the greenhouse not covered in concrete will have a 60mill liner with gravel on top. Any permeate not used throughout the pilot will be disposed of in the current SWD.

The RO skid will sit on a concrete floor withing the current pump house. The interior of the pump house also has secondary containment lining. Should any water spill, it will be contained within the pump house. Additionally, all equipment within the pump house is controlled by a master control unit that monitors the key aspects of the system. Should any major leaking or problems occur, the master control unit shuts down the entire system to prevent any major spills.

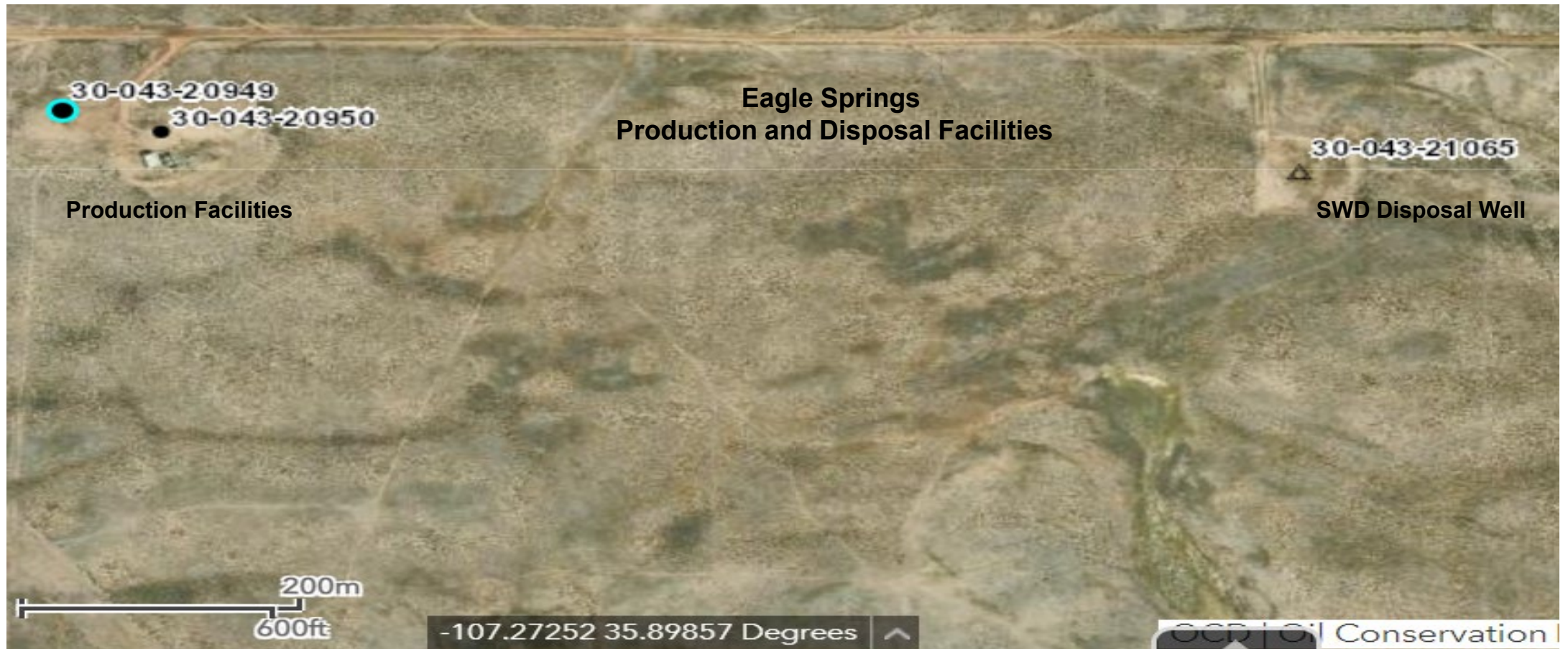
# Produced Water Handling System Greenhouse - Question #15

Controlled-environment agriculture, consisting of a twin-bay greenhouse, will utilize desalinated produced water for irrigation to grow pine tree seedlings. Current rules and regulations do not allow any produced water or desalinated water to contact or infiltrate site soil substrate; therefore, an impermeable geomembrane or cover will isolate the greenhouse interior growing and working space from soil beneath the greenhouse. In concert, current rules and standards disallow use of desalinated water from a produced-water source for irrigation of a food crop even though the water product is cleaner than any municipal water supply in New Mexico. Proposed work will demonstrate safe and environmentally sound application of desalinated produced water to aid in promulgation of new rules and regulation to fully utilize this resource.



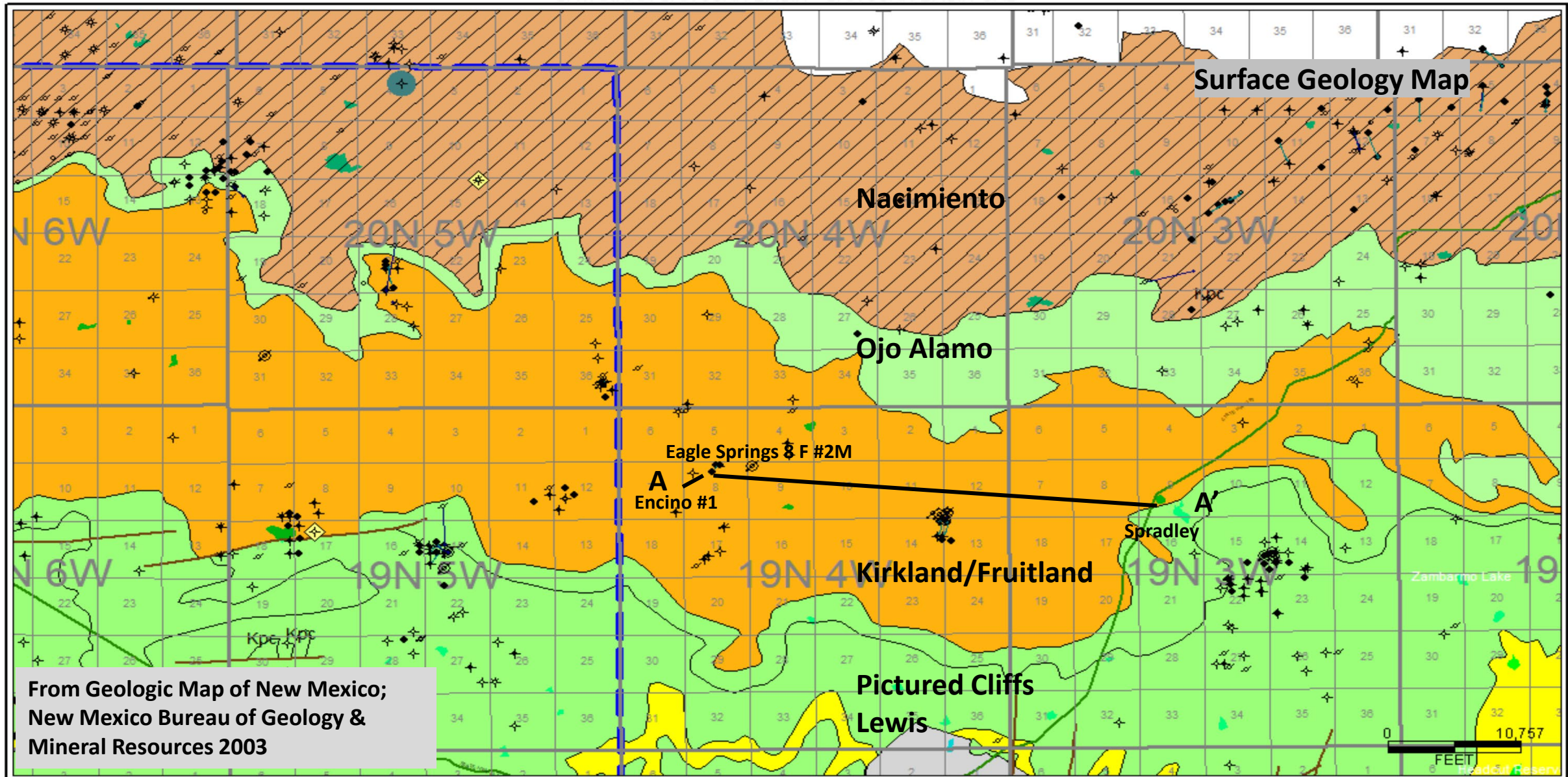
## Eagle Springs SWD System Question #16

We will continue to use the fully permitted, existing SWD well, Eagle Springs 9 Federal SWD 1 which is about one mile from the Central production facilities.





# Depth to Groundwater – Question #18



# Depth to Groundwater – Question #18

- **Objective:** To determine best approximation of depth to groundwater under the Eagle Springs Lease where the Greenhouse Pilot will be conducted.
- **Problem:** Precise determination of depth to groundwater is difficult due to lack of direct data and the distance between wells. However high confidence indirect determination is possible using information from 3 wells listed below:
- Well Information and data utilized to make the groundwater determination:
  1. Tesoro's Encino #1 19N 4W Section 8:

Located approximately 0.5 miles from the Eagle Springs (ES) 8 Fed 1H, it has a gamma ray log from surface to Total Depth 6714 ft and a full logging suite, which helps us understand the lithology of the subsurface directly under the Eagle Springs Lease. The gamma ray log has good correlation with the gamma ray logs from the ES 8 Fed1H and the derived gamma ray log in the Spradley Water Well.
  2. ES 8 Fed1H 19N 4W Section 8:

This well has both gamma ray and resistivity logs from 250ft to TD (6749 ft). When geologically correlated with the Encino #1 well at lower depths, we see a strong correlation between these two wells. Therefore, even though the ES Fed1H has no logs above 250ft, we expect the Encino #1 to be representative of the ES 8 Fed1H above 250 ft.
  3. Spradley Water Well 19N 3W Section 9:

The log report from OSE indicates the Spradley Water Well, located approximately 8 miles east of Eagle Springs Lease, was drilled in August 2019 to a depth of 720' (TD was in a probable transition zone of the Mesa Verde Cliff House Sand). This well has the Fruitland/Kirtland formation(s) on the surface (New Mexico State Geologic Map) which is non water bearing. The first zone that encountered water was found at a depth of 140' – 150'. This appears to correlate as being the uppermost sand present in the Pictured Cliffs Sandstone. This zone tested at a rate of 2 gpm. Most significantly is that this zone was sealed off as the water had a very high sulfide content. The first zone of producible water was found at a depth of 690' – 700' in a coarse grained sandstone. This sand appears to correlate with the Cliff House Transition Zone. This zone was tested at 10 gpm. The static water level was measured at 440'.
- **Conclusions:** Depth to groundwater under project area (Eagle Springs Lease) is estimated at 480ft based on the resistivity and gamma ray logs in the ES 8 Fed 1H. In the correlation log analysis performed by Savannah Exp. between the wells/logs listed above, it is highly unlikely that the water bearing Pictured Cliffs Sandstone in the Spradley Water Well exists above 300ft in the Encino #1 well or the ES 8 Fed1H. Synergy Operating, LLC, a prior operator of the Eagle Springs Lease, correlated the Pictured Cliffs Sandstone top at approx. 400ft. Savannah's interpretation estimates the first depth that strongly suggests water bearing in the ES 8 Fed 1H is at 480ft. Definitively, the water bearing Cliff House Transition Zone at 690' – 700' in the Spradley Water Well appears at approximately 730' – 740' in the ES 8 Fed 1H.

Note: All log analysis was performed by Glen Luebking of Savannah Exploration, Inc (3<sup>rd</sup> party)