

State of New Mexico
Energy Minerals and Natural Resources
Department Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505
<https://www.emnrd.nm.gov/ocd/ocd-e-permitting/>

Form C-147
Revised October 11, 2022

Recycling Facility Only

Type of action: ☒ Permit ☐ Registration ☐ Modification ☐ Closure ☐ Other (explain) _____

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.

1.
Operator: HPOC, LLC (For multiple operators attach page with information) OGRID #: 246238
Address: 6358 Main Street, Unit 1898, Cuba NM 87013
Facility or well name (include API# if associated with a well): Eagle Springs Oil Field, Eagle Springs 8 Federal #001H
OCD Permit Number: 3RF-63 (For new facilities the permit number will be assigned by the district office)
U/L or Qtr/Qtr B Section 8 Township 19N Range 4W County: Sandoval
Surface Owner: ☒ Federal ☐ State ☐ Private ☐ Tribal Trust or Indian Allotment

2.
☐ **Recycling Facility:**
Location of recycling facility (if applicable): Latitude 35.8984489 Longitude -107.2817764 NAD83
Proposed Use: ☐ Drilling* ☐ Completion* ☐ Production* ☐ Plugging *
**The re-use of produced water may NOT be used until fresh water zones are cased and cemented*
☒ Other, *requires permit for other uses. Describe use, process, testing, volume of produced water and ensure there will be no adverse impact on groundwater or surface water.*
☒ Fluid Storage Research Pilot Project under NMAC 19.15.34.8(3). Please see attachment for details.
☒ Above ground tanks ☐ Activity permitted under 19.15.17 NMAC explain type _____
☐ Activity permitted under 19.15.36 NMAC explain type: _____ ☐ Other explain _____
☐ **Closure Report (required within 60 days of closure completion):** ☐ **Recycling Facility Closure Completion Date:** _____

3.
Variances:
Justifications and/or demonstrations that the proposed variance will afford reasonable protection against contamination of fresh water, human health, and the environment.
Check the below box only if a variance is requested:
☐ Variance(s): Requests must be submitted to the appropriate division district for consideration of approval. If a Variance is requested, include the variance information on a separate page and attach it to the C-147 as part of the application.
If a Variance is requested, it must be approved prior to implementation.

4.
Operator Application Certification:
I hereby certify that the information and attachments submitted with this application are true, accurate and complete to the best of my knowledge and belief.
Name (Print): Nyle Khan Title: Manager
Signature: Nyle Khan Date: 08/21/2023
e-mail address: n.khan@hpocllc.com Telephone: (575) 385-1207

5.
OCD Representative Signature: Victoria Venegas Approval/Registration Date: 09/20/2023
Title: Environmental Specialist OCD Permit Number: 3RF-63
☒ OCD Conditions _____
☒ Additional OCD Conditions on Attachment _____

State of New Mexico
Energy, Minerals and Natural Resources Department

Michelle Lujan Grisham
Governor

Sarah Cottrell Propst
Cabinet Secretary

Todd E. Leahy, JD, PhD
Deputy Secretary

Dylan Fuge, Division Director
Oil Conservation Division



BY ELECTRONIC MAIL ONLY

September 19, 2023

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

RE: Eagle Springs Sealed Greenhouse Pilot

Dear Mr. Khan:

The New Mexico Oil Conservation Division (OCD) has reviewed the C-147 Form and associated attachments submitted by [246238] HPOC, LLC (Permittee) on August 24, 2023, Application ID 254925, for the proposed Eagle Springs Sealed Greenhouse Pilot (ESGP).

Given 19.15.34.8(A)(3) NMAC allows for pilot projects related to produced water research, OCD hereby approves the ESGP project subject to the following conditions of approval:

- Permittee agrees to the specific provisions set out in this document, all applicable requirements of 19.15.34 NMAC, and the commitments made in the attachments to the C-147 Form.
- The financial assurance (FA) associated with the ESGP project is \$25,000. The FA must be on OCD-prescribed forms, or forms otherwise acceptable to the OCD, payable to the OCD. Bond forms can be found at the bottom of OCD's Forms Page located at <https://www.emnrd.nm.gov/oed/oed-forms/>. The FA is due to the OCD's Administration and Compliance Bureau at 1220 South St Frances Drive, Santa Fe, NM 87505 prior to construction of the ESGP project.
- The Permittee shall notify the OCD when the ESGP commences operation and ceases operation.
- The Permittee shall conduct daily inspections during the duration of the ESGP project and ensure the facility is manned during reverse osmosis (RO) skid operation. If a malfunction occurs, the Permittee will report the malfunction to the OCD including the steps taken to address the malfunction.
- The Permittee shall:

- Conduct conductivity testing three times per week to ensure proper RO filtration; and
- Test the permeate stream to WQCC 20.6.2.3103 Standards and National Primary/Secondary Drinking Water Standards once a month for the first three months of ESGP operation and immediately in the event weekly conductivity testing shows an abnormality.
 - After the first 3-months of operation are concluded, testing shall occur every quarter.
 - If the Permittee wishes to reduce the testing frequency, the Permittee must receive approval from the OCD for a reduced testing frequency.
- The Permittee shall comply with 19.15.29 NMAC in the event of a release of produced water whether treated or untreated.
- The Permittee shall dispose of materials/equipment, including the tree seedlings, that come in contact with produced water, whether treated or untreated, at an OCD approved surface waste management facility.
- The Permittee shall submit semi-annual reports to the OCD that includes all sampling data, a summary of any exceedance(s) of WQCC and/or National Primary/Secondary Drinking Water Standards, the volume of produced water treated and injected into an approved SWD well, a summary of any releases of produced water, and an overall discussion of the ESGP's success and/or lessons learned.
 - The semi-annual reports are due to the OCD by July 30th and January 30th of each year for the preceding 6-month period.

The permit number for this facility is 3RF-63 - EAGLE SPRINGS OIL FIELD, EAGLE SPRINGS 8 FEDERAL #001H FACILITY ID [fVV2323649984]. The Permittee shall include this permit number in all future communications with the OCD.

If you have any questions, please do not hesitate to contact me at (505) 795-1722 or via email at LeighP.Barr@emnrd.nm.gov.

Take Care,

Leigh Barr

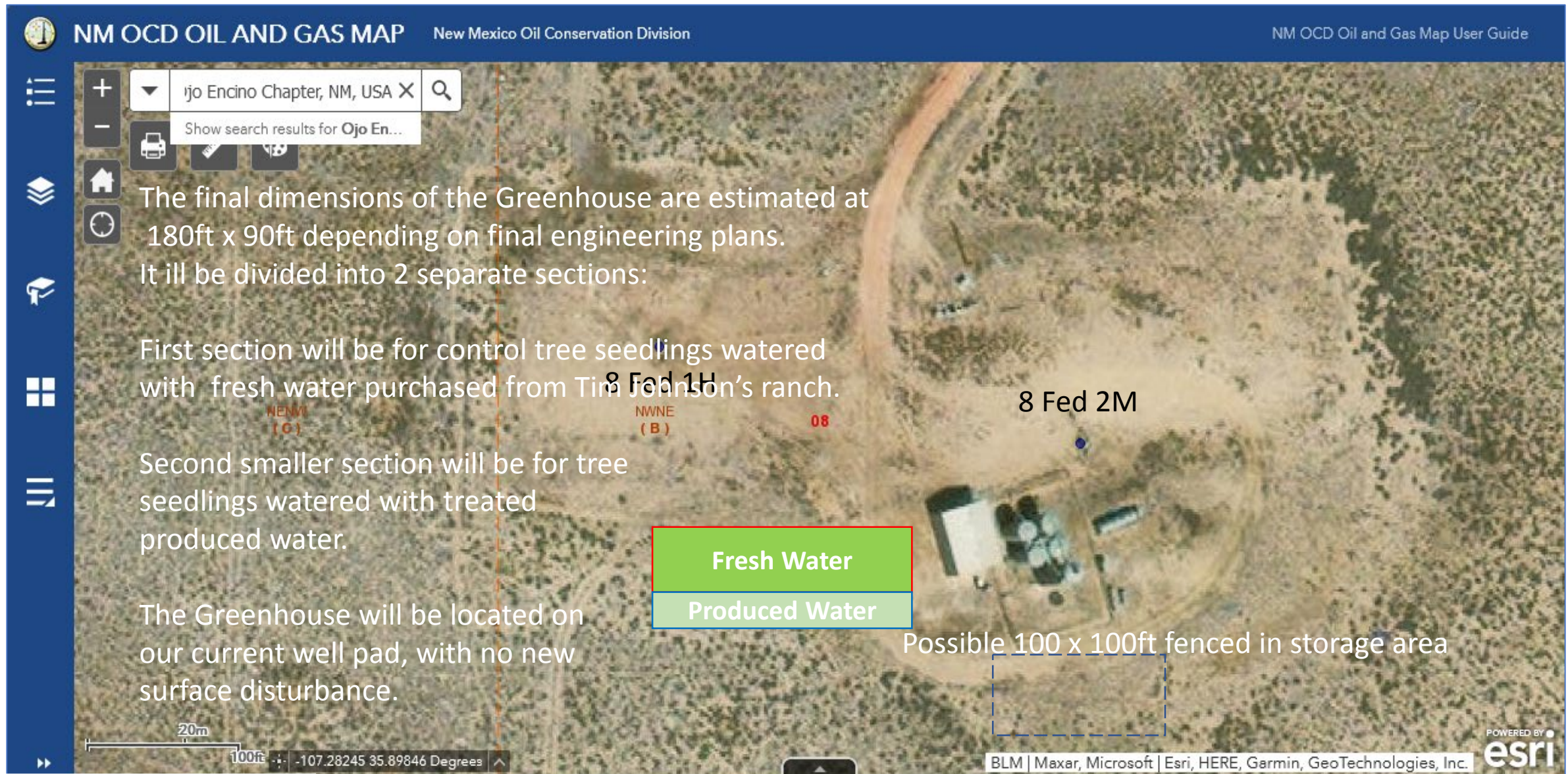
Leigh Barr
Administrative Permitting Supervisor

Kanalis Response to OCD August 1, 2023 Letter

- 1) Detailed description of the ESGP including diagrams and process flow sheets, as appropriate;
- 2) Equipment and materials list;
- 3) Sampling plan;
- 4) A closure/post-closure plan that includes associated costs. Note, financial assurance in the form of bonding is required for this project;
- 5) A list of chemicals used as part of the ESGP, if applicable, and a representative laboratory analysis of the reject water;
- 6) A statement that Kanalis understands that any materials/equipment, including the tree seedlings, that come in contact with produced water, either treated or untreated, must be disposed of at an OCD approved surface waste management facility;
- 7) Proof of approval of the ESGP by the Bureau of Land Management (BLM);
- 8) Description of any containment and/or measures taken to address a possible release from the heat exchanger located in the greenhouse;
- 9) A description of any land disturbance the ESGP may cause;
- 10) Description on the measures taken to support the statement that no untreated and pre-treated water will touch the ground at any point;
- 11) Description of any secondary containment incorporated in the pump house. Describe the pump house's containment lining and its functionality as it would pertain to a release;
- 12) Describe the storage capacity of the lined berm utilized to store the project's tanks. Will rainwater be vacuumed out of the lined berm to ensure proper storage capacity in the event of a release; and
- 13) Include any proposed inspections along with frequency. The OCD understands that equipment within the pump house will be controlled by a master control unit that monitors the key aspects of the system. Will there be periodic system testing to ensure the control unit is working properly?

Eagle Springs

Illustrative Diagram of Existing Field and Greenhouse – Question #1, #9



Eagle Springs Proposed Greenhouse Facilities Narrative

Questions #1, #10, #12

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 filter and 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 located in the lined berm.

All tanks, (oil, produced water, and clean water), are located in a 60 MM lined berm that is 60ft x 90ft x 2ft (approximately).

Greenhouse Interior:

Permeate Water from the clean water tank will either be piped or not (watered by hand) 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 treated produced water will be sprayed anywhere.

The irrigation trays will be placed in secondary water spillage/containment trays on stationed on the lined floor. This will provide spillage prevention redundancy.

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

Fresh water, bought from local suppliers, 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.

Equipment and Material List (Estimated) – Question #2

Growing Space Components

Item	Component
1	Multiple peak-roof greenhouse structure with covering, vents max size approx 180ft x 90 ft
2	Cooling system fans
3	Cooling evaporative pad system 4-in thick
4	Air circulation fans (internal overhead)
5	Greenhouse electrical, wiring, and controls
6	Plumbing, irrigation, and fertilizing system
7	Miscellaneous (pumps, switches, sensors, test equipment)
8	Greenhouse bay walkway
9	Internal column foundations
10	Impermeable groundcover inside greenhouse (60 mil liner)

Heating System Components

Item	Component
1	Heat exchanger- titanium stainless steel/ boiler
2	Bench heat black iron pipe SCH-40 2-inch black iron pipe
3	Perimeter and overhead heat SCH-40 2-inch black iron pipe
4	Misc (pumps, switches, sensors, test equipment)

Accessory Components

Item	Component
1	Rolling grow benches/sub irrigation containers
2	Growing containers

Headhouse Components

Item	Component
1	Multiple peaked-roof greenhouse structure with cheaper cover
2	Added perimeter heat SCH-40 2-inch black iron pipe
3	Headhouse slab

External Components

Item	Component
1	Reverse Osmosis Unit
2	External temporary water tanks located in lined berm
3	External piping
4	Hot water recirculating pump
5	External Fencing as needed
6	Activated Carbon Filtration
Note: Equipment listed is subject to final design parameters	

Sampling Plan – Question #3

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.

Kanalis Disposal and Decommissioning Plan

Question #4, #6

1. Disposal at Envirotech – Estimated cost \$10K
 - 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 – Estimated cost \$5K
 - 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 – Estimated cost \$10K
 - I. After cleaning, the structure will be dismantled and sold off if appropriate
4. A suitable bond will be posted

Chemicals Present – Question #5

A Hall Environmental Services Analysis Laboratory evaluation of reject water dated December 1, 2022 of volatile and semi-volatile substances found no out-of-tolerance observations with EPA Primary or Secondary drinking water standards.

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order: 2210841

Date Reported: 12/1/2022

CLIENT: NMSU

Project: BGNDRF SWRO

Lab ID: 2210841-003C

Client Sample ID: Concentrate

Collection Date: 10/17/2022 10:00:00 AM

Matrix: Aqueous

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 8270C: SEMIVOLATILES							Analyst: JME
Acenaphthene	ND	10		µg/L	1	10/31/2022 5:26:25 PM	71006
Acenaphthylene	ND	10		µg/L	1	10/31/2022 5:26:25 PM	71006
Aniline	ND	10		µg/L	1	10/31/2022 5:26:25 PM	71006
Anthracene	ND	10		µg/L	1	10/31/2022 5:26:25 PM	71006
Azobenzene	ND	10		µg/L	1	10/31/2022 5:26:25 PM	71006
Benz(a)anthracene	ND	5.0		µg/L	1	10/31/2022 5:26:25 PM	71006
Benzo(a)pyrene	ND	10		µg/L	1	10/31/2022 5:26:25 PM	71006
Benzo(b)fluoranthene	ND	10		µg/L	1	10/31/2022 5:26:25 PM	71006
Benzo(g,h,i)perylene	ND	5.0		µg/L	1	10/31/2022 5:26:25 PM	71006
Benzo(k)fluoranthene	ND	10		µg/L	1	10/31/2022 5:26:25 PM	71006
Benzoic acid	ND	20		µg/L	1	10/31/2022 5:26:25 PM	71006
Benzyl alcohol	ND	5.0		µg/L	1	10/31/2022 5:26:25 PM	71006
Bis(2-chloroethoxy)methane	ND	10		µg/L	1	10/31/2022 5:26:25 PM	71006
Bis(2-chloroethyl)ether	ND	10		µg/L	1	10/31/2022 5:26:25 PM	71006
Bis(2-chloroisopropyl)ether	ND	5.0		µg/L	1	10/31/2022 5:26:25 PM	71006
Bis(2-ethylhexyl)phthalate	ND	10		µg/L	1	10/31/2022 5:26:25 PM	71006
4-Bromophenyl phenyl ether	ND	10		µg/L	1	10/31/2022 5:26:25 PM	71006
Butyl benzyl phthalate	ND	10		µg/L	1	10/31/2022 5:26:25 PM	71006
Carbazole	ND	10		µg/L	1	10/31/2022 5:26:25 PM	71006
4-Chloro-3-methylphenol	ND	5.0		µg/L	1	10/31/2022 5:26:25 PM	71006
4-Chloroaniline	ND	5.0		µg/L	1	10/31/2022 5:26:25 PM	71006
2-Chloronaphthalene	ND	10		µg/L	1	10/31/2022 5:26:25 PM	71006
2-Chlorophenol	ND	5.0		µg/L	1	10/31/2022 5:26:25 PM	71006
4-Chlorophenyl phenyl ether	ND	10		µg/L	1	10/31/2022 5:26:25 PM	71006
Chrysene	ND	10		µg/L	1	10/31/2022 5:26:25 PM	71006
Di-n-butyl phthalate	ND	10		µg/L	1	10/31/2022 5:26:25 PM	71006
Di-n-octyl phthalate	ND	20		µg/L	1	10/31/2022 5:26:25 PM	71006
Dibenz(a,h)anthracene	ND	10		µg/L	1	10/31/2022 5:26:25 PM	71006
Dibenzofuran	ND	10		µg/L	1	10/31/2022 5:26:25 PM	71006
1,2-Dichlorobenzene	ND	5.0		µg/L	1	10/31/2022 5:26:25 PM	71006
1,3-Dichlorobenzene	ND	5.0		µg/L	1	10/31/2022 5:26:25 PM	71006
1,4-Dichlorobenzene	ND	5.0		µg/L	1	10/31/2022 5:26:25 PM	71006
3,3'-Dichlorobenzidine	ND	10		µg/L	1	10/31/2022 5:26:25 PM	71006
Diethyl phthalate	ND	10		µg/L	1	10/31/2022 5:26:25 PM	71006
Dimethyl phthalate	ND	10		µg/L	1	10/31/2022 5:26:25 PM	71006
2,4-Dichlorophenol	ND	5.0		µg/L	1	10/31/2022 5:26:25 PM	71006
2,4-Dimethylphenol	ND	10		µg/L	1	10/31/2022 5:26:25 PM	71006
4,6-Dinitro-2-methylphenol	ND	10		µg/L	1	10/31/2022 5:26:25 PM	71006
2,4-Dinitrophenol	ND	20		µg/L	1	10/31/2022 5:26:25 PM	71006
2,4-Dinitrotoluene	ND	5.0		µg/L	1	10/31/2022 5:26:25 PM	71006
2,6-Dinitrotoluene	ND	10		µg/L	1	10/31/2022 5:26:25 PM	71006

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*

D

H

ND

PQL

S

Value exceeds Maximum Contaminant Level.

Sample Diluted Due to Matrix.

Holding times for preparation or analysis exceeded

Not Detected at the Reporting Limit

Practical Quantitative Limit

% Recovery outside of standard limits. If undiluted results may be estimated.

B

E

J

P

RL

Analyte detected in the associated Method Blank

Above Quantitation Range/Estimated Value

Analyte detected below quantitation limits

Sample pH Not In Range

Reporting Limit

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BLM Approval – Question #7

Hello Mr. Khan,

I spoke with Leigh Barr with OCD and indicated BLM's intent to move forward with granting approval of the sundry application once OCD approval has occurred. Once all documentation on the various approvals that have occurred to date (OCD, NMED) are procured and included in your sundry application the BLM will move forward on processing your sundry request.

Joshua Freeman
Assistant Field Manager Multi-Resources
Rio Puerco Field Office
Bureau of Land Management
Phone: 505-761-8778
Fax: 505-761-9891
Email: jfreeman@blm.gov

Produced Water Handling Safety System - Questions #10, #11

The reverse osmosis skid will be a three 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. 60% 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 pre- filter, then through a 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 500bbl storage water tank(s) through 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 using sub irrigation methodology. Alternatively, we may choose to hand irrigate instead. Additionally, the floor of the greenhouse used by the treated produced water covered 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 within the current pump house. The interior of the pump house also has secondary containment lining around the perimeter. 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. This system is monitored 24/7, with visual inspections daily.*

Question #13

Visual inspections occur daily.

Should system fail, operator immediately notified as equipment begins to shut down.

All equipment monitored remotely.

During R/O runtime, facility will be manned.

Daily visual inspection of master control unit – multiple electronic checks as well.

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 254925

CONDITIONS

Operator: HPOC, LLC P.O. Box 1898 Cuba, NM 87013	OGRID: 246238
	Action Number: 254925
	Action Type: [C-147] Water Recycle Short (C-147S)

CONDITIONS

Created By	Condition	Condition Date
vvenegas	Conditions of Approval provided by email.	9/20/2023