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DIVISION OF MINERALS

STATE OF NEVADA
COMMISSION ON MINERAL RESOURCES
DIVISION OF MINERALS
400 W. King Street, Suite 106
Carson City, Nevada 89703
(775) 684-7040 | Fax (775) 684-7052
http://minerals.nv.gov

Date Received 2/22/2023
API Number 27-015-90141
County Lander
Permit Number 1553
FOR DIVISION USE ONLY

GEOTHERMAL INJECTION WELL PERMIT APPLICATION

The applicant

Beowawe Power LLC
Name (or Corporate/Business Name)

Nevada SOS Business ID Number NV 20001036986

Street Address 6140 Plumas Street

City Reno State NV Zip Code 89519

Telephone 775-356-9029

Email mhanneman@ormat.com

hereby makes application for a geothermal development permit, State of Nevada, Division of Minerals.

Applicant is: ☐ Land Owner ☒ Lease Holder

Well Name: 85A-18

Lease Name/No: NVN-105583051 Split Estate? ☐ Yes ☒ No

Land Type: ☒ Federal (BLM, USFS, etc.) ☐ Private ☐ State

Type and Amount of Bond: Nationwide BLM Bond $250,000
(Exempt for Domestic Class)

Bond Issued by: B of A

Serial Number: NVB000284

Well Location: NE ¼ of, SE ¼, Section 18,

Township 31N, Range 48E, County Lander.

UTM Northing 4,488,842 N; UTM Easting 534,149 E (NAD83 Datum)

Operator's:

Name: Beowawe Power LLC

Address: 6140 Plumas St

City, St Zip: Reno, NV 89519

Drilling Contractor's:

Name: Geodrill

Address: 6140 Plumas Street

City, St Zip: Reno, NV 89519

Telephone: 775-356-9029

Hole Size: 17.5 Casing Size: 16 Weight/Gauge: 75 lb/ft

Size of BOP: ☒ 2000 psi ☐ 3000 psi ☐ 5000 psi

Rotary Description:

Full size, geothermal, mud rotary rig

Identify or locate the sources of the fluids which will be injected:

fluid will be from geothermal production wells, following heat extraction at power plant.

Estimated average daily volume of fluids injected 12,000,000 gallons.

Maximum daily volume of fluids injected 13,000,000 gallons.

Estimated maximum injected pressure 275 psi, temperature 155 °F

List proposed metering equipment, pipelines and safety devices that will be used to prevent accidental pollution:

see attached drilling program.

Total Depth to be Drilled: 3500

Drilling will Commence On: April 1, 2023

Is this well location under an Underground Injection Permit?

If so, provide NDEP Permit number UNEV UNEV 50033 Well will be added to permit, if successful.

I certify this information to be true, correct, and complete and that no pertinent matter inquired about in this application has been omitted.

Signature of Applicant/Agent: Mark Hanneman

Print Name: Mark Hanneman

Date: January 31. 2023

Please attach a detailed drilling program including the following information:

1. Well design schematic; casing and mud programs; potential water supply; drilling rig to be used and pad layout; blow out prevention equipment diagram and testing program; directional drilling information if applicable; map of location and access roads. Additional information may be required upon review.
2. The required fee per NAC 534A 210 or 534A.212.

CONDITIONS OF PERMIT

1. **All permittees must comply with appropriate sections of the Geothermal Rules and Regulations of the Division of Minerals and with applicable rules and regulations of other local, state, and federal agencies.**

2. **During the drilling of geothermal injection wells, all water strata above the geothermal horizon being used must be sealed or separated in order to prevent their contents from passing into other strata.**

3. **All fresh water and water of value or possible value for other beneficial uses must be confined to their respective strata and be adequately protected by methods approved by the Division. Precautions must be taken in drilling and abandoning wells to guard against any loss of fresh water from the strata in which it occurs, and the contamination of any fresh water by objectionable water.**

4. **The operator of any well must shut off and exclude all water from any geothermal resource-bearing stratum to the satisfaction of the Division.**

5. **See attached Conditions of Approval.**

6. **Please send daily drilling reports to : Fluid Minerals Program Email.....fluids@minerals.nv.gov**

7. **Additional Conditions/Comments**

A.	Please submit the injection test plan, provided by the resource engineer, before performing tests.
B.	
C.	

This permit does not extend the permittee the right of ingress and egress on public, private or corporate lands.

The issuance of this permit does not waive the requirements that the permit holder obtain other permits from State, Federal, and local agencies.

PERMIT APPROVAL

Approved 5/5/2023 with the conditions noted above.
Date

Permit Number 1553

Administrator
Division of Minerals

STATE OF NEVADA
COMMISSION ON MINERAL RESOURCES
DIVISION OF MINERALS
400 W. King Street, Suite 106
Carson City, Nevada 89703
(775) 684-7040 • Fax (775) 684-7052
http://minerals.nv.gov/

JOE LOMBARDO
Governor

Las Vegas Office: 375 E. Warm Springs Rd. Ste 205, Las Vegas, NV 89119
Phone: (702) 486-4343; Fax: (702) 486-4345

MICHAEL VISHER
Administrator

GEOTHERMAL CONDITIONS OF APPROVAL FOR INJECTION WELL DRILLING PERMIT 1553

Submit forms and correspondence to: Nevada Division of Minerals
400 West King Street
Suite 106
Carson City, NV 89703

Operator: Beowawe Power LLC
Lease Name: NVN-105583051
Well: 85A-18
Permit#: 1553

A COPY OF THESE CONDITIONS OF APPROVAL MUST BE FURNISHED TO YOUR FIELD REPRESENTATIVE TO ENSURE COMPLIANCE

Communications with the Division shall be directed to:

Dustin Holcomb, Fluid Minerals Program Manager
Office 775-684-7046 Email dholcomb@minerals.nv.gov
Cell 775-721-2726
Fax 775-684-7052

Michael Visher, Division Administrator
Office 775-684-7044 Email mvisher@minerals.nv.gov
Cell 775-721-7625
Fax 775-684-7052

Voicemail is available on all cell phones and office phones. Please leave a message if you are unable to speak to someone and we will return your call as quickly as possible.

By provision of the current Memorandum of Understanding between NDOM and BLM, you may contact the following individuals for information or approvals. Approvals under the MOU apply to Fee and Federal lease locations.

Alexander Jensen, Acting Branch Chief, Reno
Office 775-861-6564 Email aajensen@blm.gov
Cell 775-560-2191
Fax 775-861-6711

Michael Erickson, PET, Reno
Office 775-861-6641 Email merickson@blm.gov
Cell 775-686-8351
Fax 775-861-6711

YOUR APPLICATION TO DRILL THE BEOWAWE 85A-18 INJECTION WELL, PERMIT 1553, IS APPROVED SUBJECT TO THE FOLLOWING PERMIT CONDITIONS

1. These conditions and the minimum Blow Out Prevention Equipment (BOPE) requirements shall be posted at the well site and read by all company personnel associated with the subject well.

2. The operator shall give notification at least 48 hours prior to spudding, drill stem testing, or production or injection testing operations. 24 Hours notification is required prior to the testing of casing or BOPE. These notifications may be by telephone or email. Please refer to the contacts list on page one of this notice.

3. If the cementing mix for the lead cement in this program includes a 10 lb/sk of Spherelite, a spherical additive for reducing density of cement mix, a high resolution CBL may be required if the cement does not reach surface, or if the cementing of the casing appears to be inadequate. This additive has been found to interfere with normal cement bond logging (CBL). The product manufacturer has stated that good logging may be achieved with a high resolution CBL. This log can be more expensive and difficult to schedule. The operator is here notified that if this mix is used and a CBL is required by the regulatory agencies, a high resolution logging may also be required if the CBL is found to be inadequate in the evaluation of the cement behind casing, unless an alternative satisfactory method of confirming cement bonding is approved by the regulatory agencies.

4. Well Cellars - For corrosion prevention, the cellar must be engineered, constructed, and/or maintained, to preclude standing water from long-term contact with the casing or wellbore assembly. The top of the surface casing will be a minimum of 24 inches above the cellar floor, or ground level if a cellar is not present. Surface casing will be as high as possible around intermediate casing with excess, tapered cement so water does not pool on top of cement. At the completion of the well, the drilling

pad is to be contoured in a manner that drains water away from the cellar, or surface casing if a cellar is not present.

5. Change in Plans - NAC 534A.540 (3) (g) specifies the operator will submit a sundry for permission for change of drilling plans. Verbal permission may be granted to a sundry notice due to an urgency of a particular matter.

6. Surface Casing - NAC 534A.260 (3) requires that surface casing be sufficient to protect fresh water aquifers and not less than 10% of the proposed total depth of well, or a minimum 50 feet, whichever is greater. The cementing of casing strings shall be done using the standard procedure of inside casing displacement or tab-in methods, unless other methods are approved prior to the cementing procedure.

7. Cementing - NAC 534A.260 (3, 4, 5) requires surface and intermediate casing to be cemented to surface. If one hundred percent (100%) returns are not obtained during the cementing operation, or if the cement falls back in the annulus, a top cement job shall be required, unless another cement program has been approved. If unconventional cement formulations are used, there must be a cased-hole logging technique available to determine the adequacy of cement bonding and hydraulic seal for the particular unconventional cement product used.

8. BOPE - After surface casing is set, all wells shall be equipped with at least the minimum required Blowout Prevention Equipment (BOPE), unless otherwise approved. NAC 534A.260 (5) requires BOPE to be tested to at least 500 psig for 30 minutes with <10% pressure loss or as approved by the Division. BOPE should be in accordance with good established oil field practice with adequate kill lines and good working order.

9. Perform casing shoe pressure test at all casing shoes – A successful casing shoe pressure test, must be performed before drilling deeper. The Division does *not* want the formation or cement to be fractured or broken down during the test. The purpose of this test is to ensure the integrity of the cement job by showing the area below and around the casing shoe will hold pressure. The operator is to drill out no further than five feet out of the casing shoe, and then pressure up to approximately 10% below the known or estimated fracture gradient for a minimum of 30 minutes. In order to pass a casing shoe pressure test there can be no more than a 10% pressure loss over the course of the minimum 30 minute test. In the event of a failed casing shoe pressure test, a cement squeeze job must be performed below the casing shoe. A successful casing shoe pressure test must be performed before drilling deeper. The following formula is to be used for the applied surface pressure calculation:

Calculate the downhole pressure for a specified or targeted pressure gradient
Specified Pressure Gradient {(psi/ft) x vertical depth (ft)} = Pressure G (psi)

Calculate the downhole pressure due to the current mud in the hole
Mud Density (ppg) x vertical depth (ft) x 0.052 =Pressure M (psi)

Calculate the surface pressure required to test formation or shoe to a specified gradient
Pressure G - Pressure M = Required Surface Pressure (psi)

Example of Formation Integrity Test at 20" Surface Casing Shoe:
Casing Shoe at 271 ft (TVD)
Mud Weight- 9.0 ppg
Specified Pressure Gradient to test casing the 20" shoe - 0.6 psi/ft
Pressure G = 0.6 psi/ft x 271ft = 162.6 psi
Pressure M = 9.0 ppg x 271 ft x 0.052 = 126.8 psi
Required Surface Pressure = Pressure G - Pressure M = 162.6 - 126.8 = 35.8 psi

10. Injection liner – If an injection liner is utilized the liner hanger must be located at least 100 feet above the surface or intermediate casing shoe.

11. Directional Drilling - NAC 534A.360 requires directional surveys (inclination and azimuth) to be run on any well permitted directionally drilled well. Division conditions of approval further require directional survey (inclination and azimuth) where the inclination exceeds 5 degrees or the projected bottom hole location would be 100 feet or less from the lease boundary, unless otherwise approved by the Division of Minerals. Direction surveys must be performed at least every 250 feet in the directionally drilled portion of the wellbore. The operator is advised that cased-hole logging for the evaluation of cement bonding and hydraulic seal may also be required as part of the well completion. The cased-hole logging technique(s) utilized by the operator must be able to give conclusive results regarding the initial quality of cement bonding and hydraulic seal.

12. Hydrogen Sulfide – If hydrogen sulfide is encountered well must be shut-in until measured amounts are determined. Values of hydrogen sulfide encountered must be reported to the Division of Minerals.

13. Air/Aerated Drilling Operations – For air/aerated drilling operations, the following equipment shall be utilized: banjo box (or equivalent), and a staked down blooie line directed to the reserve pit with a minimum distance of 100 feet.

14. Samples – NAC 534A.310 requires samples of cuttings or splits of core shall be collected and submitted to the Nevada Bureau of Mines and Geology (NBMG). Division conditions of approval further require a minimum of 30-foot intervals from surface to the total depth, unless otherwise approved in the permit.

    a. TWO separate sets of cuttings, and one split of core, are to be sent prepaid to the Great Basin Science Sample and Records Library, Nevada Bureau of Mines and Geology, 2175 Raggio Parkway, Reno, Nevada 89512. For more information phone 775-682-8766 or e-mail nbmg@unr.edu.

    b. EACH SET of cuttings is to consist of at least 15 milliliters of cuttings per sampling interval that must be cleaned, dried, and placed into 3"x5" sample envelopes. The envelopes are to be placed in order by interval into common drill cutting boxes with approximate dimensions of 3"x5"x20". The envelopes are to be identified by the Division permit number, well name/number as noted on the Geothermal Resource Development Permit Application, and interval.

    c. The samples are to be PROPERLY IDENTIFIED as follows: Each box is to have legibly written on one end the name of the operator and well, as noted on the Geothermal Resource Development Permit Application, Division permit number, total interval (missing intervals noted), and set number.

    d. NOTE: the samples are not to be sent to the Division of Minerals, rather they should be sent directly to the NBMG. **The samples are due within 30 days of completion of the well**. The operator will be responsible for the cost of any further handling of your samples by the NBMG required to meet the standards set out in this permit condition.

Drilling Reports - The Nevada Division of Minerals will be included on the daily morning operational report distribution list during the drilling/completion of the well, starting on spud date and through date of drill rig release, or date of completion rig and/or completion equipment release, whichever occurs last. The operational morning report is to be emailed to the Fluid Minerals Program email fluids@minerals.nv.gov

15. Well Completion Report - NAC 534.550 (1) (a) requires a well completion form to be filed with the Division of Minerals within 30 days of the cessation of drilling (rig release date).

16. Logging - NAC 534A.350 requires two copies of all well logs run, including lithological and electrical, neutron-gamma or similar, to be filed with the Division. Computed results in LAS format must also be submitted to the Division for each electric log run. Electronic files are to be provided on CD Rom. These logs are to be submitted within 60 days of the completion of the well.

17. Survey Plat - NAC534A.205 requires a certified plat of the location by a professional land surveyor of the well must be filed with the Division of Minerals within 60 days of completion of the construction of the well.

18. Emergency Notification - In the event of a serious accident, blow out, spill or fire, immediately notify the Division of Minerals (see page one for contact information).

19. Spills - Spills or accidental discharge of hydrocarbons in excess of 25 gallons must be reported to the Nevada Division of Environmental Protection at 1-888-331-6337.

20. Plugging - NAC 534A.540 require all plugging and abandonment programs to be approved prior to commencing plugging and abandonment work. Verbal approval may be given. Subsequent submission of forms is required with 30 days of completion of plugging operations.

21. UIC Requirements – Operators must refer to NDEP Bureau of Water Pollution Control Underground Injection Control (UIC) for wells proposed for use as injection wells. These documents will provide you with guidance for collection of data during the drilling progress which will be required for submission with an application for an Underground Injection Permit. Forms, specifically the U120 and U202, can be accessed at: https://ndep.nv.gov/water/water-pollution-control/permitting/underground-injection-control-uic/forms .

22. Well head protection and cellar design – Cellar design must prohibit soil and water contact with casing and well head components, as well as prevention of standing water around same. If water chemistry indicates corrosion precautions and / or cathodic protection may be necessary. The operator must be prepared to document water chemistry and protective measures taken to permit injection into the well via a UIC permit. For further information contact NDEP Bureau of Water Pollution Control 775-687-9418 or visit the Bureau's website ndep.nv.gov/water.

23. Injection Testing and Stimulation Programs – Programs must have prior approval from the Division. Completion Reports must be accompanied by the appropriate checklist of information regarding these programs.

24. **The enclosed Abandoned Mines brochure shall be posted at the well site alongside the Conditions of Approval and the Minimum Blowout Prevention Equipment Requirements and read by all company personnel associated with the subject well. The operator shall inform all drilling personnel and contractors associated with the drilling of the well of potential dangers, including bodily injury, associated with the exploration of abandoned mine workings, as well as the disturbance of possible bat habitats.**

25. The Operator shall ensure proper centering of the casing strings for new wells with downhole centralizers as well as centering the top of the casing with the drilling rig during and immediately after cement is put in place. The Operator must also ensure that the number and depths of casing centralizers are recorded in a contemporaneous log during the installation of the casing strings.

SUNDRY NOTICES
OIL, GAS AND GEOTHERMAL

Verbal approval for the following work may be given by the Division:

1. Any emergency work necessary to prevent or control blow outs or other situations with significant potential to result in injury to the crew or damage to the environment or resource.
2. Any kick-offs necessary to by-pass bad hole or fish left in hole.
3. Changes in casing points due to bad hole.
4. Deepening, attempting to encounter resource.
5. Necessary well work to keep geothermal power plants operating.
6. Drilling equipment failure.
7. Squeeze or plug backs to prevent any injected geothermal or oil field waters from contaminating other water zones.

The operator is required to file a written sundry notice with the Division subsequent to verbal approval if the sundry notice has not already been filed. Verbal approvals will not be given for any work that can be planned in advance, such as acidizing, changes in casing points or completion, etc., reentry of a well, remedial work, production or injection testing.

NDEP

Nevada Division of Environmental Protection
Bureau of Water Pollution Control
Underground Injection Control Program

UIC Form U120 - Checklist for UIC Completion Report for Class II and Geothermal Injection Wells

Complete or check-off all items - Attach this form to each new injection well submittal
(Operator checks of items submitted in first column, and fills in blanks in table)

Well Name and Number _____ (well name – field or project name)
UIC Permit Number _____
API No.: _27-____-_____ NDOM Permit No. _____

Spud date: _____ **End Drilling date:** _____ **Land Status for well:** ___Private ___Public

___ New well or ___ Workover **Date Form submitted:** _____

Submitted √	Recd √	Recd Date	Submit at least 30 days before approval needed
			Confidentiality Requested: YES NO (stamp each page you feel should be "confidential")
			Location data
			Is well registered with NDOM as an injection well? YES NO
			Section, Township and Range _____
			Latitude _____ and Longitude _____
			Updated Well Map (with new injection well and all Prod/Observ/Injection wells)
			Injection Well Site Signage: Well Name/Number, NDOM/API #s, location, contact info
			Calculated maximum injection wellhead pressure **Calc Value = _____ psig**
			Injection pressure per NAC 445A.911.1, show calculation in completion report
			Requested Injection Rates: maximum _____
			Water Chemistry of injection zone(s) **Date collected** _____
			Well Schematic **Date as of** _____
			Daily reports
			Cementing records
			Deviation checks – including map view plot of well track
			Mud logs
			Static Temperature Log
			All Other logs run on well - List _____
			Corrosion Prevention plan – wellhead and injection casing What was done?
			Internal MIT Records - **Type run** _____
			Date as of _____
			External MIT Records - **Type run** _____
			Date as of _____
			Injection Test results
			Other testing performed? _____
			Cost Estimate for Plugging and Abandonment **Date as of** _____
			Bonding assurance (this could be a bond with BLM or NV Division of Minerals)
The following information can be submitted after surface equipment installation is completed			
			Wellhead schematic with location of gauges
			Photos of gauge locations, corrosion prevention and wellhead are required

Pursuant to NAC 445A.909 **Submission and contents of notice of completion; approval or denial of permission to initiate injection.** (NRS 445A.425, 445A.465)

Rev May 22, 2017 RECORD DATE _____ BY_____

Nevada Division of Environmental Protection
Bureau of Water Pollution Control
Underground Injection Control Program
901 S. Stewart St Ste 4001
Carson City Nevada 89701
Ph: 775-687-9418 Fx: 775-687-4684

UNEV Permit Application Form U202
APPLICATION ATTACHMENTS – Class 2, 3, or 5 Geothermal Wells

Attachments are required to be submitted with all UNEV permit applications. Be sure you choose the appropriate "Attachments" Form from the list below that applies to the type of well you will be using. Go to http://ndep.nv.gov/bwpc/forms/html#uic if you need to obtain one of these other forms.

I. Form U201 – CLASS 5 (types not listed below)
II. Form U202 – CLASS 2, CLASS 3, or CLASS 5 GEOTHERMAL
III. Form U203 – CLASS 5 REMEDIATION or TRACER TESTING

IF APPLICATION IS FOR AN UIC GENERAL PERMIT, STOP HERE – do not provide the attachments below. Instead, attach the specific Notice of Intent (NOI) for that general permit.

Application Attachments for Class 2, 3 or Class 5 Geothermal Injection Wells

Read the instructions for preparing the attachments carefully and refer to the regulations (NAC 445A.867). The ability to process your application for a permit depends heavily on the completeness and accuracy of the attachments. Attachments shall be submitted with UIC permit applications for Class 2, 3, and 5 wells, including Oil and Natural Gas Production (disposal, enhanced recovery, and storage), Solution Mining (In-Situ Production for uranium and metals, and fossil fuel recovery, etc.), and geothermal pursuant to NAC 445A.867.

Attachments

A. MAPS OF WELLS/AREA AND AREA OF REVIEW (AOR) - Submit the following maps:

a. Injection well map - a topographic map, extending at least one mile (see AOR Methods below) beyond the project/property boundaries, showing all existing and proposed injection well(s) or if locations of injection wells are not know – highlight the sections in the project area for which a permit is sought and the applicable area of review.

b. Second map showing area of review, the map must show the following:

All wells and other relevant features including producing wells, injection wells, abandoned wells, dry holes, surface bodies of water, springs, mines (surface and subsurface), quarries, water wells, public water supply systems, and other pertinent surface features, including residences, roads, faults (if known or suspected), etc. The map must show all intake and discharge structures and all hazardous waste, treatment, storage, or disposal facilities.

c. Third map showing distribution system from producing wells – through surface facilities (e.g. processing units, treatment works, power plant, etc.) to injection wells; include pumps, valves, manifolds, all system monitoring points.

d. Fourth map showing property boundaries and land ownership (public or private - include land

owners name)

AREA OF REVIEW (AOR) METHODS - The area of review shall be a fixed radius of 1 mile from the well bore unless the use of an equation is approved in advance by the Director. If alternative method is pre-approved by the Director, give the method(s) and the calculations used to determine the size of the area of review (fixed radius or equation).

FOR RENEWAL
Please review the original and subsequent renewal applications, and update the maps of wells and AOR. Identify any changes or new work performed over the last 5 years that is different than in the original application, please summarize in this renewal application.

B. DESCRIPTION, MAPS AND CROSS SECTIONS OF REGIOINAL GROUND WATER –

1. Submit a description of the hydrology in the area, including geologic name/units where any ground water could be found, and depth to top and bottom of all aquifers.
2. Submit maps and cross sections indicating the vertical limits of all aquifers within the area of review, their position relative to the injection formation and the direction of water movement, where known, in every aquifer. Include depth to groundwater, groundwater flow direction/rate, and hydraulic conductivity.

A baseline water analysis of the receiving groundwater (zone of injection) of the injection wells must be submitted with the application. The applicant may wish to provide more than one sample to adequately characterize the receiving groundwater for baseline purposes. It is the responsibility of the applicant to determine background water quality conditions (physical and chemical) in the region immediately surrounding the injection wells, and determine current baseline water quality in the ground/surface water above the injection zone(s) and of the receiving groundwater. Determination of baseline and background conditions may require multiple sampling points and/or dates. Keep in mind baselines values in the application may be reflected in permit limitations in the UIC permit, so the more background data an applicant uses, the better actual conditions will be represented.

The sample(s) must be analyzed for inorganics (UIC Extended Sample List 2), other relevant constituents may also be required, such as total petroleum hydrocarbons. This sampling must be completed for each new injection well constructed based on the zone of injection.

FOR RENEWAL
Please review the original application, and identify any changes or new work performed over the last 5 years that is different than in the original application, please summarize and provide new maps and cross sections in the renewal application.

C. DESCRIPTION, MAPS AND CROSS SECTIONS OF GEOLOGIC STRUCTURE OF AREA -

Submit maps and cross sections detailing the geologic structure of the local area (including the lithology of the injection zone and confining intervals thickness, depths and fracture pressure) and generalized maps and cross sections illustrating the regional geologic setting.

FOR RENEWAL
Please review the original application, and identify any changes or new work performed over the last 5 years that is different than in the original application, please summarize and provide new maps and cross sections in the renewal application.

D. CORRECTIVE ACTION PLAN AND WELL DATA - Submit a tabulation of data reasonably available from public records or otherwise known to the applicant on all wells within the area of review, including those in the map required in the Maps Section, which penetrates the proposed injection zone. Such data shall include the following:

A description of each well's type, construction, date drilled, location, depth, record of plugging and/or completion, and any additional information the Director may require. Include the corrective action proposed to be taken by the applicant under NAC 445A.899.

FOR RENEWAL
Provide information on any wells modified or constructed within the AOR since the last renewal or original application. Submit any details needed for corrective action on these or other wells.

E. FORMATION TESTING PROGRAM - For Class 2 and geothermal Class 5 wells, the testing program must be designed to obtain data on fluid pressure, estimated fracture pressure, physical and chemical characteristics of the injection zone.

For Class 3 wells the program must be designed to obtain data on fluid pressure, fracture pressure, and physical and chemical characteristics of the formation fluids if the formation is naturally water bearing. Only fracture pressure is required if the formation is not water bearing.

FOR RENEWAL
Please review the original application, and identify any changes or new work performed over the last 5 years that is different than in the original application, please summarize in the renewal application.

F. CONSTRUCTION PROCEDURES and DETAILS - Discuss the injection well construction procedures to be utilized. This should include details of what type of rig will be used to drill well, the casing and cementing program, logging procedures, deviation checks, and the drilling, testing, cuttings and coring programs, proposed annulus fluid, and final completion details including liner hangers, tubing and packer configuration, etc. Submit preliminary schematic or other appropriate drawings of the surface and subsurface construction details of the well. As a reminder, mechanical integrity testing must be conducted during construction of wells – see Attachment H.

As part of injection well construction, a plan for corrosion prevention of the casing string and tubing (if used) is required to be submitted. The corrosion prevention shall show how steps will be taken to ensure casing/tubing does not corrode near surface or at depth during the life of the well. The well cellar(s) shall be constructed to prevent water from collecting around the injection well casing and measures shall be taken to . Also, describe how well construction will prevent casing corrosion at depth.

Also required with all applications is a schematic of the complete surface/subsurface conveyance system, including all process/treatment systems, additive ports, valves and gauges, pumps, etc.

FOR RENEWAL
Submit a current schematic for each injection well constructed. Include a list of workovers on each well, with type and date of work. Please review the original application, and identify any changes to construction procedures proposed and/or new work performed over the last 5 years that is different than in the original application, please summarize in the renewal application.

G. INTERNAL and EXTERNAL MECHANICAL INTEGRITY – Provide details on how MITs will be conducted on all injection wells during construction. An internal and external test must be conducted on each injection well. Usually, a casing pressure test is conducted on the intermediate or production casing

string to show internal integrity; and a cement bond/variable density logs must be run to demonstrate external integrity. Other tests to show integrity must be pre-approved along with the drilling program. Results of any mechanical integrity testing shall be submitted, including description of test, date performed, and name of Division representative witnessing test.

FOR RENEWAL
Please provide MIT results over the last 5 years, and discuss any issues and/or corrections that needed to be addressed. Provide a schedule and description of the next round of MITs.

H. INJECTION PROCEDURES - Describe the proposed injection procedures including all pumps, water storage tanks, surge tanks, etc. Provide the make/model and operating parameters (e.g. maximum pump rate and pressure) of the injection pumps that will be used. For high volume injection wells, data on fracture pressure is required.

FOR RENEWAL
Please review the original application, and identify any changes or new work performed over the last 5 years that is different than in the original application, please summarize in the renewal application.

I. OPERATING DATA and MONITORING PROGRAM - Submit the following proposed operating data for each well proposed under the application:

a. average and maximum daily rate and volume of the fluids to be injected;
b. average and maximum injection pressure;
c. nature of annulus fluid, if used; and
d. source and analysis of the physical and chemical characteristics of the injection fluid.

If a manifold monitoring program is utilized, pursuant to CFR §146.23(b) (5), describe the program and compare it to individual well monitoring.

The chemical analysis shall be for UIC Sample List 2. Other constituents may be required by UIC staff depending on the project.

Submit details for monitoring and sampling injected or discharge water from all sources after operations begin. Provide details and schematics on gauges, meters, sampling ports, etc. and all their locations.

FOR RENEWAL
Please review the original application, and identify any changes or new work performed over the last 5 years that is different than in the original application, please summarize in the renewal application.

J. CHANGES and FATE IN INJECTED FLUID - Discuss expected changes in pressure, chemistry, native fluid displacement, potential for receiving aquifer degradation and direction of movement of injected fluid. Describe in detail what chemicals will be used for any purpose, including corrosion, scale inhibition, separation of oil/water, etc. Provide product sheets for each chemical.

FOR RENEWAL
Please review monitoring data of the life of the permit along with the original application to discuss what observations can be made regarding the chemistry of injected fluid and receiving ground water; and identify any changes or new work performed over the last 5 years that is different than in the original application, please summarize in the renewal application.

K. OPERATIONS AND MAINTENANCE (O&M) MANUAL: SAMPLING (QA/QC) &

CONTINGENCY PLAN – A basic O&M practices shall be submitted as part of the UIC application package. The manual should include standard sampling and quality assurance/quality control (QA/QC) practices for field sampling (including use of UIC Form U230); discussion of standard routine operating instructions and maintenance procedures of all water-related conveyance equipment, including component of water cooling towers, if used. Outline contingency plans to cope with all shut-ins or well failures, so as to prevent migration of fluids to the surface. The contingency plan should include provisions for reporting violations and a statement assuring injection will cease in the event of a well failure or if the receiving water is degraded.

FOR RENEWAL
Please update the manual to reflect current conditions and activities at the time of renewal. If an O&M Manual has never been submitted for a permitted well/facility, a manual will be required at the time of the next renewal.

L. GROUNDWATER MONITORING PLAN (all geothermal projects, Class 2 as required)

Discuss the planned monitoring program. This should be thorough, including maps showing the number and location of monitoring wells with depths and screened intervals as appropriate and a discussion of monitoring devices, sampling frequency, and parameters measured.

FOR RENEWAL
Please review the original and previous application, and identify any changes or new work performed over the last 5 years that is different than in the original application, please summarize in the renewal application.

M. STIMULATION and/or AUGMENTATION PROGRAMS - Outline and provide details on any proposed formation stimulation, aquifer augmentation and/or well stimulation programs. These should be listed in the O&M Manual and details provide on how they will be maintained and monitored.

FOR RENEWAL
Please review the original and previous application, and identify any changes or new work performed over the last 5 years that is different than in the original application, please summarize in the renewal application.

N. PLUGGING COST ESTIMATE AND PLAN - Submit a current **Cost Estimate** and **Plan** to plug all wells once they become abandoned pursuant to NAC 445A.923 through 925. First: (1) describe the type, number, and placement (including the elevation of the top and bottom) of plugs to be used; (2) describe the type, grade, and quantity of cement to be used; and (3) describe the method to be used to place plugs, including the method used to place the well in a state of static equilibrium prior to placement of the plugs; Second, based on 1, 2, and 3 above, provide a cost estimate of materials, equipment and labor for plugging and abandonment of the well. ~~Also for a Class 3 well that underlies or is in an exempted aquifer, demonstrate adequate protection of USDW's.~~

FOR RENEWAL
Please review the previous application, and update the cost estimate and plugging plan. Be sure to note any changes in well completion in any existing wells that needs to be addressed in plugging plan.

~~**O. DESCRIPTION OF BUSINESS** - Give a brief description of the nature of the business.~~

~~*FOR RENEWAL*~~
~~*No action required, unless necessary.*~~