



December 20, 2024

Sheldon Bye | Permitting Manager
Cyrq Energy Inc.
15 W. South Temple
Slat Lake City, UT 84101

RE: Underground Injection Control (UIC) Temporary Permit UNEV2024206T
Soda Lake Geothermal Project (Soda Lake 2 & 3 Power Plants) | Churchill County
Additional injection testing in inactive Production Well 45A-33

Dear Mr. Bye,

The Nevada Division of Environmental Protection – Bureau of Water Pollution Control (NDEP-BWPC) issues UIC temporary permit UNEV2024206T to provide an additional ninety days of coverage—for injection testing in production well 45A-33 in the Soda Lake Geothermal Project area—following expiration of the ninety-day authorization issued on October 3, 2024, effective from October 10, 2024 to January 8, 2025. Authorization to inject under this temporary permit is contingent on fulfillment of requirements in the schedule of compliance (permit Section II.) prior to the Effective Date. Please include all monitoring and reporting from testing of well 45A-33 authorized by NDEP in the semi-annual Injection Monitoring Report.

Continued injection under this temporary permit beyond the expiration date of April 7, 2024 is contingent on submission of a complete application for a Major Modification of UIC permit UNEV89037 (Soda Lake Geothermal Project area permit).

Please read the conditions, requirements, and limitations specified in the permit and contact me at 775-687-9428 or akowler@ndep.nv.gov if you have any questions.

Respectfully,

Andrew Kowler | Environmental Scientist
Underground Injection Control Program
Bureau of Water Pollution Control | Permits Branch
Nevada Division of Environmental Protection
Department of Conservation & Natural Resources
akowler@ndep.nv.gov | (775) 687-9428

Encl: Temporary UIC Permit UNEV2024206T

Ecc: Joe Bannon | Cyrq Energy Inc.
Jeff Kinder | NDEP Deputy Administrator
Andrew Dixon | NDEP-BWPC Chief
Ben Kahue | NDEP-BWPC Permits Branch Supervisor
Rob Ghiglieri | NDOM Administrator
Dustin Holcomb | NDOM Fluid Minerals Program Manager

**STATE OF NEVADA
DIVISION OF ENVIRONMENTAL PROTECTION**

TEMPORARY AUTHORIZATION TO INJECT/DISCHARGE

In compliance with the provisions of the Nevada Revised Statutes (NRS) 445A and the Underground Injection Control (UIC) Regulations in the Nevada Administrative Codes (NAC) 445A.810 to 445A.925, inclusive, the Permittee is authorized to inject and discharge from the wells described below in accordance with the conditions, requirements, and limitations specified in the permit.

TABLE A. Temporary UIC Permit Information	
General	Information
UIC Permit	UNEV2024206T
Site/Facility	Soda Lake Geothermal Project Area
Permittee	Cyrq Energy Inc.
Permittee Mailing Address	15 W. South Temple, Suite 1900 Salt Lake City, UT 84101
Property Owner(s)	Truckee Carson Irrigation District
Well Owner/Operator	Cyrq Energy Inc.
Well Owner/Operator Address (if different from Permittee)	N/A
Municipality & County	Fallon Churchill County
Legal Description (PLSS: MDB&M)	T 20N, R 28E, Sec 33
Wells Authorized for Injection	45A-33
Associated WPC Discharge Permit(s)	UNEV89037

Coverage for the injection wells listed above shall become **Effective** on: January 8, 2025

This Permit **Expires** on: April 7, 2025



 Andrew Kowler, Ph.D. | Environmental Scientist
 Underground Injection Control Program
 Bureau of Water Pollution Control

Date: December 20, 2024

SECTION I. Injection Well Information & Injection Parameter Limits

TABLE B. Injection Well Information & Injection Parameter Limits	
Well ID (Kettleman #)	45A-33
API	27-001-90395
NDOM Permit No.	912
Drilling Completion Date	6/7/2009
Property Owner	Cyrq
Well Status and Type	Inactive Production Well
Legal Description (PLSS: MDB&M)	Zone 11
	T 11N
	R 33E
Location (UTM: WGS 84)	341195
	4379864
Wellhead Elevation (ft. amsl)	3,988
Injection Zone (ft. bgs)	3452-3850
Maximum Injection Pressure (psig)	1,278 psig
Maximum Injection Rate (gpm)	1,500
Maximum Combined Injection Rate for Injection Wells permitted under UNEV2024206T + UNEV89037	10,000 gpm

SECTION II. Schedule of Compliance

Schedule of Compliance	
Requirement	Date following Issuance of UNEV2024206T
Copy of testing plan and sundry submitted to NDOM for testing covered under this permit.	Prior to Effective Date
Schematic of surface/subsurface conveyance system (from UIC application form U202 Attachments A and F) showing current test configuration with all monitoring points, valves, gauges, manifolds, pumps, cooling system, open surface basins, etc.	Prior to Effective Date
Results from currently authorized and ongoing injection test	Prior to Effective Date

SECTION III. General Conditions

A. Nevada UIC Permit Requirements for Geothermal Projects.

The Permittee shall comply with all requirements listed herein; and found in the *Nevada UIC Permit Requirements for Geothermal Projects* (See Attachment 1).

B. Notice to Director of Failure to Comply with Terms of Permit. (NAC 445A.889)

1. If the noncompliance with a condition, requirement or limitation specified in the permit has caused or may cause migration into or between underground sources of drinking water, or has introduced or may introduce a contaminant which endangers an underground source of drinking water, or otherwise endangers public health or the environment, **the Permittee shall notify the Director within 24 hours after becoming aware of the circumstances.**
2. If for any reason the Permittee does not comply with or will be unable to comply with the conditions, requirements and limitations specified in the permit, the holder shall provide the Director with the following written information within 5 days after becoming aware of his or her inability to comply:
 - a. A description of the condition, requirement, or limitation with which he or she cannot comply;
 - b. The period of the noncompliance including exact dates and times, or the anticipated time the noncompliance is expected to exist; and
 - c. A description of any action being taken to reduce or eliminate the probability of its recurrence.

C. Injection / Discharge.

During the period beginning on the effective date and lasting through the expiration date of this permit, the Permittee is authorized to:

1. Inject geothermal fluids into the wells listed in Table B of this permit into zones below the casing shoe of each well with the intent of recharging injected water into the same or comparable geothermal zone; and
2. As specified in the Operations and Maintenance Manual for the Soda Lake Geothermal Project area permit UNEV89037:
 - a. Discharge geothermal water derived from well start-ups, testing and maintenance into bermed discharge basins;
 - b. Upon notifying the Division and receiving written approval, inject cooling tower blowdown water into approved injection well(s).
 - c. Permittee shall submit documentation (UIC Form U240) on all chemical use requests, and received Division written approval, prior to use.

D. Change in Effluents or Discharge.

1. All effluents or discharges authorized herein shall be consistent with the terms and conditions of this permit.
2. The discharge of any constituent identified in this permit more frequently than or at a level in excess of that authorized shall constitute a violation of the permit.
3. Any anticipated facility expansions or other activity which will result in new, different, or increased effluents or discharges must be reported to the Division by submission of a new application. A new application requires complete UIC forms U200 and U202, including all attachments required therein and any additional information requested. The Division will make a determination of whether the facility expansion or other activity requires a minor or major modification, and the appropriate application fee.
4. If such changes will not violate the limitations specified in this permit provide notice to the Division of such changes. Following such notice, the permit may be modified to specify and limit any constituents not previously limited.

E. Adverse Impact.

The Permittee shall take all reasonable steps, including such accelerated or additional monitoring as necessary to determine the nature and impact of the non-complying effluent or discharge, to prevent any adverse impact to waters of the State resulting from noncompliance with any limitations specified in this

permit.

F. Conformance to Plans and Specifications.

All facilities and ancillaries encompassed by this permit shall conform to the plans and specifications filed with the Division and shall be maintained in good working order at all times.

G. Bypassing.

Any diversion from or bypass of facilities necessary to maintain compliance with the terms and conditions of this permit is prohibited except where unavoidable to prevent loss of life or severe property damage. The Division will have the final authority in the determination of whether a discharge is deemed unavoidable. The Permittee shall promptly notify the Administrator in writing, of each such diversion or bypass.

H. Contaminants.

Extraction, conveyance, and injection must be accomplished in a manner that prevents introduction of a contaminant or foreign object not covered by this permit. All fluids extracted will be disposed of by injection with the exception of those discharges approved under Section IV. Fluids.

I. Applicable Standards of Other Governmental Agencies. (NAC 445A.843)

The provisions of any federal, state, county or municipal law or regulation establishing standards for injection wells which affords greater protection to the public welfare, safety, and health and to the groundwater prevail within the jurisdiction of that governmental entity over standards established by NAC 445A.810 to 445A.925, inclusive. Those sections do not replace, or in any way affect the responsibility of any person to comply with the regulations and rules of practice and procedure administered by any other governmental agency.

J. Waste.

All solid, toxic, or hazardous waste shall be disposed of in accordance with the rules and regulations of the Division.

K. Spills.

All spills and releases shall be reported to NDEP's Spill Hotline as soon as possible, but no later than the end of the first working day of the release.

L. Right of Entry.

The Permittee shall allow the Administrator and/or their authorized representatives, upon the presentation of credentials:

1. To enter upon the Permittee's premises where a source is located or in which any records are required to be kept under the terms and conditions of this permit; and
2. To have access to, and to copy any records required to be kept under the terms and conditions of this permit; to inspect any monitoring equipment or monitoring method required in this permit; and to perform any necessary sampling to determine compliance with this permit or to sample any effluent or discharge.

M. Transfer of Ownership or Control.

No less than 30 days before a planned transfer of ownership, control, and/or management, the Permittee shall submit an original and signed UIC form U250.

N. Availability of Reports.

Except for data determined to be confidential under NRS 445A.665, all reports prepared in accordance with the terms of this permit shall be available for public inspection. Knowingly making any false statement on any such report may result in the imposition of criminal penalties as provided for in NRS 445A.710.

O. Permit Modification, Suspension or Revocation.

After notice and opportunity for a hearing, this permit may be modified, suspended, or revoked in whole or in part during its term for cause including, but not limited to, the following:

1. Violation of any terms or conditions of this permit;

2. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts; or
3. A change in any condition, or the existence of a condition, which requires either a temporary or permanent reduction or elimination of the permitted activity.

P. Civil and Criminal Liability.

1. Nothing in this permit shall be construed to relieve the Permittee from civil or criminal penalties for noncompliance.
2. Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the Permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State law or regulation.
3. The issuance of this permit does not convey any property rights, in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, State, or local laws or regulations.

Q. Schedule of Compliance.

1. A schedule for compliance must require compliance as soon as possible and in no case later than 1 year after the effective date of the permit. (NAC 445A.888)
2. With the consent of the holder of a permit issued pursuant to NAC 445A.810 to 445A.925, inclusive, and without public notice, the Director may make minor modifications to the permit to change an interim compliance date in a schedule of compliance if the new date is not more than 120 days after the date specified in the permit and does not interfere with attainment of the final compliance date requirements. (NAC 445A.902)

R. Records Retention.

All records and information resulting from the monitoring activities required by this permit, including all records and analyses performed, calibration and maintenance of instrumentation, and recordings from instantaneous or continuous monitoring instrumentation, shall be retained for a minimum of three (3) years or longer if required by the Director.

S. Renewal.

This permit cannot be renewed, and no fee for the Annual Review and Services fee shall be assessed.

SECTION IV. Limits

A. Injection Pressure.

The injection pressure at the wellhead shall not exceed the maximum pressure as calculated per NAC 445A.911(2). Calculations for all future wells and following workovers which introduce new injection zones shall be submitted to and approved by the Division prior to use of the well.

B. Temperature of the Discharged Fluids.

The temperature of discharged fluids shall not cause:

1. Degradation to ground water;
2. Degradation of well integrity; and/or
3. Harm to the public, wildlife and/or environment.

C. Zone for Injection. (NAC 445A.839)

1. Injected water shall remain in the permitted zone for injection and geothermal aquifer/reservoir identified through the UIC application process. Injected water must not migrate into adjacent or overlying bodies of groundwater, shallow formations, unconfined aquifers, or to the surface.
2. The Permittee is constrained to inject only those natural produced fluids from the permitted project area and aquifer/reservoir as well as synthetic additives authorized by the Division.

D. Surface Discharge.

Surface discharge to basins shall be limited to those in the Operations and Maintenance Manual for permit UNEV89037.

E. Chemical Additives.

The introduction of any chemical additive to the injectate requires written authorization from the Division through submission of UIC Form U240. Only substances listed in Attachment Y, including synthetic chemical products added to the injectate and binary heat-exchange fluid (see attachment).

SECTION V. Fluids

- A. Geothermal fluids shall be disposed of in such a manner that they do not present a hazard to livestock, wildlife, or the beneficial use of the waters of the State.
 - 1. Discharge basins associated with the permitted wells shall be fenced off and maintained in proper manner at all times so as to not allow wildlife or livestock to be endangered by these constructed devices or the water within them.
 - 2. If any wildlife is trapped or found dead in basins, the Nevada Department of Wildlife shall be contacted immediately.

- B. Fluids derived from maintenance procedures or well testing may only be diverted on a short-term basis to separately permitted holding/discharge basins constructed for such located on the site. Fluids discharged to such ponds may contain previously approved additives. All discharge basins must be constructed according to the approved plan submitted and reviewed.

- C. No chemical additives shall be added to the geothermal fluids or condensate prior to injection or disposal without prior written approval by the Division (UIC Form U240 Chemical Request/Authorization form). The use of any additive substance in either the injectate or cooling system may require modification of monitoring requirements. All approved U240 Chemical Request/Authorization forms shall be maintained in the UNEV89037 Operations and Maintenance Manual. All chemical additives shall be inventoried and reported.

- D. Wastewater from the cooling tower shall not be discharged to the injection well(s) authorized under this permit.

SECTION VI. Monitoring & Sampling Requirements

A. Monitoring and Sampling Requirements.

The Permittee shall perform the following monitoring and sampling:

TABLE C. Monitoring & Sampling Requirements			
Injection Parameter	Injection Well	Data Presentation	Frequency and Location
Water Quality per UIC Sample List 2 (See Attachment 2) Total Petroleum Hydrocarbons (TPH)	45A-33	Include copy of the sample collection form U230 and chain-of-custody. Note: The UIC Program requires inorganic analyses of metals for "Total Metals" in which samples are not filtered and are preserved in the field with a weak acid.	Sample from port at wellhead immediately prior to injection and monthly thereafter.
Injection Rate (gpm)	45A-33	For each week in the reporting period: total volume (gal) of fluid injected; and mean- average, lowest (non-zero), and highest injection rates (gpm) for each injection well must be measured.	Once Daily (24-hr) readings from instantaneous direct-reading monitoring gauge at wellhead (reading from Human-Machine Interface [HMI] is acceptable).
Injection Pressure (psi)	45A-33	For each week in the reporting period: mean-average, lowest, and highest injection pressures (psi) for each injection well must be measured.	Once Daily (24-hr) readings from instantaneous direct-reading monitoring gauge at wellhead (reading from HMI is acceptable).
Injection Temperature (°F)	45A-33	For each week in the reporting period: lowest and highest injection temperatures (°F) for each injection well must be measured.	Once Daily (24-hr) readings from instantaneous direct-reading monitoring gauge at wellhead (reading from HMI is acceptable).
Discharges of geothermal fluid or condensate to reserve basins directly adjacent to the permitted wells.	45A-33	Monitoring flow rate and duration of discharge, calculate discharge based on these parameters.	Fluid volumes discharged to these basins shall be reported.
Documentation of calibrations performed for all gauges used for compliance with this permit.	With each submission of monitoring and sampling required in this table.		
A table listing any substance other than the natural produced geothermal fluid that is added to the injectate above-ground or in wells, including the following information: product name and the amount, volume, concentration, and rate of addition (including all UIC Form(s) U240 previously approved, authorizing injection of any additive substance into wells authorized under this permit and UNEV89037.			With each submission of monitoring and sampling required in this table.

B. Accessibility.

The Permittee shall notify the Division in writing immediately upon becoming aware of any situation that prevents access to any of the monitoring wells/points. The reason for this inaccessibility and corrective action measures necessary to resolve the situation shall be noted in the next UIC report.

C. Minimum Requirements.

1. Water samples shall be:
 - a. Collected by grab method; and
 - b. Unfiltered for metals analysis; unless otherwise approved by the Division in writing.
2. A laboratory certified by the State of Nevada must perform analyses. Testing methods for constituents must be EPA or Division approved and meet drinking water analysis requirements.
3. The detection limits for the constituents listed above must be at least as low as primary or secondary drinking water standards when applicable.
4. When sampling for radioactive constituents, ensure the laboratory reports only the adjusted gross alpha, as the drinking water standard of 15 pCi/L is an adjusted standard that subtracts radon and uranium from the total activity. Uranium is added in List 2 to verify value and additional activity.
5. The UIC Program requires inorganic analyses of metals for "Total Metals" in which samples are not filtered and are preserved with a weak acid in the field. Any exceptions to this policy must be requested and pre-approved by the Division prior to the sampling event. It must be clearly stated on all reports which analyses were performed.
6. All gauges used for compliance with this permit shall be calibrated pursuant to Operation and Maintenance Manual and documented in the monitoring reports.
7. Annual samples shall be collected during the same month each year.
8. Samples collected to satisfy monitoring requirements prescribed herein for characterization of ground water or surface water at different times, or time scales, relative to the period of injection authorized under this permit shall be collected during the same day.
9. Each water sample shall be collected using UIC Form U230, a copy of which shall be sent to the UIC Program upon submission to the laboratory, as proof of submission, and included, along with the results of analyses, in the UIC report.
10. Test procedures for the analyses of required constituents shall comply with applicable analytical methods cited in 40 CFR 141 and under state of Nevada Drinking Water Program approved analytical methods, under which such procedures may be required, unless other procedures are approved by the Administrator.
11. Samples and measurements collected/taken as required herein shall be representative of the volume and/or nature of the subject of interest.

D. Recording of Results.

For each measurement or sample taken pursuant to the requirements of this permit, the Permittee shall record the following information using UIC Form U230 – UIC Field Sampling & Monitoring Summary. Information shall include:

1. The exact place, date, and time of sampling;
2. The dates the analyses were performed;
3. The person(s) who performed the analyses;
4. The analytical techniques or methods used;
5. The results of all required analyses; and
6. The precision and accuracy of the analytical data.

E. Elemental Mercury.

During all workovers, repairs, etc., of wells or in any part of the facility in contact with geothermal fluid sample geothermal fluid at wellhead and analyze for Elemental mercury

F. Additional Monitoring by Permittee.

The Permittee may increase monitoring frequency or increase the number of constituents analyzed at any of the location(s) beyond those required by this permit for technology or research purposes without disclosure of such additional analyses to the Division. The Permittee shall be in good standing with the Division and maintain compliance with all required reporting activities of this permit.

SECTION VII. Reporting

- A. The Permittee is required to notify the Division immediately upon becoming aware of:
1. Any elevated water levels.
 2. Constituents in any wells or surface waters being monitored under the terms of this permit that exceed 1 standard deviation of non-outlier values.
 3. Any leaks in heat exchanger units or non-native fluid associated with any portion of infrastructure comprising the above- or below-ground fluid conveyance system, including but not limited to fluids used for cooling, lubrication, heat transfer, etc., associated with operations and maintenance.
 4. Depending on the magnitude of the change in elevation, change in constituents, or leaks, the Division may require the Permittee to conduct a hydrogeologic investigation, increase monitoring, cease injection and/or any other actions deemed necessary by the Division so as to determine the cause and/or any necessary mitigation.
- B. Permittee-signed hard copies of these, and all other reports required herein, shall be submitted to the following address:

Nevada Division of Environmental Protection
Bureau of Water Pollution Control
Attn: UIC Program (Injection Monitoring Report)
901 S. Stewart Street, Suite 4001
Carson City, NV 89701

SECTION VIII. Well Construction and Workover Section

- A. The Permittee shall construct all production, test, and other wells in compliance with all State and federal regulations such that unauthorized releases do not occur.
- B. When standard or routine maintenance procedures for injection well cleanouts are developed such procedures will be submitted to the Division for approval and included in the Operations and Maintenance Manual.
- C. No stimulation, acidizing, or other treatment of the injection well Are authorized under this Permit.
- D. Within 60 days following construction or reworking of production, test, or other wells, the Permittee shall submit plans and drawings of the completed well as constructed, and chemical analysis (UIC Sample List 2) of the production waters.
- E. The Permittee shall contact the Division prior to the construction of (or conversion to) all future injection wells. Following construction or reworking and prior to injection of the injection wells identified in this permit, the Permittee shall submit the information specified in UIC Form U120 – UIC Injection Well Completion Report.
- F. An approved plan for plugging and abandonment has been submitted to and on file with the Division. If the Permittee or Division determines at a future date that the plugging and abandonment plan requires modification, the modified plan, upon approval by the Division, will become a part of the permit.

SECTION IX. Mechanical Integrity Testing

- A. The Permittee shall conduct mechanical integrity tests (MIT) on the injection wells:
 - 1. Prior to initial use of the injection well;
 - 2. At least once every five (5) years on all required injection wells; or
 - 3. Per Division MIT policy.
- B. These tests must demonstrate there are no significant leaks in the injection well casing and demonstrate there is no significant fluid movement behind the casing.
- C. The Division may, by written notice, require the Permittee to demonstrate mechanical integrity if loss of mechanical integrity is evidenced by well failure or by other information.
- D. The following must occur for each test on each well:
 - 1. Determine what internal and external mechanical integrity tests are the best for each injection well covered by this permit based on the static and maximum flow rate conditions, and well construction.
 - 2. Submit a plan for each injection well to demonstrate the integrity of the well to the Division forty-five (45) days prior to the test(s) being conducted to receive approval of said methodology and plan. Important: Reference the requirements of the MIT Summary Report below to ensure plan contains how field notes will be taken, information is recorded, and discussion on testing interpretation and conclusions.
 - 3. Give 48-hour notice to the Division as to date and time of test(s) in order for Division staff or their representatives to witness the test.
 - 4. Compile and submit MIT Summary Report, including relevant logs and interpretative reports, to the Division within 90 days after the completion of the tests.
- E. The MIT Summary Report shall contain the following information:
 - 1. Conditions of the injection well(s) prior to the test (e.g. static, injecting at # gpm, etc.).
 - 2. Conditions of the well(s) during the test(s), such as, but not limited to, operating conditions of the well, water level, changes in status/conditions of the well during the test, anomalies witnessed prior to or during the test, gauge calibration and condition for any gauges used, etc.
 - 3. Interpretation and conclusions of the test results stating whether each well meets the internal and external regulatory requirements in UIC regulations. This part should be done in conjunction with the service company.
- F. If the Permittee or the Division finds that the injection well fails to demonstrate mechanical integrity during a test or a loss of mechanical integrity becomes evident during operation, the operation of the injection well must be stopped immediately and may not be resumed until approved by the Division.



FACT SHEET

Nevada UIC Permit Requirements for Geothermal Projects

- UIC form U230 must be filled out and submitted with all water samples collected for UIC requirements or purposes; data unaccompanied by a completed U230 cannot be utilized
- This is guidance to all geothermal operators for new and existing projects
- UIC permits for new geothermal projects only cover UIC discharges

As of January 2008, a Permit to Drill from the Nevada Division of Minerals (NDOM) fulfills the UIC program requirement to obtain a permit to drill an injection well.

A UIC permit from NDEP serves as authorization to inject into any injection well listed on the permit (barring exceptions documented in this fact sheet):

1. For authorization to inject: the UIC permit application must be submitted, and the UIC permit issued
2. A UIC application must be submitted to NDEP at least **180** days prior to injection.
3. An Injection Well Completion Report must be submitted for any newly drilled, repaired, or idle/inactive (and recently MI-tested) injection well that is included in an application for first-time issuance of a UIC permit from NDEP
4. For applications to modify (whether or not concurrently with an application for permit renewal) an existing UIC permit to reflect the addition of a newly drilled, repaired, or idle/inactive (and recently MI-tested) injection well located within the Area of Review defined in the most recently approved application for first-time issuance, renewal, or modification of a UIC permit: submit an Injection Well Completion Report within 30 days following well completion
5. If the injection well is not located within the Area of Review defined in the most recently approved application, contact the UIC Program in the BWPC Permits Branch to discuss the AOR and associated permitting requirements
6. NOTE: Injection up to 7 days can be approved by the NDOM.

Part 1 – Injection Well Construction Requirements and Completion Report

A. The following are required pursuant to NAC 445A.908, and other 445A regulations.

NOTE: Failure to properly record, document, and submit the necessary information will lead to denial of an application for a first-time issuance, renewal, or modification of a UIC permit.

B. UIC Required Actions for Injection Wells:

1. Static Temperature Survey - all injection wells require a static temperature survey to be conducted after the well has been completed (survey shall be run after the well has been flowed and has had time to stabilize from drilling, testing, etc. for at least 72 hours or other NDEP-approved time).



FACT SHEET

2. Mechanical Integrity Testing

- The operator shall plan for and determine the maximum allowable injection pressure based on the last string of cemented casing (Per NAC 445A.911.1 – The pressure for injection at the wellhead of an injection well must not exceed that which is calculated to initiate new fractures or propagate existing fractures in the zone for injection or the confining formation between the zone for injection and underground sources of drinking water.)
- The operator is required to demonstrate internal and external integrity of the injection well during construction. The following items are required to be completed, documented and submitted with the Injection Well Completion Report.
 - a. Part 1 – Internal Integrity
 - i. **During Construction**
 - ii. Casing pressure test – use chart recorder and provide charts
 - 1. Intermediate casing string
 - 2. Liner laps require testing as well
 - 3. (can be conducted with BOPE pressure testing)
 - iii. Optional - Casing/cement evaluation tools (sonic, ultrasonic, etc)
 - iv. **Operational Testing**
 - v. Casing pressure test with packer
 - vi. Temperature and spinner logs
 - vii. Sonic/ultrasonic casing/cement evaluation logs
 - viii. Casing evaluation logs for internal/external corrosion
 - b. Part 2 – External Integrity
 - i. **During Construction**
 - ii. Cementing Records – required for all wells (appropriate calculation and placement methods shall be listed in drilling program)
 - iii. Shoe/formation integrity test after last cemented string of casing (drill out 5 – 10 feet below shoe and run test – DO NOT FRACTURE FORMATION)
 - iv. Optional - Cement Bond/Variable Density Log
 - v. Optional - Other methods that have received prior written approval from NDEP
 - vi. NOTE: additional testing may be required under the issued UIC permit (e.g. surveys after 1-2 years of operation)
 - vii. **Operational Testing**
 - viii. Radioactive survey (where allowed by State Health)
 - ix. Noise log (note: minimum noise at surface around wellhead)
 - x. Time-interval static temperature survey (e.g. 12/24 hour), (note this test depends on background temperature profile of well.)
 - xi. Temperature & spinner log may satisfy requirement on some wells depending on well environment and design. It will need to close measure for losses immediately below the casing shoe. Test may satisfy if no loss, however, loss below shoe does not demonstrate loss to the surrounding formation or upward behind casing. More testing would then be required.



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

FACT SHEET

Compile and submit a **MIT Summary Report** of the above tests and logs, which contains the following information:

1. A list of all internal and external integrity tests conducted for each well with date and time of each test, and the depths covered;
2. A discussion of the intent of the test(s) – what would the test show? And what zones and casing features were focused on.
3. What company conducted the test(s), and who oversaw/witnessed the test(s) for the operator and state;
4. Conditions of the injection well(s) prior to the test (e.g. static, drilling, injecting at ##### gpm, etc.);
5. Conditions of the well(s) during the test(s), such as, operating conditions of the well, water level, changes in status/conditions of the well during the test, anomalies witnessed prior to or during the test, gauge calibration and condition for any gauges used, etc.;
6. **Interpretation and conclusions of the test results stating whether each well meets the internal and external regulatory requirements in UIC regulations. This part should be done in conjunction with the service company.**

C. UIC Considerations for Injection Wells – (items evaluated during application review process.)

Injection String Casing Point – If the casing point is shallower than the target in the drilling program, the operator must ensure that (1) the zone below the shoe is within the same reservoir from which the source fluid (geothermal “brine”) was extracted by the production well(s); and that (2) the completion report includes documentation showing the “new” casing point in addition to data from hydrogeologic monitoring and modeling demonstrating that the zones for injection and production occupy the same formation/reservoir/aquifer.

Wellhead Design and Site Location

- Wellhead must be equipped above the ground or above cellar bottom with valves for the observation of pressure for each annular opening of the well, temperature and flow rate. Pressure gauge shall be at the wellhead or as close as physically possible.
- Wellhead shall have valves that are protected and operational during the life of the well.
- Well Signage – all injection wells shall have at a minimum a sign with the well name/number, operator’s name and phone, well location.

D. Corrosion Prevention Plan

1. The submitted plan must provide documentation required for the Injection Well Completion Report, describing measures that might needed to be taken during and after injection well to prevent surface and downhole corrosion during the life of the well (NAC 445A.908 “..The casing and cement used in the construction of each injection well must be designed to endure for the life expectancy of the well). The plan may include measures that will be evaluated. NOTE: Failure to employ corrosion prevention measures may require more frequent casing integrity evaluation (MITs)
2. Standard requirements:
 - a. Injection casing string shall not be in contact with soil.
 - b. Injection casing string shall be sealed or configured to prevent “standing” water from coming in contact with string.
 - c. In areas where shallow boiling zones occur, the annular space between the intermediate and injection casing string shall be sealed at surface, and if necessary, a “gas cap” applied to this annular space.



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E. Completion Report (NAC 445A. 909)

http://ndep.nv.gov/bwpc/docs/uic_%20from_checklist_class2_geothermal_injection_wells.pdf

To request the addition of an injection well—located within the Area of Review defined in the most recently approved application for first-time issuance, renewal, or modification of a UIC permit—to an existing UIC permit, a completion report with the following documentation is due within 30 days after drilling completion and 30 days before reissuance of the permit, modified to reflect addition of the requested injection well(s):

1. As-built well schematic
2. Daily drilling reports
3. Cementing record
4. Public Land Survey System coordinates (Township, Range, Section, Quarter-quarter section)
5. Geospatial location of wellhead, including UTM and Latitude/Longitude (with projection or geoid)
6. Deviation records
7. Static temperature survey(s)
8. Copies of all E-logs
9. Photos of wellhead showing cathodic protection methods
10. Photos of wellhead or pipeline showing temperature, pressure and flow rate gauges
11. Document signage has been posted for the well at the wellhead location
12. Water sample results from injection zone(s)
 - a. See Part 3 and UIC Sample List 2 for sampling requirements
 - b. (if multiple injection zones in different “formation” within the same wellbore, contact NDEP staff to discuss if each zone would need to be tested)

Note: if **confidentiality** is being requested, ensure every page is stamped indicating so. Not all records can be held confidential, so please indicate your reasoning for the request to justify for our review.

Part 2 – Discharge of Produced or Plant Water

A. Discharges to Drilling Sumps

- 1) Drilling sumps (reserve basins) are permitted by the NDOM
- 2) Drilling sumps that will be used during the life of the well must be constructed in accordance with discharge basins, as described below.
- 3) Discharge (to drilling sumps) associated with flow testing is limited to **7** days under a permit from NDOM; discharge to any basin beyond **7** days requires the appropriate water pollution control discharge permit from the NDEP Bureau of Water Pollution Control
- 4) Discharges outside of these basins or other containment devices require specific NDEP approval; ***authorization to discharge into a basin does not authorize discharge outside the basin, for which an operator must obtain a separate water pollution control discharge permit***

B. Discharges to Basins

- 1) Basins receiving geothermal and other plant water must be designed and constructed to safely manage water and prevent contamination of surface and ground water
- 2) Minimum requirements for geothermal storage basins include the following:
 - a. Discharge basins shall be lined to prevent infiltration of water, unless the requirement in item B.2.b (below) has been satisfied
 - b. Lining of discharge basins shall be waived if it can be demonstrated that ground water degradation will not occur due to lesser water quality of the discharged fluid and/or leaching of soil salts. A waiver of the basin liner requirement requires evaluation of the following:



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Bureau of Water Pollution Control
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1. Water quality and flow rates of discharge
 2. Elevation and gradient of water table
 3. Ground water quality at/below the water table (monitoring well(s) may be required)
 - c. Interior embankments shall be no steeper than 3:1 (horizontal : vertical)
 - d. Minimum freeboard (based on basin area): 2 ft for <1 ac or 3ft for 1 ac
 - e. Shall not be located within 100-yr floodplain without reasonable accommodations, and account for 25-yr, 24-hr storm events. Protection measures shall be in place as needed
 - f. Discharge and overflow locations shall be constructed to prevent erosion and washout
- 3) Geothermal fluids shall be disposed of in such a manner as to not present any hazard to livestock, wildlife, or the beneficial use of the waters of the State. ***All surface basins shall be fenced off and maintained in proper manner at all times as to not allow wildlife or livestock to be endangered by these constructed devices or the water within them. If any wildlife is trapped or found dead in basins, the Nevada Department of Wildlife shall be contacted immediately.***
 - 4) All supplies of water for livestock shall demonstrate approval to NDEP from the Nevada Department of Agriculture.
 - 5) No chemical amendments shall be added to injectate (or precursor fluids – i.e., produced brine and plant effluent) prior to injection or disposal without prior written an approved chemical use authorization request (Division-signed form U240)
 - 6) Samples of water discharged to surface basins shall be collected (at the outfall into the basin, not from the water in the basin) at least once during discharges lasting ≤ 3 days; a second must be collected for discharges lasting >3 days

Part 3 – Sampling Requirements

- A. The following sampling requirements are required for all production and injection wells, and shall be filed with NDEP as part of the UIC application.
 1. As of October 1, 2010, UIC Form U230 must be used and submitted with all water samples.
 2. Samples shall be taken following construction of all production and injection wells. Sample shall be taken after well has been flowed to clean drilling mud from well.
 3. Samples shall be taken after the well has been flowed for a period of time to ensure drilling fluids have been flushed from the wellbore, and the water is representative of the geothermal reservoir.
 4. Geothermal water shall be sampled and analyzed for the constituents listed in ***UIC Sample List 2, at minimum – NDEP may require monitoring of additional analytes***
 5. All analyses conducted in fulfillment of UIC permit conditions or application requirements must be performed by a State of Nevada Certified Laboratory (List can be found at <http://ndep.nv.gov/bwqp/lab/labservice.htm>)
 6. All sampling reports shall include the following information with submitted to NDEP:
 - a. Time and Date of Sample
 - b. Sample location (provide the exact location taken)
 - c. Sampler name and affiliation
 - d. Name of laboratory conducting analysis (must be state certified)
 - e. Chain of Custody sheet
 - f. Indicate if sample was field filtered or not



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Part 4 – Standard Requirements

- A. All solid, toxic or hazardous waste shall be disposed in accordance with the rules and regulations of this Division. All spills and releases shall be reported as required by Nevada Revised Statutes. The use of any other additive(s) requires written authorization from the Division prior to injection. All spills of refined products shall be cleaned up immediately; soil removed and properly disposed of per local, state and federal rules. (This applies to any location on project site). Report spill of greater than 25 gallons or 3 cu yds impacted to NDEP at 1-888-331-6337 (in-state number) For questions on reporting, call 775-687-9368
- B. All facilities encompassed by this permit shall conform to the plans and specifications filed with the Division of Environmental Protection and shall be maintained in good working order at all times. Standard drilling materials are approved for use on all wells; however, use of any non-standard or toxic chemical must be submitted to NDEP for review
- Addition of a well located within the Area of Review defined in the most recently approved application for first-time issuance, renewal, or modification of a UIC permit requires submission of an injection well completion report to the UIC program in the NDEP Bureau of Water Pollution Control for review within 30 days after completion of the well, and **30 days before** the permit is reissued following modification to reflect authorization to inject into the requested well(s)
- C. Monitoring & Reporting:
Operator must submit an Injection Well Completion Report to the Nevada UIC Program in the NDEP–BWPC to request addition of a well to an existing permit.

SUBMIT TO:
Nevada Division of Environmental Protection
Bureau of Water Pollution Control | Permits Branch
Underground Injection Control Program
901 S. Stewart Street, Suite 4001
Carson City, Nevada 89701

Nevada Division of Environmental Protection

Underground Injection Control Program - Sampling and Monitoring Report Form

Facility Name :	Depth of sampled water's origin :
Facility Owner:	County:
NDEP UIC Permit # :	Location sample taken :
Well ID # :	Sampler :
Type of Well : Monitor Production Injection	Date Sampled :
<u>UIC Sample List 2- Inorganic Extended</u>	Name of Laboratory :

Parameter	Units	DW Standards	Results	Method
total dissolved solids	mg/L	500 - 1000		Approved analytical methods can be found at the Bureau of Safe Drinking Water webpage: http://ndep.nv.gov/bsdw/oversight.htm or http://ndep.nv.gov/bsdw/docs/approved-analytical_methods.pdf
pH	standard units	6.5 - 8.5		
chloride	mg/L	250 - 400		
fluoride	mg/L	4		
sulfate	mg/L	250 - 500		
nitrate (as nitrogen)	mg/L	10		
nitrite (as nitrogen)	mg/L	1		
aluminum	mg/L	0.05-0.2		
antimony	mg/L	0.006		
arsenic	mg/L	0.01		
barium	mg/L	2		
beryllium	mg/L	0.004		
cadmium	mg/L	0.005		
chromium	mg/L	0.1		
copper	mg/L	1.0-1.3		
lead	mg/L	0.015		
iron	mg/L	0.3 - 0.6		
magnesium	mg/L	125 - 150		
manganese	mg/L	0.1		
mercury	mg/L	0.002		
nickel	mg/L	0.1		
selenium	mg/L	0.05		
silver	mg/L	0.05		
thallium	mg/L	0.002		
zinc	mg/L	5		
total uranium	ug/L	30		
adjusted gross alpha*	pci/L	15		
gross beta	mrem	4		
alkalinity (CaCO3)	mg/L	-		
bicarbonate	mg/L	-		
boron	mg/L	-		
calcium	mg/L	-		
carbonate	mg/L	-		
Elect. Conductivity	umhos/cm	at 25 degC		
lithium	mg/L	-		
molybdenum	mg/L	-		
phosphorus, total	mg/L	-		
potassium	mg/L	-		
silica	mg/L	-		
sodium	mg/L	-		
total suspended solids	mg/L	-		
turbidity	NTU	-		

Comments: Rev 7/2013

Note: A completed UIC U230 Form is required for all UIC-related samples (produced, injected & monitoring point waters)

Detection limits must be at least as low as primary or secondary drinking water standards where applicable.
 Nevada Certified Laboratory must be used for all UIC samples, lab must be certified the method being used.
 Metals shall be sampled and analyzed as total metals. Please indicate detection limit instead of stating "Non-Detect" or "ND".
 When TDS is high, 200.8 can't be used. See EPA's Approved Methods for Inorganic Chemicals and Other Contaminants at http://www.epa.gov/safewater/methods/inch_tbl.html.

CHEMICALS

Approved geothermal fluid additives:

Geosperse GS8464 | Anti-scalant added to production stream

GG442 | Anti-scalant added to production stream

ExxonMobil Americas Core 2500 | base oil pump lubrication fluid added to production stream

Chemicals monitored for leakage into injection stream:

Isopentane – binary heat-exchange fluid