



February 22, 2024

Erica Freese  
Director, Business Development  
ORNI 36 LLC (Ormat)  
6140 Plumas Street  
Reno, Nevada 89519-6075

**RE:** Underground Injection Control (UIC) Temporary Permit UNEV87041T2024-1  
San Emidio Geothermal Power Project (San Emidio II North Valley Geothermal Project)  
Washoe County, Nevada  
Injection Wells 52-4 and 55A-4 and Tracer Test

Dear Ms. Freese,

The Nevada Division of Environmental Protection – Bureau of Water Pollution Control (NDEP-BWPC), grants authorization for injection testing in wells 52-4 and 55A-4 under Temporary UIC Permit UNEV87041T2024-1.

This temporary permit is valid until the Division takes final action on the pending updated renewal application, received December 8, 2023. Continued injection under this temporary permit is contingent on Ormat complying with the following schedule of compliance:

Schedule of Compliance		
Requirement	NAC Reference	Date from UNEV87041T2024-1 Issuance
Provide all data and calculations used to demonstrate compliance with injection pressure.	NAC 445A.899 NAC 445A.911	Within 2 Weeks
Plan for monitoring the elevation or quality of groundwater within the Area of Review.	NAC 445A.867	Within 2 Weeks
Provide Monitoring and Sample Results as per TABLE C. Monitoring and Sampling Requirements.	NAC 445A.912 NAC 445A.913 NAC 445A.921	By the 28 <sup>th</sup> of the following month
Provide Analytical Results from Tracer Sampling Frequency Table Below	NAC 445A.912	Within 30 Days from Completion of the Tracer Test
Provide Results for All Tracers at Sweetwater Well No. 2 at Completion of 365-Day Tracer Test	NAC 445A.912	Within 30 Days from Completion of the Tracer Test
Certificate of Performance Bond.	NAC 445A.871	Within 30 Days

Schedule of Compliance		
Requirement	NAC Reference	Date from UNEV87041T2024-1 Issuance
Update Operation and Maintenance Manual. (See NDEP Form – UIC Minimum Info Requirements for O&M Manual – Geothermal Projects)	NAC 445A.869	Within 6 Months

Tracer and Injection Data		
Injection Well	Tracer	Quantity (kg)
42-21	2-NSA	100
43-21	2,6 NDSA	100
53-21	1,3,6 NTSA	100
55-4	1-NSA	100
67-4	1,6 NDSA	100
84-20	1,5 NDSA	100

Tracer Sampling Frequency		
Sampling Day	Sampling Frequency	Number of Samples per Well (17A-21, 18A-21, 25A-21, 25B-21, 75B-16, and 76-16)
0	Twice (Raw Tracer Sample and Afternoon Well Sample)	2
1 – 7	Daily	7
8 – 29	Every 2 <sup>nd</sup> Day	11
30 - 58	3 <sup>rd</sup> Day	9
59 - 121	7 <sup>th</sup> Day	9
122 - 191	14 <sup>th</sup> Day	5
192 - 342	30 Days	5

Please read the conditions, requirements, and limitations specified in the permit carefully; and contact me at the email address or phone number below if you have any questions.

Respectfully,

A handwritten signature in cursive script that reads "Jeffrey Kinder".

Jeffrey Kinder, P.E.  
Deputy Administrator  
Nevada Division of Environmental Protection  
jkinder@ndep.nv.gov  
(775) 687-9307

Encl: Temporary UIC Permit UNEV87041T2024-1

Ecc: Jennifer Carr, P.E., C.P.M., CEM, Administrator, NDEP  
Andrew Dixon, Chief, Bureau of Water Pollution Control  
Donette Barreto, Supervisor, Permits Branch, Bureau of Water Pollution Control  
Andrew Kowler, Environmental Scientist, Permits Branch, Bureau of Water Pollution Control  
Rob Ghiglieri, Administrator, NDOM  
Dustin Holcomb, Fluid Minerals Program Manager, NDOM  
Alex Jensen, State Geothermal Lead, Nevada State Office, BLM

**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.

<b>TABLE A. Temporary UIC Permit Information</b>	
<b>General</b>	<b>Information</b>
<b>UIC Permit</b>	UNEV87041T2024-1
<b>Site/Facility</b>	North Valley Geothermal Project
<b>Permittee</b>	ORNI 36 LLC (Ormat)
<b>Permittee Mailing Address</b>	6140 Plumas Street, Reno, NV 89519
<b>Property Owner(s)</b>	52-4: Bureau of Land Management 55A4: Pyramid Associates LP
<b>Well Owner/Operator</b>	ORNI 36 LLC and USG Nevada LLC
<b>Well Owner/Operator Address (if different from Permittee)</b>	N/A
<b>Municipality &amp; County</b>	San Emidio Desert, Washoe County
<b>Legal Description (PLSS: MDB&amp;M)</b>	T29N, R23E, Sections 20 and 21
<b>Wells Authorized for Injection</b>	52-4 and 55A-4
<b>Associated WPC Discharge Permit(s)</b>	UNEV87041 UNEV87041T2023-1 UNEV87041T2023-2 NS00094003

Coverage for the injection wells listed above shall **Become Effective on:** February 22, 2024

**This Permit Expires on:** This Temporary Permit is valid until the Division takes final action on the pending renewal application.

*Jeffrey Kinder* Date: 2/22/2024

Jeffrey Kinder, P.E.  
Deputy Administrator  
Nevada Division of Environmental Protection

**SECTION I. Injection Well Information and Injection Parameter Limits**

<b>TABLE B. Injection Well Information and Injection Parameter Limits</b>	
<b>Well ID (Kettleman #)</b>	<b>52-4</b>
API	27-031-90316
NDOM Permit No.	1532
Drilling Completion Date	9/27/2022
APN	071-030-06
Property Owner	BLM (Lease No. NVN-98636)
Well Status and Type	New Injection Well
Legal Description (PLSS: MDB&M)	Section 4, T29M, R23E
Location (Lat/Long: WGS 84)	40.415253° N, 119.403290° W
Location (UTM: WGS 84)	296094 m E, 4476621 m N (Zone 11)
Wellhead Elevation	4,095 ft
Ground Surface Elevation	4,095 ft amsl
Injection Zone (depths of slotted/perforated casing)	67 to 967 ft bgs
Maximum Injection Pressure (Wellhead)	18.1 PSIG
Maximum Injection Rate	1,500 gpm
<b>Well ID (Kettleman #)</b>	<b>55A-4</b>
API	27-031-90314
NDOM Permit No.	108
Drilling Completion Date	1/16/2023
APN	071-070-01,02,03,04,05,15,17
Property Owner	Pyramid Associates LP
Well Status and Type	New Injection Well
Legal Description (PLSS: MDB&M)	Section 4, T29M, R23E
Location (Lat/Long: WGS 84)	40.410519° N, 119.403284° W
Location (UTM: WGS 84)	296069 m E, 4476015 m N (Zone 11)
Wellhead Elevation	4,069 ft
Ground Surface Elevation	4,069 ft amsl
Injection Zone (depths of slotted/perforated casing)	95 to 1000 ft bgs
Maximum Injection Pressure (Wellhead)	30.2 PSIG
Maximum Injection Rate	3,000 gpm
<b>The Combined Maximum Injection Rate</b>	<b>4,500 gpm</b>

## SECTION II. 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:
    - 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 III. 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 zone for injection that has been identified through the UIC application process. Injected water must not migrate into unauthorized underground sources of drinking water (all aquifers within this State regardless of the quality of the water, except those exempted), shallow formations, or the surface.
2. The Permittee is constrained to inject only those natural produced fluids from the project area that have received prior written approval from the Division.

**D. Surface Discharge.**

Surface discharge to basins shall be limited to those in the Operations and Maintenance Manual for permit UNEV87041.

**E. Chemical Additives.**

The introduction of any chemical additive to the injectate requires written authorization from the Division through submission of UIC Form U240.

**SECTION IV. 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 cooling prior to injection or disposal without prior written approval by the Division (UIC Form U240 Chemical Request form). The use of any type of chemical additive in either the injectate or cooling system may require modification of monitoring requirements. All approved U240 Chemical Request forms shall be maintained in the 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 wells on this permit.

**SECTION V. Monitoring and Sampling Requirements**

A. Monitoring and Sampling Requirements.

The Permittee shall perform the following monitoring and sampling:

<b>TABLE C. Monitoring and Sampling Requirements</b>			
<b>Injection Parameter</b>	<b>Injection Well</b>	<b>Data Presentation</b>	<b>Frequency and Location</b>
Provide a table listing all production and injection wells, test wells, and monitoring wells, including the following information: installation date, if permitted, dates of active injection or production during the monitoring/reporting period, well depth, slotted/perforated and/or open depths, type, operational status, name/ID, location, and any other relevant information. Include a schematic of piping with monitoring and sampling locations identified.			With each submission of monitoring and sampling required in this table.
Water Quality per UIC Sample List 2 (See Attachment 2)	52-4 and 55A-4	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 with a weak acid in the field.	Immediately before injection - Collect sample of produced fluid from port at (1) production wells, and (2) injection outlet from the plant (i.e., nearest sampling port to the plant).
			After 3 Months – Collect sample of produced fluid from port at (1) production wells, and (2) injection outlet from the plant (i.e., nearest sampling port to the plant).
			After 6 Months and Semiannually Thereafter – Collect sample of produced fluid from port at (1) production wells, and (2) injection outlet from the plant (i.e., nearest sampling port to the plant).
Injection Rate (gpm)	52-4 and 55A-4	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)	52-4 and 55A-4	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)	52-4 and 55A-4	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).

TABLE C. Monitoring and Sampling Requirements			
Injection Parameter	Injection Well	Data Presentation	Frequency and Location
Water discharges to reserve basins on, or adjacent to, the permitted wells.	52-4 and 55A-4	Monitoring flow rate and duration of discharge, calculate discharge based on these parameters (including discharges reported under NS00094003).	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 all chemical additives put into circulation above-ground or in wells, including the following information: product name and amount/volume and/or rate used (including all previously approved UIC Form(s) U240, authorizing chemical use for injection wells 52-4 and 55A-4).			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.

If the Permittee monitors any constituent at the locations(s) designated herein more frequently than required by this permit, or monitors additional constituents than required by this permit, the results of such monitoring results shall be made available to the Division upon request.

## **SECTION VI. 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 VII. 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. The Division may remove chemical species from the list if the Permittee satisfactorily demonstrates said species are not significant to the analysis of injection operations and has no potential impacts.
- 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 VIII. 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.

**Attachment 1 – NDEP Form – UIC Permit Requirements for Geothermal Projects**

**Attachment 2 – NDEP Form – UIC Sample List 2 – Inorganic Extended**



## FACT SHEET

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### 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).



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### 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.



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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](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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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  $\leq 3$  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  
BWPC | Permits Branch  
UIC 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**

<b>Facility Name :</b>	<b>Depth of sampled water's origin :</b>
<b>Facility Owner:</b>	<b>County:</b>
<b>NDEP UIC Permit # :</b>	<b>Location sample taken :</b>
<b>Well ID # :</b>	<b>Sampler :</b>
<b>Type of Well :</b> Monitor    Production    Injection	<b>Date Sampled :</b>

**UIC Sample List 2- Inorganic Extended**

**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: <a href="http://ndep.nv.gov/bsdw/oversight.htm">http://ndep.nv.gov/bsdw/oversight.htm</a> or <a href="http://ndep.nv.gov/bsdw/docs/approved-analytica_methods.pdf">http://ndep.nv.gov/bsdw/docs/approved-analytica_methods.pdf</a>
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](http://www.epa.gov/safewater/methods/inch_tbl.html).

\*Adjusted gross alpha particle activity doesn't include radon and uranium activity.