



NEVADA DIVISION OF ENVIRONMENTAL PROTECTION
Underground Injection Control Program

FACT SHEET

(Pursuant to NAC 445.42525)

Project Name: NGUC Warren Estates Geothermal Project, Reno
Permittee Name: Nevada Geothermal Utility Company (NGUC)
Permit Number: UNEV30013
Permit Action: Permit Renewal (2016)

A. Description of Discharge

Location: Two injection wells located at the Warren Estates Subdivision, within the SW¼, NW¼ of Section 26, T.19N., R.19E., Reno, Washoe County, Nevada. 2009 and 2016 Renewals: WE-3 & WE-1

Characteristics: Injected water is spent geothermal fluid produced from one or two production wells and passed through a heat exchanger for the purpose of water heating for a residential space-heating district, and then injected in the injection wells. Produced water does not meet drinking water quality standards; parameters exceeding standards are TDS (1050 mg/l), sulfate (425 mg/l), fluoride (4.7 mg/l) and arsenic (0.14 mg/l).

B. Synopsis

History

- No changes for 2016 renewal.
- Jan 2006, short term injection tests were performed on well WE-3 and WE-1.
- NGUC ownership changed in 2006 to local Reno group. System has been updated after change.
- WE-3 was tested in 2005 - hole was found shallow and well was repaired.
- Well WE-3 went out of service on March 7, 2005. WE-1 produced and injection went to WE-2 (which was a violation of the permit since it was not listed as an injection well or testing for integrity). Notice of Violation was issued.
- Permit originally issued June 24, 1986.

2009 Renewal - (the permit number has been updated from NEV30013 to UNEV30013)

The renewal process was started in 2009. A meeting was held on June 18, 2009 to discuss the future of the project and to identify which wells will be used for injection. The permittee requested two (2) injection wells to be permitted into the future. The primary injection well will continue to be WE-3 and WE-1 a backup injection well. WE-1 will be the primary producer with WE-2 as a backup production well. NGUC is considering installing a downhole heat exchanger in WE-4, and not permitting as injection well. Flow rates will remain between 300-350 gallons per minute (gpm). Both of the injection wells have been videoed within the last 5 years. Corrosion was found at shallow depths and new casing was installed and cemented in place. WE-2 may have a video survey run on it, and be considered for backup injection in the future. The permit will need to be modified for adding this well. The

heat exchange system inside the brick building was updated around 2006. Geothermal water is not circulated through the neighborhood piping system.

Historical Summaries

The applicant seeks modification of permit number UNEV30013 to add another injection well for backup. Geothermal fluids are used to provide space heating for the Warren Estates subdivision which is located in the Moana Geothermal Area in southwest Reno and the spent fluids are injected. Chemical, hydrologic and geologic data show that production is from faults and fractures in volcanic rocks along which geothermal fluids migrate to the surface. The pre-injection water table depth is estimated to have been approx. 90 feet and ground water flows northeastward toward the valley floor. Natural geothermal fluids cool and mix with shallow, non-thermal ground water as they flow downgradient along permeable layers in the subsurface.

The heating system consists of two production wells, WE-1 and WE-2, a heat exchanger unit and two injection wells, WE-3 and WE-4. Water is produced at a temperature of approx. 206°F and pumped at an average rate of 230 gpm from a zone 610 to 650 feet below the surface. Well WE-3 was completed to 1475 feet and has been in use since 1986; well WE-4 is proposed to be completed to 1000 feet. Injection is by gravity flow through four-inch tubing or slotted liner that extends into the geothermal resource.

During injection, the water levels in the wells fluctuate generally between 50 and 70 feet below the surface. Water will not be permitted to rise above a point two feet below the top of the casing.

C. Receiving Water Characteristics

Chemical, hydrologic and geologic data demonstrate injection and production wells operate in the same geothermal system. Fluid chemistry of water samples from the production and injection wells is nearly identical. All wells produce water which does not meet drinking water quality. Receiving waters exceed standards for TDS (1104 mg/l), sulfate (540 mg/l), fluoride (5.1 mg/l) and arsenic (0.1 mg/l).

D. Procedures for Public Comment

The Notice of the Division's intent to reissue a permit authorizing the facility to discharge to the ground water of the State of Nevada is being sent to the *Reno Gazette-Journal* for publication no later than April 10, 2016. The notice is being sent to interested persons on BWPC's mass email list. Anyone wishing to comment on the proposed permit can do so in writing for a period of 30 days following the date of the public notice. The comment period can be extended at the discretion of the Administrator. All written comments received during the comment period will be retained and considered in the final determination.

A public hearing on the proposed determination can be requested by the applicant, any affected state, any affected interstate agency, the regional administrator of EPA Region IX or any interested agency, person or group of persons.

Any public hearing determined by the Administrator to be held must be conducted in the geographical area of the proposed discharge or any other area the Administrator determines to be appropriate. All public hearings will be conducted in accordance with NAC 445.150.

The final determination of the Administrator may be appealed to the State Environmental Commission pursuant to NRS 445.274.

E. Proposed Determination

The Division has made the tentative determination to modify and reissue the proposed permit.

F. Proposed Effluent Limitations and Special Conditions

See Part I.A of the permit.

G. Rationale for Permit Requirements

Rationale for permit requirements are verification the quality of fluid discharged to the injection wells remains constant and confirmation that fluids disposal does not adversely affect the existing hydrologic regime.

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