

NEVADA DIVISION OF ENVIRONMENTAL PROTECTION

FACT SHEET
(pursuant to NAC 445A.856)

Permittee Name: Las Vegas Valley Water District (District)

Permit Number: UNEV87054

Number of Permitted Wells: 78

Type of Injection: Aquifer Storage and Recovery

A. Description of Discharge

Location: Seventy-eight (78) authorized injection wells are located in the Las Vegas Valley Water District well fields within T19S, R60E Sections 5, 28; T20S, R60E Sections 1, 5, 6, 7, 8, 9, 10, 11, 15, 21, 23, 24, 26, 27, 28, 29, 32, 33, 34, 35; T21S, R60E Sections 3, 4; T20S, R61E Sections 19, 20, 29, 30, 31; MDB&M; Clark County, Nevada.

Characteristics: All injectate is treated Colorado River water provided by the Southern Nevada Water System (SNWS). Injectate has a TDS concentration of approximately 550 mg/l and meets all other established drinking water standards.

B. Synopsis

Gross recharge from 1987 through Dec. 31, 2008 was 351,017 acre-feet.

2010 Renewal with modifications to address total Trihalomethanes (THMs) concern:

Between 1993 and 2008, occasional elevated THM levels ($> 80 \mu\text{g/l}$, the current drinking water MCL for total THMs) in the recovered water had been included in the annual reports for select production and dual-use wells. These elevated THM concentrations were generally detected in initial (minutes to days) pump back water in a number of the dual use wells, and they declined to around $50 \mu\text{g/l}$ before a well is brought on-line according to the Southern Nevada Water Authority's (SNWA) report, "*Chemical Conditions in the Primary Producing Aquifers and Portions of the Shallow Groundwater System of the Las Vegas Valley in 2000*" (Leising, 2003). Initial estimate suggest that THM detection were limited spatially with within 500 feet from the dual-use wells. The initial pump back water with elevated THM concentration was sent to waste before a well as brought on-line. Annual compliance reports stated that "[n]one of the recovered (produced) water put to the distribution system exceeded drinking water standards" through the years. The District and SNWA continue to actively

track groundwater quality issues in the Valley.

As a condition for this renewal, the Permittee is required to develop and implement a monitoring and operational plan to address short-term total THM spikes in the initial pumpback (produced) water, and conduct a long-term study to examine the fate of THMs in the aquifer.

For this 2010 renewal, LVVWD requested modification to remove artificial recharge well AR005 (SE ¼ NE ¼ S17 T21S R60E) from the permit and add artificial recharge well W091 (SW ¼ SE ¼ S06 T20S R60E) to the permit.

November 2005 Minor Modification

LVVWD requested that Aqua Guard be added to the Standard Maintenance Procedures for Artificial Recharge Wells. Aqua Guard utilizes a high energy, gaseous and liquid carbon dioxide technique. Aqua Guard was approved and added to the permit Part I.A.8.

August 2005 Minor Modification

LVVWD provided further information on sonar jetting. This technique was part of the Standard Maintenance Procedures for Artificial Recharge Wells approved in June. Sonar jetting was approved and added to the permit Part I.A.8.

June 2005 Minor Modification

LVVWD provided Standard Maintenance Procedures for Artificial Recharge Wells. This document was approved with the exception of sonar jetting. The approved practices have been added to the permit Part I.A.8.

December 2004 Minor Modification

LVVWD requested to modify their permit to add five wells and remove 5 wells, so the total permitted remains at 78. The wells to add are W078, W098, W110, W112 and W113, and are all within approved Sections 5, 7 and 8 T20S R60E, to the north of the City of Las Vegas. Wells to be removed at this time are wells AR002, AR003, AR004 in Sections 14 and 17 T21S R60E, well W68 in Section 31 in T20S R61E, and well W081 in Section 32 T20S R60S.

2000 Modification

Las Vegas Valley Water District (LVVWD) has requested to modify their existing permit #UNEV87054 to include ten (10) additional injection wells for a total of 78 injection wells. The increase is necessary to accommodate the growing demand for water in Las Vegas.

LVVWD has been recharging surplus SNWS water since 1988 for the purpose of storing water for future demands. Artificial recharge is seasonal, with injection occurring only in the cooler months when customer demand declines below SNWS capacity. Sixty-eight (68) wells were previously authorized for injection into the principal aquifer to accommodate the

artificial aquifer recharge program.

The additional ten (10) injection wells authorized in 2000 are located in the northwestern portion of the valley. SNWS water quality will be monitored during the injection cycle and produced ground water quality will be monitored during the non-injection cycle. NDEP was notified prior to each new injection well going on-line.

Perchlorate, which is primarily manufactured for use as an oxidizer in solid propellants for rockets and missiles, became a concern in Nevada when it was discovered in drinking water sources, which are obtained from the Colorado River. The contaminant was traced up the river to Lake Mead and was found to be entering Lake Mead from the Las Vegas Wash. The United States Environmental Protection Agency (USEPA) has established a provisional perchlorate action level for drinking water at 18 ppb. The Nevada Division of Environmental Protection has adopted this provisional level as an interim guidance limit, which will be incorporated into this permit. If, based upon the receipt of more conclusive data, the USEPA formally adopts a different limit, the NDEP will also adopt the limit and subsequently update this permit to reflect the official drinking water limit.

On January 20, 1998, perchlorate monitoring was added to the permit. To date, LVVWD has not had perchlorate detections that exceed 18 ppb.

A perchlorate treatment system has recently been installed which intercepts contaminated groundwater prior to entering into the Las Vegas Wash, and subsequently, Lake Mead. The perchlorate levels entering into the Wash have consequently declined and are expected to continue to decline as the treatment system is expanded. This lends itself to the assumption that the water that LVVWD draws from Lake Mead for treatment prior to injection into the Las Vegas Valley Aquifer will also experience a decline in perchlorate levels.

Due to the vast number of injection wells operated by LVVWD and the consistency of water quality in the Las Vegas Valley Aquifer from 200 feet below surface and deeper, which is where injection takes place, the following restrictions shall apply:

1. Within a given LVVWD pressure zone, when injection occurs in more than one recharge well within a 5-mile radius, one sample shall be taken from within the affected pressure zone to provide representative injectate data.
2. Injection wells which cannot be sampled due to non-reversible pumping conditions shall have a representative sample taken from the production well nearest in proximity. The production well sampled shall be identified in the monitoring report with its proximity to the injection well clearly stipulated as well as the perforation intervals listed with respect to the injection well.

C. Receiving Water Characteristics:

The receiving water meets all drinking water quality standards and has a TDS concentration of approximately 300 mg/l.

D. Procedures for Public Comment

The Notice of the Division's intent to modify a permit authorizing the facility to discharge to the ground water of the State of Nevada is being sent to the Las Vegas Review-Journal for publication.

The notice is being mailed to interested persons on our mailing list (see Attachment A). 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 NRS NAC 445A.238.

The final determination of the Administrator may be appealed to the State Environmental Commission pursuant to NRS 445A.605.

E. Proposed Determination

The Division has made the tentative determination to approve the proposed modification to UIC permit UNEV87054.

F. Proposed Effluent Limitations and Special Conditions

Proposed monitoring parameters and limitations as listed in Tables 1 and 2 below.

G. Rationale for Permit Requirements

The rationale for permit requirements is to verify that the injectate does not adversely affect the existing hydrologic regime.

My-Linh Nguyen Date: October 2010

Table 1. Monitoring Requirements

Cycle	Parameters	Sample Source Location	Frequency	Limitations
Injection	Injection Rate (gpm); Cumulative Volume (gal)	Injection well, at totalizing flow meter capable of instantaneous readings located on wellhead, or electronic equipment capable of equivalent readings at another location	Recorded bi-weekly during injection cycle	Monitor and Report
	Injection Pressure (psig), (minimum, maximum, average)	Injection well, at gauge located on wellhead, or electronic equipment capable of equivalent readings at another location ¹	Recorded bi-weekly during injection cycle	Monitor and Report
	Water Levels (nearest one - tenth foot)	Injection wells and all monitoring wells	Recorded monthly	Monitor and Report
	Water Quality Parameters specified in Table 2 (attachment B)	Injectate, sample port between final treatment and wellhead	During injection cycle, as specified in Table 2	State and Federal Drinking Water Standards. Perchlorate - 18 ppb
Recovery	Production Rate, gpm	Continuous Recording Gauge for Production Well	Daily readings of totalizing flow meter(s)	Monitor and Report
	Water Quality Parameters specified in Table 2 (attachment B) ²	Produced water from each well used for injection (or nearest representative production well)	During production cycle, as specified in Table 2	State and Federal Drinking Water Standards. Perchlorate - 18 ppb
		Dedicated production wells that do not receive recharge	One sample at the end of pumping season	State and Federal Drinking Water Standards. Perchlorate - 18 ppb
	Produced water from municipal production well down-gradient of recharge wells ³ (if not a representative recovery well?)	One sample at beginning and one at the end of pumping season	Monitor and Report	
Other pumping	Water Quality Parameters specified in Table 2 (attachment B)	Representative domestic or other municipal wells	Annually during the 1 st , 2 nd , 3 rd and 5 th year.	Monitor and Report

Table 2. Water Chemistry Report

Category	Water Quality Parameters	Units	Frequency	LIMITATIONS
Field Chemistry	Electrical Conductivity, pH, Temperature	µmho/cm, AU, °C (respectively)	Monthly	Monitor and Report
Major Cations	Na ⁺ , K ⁺ , Ca ⁺² , Mg ⁺²	mg/l	Monthly	Monitor and Report. Must not exceed applicable State and Federal Drinking Water Standards (DWS).
Major Anions	HCO ₃ ⁻ , SO ₄ ⁻ , Cl ⁻ , NO ₃ ⁻ , SiO ₂ ⁻	mg/l	Monthly	Monitor and Report. Must not exceed applicable State and Federal (DWS).
Trihalomethanes (THMs) and related parameters	Total THMs , DOC (or TOC),	µg/l mg/l	Day 1 & monthly during injection and / or production cycle ⁵	80 µg/l for Total THMs Monitor and Report
Perchlorate	ClO ₄ ⁻	µg/l	Monthly	18 µg/l
Total Dissolved Solids	TDS ⁶	mg/l	Monthly	Must not exceed applicable State and Federal Drinking Water Standards.
Total Metals	B, F, Ag, As, Ba, Be, Cd, CN, Cr, Cu, Fe, Hg, Mn, Ni, Pb, Sb, Se, Tl, Zn	mg/l or µg/l (based on applicable DWS & detection limits).	Quarterly	Must not exceed applicable State and Federal Drinking Water Standards.

^{1.} For each given LVVWD pressure zone, when injection occurs in more than one recharge well within a 5-mile radius, one sample shall be taken from within the pressure zone to provide representative injectate data.

^{2.} Recharged water recovered from NWWRC wells (118, 119, 120 and 121) is used for a non-potable purpose, blending with tertiary treated effluent to supplement golf course irrigation; therefore, monitoring and chemical analyses for major ions, perchlorate and total trihalomethanes is not required when recovered water from the four wells has a non-potable use. Electrical conductivity of the recovered water, water levels and production volume monitoring and reporting remain permit requirements.

^{3.} Injection wells which cannot be sampled due to non-reversible pumping conditions shall have a representative sample taken from the production well nearest in proximity. The production well sampled shall be identified in the monitoring report with its proximity to the injection well clearly stipulated as well as the perforation intervals listed with respect to the injection well.

^{4.} Monitoring of representative domestic or municipal wells, as required in the Schedule of Compliance (Part I.B.c), shall be conducted annually during the 1st, 2nd, 3rd and 5th year of this permit for wells that do not have at least 5 years of historical water quality data (as specified in Table 2, attachment B) prior to this permit renewal. For wells with 5 years of water quality data, NDEP may reduce monitoring frequency to once every 5-year if no significant changes were observed.

^{5.} If the duration of the injection or product cycle is less than 30 days, sampling shall occur on Day 1 and the final day of operation.

^{6.} TDS value may be calculated based upon electrical conductivity results.