

NEVADA DIVISION OF ENVIRONMENTAL PROTECTION
FACT SHEET
(Pursuant to NAC 445A.236)

Permittee Homestretch Geothermal, LLC
15 Julian Lane
Yerington, Nevada 89447

Permit No. NV0023655

Facility Wabuska Geothermal Power Plant

Latitude: 39° 09' 40" N
Longitude: 119° 11' 00" W

General: Homestretch Geothermal, LLC operates a binary geothermal power plant in northern Wabuska Valley in Lyon County Nevada. They have submitted an application to Division of Environmental Protection which requests the discharge of non-contact, spent geothermal water from their cooling ponds to the Walker River. The proposed discharge outfall would be located approximately 100 yards downstream of the entry point of the Wabuska Drain to the River.

The requested discharge amount is for an annual average of 7.2 MGD to the Walker River and will require the establishment of a mixing zone in the Walker River from the point of discharge in the river to the Walker River Paiute Tribal boundary on the Walker River.

The spent geothermal water will be cooled in a series of earthen evaporation ponds and then flow through a 36 inch pipeline for approximately 9,000 feet before discharging to the Walker River at the following location:

Latitude: 39° 09' 08" North
Longitude: 119° 05' 57" West

The mixing zone will consist of about a half mile stretch of the Walker River, with the compliance point for meeting all water quality standards at the boundary of the Walker Paiute Tribe.

During periods when either the river flow or cooled geothermal water quality would result in a violation of the Walker River water quality standards at the compliance point, the applicant will not be allowed to discharge to the Walker River. Instead, the applicant will direct flow via ditches to playas east and west of the power plant in accordance with the permit requirements listed under their groundwater discharge permit, NEV92037. This discharge option will not result in any flow of cooled geothermal water to the Walker River.

Receiving Water Characteristics:

Standards for the reach of the Walker River for this discharge are set in NAC 445A.167 (Walker River up to inlet to Weber Reservoir) and NAC 445A.144. This reach is not listed in Nevada's 2004 Impaired Waters List as an impaired water body. However, the terminus of the river, Walker Lake, is high in TDS and in need of supplemental water for dilution. This discharge will benefit the lake by providing additional water that would not ordinarily flow to the lake.

Effluent Limitations: During the period beginning on the effective date of this permit and lasting until the permit expires, the Permittee is authorized to discharge cooled, spent geothermal water to the Walker River via an outfall pipeline located approximately 100 yards down river from the Wabuska Drain discharge point into the Walker River.

Samples taken in compliance with the monitoring requirements specified below shall be taken at:

1. Outfall 001- Discharge Pipeline Outfall to the Walker River from the cooling pond(s).
2. River Monitoring Station 'A', 150 feet upstream of the outfall to river
3. River Monitoring Station 'B', Downstream Mixing Zone Boundary at the Walker River Indian Tribal border.

Latitude: 39° 09' 10" North
Longitude: 119° 05' 19" West

TABLE I.A.1.: EFFLUENT LIMITATIONS

<i>Parameters</i>	<i>Effluent Discharge Limitations</i>		<i>Monitoring Requirements</i>		
	Annual Average	Daily Maximum	Sample Location	Measurement Frequency	Sample Type
Flow Rate (MGD)	7.2 ¹	M & R ²	001	Continuously	Meter
Fluoride (mg/l)	M & R	M & R	001, Station A	Monthly	Discrete
		1.0	Station B		
Total Dissolved Solids (TDS) mg/l	M & R	M & R	001, Station A	Monthly	Discrete
	≤ 400	≤ 450	Station B		
Sulfate (mg/l)	M & R	M & R	001, Station A	Monthly	Discrete
	≤ 95	≤ 110	Station B		
Chloride (mg/l)	M & R	M & R	001, Station A	Monthly	Discrete
	≤ 30	≤ 35	Station B		
Boron (mg/l)	M & R	M & R	001, Station A	Monthly	Discrete
		0.75	Station B		
Alkalinity as CaCO ₃ (mg/l)	-----	M & R	001, Station A	Monthly	Discrete
		± 25 % change from Station A	Station B		
Sodium Adsorption Ratio (SAR)	M & R	M & R	001, Station A	Monthly	Discrete
	≤ 3		Station B		
Temperature (Celsius)	M & R	M & R	001, Station A ³	Monthly	Discrete
		ΔT ± 2°C from Station A	Station B		
pH (S.U.)	6.5 to 9.0		001	Monthly	Discrete
	M & R		Station A		
	ΔpH ± 0.5 S.U. from Station A		Station B		
Dissolved Oxygen (mg/l)	----	≥ 6.0 Nov-May ≥ 5.0 Jun-Oct	001	Monthly	Discrete

¹ The annual average for discharge shall be less than or equal to 7.20 MGD.

² The discharge rate shall be managed per the methodology in the approved operation and maintenance manual and include use of the river flow data at Wabuska Gaging Station.

³ If the river temperature at Station A is greater than the following seasonal standards (see below), then the discharge from 001 must have a temperature less or equal to the seasonal standard below.

Nov-Mar: $\leq 13^{\circ}\text{C}$
Apr-Jun: $\leq 23^{\circ}\text{C}^{\text{a}}$
Jul- Oct : $\leq 28^{\circ}\text{C}$

^a The temperature beneficial use standard is $\leq 21^{\circ}\text{C}$ from February through June when Lahontan Cutthroat are present in the reach from Walker Lake to Weber Reservoir.

Acronym Definitions:

mg/l Milligrams per liter.
MGD: Million gallons per day.
CaCO₃: Calcium carbonate.
°C: Degrees Celsius.

Rationale for Permit Requirements: The beneficial uses for this reach of the Walker River include “Propagation of aquatic Life,” “Drinking Water”, and “Irrigation of Farmlands” which are the most restrictive.

Discharge Flow: The discharge rate to the outfall shall be monitored to track the flow rates. The total annual average limit of 7.2 MGD is placed in the permit due to the maximum annual authorization of through-put for the facility.

River Flow: The river flow at the USGS Wabuska Gaging Station shall be tracked for use in determining the allowable discharge rate via Outfall 001 as a part of the approved operations manual. This rate, Qr in the complete mixing zone calculation, will be used to determine how much water can be released to the outfall pipeline from the cooling ponds.

Fluoride (mg/l): The fluoride limit of 1 mg/l shall be met at all times at the edge of the mixing zone, Station B. This standard is listed under NAC 445A.144 for the irrigation use standards for this reach of the river. The spent geothermal water has an average fluoride concentration of around 7.3 mg/l based upon data from 1998 to 2008. Therefore, a significant level of flow is needed in the river to mix the discharge to meet the standard of 1 mg/l. It is estimated that a river flow rate of 292 CFS is required for mix at the annual average discharge rate of 7.2 MGD.

This is the most limiting constituent in the discharge to be mixed at the issuance of the permit.

The Division is presently evaluating its longstanding 1 mg/l fluoride limit for irrigation to determine if it’s applicable for the soils of Nevada. If and when the SEC (State Environmental Commission) changes the standard upward, the fluoride limit in the permit shall be modified to the new standard as a minor modification.

TDS (mg/l) The TDS limit of 400 mg/l annual average and 450 single values shall be achieved at the edge of the mixing zone. This can be attained at around 120 CFS at the annual average discharge rate of 7.2 MGD. The geothermal water has an average TDS concentration of around 1000 mg/l.

The 400 mg/l and 450 mg/l limits are RMHQ’s (Requirements to Maintain Existing Higher Quality) standards. The Division will be evaluating the applicability of its RMHQ’s that were set years ago and if the SEC changes these standards, the permit limit will be modified to the new standard as a minor modification.

Sulfate (mg/l) The Sulfate limit of 95 mg/l annual average and 110 mg/l single value shall be achieved at the edge of the mixing zone. This can be attained at around 150 CFS at the annual average discharge rate of 7.2 MGD. The geothermal water has an average sulfate concentration of around 500 mg/l.

The 95 mg/l and 110 mg/l limits are RMHQ's (Requirements to Maintain Existing Higher Quality) standards. The Division will be evaluating the applicability of its RMHQ's that were set years ago and if the SEC changes these standards, the permit limit will be modified to the new standard as a minor modification.

Chloride (mg/l) The chloride limit of 30 mg/l annual average and 35 mg/l single value shall be achieved at the edge of the mixing zone. This can be attained at around 110 CFS at the annual average discharge rate of 7.2 MGD. The geothermal water has an average sulfate concentration of around 44 mg/l.

The 30 mg/l and 35 mg/l limits are RMHQ's (Requirements to Maintain Existing Higher Quality) standards. The Division will be evaluating the applicability of its RMHQ's that were set years ago and if the SEC changes these standards, the permit limit will be modified to the new standard as a minor modification.

Alkalinity as CaCO₃ (mg/l): The alkalinity as CaCO₃ limitation is based on the Walker River at Weber Reservoir Standards of Water Quality, NAC 445A.167. This requires no more than a 25% change, plus or minus, from the background river quality.

Boron (mg/l) The Boron standard is set under NAC 445A.144 at 0.75 mg/l for irrigation of agricultural lands. The average Boron concentration in the spent geothermal water is around 0.93 mg/l, so minimal mixing will be required.

SAR Sodium Adsorption Ration, in millequivalents per liter, is another irrigation standard in place for this reach of the Walker River. The annual average limit is set at 3 under the NAC 445A.167. Based on the average water quality of the discharge, the SAR is calculated to be around 13. Therefore, an average river flow of 125 CFS will be required to attain this value.

Temperature: The temperature limitation is based on the Walker River standards listed in NAC 445A.167. Because the natural river temperature varies greater than 0°C (RMHQ) routinely between monitoring stations, the Beneficial Use standard is applied. A mixing zone has been established for temperature. When the natural river conditions (upstream background sampling point (Sample Location A) exceed the seasonal water quality standard, the temperature at the end of the mixing zone shall be monitored and reported only. This is because the natural upstream river conditions will likely cause an unwarranted temperature standard violation at the downstream mixing zone boundary (Sample Location B).

pH: The pH limitation is based on the Walker River at Weber Reservoir Inlet, NAC 445A.167. This will be met at the discharge point for the outfall.

Dissolved Oxygen: The dissolved oxygen limitation is based on the Walker River at Weber Reservoir, NAC 445A.167. This will be met at the discharge point for the outfall.

Total Phosphates: The total phosphate limitation is based on NAC 445A.167 for the protection of aquatic life. High levels of phosphates in certain water can cause algal blooms during certain parts of the year, and therefore this limit shall be met at the discharge outfall.

Total Nitrogen: This parameter does not require a zone of mixing. The applicable water quality standards will be achieved at the outfall.

Mixing Zone:

The mixing zone length in the Walker River is 5000 feet downstream from outfall 001. The downstream boundary of the mixing zone will be monitored monthly for the parameters listed in Table 1.A.1 to insure all water quality standards are maintained at the point where the river flows onto Walker River Paiute Tribal Lands. A site map is attached to show the location for the Outfall 001 to the river.

Determination of the discharge rates from Outfall 001 is based upon a complete mix calculation for the limiting parameter. The limiting parameter at the drafting of this permit is fluoride with a maximum river concentration of 1 mg/l at the edge of the mixing zone. During periods when the Walker River flows are below 292 CFS, the permittee will have to throttle down the discharge rate to match the methodology calculations listed in the approved operations and maintenance manual.

If downstream monitoring at Station B reveals exceedances of the water quality standards, the Division will require the permittee to modify the discharge or take other measures to ensure that water quality standards are achieved at the edge of the mixing zone. As a back-up disposal option, the permittee is authorized under groundwater discharge permit NEV92037 to discharge out to its undeveloped property for evaporation and percolation of the water.

Procedures for Public Comment: Notice of the Division's intent to issue discharge permit NV0023655 as described here is being sent to the Mason Valley News for publication and mailed to interested persons on our mailing list. Anyone wishing to comment on the proposed permit must submit written comments to the Division within (30) days of the publication date. The comment period can be extended at the discretion of the Administrator. The deadline for comments is 5:00 pm XXXXX, 2009, although letters postmarked on that date will also be accepted.

A public hearing on the proposed determination can be requested by the applicant, any affected state or interstate agency, the Regional Administrator, or any interested agency, person, or group of persons. The request must be filed within the comment period and indicate the interest of the person filing the request and the reasons why a hearing is warranted. Public hearings granted by the Division are conducted in accordance with NAC 445A.238.

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

Proposed Determination: The Division has made the tentative determination to issue the proposed discharge permit for a five year term.

Prepared by: Joseph Maez
March 09, 2009