



NEVADA DIVISION OF ENVIRONMENTAL PROTECTION

FACT SHEET

(Pursuant to NAC 445A.874)

Permittee Name: **NGP Blue Mountain I LLC**
 Permit Number: **UNEV2007202**
 Project Name: **Blue Mountain Geothermal Project - NGP Blue Mountain I LLC**
 Address/Location: **Jungo Road 25 miles WNW of Winnemucca, Humboldt Co.**
 Permit Action: **UIC Draft Permit for Renewal**
 Type of Project: **Geothermal Power Production**
 Injection Wells (#): **Fifteen (15)**

A. Description of Discharge

Location: Up to fifteen (15) injection wells to be located at the Blue Mountain facility in the following sections:

Sections 1, 10, 11, 12, 13, 14, 15, 16, 21, 22, 23, 24, 25, 26, 27, 28, and 35 T.36N., R.34E., M.D.B&M.

As of 2016, the field is still be evaluated and changes being made to increase productivity. In 2012, there were 21 geothermal-related wells in field, including 9 injection wells. As of January, 2008, there were five (5) wells in the project area into geothermal reservoir and injection wells are planned for Section 11 and 15 (however, this may change):

The following table outlines injection well completion dates, depths, and injection intervals (as late 2015).

Injection Well	Date Completed	Max WHP (psig)	TDS, ppm
58-15	5/15/2008	425	5,300
58A-15	11/03/2008	297	3100
57-15 ST1	4/05/2009	450	NA
61-22 ST2	5/30/2009	1000	5,500
58-11	12/28/2009	503	NA
44-14	2/23/2008	598	5,000
89(82-14)-11	12/20/2008	604	NA
55-15	12/23/2009	784	4,900
91-15	2/18/2010	815	4,500
BD-1 (blowdown)	8/9/2009	(210 feet deep)	3,236

* NDEP value based on max injection pump capabilities

In addition to injection, the applicant uses an evaporation/infiltration pond to dispose of cooling tower water and geothermal fluids produced during test/maintenance procedures. Basins are utilized at existing injection wells for emergency or maintenance procedures.

Characteristics: The injectate consists of geothermal fluid which has been passed through a binary power generating plant. The system is water-cooled and cooling tower blowdown fluid is discharged to the large discharge basins north of the plant after a few cycles. Chemical additives are used in well water and treatment of cooling tower water as approved by the Division. The injectate has a neutral pH and a TDS content of approximately 3,800-4,300 mg/l with sodium and chloride being major constituents. Geothermal fluids typically have elevated levels of boron, lithium, fluoride, arsenic and slightly elevated levels of silica.

Below is a comparison of the injectate to the characteristics of the receiving reservoir fluids:

Table 1

Constituent	Produced water	Receiving Water-- Injection Well
pH	7.9	8.43
Total Dissolved Solids	3,800-4,400	5,000
Sodium	1,400	1,600
Potassium	160	180
Magnesium	2.2	<5
Iron	-	<0.5
Silica	250	390
Boron	12	14
Lithium	3.5	4
Zinc	-	<0.2
Barium	-	0.45
HCO ₃	260	87
CO ₃	<2	17
Chloride	2,000	2,600
Fluoride	4	7
Sulfate	120	110
Arsenic	0.035	0.14

All values in parts per million, unless otherwise noted

N.D. Not Detected

N.A. Not analyzed/available

TDS Total Dissolved Solids

B. Synopsis

General: NGP Blue Mountain I, LLC (transferred in 2013/2014) is developing a binary geothermal power generation facility at the Blue Mountain Known Geothermal Resource Area near Winnemucca, Nevada (Location Maps, Attachments 1& 2). The project's full operation design capacity is planned for 51 MW, originally set for 37.5 MW. The geothermal fluid is delivered to the power plant from the geothermal production wellfield. The fluid is distributed to heat exchangers that utilize isopentane. The cooling system uses a wet cooling tower, cycling groundwater through system multiple times, to

condense the vaporized isopentane. The water from cooling tower has been discharged to two (2) large discharge basins north of the plant. Injection is into or below currently utilized production zones.

The shallow aquifer system begins at 100+ feet below ground surface, and is fair to poor quality and generally has TDS values of 250 to 3200 ppm, depending on depth and location. A 700-foot well (screened from 240 feet) on the south-western edge of the project area contained TDS of 3,200 ppm.

Geologic Setting/Hydrogeology/Geothermal Characteristics: The project area is located in the Desert Valley Hydrographic Area (Basin #31) of the Black Rock Desert Hydrographic Region (Region #2). The project area is located at the foot of the west side of Blue Mountain.

The geothermal system in this area is a typical range-front fault system on the west side of Blue Mountain. Faults are typically N-S trends with cross faults of W-E and NE-SW orientation.

Lithologic units in alluvium material up to 1,000+ feet thick, underlain by metamorphic rocks of a hundreds-thousands of feet thick. Felsic dike intrusions in the meta-sediments are evident in the well logs. Soils in the project area are mostly silts and clays, with sand. Shallow lithologic units appear to be lacustrine in nature.

C. Receiving Water Characteristics

Geothermal fluids are injected back into the geothermal reservoir (see Table 1 above). Shallow groundwater (underlying discharge basins) quality: Jan. 2009

	MW-5	MW-6	MW-7	WW-5
TDS	2900	3100	3700	3000
arsenic	0.018	0.0058	0.012	0.055
boron	9.3	11	12	
chloride	1700	1500	1900	1500
fluoride	2.4 (3 in March)	1.9	<1.0	3
lithium	1.7	2.5	2.5	2.1
sulfate	110	160	60	100

D. Procedures for Public Comment

The Notice of the Division's intent to reissue a permit authorizing the facility to inject into the ground water of the State of Nevada subject to the conditions contained within the permit, will be sent to the *Humboldt Sun*. The notice will be 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.

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 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 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 modify and reissue the permit contingent upon comments received during the public comment period and the public hearing. If no significant negative impacts due to injection are identified during this process, it is the intent of the Division to reissue the permit.

F. **Proposed Effluent Limitations and Special Conditions**

See Part I.A. of the permit.

G. **Rationale for Permit Requirements**

Verification the quality of fluid discharged to the injection well(s) and discharge basins remains constant. Confirmation that fluids disposal does not adversely affect the existing hydrologic regime.

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