NEVADA DIVISION OF ENVIRONMENTAL PROTECTION
UNDERGROUND INJECTION CONTROL PROGRAM

UIC FACT SHEET

(Pursuant to NAC 445A.874)

Permittee Name: **Brady Power Partners**
Permit Number: **UNEV87050**
Address: **10750 I-80 East Exit 65, NV 89406 (north east of Fernley)**

A. Description of Discharge

Location: Twelve (12) injection wells and varies infiltration basins, including Pond 1A, located at Brady Power Partner's (BBP) Unit-1 geothermal power plant at Brady's Hot Springs, approximately 15 miles northeast of Fernley, in Sections 1, 2, 3, 10-15, 22-25, T.22N., R.26E., Sec. 6, 7, 18, T.22N., R.27E., Sec. 36 T.23N., R.26E., Sec. 31, T.23E., R.27E., and W½ Sec. 30 , T.22N., R.27E., Churchill County, Nevada. Currently, there are eight (8) injection wells in operation (see below -Sec B). The additional sections which were not listed in the previous permit, excluding the two southern most sections, requested make up the Brady Hot Springs Unit Area, as defined by the Bureau of Land Management.

Characteristics: The injectate consists of geothermal fluid which has passed through a dual flash electric power generator and cooling tower blowdown. Certain chemical corrosion inhibitors and cooling tower biocides are utilized, subject to DEP's approval. Discharges are authorized by this permit to infiltration basins, including Pond 1A (Lake Brady) which is netted for wildlife protection.

The injectate characteristics are the same as the Brady's main reservoir characteristics. Below is a comparison of the injectate to the characteristics of the geothermal reservoir being considered in section 25 for injection:

Constituent	Brady Main "Injectate"	"Section 25" Reservoir (well #74-25)
Temperature	240 degF	200 degF+
pH	8.0	8.69
TDS	2800	6870
Calcium	51	110
Sodium	870	2300
Chloride	1120	3800
Sulfate	425	100
Arsenic	0.16	0.084
Boron	4.75	13
Iron	0.12	0.06
Fluoride	6.7	2.5
Silica	200	131
Antimony	NA	0.026

Production temperature: 290-380 degF
Injection temperature: 220-240 degF
Injection rate (ave in 1997): 11,000 gpm

B. Synopsis

Injection Wells (as of 1998)

Well	Location	Depth	DOM#	Injection Interval	Max Inj Press
81A-1	NE NE Sec 1	696'	323	485' - 696' (slotted)	161 psig
81B-1	NE NE Sec 1	662'	329	380' - 662' (slotted)	126 psig
18B-31	SW SW Sec 31	762'	326	550' - 580' (slotted)	183 psig
18D-31	SW SW Sec 31	690'	325	340' - 454' (open hole)	113 psig
61-25	Sec 25	496'	478	442'- 496'	140 psig
73-25	Sec 25	612'	479	437'-612'	140 psig
74-25	Sec 25	438'	480	398'-438'	140 psig
81-25	Sec 25	774'	481	554'-774'	140 psig
MGI-2	SW SE Sec 1	443'	168	380' - 443' (slotted)	no longer IW
82A-11	Sec 11	5966' GL	370	no longer injector	na
18-1	SW SW Sec 1	5730' GL	342	no longer injector	na
18A-1	SW SW Sec 1	4268' GL	355	no longer injector	na

2012 Renewal

2002 – facility added a binary unit to the existing dual flash configuration.
2001 – Ormat took over Brady Power Partners.
2001 April – water was found surfacing near Section 25 after new wells were placed into service. Reduced injection rate. Water quality was of similar or poorer quality.
1999 – four Section 25 wells were placed into service.

Review of 2001 surfacing event: In 2000, injection started into the section 25 injection wells (61-25, 73-25, 74-25, 81-25), including injecting 100% of the plant flow >8,000 gpm to these wells. Within months, the flow was mostly diverted back to the main (northern) injection wells, and wells were not used much until November 2000. In early April of 2001, water began to surface in an area to the south-southwest of the wells and a few seep appeared and a large area became damp. Water quality tests were conducted and found no impacts as shallow water similar to the geothermal water. Well tests were conducted to look for leaks. After all data was collected, evidence pointed to a zone (fault?) in the formation around 61-25 was leaking. Injection rates were decrease or eliminated into 61-25 over the years. Surfacing water has not occurred since. Restrictions are being set in this version of the permit to ensure surfacing does not recur.

1998 Changes

In November of 1996, the permittee submitted an application for renewal, however, because of the permit backlog and the fact that the permittee was considering other changes, renewal was extended. Since 1997, the permittee has explored alternative injection locations south of the project, in Section 25. Five test holes (BCH-5, BCH 7-BCH 10) were drilled, partially cored, and logged in Section 25. BCH 7 was flowed and a water sample collected. The permittee submitted an application for modification of the permit to include portions of Sections 24/25 T.22N., R.26E. and Section 30 T.22N., R.27E. An injection well was drilled in the fall of 1998 under a temporary permit. The permittee was allowed to drill and flow test the well, as well as conduct a low-volume injectivity test. A determination was made to monitor wells in this area for arsenic and fluoride changes (see below).

Historically, observation well #64-1, located between the power plant and the northern injection wells, has been used as a monitoring well as a condition of the UIC permit. This well is being dropped from monitoring because there have not been any changes to water quality. There have been anomalous values for some of the samples collected on this well, however, sampling and lab analysis are suspect in these cases.

Since May 1993, BPP has supplied geothermal water (injectate) to the Gilroy Foods Plant (GFP) under agreement. BPP has monitored Gilroy's wells to evaluate the impacts that production/injection could have on Gilroy's resource. It was required, by NDEP and through agreement by both companies, that BBP monitor two of Gilroy's three wells: B-5, B-8, Grace-1. Well EE-1 is no longer being monitored under agreement between the BPP and GFP due to it's lack of connection to the reservoir. The wells formerly being monitored under agreement with Gilroy (B-5A, B-8 and EE-1) are no longer monitored due to lack of response to production and tracer testing that revealed no interference from MGI-2, etc. These monitoring results have been submitted with quarterly reports since 3rd quarter of 1996. These wells will no longer require monitoring under the UIC permit due to the results of the monitoring and tracer tests.

Original permit fact sheet

Brady Unit-1 consists of a 26 megawatt (gross) geothermal power plant and associated production and injection wells located at Brady's Hot Springs. The plant sells electricity to Sierra Pacific Power Company. This permit covers the injection and surface discharges to basins located within the boundaries of the Brady Unit 1 project.

The project is located in the Brady Known Geothermal Resource Area (as designated by USGS). At Brady Unit-1, geothermal fluids of 290 to 380 degrees Fahrenheit are produced from seven production wells from depths of approximately 500 to 6,000 feet. The source of the geothermal water is the northeasterly trending Brady's Fault Zone. Surface manifestations include fumaroles, steaming ground and minor hot springs in a linear zone about 1.5 miles long over the project site. Thermal groundwater is widespread within an area of about seven square miles centered around the project. Cool waters in the Hot Springs Flat area down gradient of the fault are very similar in composition to the thermal waters and are thought to be mostly geothermal in origin, with a small meteoric component.

The injection wells which have been used historically are #81A-1, #81B-1, #18B-31,

#18D-31 (all four wells to the northeast of main production field and on the east side of Brady's fault) and MGI-2, which is near the power plant. Wells 82A-11, 18-1, 18A-1 have also been used for injection.

There are twenty observation (pressure and temperature only/not required by NDEP) wells located within the project area, including four within Section 25 in the new area being explored.

Sampling of all new injection zones will be required prior to approval of the wells to confirm no degradation by injectate will occur. The injection zones vary between 300-800 feet, all within volcanic tuff and limestone formations (Lower Truckee Formation) of the geothermal reservoir. There are no public water supply wells within the area of review.

C. Receiving Water Characteristics

Historically, the produced fluid has been injected back into the same reservoir (see Part A above). Ground water at all depths surrounding the project is of geothermal nature and poor quality, evident by hot springs, mud pots and fumaroles surrounding the facility.

In 1998, the permittee began looking at an area 3.5 miles south of the plant site for injection. The geothermal reservoir fluids within this area are of differing quality than the main Brady Hot Springs area. (See table in Section A of this fact sheet). A determination was made by the Division to allow injection into wells in Section 25 with arsenic and fluoride values higher than the receiving aquifer's. This determination is based on the fact that the aquifer has geothermal characteristics, above drinking water standards for arsenic and TDS. Due to hydraulic and geochemical properties of the receiving formation, arsenic and fluoride values should remain at background levels. Monitoring will be conducted at observation well(s), to be selected based on injection points, in Section 25 as confirmation that degradation is not occurring.

The permittee will make a determination at a later date on the percentage of injectate that will be diverted to wells in the new area, based on injectivity tests.

D. Procedures for Public Comment

The Notice of the Division's intent to modify and 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, was sent to the *Reno Gazette-Journal* for publication **no later than August 20, 2012**. The notice was mailed to interested persons on our mailing list (see Attachment A). Anyone wishing to comment on the proposed permit modification 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 that the quality of fluid discharged to the injection well(s) remains constant. Confirmation that fluids disposal does not adversely affect the existing hydrologic regime.

Prepared by: Russ Land
Date: June 2012