

NEVADA DIVISION OF ENVIRONMENTAL PROTECTION FACT SHEET

(pursuant to NAC 445A.236)

Applicant: Nevada Solar One, LLC
2551 North Green Valley Parkway, No. 205-B
Henderson, Nevada 89014

Permit: NEV2007503

Location: Nevada Solar One Power Station
602 Eldorado Valley Drive
Boulder City, Clark County, Nevada 89005

Latitude: 35° 48' 30" N; Longitude: 114° 58' 32" W

Township 25S, Range 63E, Section 6 MDB&M

Flow:

Evaporation	Daily maximum	0.150 Million gallons per day (MGD)
	30-day Average	0.090 Million gallons per day (MGD)
Pond Inflow		

Reuse	Daily maximum	0.048 Million gallons per day (MGD)
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Wellhead Protection: The facility is not located within an established wellhead protection capture zone or a 6,000-foot Drinking Water Protection Area.

General: The Nevada Solar One Power Station (NSOPS) is a 64-megawatt (MW) solar thermal electric generating plant located in the Eldorado Valley, Clark County, Nevada. Facility construction, startup, and initial operation were authorized under temporary permit TNEV2007380 with plant startup scheduled for May 2007. The applicant proposes to modify permit NEV2007503 issued by the Division on June 25, 2007. The permit authorizes applicant to discharge industrial process wastewater, including cooling tower and boiler blowdown, equipment sumps, floor drains and wash water, service water, filter backwash, reverse osmosis (RO) reject water, and oil-water separator water, to two double-lined evaporation ponds. The ponds were designed to a zero-discharge standard of performance. The requested permit modification proposes to utilize process waste stream and pond incidental rainfall fluid stored in the evaporation ponds for reuse as dust suppression purposes on the NSOPS 400 acre property at a maximum rate of 0.048 MGD. Boulder City currently supplies the applicant potable water for dust suppression typically at an application rate of up to 0.024 MGD under usual site operating conditions. The proposed reuse 0.048 MGD maximum rate withdrawn from pond storage will provide the applicant ability to address infrequent needs for additional short term dust suppression capacity beyond usual operating conditions that may be necessary for occurrences such as during more severe weather conditions which periodically happen at the site or during additional construction activity.

At peak capacity, the facility will generate up to 64-MW using parabolic mirrored troughs arranged in a 350-acre collection grid, 182,400 four-foot by five-foot mirrors. Parabolic trough power plants use concentrated sunlight to provide the thermal energy required to drive a conventional power plant. The computer guided troughs track the sun during the day and concentrate the solar radiation on a receiver tube located at the focus of the parabolic mirrors. A heat transfer fluid will pass through the receiver and will be heated to temperatures required to generate steam and drive a conventional Rankine cycle steam power plant.

The industrial process wastewater system for the facility is designed as a closed system to route flow from the various waste streams to either of the two evaporation ponds. The ponds are located near the northern perimeter of the property.

Water in the cooling tower will be recycled through the tower up to seven times with chloride concentration monitoring. Blowdown from the tower will be used as part of the system to control water quality in the tower. The water in the tower and the blowdown stream will be treated to avoid algae growth and to maintain pH between 6.0 and 8.0 standard units (SU). The blowdown flows to the ponds via Manhole 1.

The RO system generates high quality demineralized water for the steam cycle of the power plant. The RO reject water flows to a sump that also collects other waste streams at the Power Block Building. These waste streams include the condensate from the air compressor system, water from floor drains in the RO room, and, during some fire pump operating conditions, a flow of potable water from the diesel driven fire pump. RO system reject water has a pH of approximately 6.0 SU. When the system is in the cleaning mode to clean the RO membranes, the reject water may have a pH as low as 4.0 SU. Water from this sump is either pumped to the cooling tower to serve as part of the makeup water for the cooling tower blowdown or is directed to the evaporation ponds through Manhole 1. Chemicals for water treatment will be stored in the RO room and at the cooling tower.

Included in the waste control systems is a 2,000-gallon oil-water separator (OWS) that is sized for 225 gallons per minute (gpm) and designed to reduce free oil in the effluent to less than 10 milligrams per liter. The OWS is connected to the floor drain in the turbine generator lube and cooling oil room. OWS discharge flows through Manhole 1 to the evaporation ponds.

Open drain funnels are located in the power generation area of the plant. Piping and equipment water drains are routed to these funnels. The water in this collection system flows through Manhole 1 to the evaporation ponds.

Typically, the plant will start-up once daily. During start-up, the steam piping will be warmed using steam generated by an auxiliary fuel source; drains will be opened to remove condensed water from the piping. The maximum flow rate of this waste stream will be less than 100 gpm and will last until the piping is at operating temperature and the drains are shut, approximately one hour. During and after startup, there will be a residual flow of less than 20 gpm from intermittent and continuous blowdown and steam trap discharges.

Both the 3-acre, Pond 1, and the 5-acre, Pond 2, evaporation ponds were constructed with 60-mil HDPE primary and secondary liners and a geonet drainage layer between the liners. The ponds were designed based on an average 150 gpm inflow to the ponds and a coincident 25-year, 24-hour storm event to contain a 3-foot maximum depth of water with a 3-foot freeboard. The ponds are not designed to collect any site runoff. Pond 1 is scheduled to be used August through January. Pond 2 is scheduled to be used February through July. A leak detection and recovery sump is located on the north side of each pond to collect any leakage through the primary liner. The sumps are equipped with pumps and totalizing flow meters so that leakage can be returned to the pond and quantified. The Permittee has calculated the effective capacity of each sump as 575 gallons.

Process makeup water is supplied by Boulder City through a 14-inch water main. Dust suppression activity on the NSOPS site is also performed with this potable water supply. Following the Division's approval to use pond storage for dust suppression purposes, the supply will continue as a backup/supplemental source. Domestic sewage generated on-site is separately discharged into a septic system.

Receiving Water Characteristics: The industrial process wastewaters are discharged to double-lined evaporation ponds with leak detection and recovery systems acting as a zero discharge to groundwater. Process waste stream and pond incidental rainfall fluids withdrawn from either pond is authorized for dust

suppression purposes on the NSOPS property to groundwater via percolation.

There are no wells within a one-mile radius of the evaporation ponds. The Division of Water Resources (DWR) well log database lists no wells in Township 25 S, Range 63 E; Township 24 S, Range 63 E, Sections 31 and 32; Township 24 S, Range 62 E, Section 36; or Township 25S, Range 62, Sections 1, and 12. Soil borings to 60 feet below ground surface did not encounter groundwater. According to DWR, groundwater flow in this area is generally to the southeast.

Discharge Characteristics. The following table summarizes storage pond Discharge Monitoring Report data for the periods 3rd Quarter 2007 to 2nd Quarter 2009, inclusive, submitted by applicant.

Table 1: Effluent Limits and Performance

Parameter	Units	Permit Limit		Pond 1			Pond 2		
		30-day	Daily Max	Min	Max	Avg	Min	Max	Avg
Flow: 30-day Avg	MGD	0.090	--	0.001	0.061	0.028	0	0.059	0.022
Flow: Daily Maximum	MGD	--	0.150	0.02	0.130	0.089	0	.0140	0.067
Total Dissolved Solids	mg/L	Monitor & Report		6,400	18,000	12,257	1,800	15,000	10,550
Sodium	mg/L	Monitor & Report		260	13,000	3,723	1,000	16,000	4,717
Calcium	mg/L	Monitor & Report		170	1,200	813	460	1,800	6,450
Chloride	mg/L	Monitor & Report		270	3,700	2,324	1,300	3,300	14,700
Sulfate	mg/L	Monitor & Report		710	9,400	5,873	2,900	7,500	6,350
Total Petroleum Hydrocarbons	mg/L	Monitor & Report		ND	ND	ND	ND	ND	ND
Oil and Grease	mg/L	Monitor & Report		ND	ND	ND	ND	ND	ND
pH, standard unit	SU	4.0 ≤ pH ≤ 10.0		8.2	9.4	8.7	8.4	9.5	8.9

Proposed Effluent Discharge Limitations: Measurements and effluent samples taken in compliance with the monitoring requirements specified in permit Part I.A.1.b. shall be collected at the following locations:

- i. Totalizing flow meter on the waste stream discharge line into Pond 1;
- ii. Totalizing flow meter on the waste stream discharge line into Pond 2;
- iii. Industrial process wastewater from each evaporation pond, sampled separately;
- iv. Monitoring port for Pond 1 leak detection and recovery system; and
- v. Monitoring port for Pond 2 leak detection and recovery system.
- vi. Totalizing flow meter on discharge line removing fluids from Pond 1.
- vii. Totalizing flow meter on discharge line removing fluids from Pond 2.

The effluent discharge shall be limited and monitored in accordance with the following specifications:

EFFLUENT DISCHARGE LIMITATIONS

PARAMETER	DISCHARGE LIMITATIONS		MONITORING REQUIREMENTS		
	30-day Average	Daily Maximum	Sample Location(s)	Measurement Frequency	Sample Type
Outfall 001: Flow (MGD) Evaporative Ponds	Monitor and Report		i., ii.	Continuous ¹	Flow Meter
	0.090	0.150	i. + ii.	Daily	Calculation
Outfall 002 ⁵ : Flow (MGD) Dust Suppression	Monitor & Report	0.048	vi., vii.	Continuous ¹	Flow Meter
			vi. + vii.	Daily	Calculation
Total Dissolved Solids (mg/L)	Monitor and Report		iii. ⁶	Quarterly	Discrete

Compliance Coordinator at the address in Part I.B.2.f. (SOC Effective: 6/25/07; & 7/??/09)

There are no special conditions. (SOC Effective: 6/25/07; & 7/??/09)

Rationale for Permit Requirements: Monitoring requirements for the parameters specified in the Effluent Discharge Limitations Table have been established:

- to ensure that the design capacity of the evaporation pond system is not exceeded;
- to characterize the water contained in the evaporation ponds;
- to ensure adequate leak detection and recovery system sump evacuation to minimize hydraulic head on the secondary liner; and
- to ensure groundwater quality is not adversely impacted by application of storage pond fluids applied to soils for dust suppression purposes.

Proposed Determination: The Division has made the determination to modify the permit and the permit will expire June 24, 2012.

Procedures for Public Comment:

The Notice of the Division's intent to issue the permit authorizing the facility to discharge to the groundwater of the State of Nevada subject to the conditions contained within the permit is being sent to the **Las Vegas Review Journal** and the **Boulder City News** for publication. The notice is being mailed to interested persons on the NDEP-BWPC mailing 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 publication of the public notice. All comments must be received by 5:00 pm local time on September 21, 2009. The comment period can be extended at the discretion of the Administrator.

A public hearing on the proposed determination can be requested by the applicant, any affected State, any affected interstate agency, the Regional Administrator or any interested agency, person or group of persons.

The request must be filed within the comment period and must indicate the interest of the person filing the request and the reasons why a hearing is warranted.

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 determined to be appropriate. All public hearings must be conducted to accordance with NAC 445A.238.

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

Prepared by: E. Samuel Stegeman, P.E.
July 2009