

Aquifer Protection Permit 106187  
Place ID 138660, LTF 63776  
Solana Generating Station  
Significant Amendment

The Arizona Department of Environmental Quality (ADEQ) proposes to issue an Aquifer Protection Permit for the subject facility that covers the life of the facility, including operational, closure, and post closure periods unless suspended or revoked pursuant to Arizona Administrative Code (A.A.C.) R18-9-A213. This document gives pertinent information concerning the issuance of the permit. The requirements contained in this permit will allow the permittee to comply with the two key requirements of the Aquifer Protection Program: 1) meet Aquifer Water Quality Standards (AWQS) at the Point of Compliance (POC); and 2) demonstrate Best Available Demonstrated Control Technology (BADCT). BADCT's purpose is to employ engineering controls, processes, operating methods or other alternatives, including site-specific characteristics (i.e., the local subsurface geology), to reduce discharge of pollutants to the greatest degree achievable before they reach the aquifer or to prevent pollutants from reaching the aquifer.

## I. FACILITY INFORMATION

### Name and Location

Permittee's Name:	Arizona Solar One LLC
Mailing Address:	57750 South Painted Rock Dam Road Gila Bend, Arizona 85337
Facility Name and Location:	Solana Generating Station 57750 South Painted Rock Dam Road Gila Bend, Arizona 85337

### Regulatory Status

The Solana Generating Station (SGS) is a 280 megawatt solar electric power plant, owned and operated by Arizona Solar One LLC. The facility was issued an Aquifer Protection Permit (APP) on July 27, 2012. Significant Amendments were issued on April 27, 2015 and June 27, 2016. This permit amendment was received by ADEQ on March 9, 2016.

### Facility Description

SGS is a 280 megawatt solar electric power plant covering approximately 2,300 acres, including a 59-acre Power Island. The SGS uses parabolic troughs to concentrate solar energy to raise the temperature of the heat transfer fluid (HTF) circulating through a closed-loop system in the solar array field.

The facilities permitted under this Aquifer Protection Permit (APP) include 20 Drywells located in the power block area, seven evaporation ponds and a vehicle/equipment wash facility.

The process water for the plant is supplied by on-site production groundwater wells and piped to the Raw/Fire Aboveground Storage Tank (AST). The AST Water is discharged directly from the Raw/Fire Water AST for fire suppression and miscellaneous process water treatment area uses. Process water is treated by flocculation, multi-media filtration, and reverse osmosis. Most of the treated process water goes to the Process Water AST for use as cooling tower make-up. Reject water from the process water treatment system is discharged to the

Wastewater AST prior to disposal in the evaporation ponds. A portion of the treated process water is further demineralized in an RO system to produce ultrapure water for use in rinsing the solar collectors and as boiler make-up water. This water is stored in the Demineralized Water AST. Reject water from the demineralization process is recycled to the Process Water AST. Wastewater from rinsing solar collectors is taken directly from the Demineralized Water AST. The boiler make-up water is treated in mixed-bed polishers prior to use. Cooling towers receive water from the Process Water AST and boiler blowdown water. This water is cycled several times through the cooling tower before being recycled through the process water treatment system. All process water tanks, the Wastewater AST, and associated piping are exempt from APP.

The site includes the following permitted discharging facilities:

Facility	Latitude (North)	Longitude (West)
Evaporation Pond A	32° 54' 41.00"	112° 58' 51.98"
Evaporation Pond B	32° 54' 36.77"	112° 58' 51.93"
Evaporation Pond C	32° 54' 41.09"	112° 58' 40.85"
Evaporation Pond D	32° 54' 36.86"	112° 58' 40.80"
Evaporation Pond E	32° 54' 38.43"	112° 59' 00.30"
Evaporation Pond F	32° 54' 40.86"	112° 59' 08.37"
Evaporation Pond G	32° 54' 36.63"	112° 59' 08.32"
Vehicle/equipment wash facility	32° 55' 25.33"	112° 58' 43.74"
Dry Well 1	32° 55' 25.00"	112° 58' 45.14"
Dry Well 2	32° 55' 25.58"	112° 58' 44.11"
Dry Well 3	32° 55' 24.49"	112° 58' 44.05"
Dry Well 4	32° 55' 23.92"	112° 58' 45.08"
Dry Well 5	32° 55' 24.93"	112° 58' 46.03"
Dry Well 6	32° 55' 24.92"	112° 58' 47.02"
Dry Well 7	32° 55' 24.92"	112° 58' 47.93"
Dry Well 8	32° 55' 25.54"	112° 58' 48.42"
Dry Well 9	32° 55' 25.55"	112° 58' 47.47"
Dry Well 10	32° 55' 25.57"	112° 58' 46.56"
Dry Well 11	32° 55' 14.23"	112° 58' 39.58"
Dry Well 12	32° 55' 13.24"	112° 58' 39.56"
Dry Well 13	32° 55' 12.22"	112° 58' 39.38"
Dry Well 14	32° 55' 11.28"	112° 58' 39.55"
Dry Well 15	32° 55' 10.09"	112° 58' 44.66"
Dry Well 16	32° 55' 11.81"	112° 58' 45.89"
Dry Well 17 (07-49233-10)	32° 55' 10.06"	112° 58' 47.58"
Dry Well 18 (07-49234-10)	32° 55' 09.90"	112° 58' 38.96"
Dry Well 19 (07-45994-10)	32° 55' 10.90"	112° 58' 51.38"
Dry Well 20 (07-45995-10)	32° 55' 10.90"	112° 58' 53.23"

### Amendment Description

ADEQ has reviewed and approved the following changes under this amendment:

- Remove the Bioremediation Facility as a regulated facility
- Correct the coordinates of several drywells
- Add Evaporation Ponds F and G
- Add a conceptual POC location associated with Evaporation Ponds F and G
- Add the use of chlorine in the evaporation ponds for algae control as needed
- Increase the flow from 149,760 gpd to 210,240 gpd.

## II. BEST AVAILABLE DEMONSTRATED CONTROL TECHNOLOGY

The facility relies on engineered controls and operational procedures to demonstrate BADCT. The APP addresses the design, construction, operation, and closure requirements for the APP-regulated facilities. All APP-regulated facilities shall be operated and maintained to prevent unauthorized discharges.

There are seven double-lined evaporation ponds (Ponds A through G), each equipped with a dual leak collection and recovery system (LCRS). The ponds receive reject waste streams from on site water and process wastewater treatment, discharge from the OWS, standing water from the bioremediation facility via the OWS, and the vehicle/equipment washing facility. The evaporation ponds have a raised berm to prevent any stormwater run-on. The evaporation ponds are designed to hold the facility design flow of 210,240 gallons per day (maximum summer average day flow).

A self-contained Bioremediation Facility is planned to store any soils impacted by incidental leaks of HTF. The Bioremediation Facility will act as a holding area where the bacteria naturally present in the soils will bioremediate any HTF in impacted soils. Soils impacted by HTF spills will be collected and hauled to the Bioremediation Facility where it will be spread on the concrete slab and allowed to bioremediate with the addition of fertilizer and water, as needed. Treated soils will be used on-site as fill as needed. Excess stormwater that may collect on the Bioremediation Facility may be discharged to the evaporation ponds. The Bioremediation Facility meets the statutory definition of a tank and the criteria for exemption from the aquifer protection permit requirements, therefore, it is not regulated by this permit.

The 20 regulated dry wells are designed to receive stormwater only. Each well is equipped with flow control and pre-treatment devices as BADCT.

## III. COMPLIANCE WITH AQUIFER WATER QUALITY STANDARDS

### **Monitoring and Reporting Requirements**

Routine groundwater monitoring is not required under the terms of this permit. Routine discharge monitoring is not required under the terms of this permit.

As defined under ARS §49-244.1, the Pollutant Management Area (PMA) is “the limit projected in the horizontal plane of the area on which pollutants are or will be placed.” There are two separate proposed PMAs within the project site. The southern PMA surrounds the evaporation, and the northern PMA encompasses the 20 Power Island dry wells, excluding the potable water supply well (POTW-5).

### **Points of Compliance**

The POCs are established by the following conceptual location(s):

POC Locations	Latitude (North)	Longitude (West)
POC #1 (Power Island)	32° 54' 45.61"	112° 58' 46.50"
POC #2 (Evaporation Ponds F-G)	32° 54' 45.63" N	112° 59' 04.16" W
POC #3 (Evaporation Ponds A-E)	32° 55' 27.98" N	112° 58' 46.40" W

## IV. STORM WATER and SURFACE WATER CONSIDERATIONS

Stormwater runoff is controlled by grading implemented for the SGS facility and by various stormwater management systems. No off-site stormwater is allowed to enter the solar field or power block area. A 100-year floodplain is about 1.5 miles north from the SGS property. A segment of the pending 100-year floodplain is adjacent to the western boundary of the SGS property where a diversion channel extends north-south along the boundary and spills into a stormwater-only retention basin located northwest of the facility. Maricopa

County has required dry wells to be used to manage stormwater at the facility. The 20 dry wells installed within the Power Island are regulated under this permit.

Surface waters in the Gila Bend Groundwater Basin include the Gila River, the Enterprise and Gila Bend Canals, numerous ephemeral washes, and the Painted Rock Reservoir. The ephemeral wash in the northwest corner of the SGS property has been redirected and now flows northward off the property along the west boundary of the site.

## V. COMPLIANCE SCHEDULE

Section 3.0, Compliance Schedule contains requirements for updated cost estimates for facility closure and post-closure and an updated financial assurance demonstration every six (6) years from the date of permit signature, for the duration of the permit. The final construction report for Evaporation Ponds F and G are also required by this section.

## VI. OTHER REQUIREMENTS FOR ISSUING THIS PERMIT

### Technical Capability

Arizona Solar One LLC has demonstrated the technical competence necessary to carry out the terms and conditions of the permit in accordance with A.R.S. § 49-243(N) and A.A.C. R18-9-A202(B).

ADEQ requires that appropriate documents be sealed by an Arizona registered geologist or professional engineer. This requirement is a part of an ongoing demonstration of technical capability. Arizona Solar One LLC is expected to maintain technical capability throughout the life of the facility.

### Financial Capability

Arizona Solar One LLC has demonstrated the financial responsibility necessary to carry out the terms and conditions of the permit in accordance with A.R.S. §49-243(N) and A.A.C. R18-9-A203. The permittee is expected to maintain financial capability throughout the life of the facility. The estimated closure cost for the facility is \$2,180,512 and post-closure cost is \$0, as clean closure is anticipated. The permittee provided financial capability for the estimated Net Present Value (NPV) of the closure cost in the amount of \$981,643. The financial capability was demonstrated through a Performance Surety Bond under A.A.C. R18-9-A203(C)(2) in the amount of \$952,173 and a Cash Deposit under A.A.C. R18-9-A203(C)(7) in the amount of \$29,470.

ADEQ is currently allowing the use of (NPV) for this permit while ADEQ holds stakeholder meetings and reviews the use of NPV for demonstration of financial capability.

### Zoning Requirements

The SGS has been properly zoned for the permitted use and the permittee has complied with all Maricopa County zoning ordinances in accordance with A.R.S. §49-243(O) and A.A.C. R18-9-A201(B)(3).

## VII. ADMINISTRATIVE INFORMATION

### Public Notice (A.A.C. R18-9-108(A))

The public notice is the vehicle for informing all interested parties and members of the general public of the contents of a draft permit or other significant action with respect to a permit or application. The aquifer protection program rules require that permits be public noticed in a newspaper of general circulation within the

area affected by the facility or activity and provide a minimum of 30 calendar days for interested parties to respond in writing to ADEQ. The basic intent of this requirement is to ensure that all interested parties have an opportunity to comment on significant actions of the permitting agency with respect to a permit application or permit.

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## VIII. ADDITIONAL INFORMATION

Additional information relating to this proposed permit may be obtained from:

Arizona Department of Environmental Quality  
Water Quality Division – APP Unit  
Attn: Maribeth Greenslade  
1110 W. Washington St., Mail Code: 5500B-3  
Phoenix, Arizona 85007  
Phone: (602) 771- 4578

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