

Arlington Valley Energy Facility
Aquifer Protection Permit No. P-501916
Place ID 13861, LTF No. 76872
Significant Amendment

I. Introduction:

The Arizona Department of Environmental Quality (ADEQ) proposes to issue an Aquifer Protection Permit (APP) 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. 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.

II. Facility Location:

39027 W. Elliot Road
Arlington, Arizona 85322

III. Facility Description:

The Arlington Valley, LLC is authorized to operate the wastewater treatment system at the Arlington Valley Energy Facility (AVEF), a natural gas-fired, combined-cycle electric generating plant on approximately 320 acres. The plant uses advanced technology, high-efficiency gas combustion turbines in a combined cycle design producing a nominal 580 megawatts (MW). The major components of the power plant consist of natural gas-fired combustion turbines, heat recovery steam generators, a condensing steam turbine, a condenser cooling tower, and a process wastewater treatment and recovery system. The wastewater treatment system treats spent cooling water for reuse.

The Arlington Valley Energy Facility shall operate three evaporation ponds, two (2) existing evaporation ponds (Ponds A and B) and one new evaporation pond (Pond C), for evaporating wastewater generated from plant operations. The two (2) existing evaporation ponds (Ponds A and B) are approximately 800 feet long and 500 feet wide with 3:1 H:V (horizontal: vertical) sloped sides and occupies a total area of 20 acres. The depth of the ponds ranges from 10.5 to 13.5 feet with a total design capacity of approximately 56.3 million gallons (173 acre-feet). Each of the existing evaporation pond is double-lined with 60-mil high density polyethylene (HDPE) and is equipped with a Leakage Collection and Removal System (LCRS).

The new evaporation pond (Pond C) will be constructed south of the existing Pond A. Pond C has been designed similar to the existing Ponds A and B including the existing terracing and topography. Pond C is approximately 825 feet long and 540 feet wide with embankment slopes designed at a 3:1 H:V slope with the exception of the eastern Pond C embankment that has an external slope of 4:1 H:V to match the side slope of the eastern channel extension and occupies a

total area of 10 acres. The average depth of the pond is 12 feet with a maximum capacity of approximately 29.8 million gallons (92 acre-feet). Pond C will consist of a 60-mil HDPE primary liner, a 200-mil HDPE drainage geonet, a 60-mil HDPE secondary liner, a low permeability geosynthetic clay liner (GCL) installed over a prepared subgrade. The drainage geonet installed between the primary and secondary liners will convey leakage through the primary liner to the LCRS collection system to be pumped back into Pond C.

The three (3) evaporation ponds (Ponds A, B and C) configuration is terraced, with Pond B elevated 4.5 feet above Pond A, and Pond A is elevated three (3) feet above Pond C. The evaporation ponds design allows individual or simultaneous filling. The evaporation ponds will maintain a minimum of two (2) feet of freeboard at all times and are designed to allow accumulation of salts for approximately 20 years. The facility may utilize an Evaporation Enhancement System (TurboMister) and/or Biological Control System. The Evaporation Enhancement System (EES) (TurboMister) increases the evaporation surface area of the evaporation ponds, and allows the facility to run at higher capacity. The EES may not cause overspray/misting outside of the ponds. The Biological Control System (BCS) reduces algae growth within the ponds. Any change in the BCS will require ADEQ approval.

The evaporation pond(s) receive a continuous wastewater stream at an annual average rate of approximately 74 gallons per minute (gpm). The discharge to the evaporation ponds consist of spent cooling water and wastewater generated from water treatment, including reverse osmosis (RO) reject, weak acid cation (WAC) exchanger waste, and mixed bed polisher regeneration wastewater. The discharge contains approximately 88,000 milligrams per liter (mg/L) of total dissolved solids (TDS). Precipitate from the evaporation process settle to the bottom of the evaporation pond(s). In addition, the discharge includes process chemicals to minimize corrosion and scaling of heat transfer surfaces. Cooling water will be chemically conditioned using various water treatment chemicals, including: dolomitic lime; soda ash; ferric chloride; sodium hydroxide; hydrochloric acid; sodium bisulfate; polymers; and scale inhibitors. Plant drains and chemical storage areas will drain to an oil/water separator for treatment. The oil/water separator is designed, constructed, operated, and maintained so as not to discharge and will be an exempt facility pursuant to A.R.S. § 49-250(B)(22).

The on-site drainage system, including the berms surrounding the evaporation ponds, has been designed for the 100-year, 6-hour storm event. Rainfall within the plant area will drain to a separate stormwater retention basin designed to store runoff from the 100-year, 2-hour storm event. The retention basin will be used solely to contain storm runoff and is an exempt facility pursuant to Arizona Revised Statute (A.R.S.) 49-250(B)(10). In addition to the evaporation ponds and stormwater retention basin, the facility will operate a septic system under a Type 4 General Aquifer Protection Permit for on-site wastewater treatment facilities.

IV. Amendment Description:

ADEQ has reviewed and approved this significant amendment to make the following changes to the permit:

- Added a new double-lined 60-mil HDPE evaporation pond (Pond C) equipped with an LCRS.

- Revised alert levels for the Evaporation Pond Facility (defined as Ponds A, B and C) for the LCRS.
- Modification of the APP to include the ability utilize an Evaporation Enhancement System (TurboMister) and/or Biological Control System for algae control within any of the evaporation ponds.
- Update the APP to include revised closure and post-closure costs for the Evaporation Pond Facility (Pond A, B and C) from \$2,241,600.00 to \$3,137,236.00.
- Update the conceptual Point of Compliance (POC) locations.

V. Regulatory Status:

The facility operates a separate stormwater retention basin for collection and evaporation of stormwater. The retention basin is used solely to contain stormwater runoff and is exempt pursuant to A.R.S. § 49-250(B)(10). In addition to the evaporation ponds and stormwater retention basin, the facility operates an on-site septic system for managing domestic waste under a Type 4 general Aquifer Protection Permit.

The latest inspection dated May 23, 2002 following the January 11, 2002, Individual APP issuances, indicated that the facility was found to be in compliance with the APP and Arizona rules and statutes.

VI. Best Available Demonstrated Control Technology (BADCT):

Engineering Design:

- Total containment of wastewater is employed to provide pollution control at this facility. The design of the pond system and operational methods for discharge control are included as part of the BADCT design.
- The subgrade consists of six inches of native soil compacted to 95% of maximum dry density according to the Standard Proctor Test.
- The liner system consists of two (2) 60-mil high-density polyethylene (HDPE) liners separated by a Leakage Collection and Removal System (LCRS).
- The lower composite liner is composed of a 0.25-inch geosynthetic clay liner (GCL) beneath a 60-mil HDPE flexible membrane liner. The hydraulic conductivity of the GCL is approximately 5.0×10^{-9} cm/sec. The primary liner is a UV resistant 60-mil HDPE flexible membrane liner.
- The LCRS consists of a 0.2-inch drainage geonet, a perforated collection pipe, a collection sump, and an automatic pump. The drainage layer shall be placed at a minimum 0.5 % slope to the collection sump and shall achieve a hydraulic conductivity of 1×10^{-2} cm/sec or greater. Solution from the LCRS will be directed to the collection sump for extraction and leakage monitoring. The capacity of the collection sump is approximately 2,050 gallons.

- Each collection sump will be equipped with a dedicated pump that is sufficiently sized to evacuate fluids from the sump. Solution evacuated from the sump will be returned to the pond(s). The pumps will be operated by an automated system activated by water depth in the sump. A flow meter will be used to quantify volumes of fluid evacuated.
- All materials used in the construction of the impoundments are compatible with the solutions discharged into them.
- All liner components are secured by an engineered trench.

VII. Compliance with Aquifer Water Quality Standards (AWQS):

All monitoring required in this permit shall continue for the duration of the permit, regardless of the status of the facility. All sampling, preservation and holding times shall be in accordance with currently accepted standards of professional practice. Trip blanks, equipment blanks and duplicate samples shall also be obtained, and chain of custody procedures shall be followed, in accordance with currently accepted standards of professional practice. The permittee shall consult the most recent version of the ADEQ Quality Assurance Project Plan (QAPP) and EPA 40 CFR Part 136 for guidance in this regard. Copies of laboratory analyses and chain of custody forms shall be maintained at the permitted facility. Upon request these documents shall be made immediately available for review by ADEQ personnel.