

STATEMENT OF BASIS
SUNNYSIDE COGENERATION ASSOCIATES ASH LANDFILLS
Modification of Ground Water Discharge
Permit No. UGW070002

I. Purpose of Permit Modification

This Permit Modification incorporates Sunnyside Cogeneration Associates (SCA) Ash Landfill Number 2 (SCA#2).

II. Description of Facility

The SCA is a coal-fired power plant that produces approximately 51 Mega Watt net of electricity. The primary fuel stock for the plant is coal refuse material that resulted from the operation of two large underground coal mines which operated for nearly a century. The plant's total life expectancy is 30 years. The first groundwater permit was issued in 1992.

Burning the coal refuse generates approximately 800 to 1000 tons of ash per day. The ash will be trucked to a disposal site SCA #1 Ash Landfill in the NW 1/4, Sec. 12, T. 15 S., R. 13 E., SLBM, or SCA #2 Ash Landfill in the NW 1/4 Sec 8 and NE 1/4 Sec 7, T. 15S., R. 14 E., SLBM, both approximately one mile from the power plant. The ash generated from the facility is excluded from the definition of solid waste and therefore no solid waste permit is required for these sites. The SCA #1 site is located along a steeply sloping escarpment that faces south to southeast and terminates in a relatively flat area along Iceland Creek. The SCA #2 site is located at the head of a small side canyon facing the west.

The SCA #1 Ash Landfill is an unlined landfill comprised of three phases on approximately 75 acres. It has been under construction since the early 1990's.

The existing SCA #1 Ash Landfill Phase I is an unlined disposal landfill. Ash is placed in cells in a terrace-and-bench configuration. Terraces are 20 feet high with a 2 horizontal to 1 vertical faces. Each terrace is set back 15 feet from the previous terrace to form a bench. The existing SCA #1 Ash Landfill Phase I encompasses approximately 15 acres. Phase I was closed in 1998, capped and re-seeded according to approved specifications.

SCA #1 Ash Landfill Phase II is located immediately west of the Closed SCA #1 Ash Landfill Phase I. Phase II has been developed over a ten-year period, and encompasses approximately 32 acres of land. Phase II was completed in 2008. Phase II is not in final closure.

SCA #1 Ash Landfill Phase III is located immediately west of the Closed SCA #1 Ash Landfill Phase I and east of the Phase II landfill. Phase III will be developed over a fifteen-year period is expected to be completed in 2013 and will encompass approximately 30 acres.

The SCA#2 Ash Landfill is located approximately one mile to the southeast from the SCA power plant facility and approximately 1.5 miles east of the SCA #1 Ash Landfill. It is proposed to begin construction in 2013 with ash placement in approximately 2015. SCA#2 Ash Landfill will be constructed in a terrace and bench configuration with a footprint of approximately 34 acres, plus surrounding access and drainage facilities. Terraces will be a maximum of 60 feet high with approximately 3 horizontal to 1 vertical faces. Each terrace will be set back 15 feet from the previous terrace to form a bench.

III. Subsurface Conditions

Ground water in the vicinity of the ash landfills is contained in isolated areas of alluvium overlying the relatively impermeable Mancos Shale. The individual areas of alluvium were deposited both from currently active streams such as Icelander Creek, as well as ancient streams and pediment gravels from an earlier cycle of erosion and deposition. Ground water is also contained in weathered Mancos Shale underlying the alluvium. Near the SCA #1 Ash Landfill site ground water issues from ancient pediment gravel at Whitmore Springs, and this flow recharges localized aquifers contained in recent alluvium, colluvium and weathered Mancos shale associated with Icelander Creek. The Mancos Shale contains soluble salts, and in a regional sense there is natural degradation of ground water quality as the water moves from its source in the Book Cliffs and comes into contact with the Mancos Shale. There are no spring sources near the SCA #2 Ash Landfill site and it would appear from the high TDS levels observed in MW-8 that even the shallow groundwater there has been affected by the Mancos Shale.

In the summer of 1994 the monitor well downgradient from the SCA #1 Ash landfill, MW-1, exceeded the permit protection level for total dissolved solids (TDS), and has remained above that level since. This rise in TDS was not seen in Whitmore Springs or the other monitor wells at the site. Subsequent investigations showed that the water from the other sampling points associated with SCA #1 Ash Landfill is similar in chemical composition to composition of MW-1. There is also a buried ridge of Mancos Shale under the alluvium that probably causes a separate ground water flow system west of the landfill that is sampled by MW-1. The chemistry of water in MW-1 is consistent with leaching from native materials at the site rather than from leaching from the ash in the landfill, which shows a different composition of all monitoring points. Because MW-1 is probably not in a location that can directly evaluate impacts from the landfill, the permittee replaced MW-1 with MW-4 in 1997 adjacent to the existing SCA #1 Ash Landfill and MW-7 which is adjacent to sediment pond #017. The permittee is encouraged to voluntarily sample MW-1 even though it is not currently a monitor point, in order to build historical record of water quality in the well. If submitted to DWQ, these analyses shall be entered into the administrative record for this permit.

IV. Background Water Quality and Ground Water Classification

Background ground water quality is summarized in Tables 1 and 2 of the permit. Table 1 data represents the average of samples taken from Whitmore Spring from October, 1992 through July, 1995, and is very similar to the average composition of water from monitor wells MW-2 and MW-3.

Separate background water quality information and protection levels are established for MW- 1, 2, 3 and 4 [Phase I and III] and MW-7 [Phase II]. TDS is higher in the seeps. Table 2 data represents the average of samples taken from MW-8 from January 2012 through January 2013 in preparation for the SCA #2 Ash Landfill construction to begin.

Based on available data, ground water at the SCA #1 Ash Landfill site is Class II. SCA #1 Phase II MW-7 is established under Class III, based upon TDS. Groundwater at the SCA #2 Ash Landfill is Class III based upon TDS and Selenium.

V. Best Available Technology

Prevention of ground water pollution will be accomplished through the operation and final closure of the landfills. Ash is placed in 12-inch lifts and compacted. The landfills are configured into terraces. A 15-foot bench is constructed at the top of each terrace. Drainage from the terraces is routed to the sedimentation basin at the toe of the landfill. A 16-inch vegetative cover soil has been placed and compacted on top of each terrace and out slopes as it is finished. Based on SCA's successful reclamation experience with an effort to improve re-vegetation on the ash landfills, SCA will place a 6 to 8-inch compacted cap plus an 18 to 24-inch native soil cover on the upper terraces of the SCA #1 Ash Landfill Phase III not yet covered. SCA will also apply this reclamation method on the SCA #2 Ash Landfill.

In preparation for the SCA #1 Ash Landfill Phase III, Sand Blanket drains were installed over two identified seasonal seeps to facilitate drainage and to prevent up take by the ash-fill material. One seep is under the Phase III landfill footprint; the other seep is just outside the footprint. These drains consist of sand placed above the seeps with a bentonite dam at the down gradient end. A screened HDPE pipe was placed 4" above the bedrock and serves as the conduit for the seep water. Due to the pozzolanic property of the ash-fill, no synthetic liner will be needed. Any discharge will be diverted to the sediment basin described in the permit.

VI. Ground Water Monitoring

The ash material does not produce leachate that contains any distinct "tracer" parameters that could be used to evaluate a discharge of leachate from the landfill. Analysis of simulated ash leachate shows no parameters in the leachate that are not also present in the ground water at the site. Protection levels have been established for metals that may be associated with ash leachate.

The primary threat to ground water quality from the SCA #1 Ash Landfill is from salts associated with the ash. Under the Ground Water Protection Regulations, TDS may not rise above 125 percent of background in a Class II ground water. At this site there is the possibility for natural variation in the background to exceed TDS protection levels not caused by the landfill. Therefore, exceedence of TDS protection levels will be a cause for out-of-compliance status unless the permittee makes a satisfactory demonstration to the Director shows the rise in TDS is due to circumstances not related to landfill leachate.

For MW-7 the chemistry of water from this well is significantly different from the other monitoring points in this permit, separate background water quality and protection levels have been established based on samples taken from this well.

For MW-8 the chemistry of water from this well is significantly different from the other monitoring points associated with the SCA #1 Ash Landfill. Separate background water quality and protection levels have been established based on samples taken from this well.

VII. Compliance

All wells have been in compliance throughout all issuances of this permit, with the exception of these two incidents:

1. On December 14, 2005 it was reported that MW-2 exceeded the Permit Conditions for the constituents of lead and TDS. As per item F. above, the permittee has adequately demonstrated that these exceedences were not caused by the facility, but rather by suspected contaminated samples. Monthly split samples reported that these constituents were below the Permit Protection levels.
2. In July 2006, it was reported that MW-1, MW-2 had elevated Selenium and TDS and MW-7 reported elevated TDS.

As per item F. above the permittee has adequately shown, by means of comparative analyses, that these constituents are not the result of the facility, but rather conditions cause by six years of drought. Sulfate is the constituent for causing elevated TDS. All TCLP analyses have reported non-detect for sulfate and selenium, therefore the facility is not the source. The same is true for selenium. These constituents are likely leaching from the underlying Mancos Shale.

The most recent ash leachate analyses [TCLP] was submitted February 17, 2011, and satisfies the Permit Condition for Part I.E.5.d. The next scheduled TCLP analyses will be performed in 2016.

VIII. Permit Term

The revised permit will be subject to renewal in 2018.