

Sunnyside Cogeneration Associates
Groundwater Permit Modification No. UGW070002
Comment Response Summary
Division of Water Quality
December 2013

195 North 1950 West • Salt Lake City, UT
Mailing Address: P.O. Box 144870 • Salt Lake City, UT 84114-4870
Telephone (801) 536-4300 • FAX (801) 536-4301 • T.D.D. (801) 536-4414
www.deq.utah.gov

Printed on 100% recycled paper

Project Background and Draft Groundwater Permit Modification Overview

The Sunnyside Cogeneration Association (SCA) facility is a coal-fired power plant that produces approximately 51 megawatts (mw) net of electricity. Burning the waste coal generates approximately 800 to 1000 tons per day of ash. The groundwater classification at this facility is either class II or III, depending on location.

From [R317-6-3](#):

3.5 CLASS II - DRINKING WATER QUALITY GROUND WATER

Class II ground water has the following characteristics:

- A. Total dissolved solids greater than 500 mg/l and less than 3000 mg/l.*
- B. No contaminant concentrations that exceed ground water quality standards in [Table 1](#).*

3.6 CLASS III - LIMITED USE GROUND WATER

Class III ground water has one or both of the following characteristics:

- A. Total dissolved solids greater than 3000 mg/l and less than 10,000 mg/l, or;*
- B. One or more contaminants that exceed the ground water quality standards listed in [Table 1](#).*

The Sunnyside Ash Disposal Landfill received its first ground water and construction permits in 1992 and has subsequently been either renewed or modified as needed or required at least every five years. The ash landfill consists of 2 areas: SCA #1 and SCA #2. SCA #1 is comprised of three phases and was developed over 20 years. SCA #1, Phase I is closed and capped. SCA#1, Phase II is nearing the end and will be closed similar to SCA#1, Phase I. Both ash areas and associated phases are or will be operated in a similar manner. Dry 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. Ground water is monitored with 5 down gradient wells. To date the facility has been in compliance with all versions of this permit. Sunnyside Cogeneration Landfill is a dry operation and has no discharge component.

This permit is a modification of Permit No. UGW070002 and includes incorporation of design and construction specifications for the SCA #1 phase III landfill expansion, as issued in the 2009 Groundwater permit renewal. This modification also includes an additional landfill area, SCA #2.

The Division of Water Quality (DWQ) provided relevant electronic data as part of the public notice of this permit modification. To respond to comments received during the Public Notice period, we have provided more electronic files as detailed below. However, since the original permit is over 20 years old, there are data records that are only available in paper files and others that have been archived and may no longer be available. The commenter should know that to obtain access to any additional records DWQ has in paper files, a Government Records Access and Management Act (GRAMA) request should be filed and the requestor can either schedule an appointment to review the files in person and copy them at five cents per copy, or pay DWQ a fee that covers staff time and copying expense to provide the records. For more information on GRAMA please see: <http://www.deq.utah.gov/grama/GRAMA.htm>

Comments and Responses

A copy of the submitted comments and attachments may be found at:

<http://www.waterquality.utah.gov/PublicNotices/pnarchive2013.htm>

Comment 1: *It is unclear whether any true “background” water quality data exists prior to commencement of operations of the coal plant disposal. The permit maps shows extensive industrial activities up gradient of the proposed landfill expansion site, including a tailings pond and coke ovens. Groundwater protection levels for TDS are based on “background” conditions. Thus, if the groundwater in SCA #1 Phase III or SCA #2 have already been affected by previous human activities, the groundwater protection standards may not be truly protective of natural conditions. Please make available to the public all background water quality data, the location and date of all such samples and results.*

DWQ Response: Background data for SCA #1 continues to be available to the public and may be obtained via Government Records Access Management Act (GRAMA) request in writing to the Department of Environmental Quality (DEQ) <http://www.deq.utah.gov/grama/GRAMA.htm>. The availability of documents and data was described in the Public Notice in the paper of record and posted on the web. While the Division of Water Quality is working to have electronic copies of files available for the public, currently not all files are in electronic form. However, as noted above the data is, and has been, available to the public in keeping with and through the legislatively defined GRAMA process. Due to the age of this project which is older than 20 years, as per record keeping procedures, some information may have been archived and subsequently destroyed. Background data for SCA #2 is available via GRAMA request. Other local groundwater conditions can be obtained from the Utah Department of Natural Resources, <http://naturalresources.utah.gov/divisions/water-resources.html>.

Unfortunately in more places than just the proposed location for SCA#2, true background conditions may have already been altered due to previous human activities. Nevertheless, the monitoring requirements are consistent with the permitting process relative to this operation. That is, the background concentration defined under R317-6-1(1.2) as “*the concentration of a pollutant in ground water upgradient or laterally hydraulically equivalent point from a facility, practice or activity which has not been affected by that facility, practice or activity*” has been determined and a downgradient well has been installed to determine any change relative to the background concentrations and against the protection of present and future beneficial uses of the water as determined by their ground water class as defined under R317-6-3 and 6.4.

Action Taken: Additional Monitoring well data is provided at:

<http://www.waterquality.utah.gov/PublicNotices/pnarchive2013.htm>

Permit Action: None

Comment 2: *It is unclear where SCA-1 Phase III and SCA-2 are lined landfills or whether they comply with design specifications that are likely to result from EPA’s new coal ash rulemaking. Please indicate to the public whether the design of this landfill would comply with EPA’s proposed rule on coal ash disposal. 75 Fed. Reg. 35128.*

DWQ Response: No liner was required to be installed under SCA #1 or SCA #2 or in any of the corresponding phases. SCA landfills are completed as a dry facility. Also, as noted by Mr. Nelson, the Blue Gate Member of the Mancos Shale is highly impermeable. Any and all shallow groundwater is restricted to the alluvium immediately beneath the landfill and as such can be easily monitored via down gradient monitoring wells. Deep aquifers are protected by the Mancos Shale, thus the natural geologic site conditions underlying the site of both SCA#1 and SCA#2 are protective such that there is no

anticipated impairment of present or future beneficial uses of the ground water. This facility is in compliance with all Permit Requirements.

The EPA proposed rule 75 Fed. Reg. 35128 has not been adopted, nor has design specification been adopted. Proposed rules are not applicable. Also note that much of the proposed rule change is directed at impoundment structures. The SCA Ash Landfills are not impoundments and climatic conditions at the SCA Ash Landfills differ vastly from sites which are referenced in the proposed rule.

Permit Action: None

Comment 3: *Although there is groundwater protection standard for total dissolved solids, there is no specific monitoring and reporting requirement for TDS in the draft permit. Please add at least monthly specific monitoring and reporting requirement for TDS.*

DWQ Response: TDS is a required parameter for measurement on all groundwater monitoring samples required by this permit. Monitoring frequency is defined in Part II.E.4 of the permit as semi-annual. Semi-annual has been approved for this site based on 20 years of data and is adequate to determine compliance with the permit requirements. Increased frequency does not add to the quality of the data collected.

Permit Action: None

Comment 4: *A technical review of the draft permit was conducted by Steve Nelson. A copy of his report is attached hereto and incorporated herein by reference. It is Mr. Nelson's professional opinion that a coal ash landfill should not be located in the proposed location. More specifically Mr. Nelson states, SCA-1 should not, in my opinion, have been constructed in its current location. More specifically Mr. Nelson states,*

- *SCA-1 should not, in my opinion, have been constructed in its current location. There are plenty of flat, pediment surfaces away from active drainage systems that could have accommodated this coal ash. It should never have been constructed into the cliff of an active drainage system. As it is, SCA-1 is vulnerable to flooding and permanent reorganization of the drainage network by stream capture. This could result in direct dispersion of coal ash during surface water flows similar to a 100-year event, as well as undercutting down-slope areas of the landfill before, during or after diversion. There is also likely to be increased seepage from diverted underflow from Grass Trail Creek flowing beneath the east end of the pile. These processes may combine to undermine the slope stability of the landfill. Even if none of this were to occur, because SCA-1 is perched on a cliff it will eventually be eroded and transported into the Green River-Colorado River system. Although no landfill can be considered a "permanent" feature, the permit should be disqualified on geologic considerations.*

DWQ Response: SCA #1 Ash Landfill construction began approximately 20 years ago. Reference to a "proposed location" for SCA #1 is in error since the landfill is existing. Modification or renewals to this permit do not include proposing a change in location. Previous engineering reviews concluded that the location is appropriate.

Permit Action: None

Mr. Nelson's Technical Review:

Since the Mr. Nelson's review is not directly labeled as comments, responses will be made on a descriptive basis as follows. Mr. Nelson's statements are in *italics* below.

Geologic Setting: Figure 1 shows the location of coal ash disposal area SCA-1. SCA-2 is not shown because it has not been constructed and its location under the township and range system is too imprecise to evaluate (see below), although it apparently is intended to lie 2 to 3 km east of SCA-1.

A very large drainage basin in the Book Cliffs feeds a stream system known as Grass Trail Creek that flows through the towns of Sunnyside and East Carbon, Utah. It is expected that periodic heavy precipitation events or rapid spring snow melt could result in large surface water flows or perhaps debris flows through the area. Note the proximity of Grass Trail Creek to the cliff and SCA-1 in particular (Figs 1 & 2). The implications of this proximity are discussed below.

DWQ Response: The control for heavy run-off and high storm flows are controlled by the Grassy Trail Reservoir, located 6 miles upstream from SCA #1. Large surface flows are not common. SCA #1 and SCA #2 are also located near the upper end of drainages that lead to Icelander Creek and do not experience large surface flows.

Permit Action: None

Surface Hydrology: The stream network in the vicinity of SCA-1 causes me considerable concern. Figure 2 illustrates the FEMA 100-year floodplain along Grass Trail Creek just north of the landfill. At point A (Fig 2) the floodplain is within about 70 meters of Drawing B. Figure 3 further illustrates that, within the resolution of Google Earth data, there is little by way of a topographic barrier to flood waters being diverted into Drainage B in this area (Fig 3).

Stream capture or stream piracy is a well-known phenomenon by which drainage networks are modified by capturing flows of one system and diverting them into another. A significant stream flow/flood event at or upstream of point A (Fig 2) could divert flows from Grass Trail Creek, and its entire collection system, into the stream networks south of the cliff, and do so permanently. Were such an event to occur at point A, high stream flows would inevitably, and directly, impact the integrity of the pile. Were Grass Trail Creek captured at or any point up gradient from point A, high flow events might compromise the southern (and down-slope) side of the pile via widening and down cutting of the channel. Given the proximity of Drainage B and Grass Trail Creek, diversions of the latter stream south of the cliff seems likely if not inevitable in the near geologic future. It appears as if a 100-year flood event may approach diversion.

DWQ Response: The concept of stream capture is well understood. Also Mr. Nelson indicates the problem is within "resolution of Google Earth data". Field visitations will reveal that there is a topographic hill that follows Grassy Trail Creek. In addition there is a raised railway bed near the reference point A that is approximately 20 feet higher than the creek. This hill and railway bed provides an existing topographic control to maintain the creek within the existing flood plain. The DWQ UPDES Storm Water rules are based on a 10 year, 24 hour event, as per 40 CFR 343.62(a)(2). SCA #1 and SCA #2 are adequate in regards to minimum requirements required under UPDES Storm Water Permits. Also note that all of SCA's retention and storm water ponds are sized for 25 year events. The storm water pond that is proposed for SCA #2 is sized for a 100 year event, far beyond the minimum required under the UPDES Storm Water permit.

Permit Action: None

Statement continued: If piracy of Grass Trail Creek were to occur, all of its underflow may be diverted along and beneath the stream network to the east and south of SCA-1. In other words, the broad, verdant

riparian zone along Grass Trail Creek in the town of East Carbon north of SCA-1 (Fig 4) may be abandoned and reestablished south of SCA-1 piles, yet becoming vulnerable to seepage from the landfill.

DWQ Response: Again, this statement hinges on the concept of stream capture that has been addressed above. Existing seepage that occurs naturally and seasonally under SCA #1 is captured via a French drain that was installed prior to construction of Phase III. The system conveys seepage water out from under the landfill to reduce the potential for water build up to occur and thus reduces any potential contact of water with the ash.

Permit Action: None

Slope Stability: *As mentioned above, SCA-1 is largely built into a south facing cliff, which is in places quite steep (e.g., Fig 1). Figure 5 indicates that the slopes of the cliff in the vicinity of SCA-1 commonly exceed 20-25°. When coupled with surface and groundwater flow discussed above, the wisdom of building this facility into the cliff face comes into question. Loading of groundwater into the east end of SCA-1, erosion of the pile by stream piracy, or undercutting of the pile by present or diverted stream flows to the south of the pile may make this facility vulnerable to slope failure.*

DWQ Response: Again, this statement hinges on the concept of stream capture that has been addressed above.

Slope stability of SCA #1 landfill has been designed within the guidelines outlined by the geotechnical engineer's study and in compliance with the requirements of the State of Utah. These reports have been reviewed and approved by State of Utah Professional Licensed Engineers. The slopes of the landfill are less steep than the original landscape and include terraces which capture and control storm water and sediments that may be eroded from above. Storm water is routed and conveyed such that it reduces the potential for impacting the landfill. Also note the pozzolanic properties that tend to harden the ash over time, and thus reducing the potential for possible leachate formation.

Permit Action: None

Draft Groundwater Discharge Permit: *SCA-2 is located far too imprecisely to evaluate its stability. The two quarter sections given as a location equate to an uncertainty of about ½ mile in an east-west direction and ¼ mile north-south. The cited values of 110°22' W. Long. & 39°32' N Lat. Place the landfill in the Book Cliffs. We had no opportunity to inspect the March 2013 drawing for this feature.*

DWQ Response: Additional information, including additional engineering drawings, is on file at DWQ and can be obtained via GRAMA Request.

Permit Action: None

Statement Continued: *MW-8 may not be an appropriate choice for background values for SCA #2. It is located near SCA-1, not SCA-2. It is also immediately south of a bare patch raising questions as to whether it has been affected by human activity. I am concerned it may set the bar too low for groundwater protection.*

DWQ Response: MW-8 is an ideal location for monitoring SCA#2 and is in accordance with the rule requirements of R317-6-6(6.9)(A) "The distance to the compliance monitoring points must be must be as close as practicable to the point of discharge." MW-8 is located immediately down gradient of the proposed toe of SCA #2, the monitoring well is therefore adequate to determine compliance with permit requirements.

Permit Action: None

Statement Continued: *MW-8 is cited as a down gradient monitoring point on Drawing 5 for SCA-2. Where is drawing 5?*

DWQ Response: The actual location of SCA #2 is as follows: Latitude ranges from approximately 39° 32' 30" N to approximately 39° 32' 18" N, Longitude ranges from approximately N 110° 22' 41" W to approximately 110° 23' 07" W

The engineering drawings for this modification are on file and can be obtained via GRAMA request from DEQ.

Action Taken: Correct Latitude and Longitude coordinates posted and clarified. Maps and well locations posted at <http://www.waterquality.utah.gov/PublicNotices/pnarchive2013.htm>

Permit Action: None

Statement Continued: *In this case, monitoring for only 10 years after final closure is inadequate. We know that leachate from these piles is chemically aggressive (pH =12.3; leachate analysis) with very high TDS.*

DWQ Response: In the case of SCA, the ash landfill areas are dry. A 10 year monitoring period is adequate for these landfills. SCA #1 Phase 1 landfill has been monitored for 20 years now and has been closed for more than 10 years. Monitoring has shown that an effective landfill construction and closure program occurred. Documentation regarding this success has been submitted as required by the Permit and is available for public review in the files at DWQ.

Permit Action: None

Statement Continued: *The public has no way of knowing exactly where phase II of SCA-1 is. No map or more exact coordinates are provided and we were not able to inspect the 'February 8 1997" drawings. And what does "additional expansion of the landfill will also incorporate referenced design specification" mean? There really should be a good map(s) in this permit that the public can use to spatially assess permit criteria.*

The public has no way of knowing exactly where phase II of SCA-1 is to be located. No map or more exact coordinates are provided and we were not able to inspect the "December 23, 2003" drawings.

DWQ Response: SCA #1 phase II and phase III are existing and visible on the ground. All drawings and maps are available via GRAMA request from DEQ. Mr. Nelson's site visit observed these phases and is included in the photos that were attached in his report.

Action Taken: Maps and well locations posted at:

<http://www.waterquality.utah.gov/PublicNotices/pnarchive2013.htm>

Permit Action: None

Statement Continued: *The location, and therefore suitability, of monitoring wells is not provided in the draft permit. I was able to locate a landfill expansion map in the sampling plan. However, this map is difficult to read. Topographic contours cannot be separated from streams. Labels for springs, seeps and wells are difficult to read. Furthermore this map is NOT GEOREFERENCED to any common coordinate system that the public can use to locate these features. In addition, MW-7 (down gradient monitoring point) and Whitmore Springs are not identified. How can these features be designated as monitoring points if they are not geographically located anywhere in the permit?*

Sampling Plan:

As above, Whitmore Springs is not located on any map, nor is the “fresh water Reservoir”.

There is an inconsistency between cited existing monitoring wells and the map. MW-1, -2,-3, -4, and -7, are cited as existing wells. There is no MW-6 on the map, but there is an MW-5 and MW-8. As noted above, MW-7 is missing from the map.

Appendices are cited but not made available for inspection.

DWQ Response: All maps and drawing are available via GRAMA request from DEQ, showing the location of monitoring wells, including MW-1, MW-2, MW-3, MW-4, MW-7 and MW-8, Whitmore Springs, “Freshwater Reservoir”, and sediment pond #017. MW-5 was seal, capped and abandoned; MW-6 did not encounter groundwater and is not monitored. The Appendices are quite large and therefore are only referenced in the Permit. The appendices are available via GRAMA request from DEQ.

Action Taken: Coordinates for all monitoring wells posted as well as Google Earth Maps showing locations at <http://www.waterquality.utah.gov/PublicNotices/pnarchive2013.htm>

Permit Action: None

Statement Continued: *Under the section on compliance there is a discussion of exceedence for Pb and Se, discussed “per item F. above”. Where is this discussion? Where is item F?*

DWQ Response: In the Statement of Basis, the section on Ground Water Monitoring is improperly identified as “F” as noted by the comment. The initial draft of the Statement of Basis was indexed using letters and subsequently re-indexed using Roman numerals, where F now equals VI. Therefore, the proper reference is to “per item VI. above”. Both references in section “VII Compliance” of the SOB have been changed to refer to section VI.

Permit Action: In the Statement of Basis under VII Compliance both references to “per item F. above” have been replaced with “per item VI. above”

Conclusions: *SCA-1 should not, in my opinion, have been constructed in its current location. There are plenty of flat, pediment surfaces away from active drainage systems that could have accommodated this coal ash. It should have never been constructed into the cliff of an active drainage system. As it is, SCA-1 is vulnerable to flooding and permanent reorganization of the drainage network by stream capture. This could result in direct dispersal of coal ash during surface water flows similar to a 100-year event, as well as undercutting down-slope areas of the landfill before, during or after diversion. There is also likely to be increased seepage from diverted underflow from Grass Trail Creek flowing beneath the east end of the pile. These processes may combine to undermine the slope stability of the landfill. Even if none of this were to occur, because SCA-1 is perched on a cliff it will eventually be eroded and transported into the Green River – Colorado River system. Although no landfill can be considered a “permanent” feature, the permit should be disqualified on geologic considerations.*

DWQ Response: Both SCA #1 and SCA #2 Ash Landfills sites were studied and analyzed by multiple third party geotechnical engineers and civil engineers licensed in the State of Utah, prior to the approval of by licensed engineers at DWQ. The two landfills were designed to address the conditions which occur in this area and include features to control storm water, monitor groundwater, provide for slope stability, reduce erosion and restore vegetation and are in compliance with engineering, geotechnical and regulatory requirements. Also included in this process is an approved site closure plan.

SCA #1 and SCA #2 Ash Landfills have been designed in accordance with the requirements of the State of Utah. Documentation and maps associated with each phase of these landfills is available via GRAMA request from DEQ. Different phases of SCA #1 have been under construction (and/or closure) for over 20 years. Monitoring has occurred continuously throughout the issuance of these permits and satisfies the condition and terms of this permit.

Permit Action: None

Statement continued: *As detailed above, there are a host of problems with documentation (or lack thereof) in the draft permit, the Sampling Plan, and the Statement of Basis. The public has not been provided with adequate information to judge the acceptability of the Draft Permit.*

DWQ Response: Background data for SCA continues to be available to the public and may be obtained via Government Records Access Management Act (GRAMA) request in writing to the Department of Environmental Quality (DEQ) <http://www.deq.utah.gov/grama/GRAMA.htm>. While the Division of Water Quality is working to have electronic copies of files available for the public, currently not all files are in electronic form. However, as noted above the data is, and has been, available to the public in keeping with and through the legislatively defined GRAMA process. Due to the age of this project which is older than 20 years, as per record keeping procedures, some information may have been archived and subsequently destroyed. The availability of documents and data was described in the Public Notice in the paper of record and posted on the web. Also as stated earlier, some of this information regarding this particular permit may be archived or destroyed due to record keeping policies and the extreme date(s) involved.

Permit Action: None

Notice: The Final Permit Modification and Statement of Basis for UGW070002 are now located at:

<http://www.waterquality.utah.gov/PublicNotices/pnarchive2013.htm>