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GROUND WATER QUALITY DISCHARGE PERMIT UGW570002

STATEMENT OF BASIS

Sunnyside Cogeneration Associates
SCA #1 and SCA #2 Ash Landfill
Carbon County, Utah

April 2020

Introduction

The Division of Water Quality (DWQ) under the authority of the Utah Ground Water Quality Protection Rules¹ (Ground Water Rules) issues ground water discharge permits to facilities which have a potential to discharge contaminants to ground water². As defined by the Ground Water Rules, such facilities include waste storage piles.³ The Ground Water Rules are based on an anti-degradation strategy for ground water protection as opposed to non-degradation; therefore, discharge of contaminants to ground water may be allowed provided that current and future beneficial uses of the ground water are not impaired and the other requirements of Rule 317-6-6.4.A are met.⁴ Following this strategy, ground water is divided into classes based on its quality⁵; and higher-quality ground water is given greater protection⁶ due to the greater potential for beneficial uses.

DWQ has developed permit conditions consistent with R317-6 and appropriate to the nature of the stored material, facility operations, maintenance, best available technology⁷ (BAT) and the hydrogeologic and climatic conditions of the site, to ensure that the operation would not contaminate ground water.

Basis for Permit Renewal

This Permit is being renewed in accordance with R317-6-6.8 which states that a permit may be terminated or a renewal denied if any one of the four items below applies:

- A. Noncompliance by the permittee with any condition of the Permit where the permittee has failed to take appropriate action in a timely manner to remedy the Permit violation;
- B. The Permittee's failure in the application or during the Permit approval process to disclose fully all significant relevant facts at any time;

¹ Utah Admin. Code Rule 317-6

² https://deq.utah.gov/ProgramsServices/programs/water/groundwater/docs/2008/08Aug/GWQP_PermitInfo.pdf

³ Utah Admin Code Rule 317-6-6.1A

⁴ Preamble to the Ground Water Quality Protection Regulations of the State of Utah, sec. 2.1, August, 1989

⁵ Utah Admin. Code Rule 317-6-3

⁶ Utah Admin. Code Rule 317-6-4

⁷ Utah Admin. Code Rule 317-6-1(1.3)

- C. A determination that the permitted facility endangers human health or the environment and can only be regulated to acceptable levels by plan modification or termination; or
- D. The Permittee requests termination of the Permit.

Basis for Renewal

Sunnyside Cogeneration Associates has requested a renewal of the Ground Water Discharge Permit UGW570002 for two ash landfills (SCA#1 and SCA#1) and has demonstrated compliance with the existing permit issued in 2013. The SCA#1 Phase I Ash Landfill was capped and reclaimed and completed its 10-year, post-closure monitoring period in 2008. This permit renewal removes the monitoring requirements for closed SCA#1 Phase I. The SCA#1 Phase II and III Ash Landfill was capped and reclaimed in August 2016 and is in the post-closure monitoring period with ongoing monitoring requirements. Construction for the SCA#2 Ash Landfill was approved in 2014 and supports ongoing operations. This permit does not approve any new construction that was not previously authorized.

Background

Description of Facility

The Sunnyside Cogeneration facility (Figure 1) is a coal-fired power plant that produces approximately 51 megawatts 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. Burning the coal refuse generates approximately 800 to 1,000 tons of ash per day. The first groundwater permit was issued in 1992 for Phase I of SCA#1 Ash Landfill. The plant's total life expectancy is 40 years.

A unique characteristic of the Sunnyside Cogeneration Associates' facility ash waste is its pozzolanic nature. Pozzolanic material is a broad class of siliceous materials which when in fine-grained form and in the presence of water, react chemically with calcium hydroxide at normal temperatures to form compounds possessing cementitious properties. This material is projected to be structurally and chemically stable with a low permeability.

The SCA#1 Ash Landfill is an unlined landfill comprised of three phases (Figure 2) on approximately 75 acres located at NW 1/4, Section 12, Township 15 South, Range 13 East SLBM. Construction began on Phase I in the early 1990's. The SCA#1 site is located along a steeply sloping escarpment that faces south to southeast and terminates in a relatively flat area along Iclander Creek.

The existing SCA#1 Ash Landfill Phase 1 encompasses approximately 15 acres. Ash was 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. 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 was developed over a 10-year period and encompasses approximately 32 acres of land. Phase II was completed in 2008. Phase II received final cap and cover and was re-seeded according to approved specifications during summer 2016. Phase II is in the post-closure monitoring period.

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 was developed over a 15-year period and encompasses approximately 30 acres. Phase III was closed in summer 2015, and capped, covered and re-seeded according to approved specifications in summer 2016. Phase III is in the post-closure period.

The SCA#2 Ash Landfill is located approximately one mile to the southeast from the Sunnyside Cogeneration Associates power plant facility (NW ¼ Section 8 and NE ¼ Section 7, Township 15 South, Range 14 East, SLBM) and approximately 1.5 miles east of the SCA#1 Ash Landfill (Figure 2). SCA#2 site is located at the head of a small side canyon facing the west. Ash placement began in September 2015. The SCA#2 Ash Landfill is being 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. The cap and reclamation plan will include a compacted 6 to 8-inch soil cap plus an 18 to 24-inch loose thickness native soil cover with fertilizer, mulch and surface roughening.

The SCA#2 Ash Landfill currently conforms to Utah's Division of Waste Management and Radiation Control coal combustion residuals (CCR) regulations (UAC R315-319), but the Agency has not yet issued a permit for the facility. It is anticipated that when the DWMRC permit is issued, it will meet the intent and objectives of the ground water discharge permit, and DWQ will transfer regulatory oversight to DWMRC and remove SCA#2 from this permit.

Best Available Technology (BAT)

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 basins at the toe of the landfills. A 16-inch vegetative cover soil has been placed and compacted on top of each terrace and outslopes as it is finished. Based on SCA's successful reclamation experience with an effort to improve re-vegetation on the ash landfills, Sunnyside Cogeneration Associates placed 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 II and III. Sunnyside Cogeneration Associates 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 (cementitious) nature of the ash-fill, no synthetic liner was necessary. Any discharge is diverted to the sediment basin described in the permit.

Ground Water Quality

Groundwater 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. Groundwater is also contained in weathered Mancos Shale underlying the alluvium. Near the SCA#1 Ash Landfill site, groundwater discharges 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 total dissolved solids (TDS) levels observed in MW-8 that the shallow groundwater there has been affected by the Mancos Shale.

Ground Water Classification and Background Water Quality

Based on available background data, ground water at the SCA #1 (Phase II and III) Ash Landfill site is Class III - Limited Use Ground Water based on TDS. Groundwater at the SCA #2 Ash Landfill is Class IV– Saline Ground Water based upon elevated TDS and dissolved selenium concentrations.

Background water quality for the Icelander Creek alluvial aquifer associated with the SCA#1 Phase II and III Ash Landfill has been established from ground water monitoring results from well MW-7 between February 1998 and December 1999 (nine samples). Background water quality for SCA#1 at MW-7 is presented in Table 1 and 3 of the Permit. The background chemistry of water from MW-7 was significantly different from the other monitoring points established for SCA #1 Phase I.

Background water quality for the upper Icelander Creek alluvial aquifer associated with the SCA#2 Ash Landfill has been established from ground water monitoring results from MW-8. Background values represented in Table 2 and 4 of the Permit were derived from 10 samples collected between January 2012 and January 2013.

Compliance Monitoring

Semiannual groundwater monitoring events and reports were completed on a timely basis, and resampling to probable non-compliance (exceedances of Protection Levels) was completed and reported.

The most recent ash leachate analyses [TCLP] was submitted April 19, 2019, and satisfies the Permit Condition for Part I.E.5.d. The next scheduled TCLP analyses will be performed in 2024.

Elevated TDS and/or selenium were reported sporadically at the closed SCA#1 Phase I monitoring locations MW-1, MW-2, MW-3 and the upgradient background monitoring location (Whitmore Springs). In each case, Sunnyside Cogeneration Associates resampled the wells and, typically, the elevated concentrations were not repeated. In cases where elevated concentrations continued, the Permittee has adequately demonstrated that these constituents were not the result of the facility, but rather site and aquifer conditions. For example, sulfate has been previously identified as a constituent commonly causing elevated TDS. Previous TCLP analyses of the ash material have reported non-detects for sulfate and selenium, therefore the facility ash is not believed to be the source of groundwater impacts. These constituents are likely leaching from the underlying Mancos Shale. Because SCA#1 Phase I is now closed, these wells and upgradient locations will no longer require monitoring, and the wells will be properly decommissioned, sealed and removed by Utah-licensed water well driller.

Similar monitoring results have been observed at MW-7 (SCA#1 Phase II and III compliance point) with elevated selenium reported in June 2014 and elevated TDS reported in May 2017 and June 2018. Upon re-sampling, the results did not exceed Protection Levels.

Elevated selenium and arsenic concentrations were reported at MW-8 (SCA#2 compliance point) during the May 2017 sampling event. Upon resampling, the concentrations remained above the Protection Limits. The reported arsenic concentration was 0.0285 mg/L with the Protection Limit at 0.025 mg/L. Based on the variability of sampling results previously observed at the site and the acknowledged geochemical conditions, it was determined that, in particular, arsenic concentrations would be scrutinized during future monitoring events. Subsequent monitoring reports have not identified an increasing (or consistent) trend in constituent concentrations or exceedance of Protection Limits.

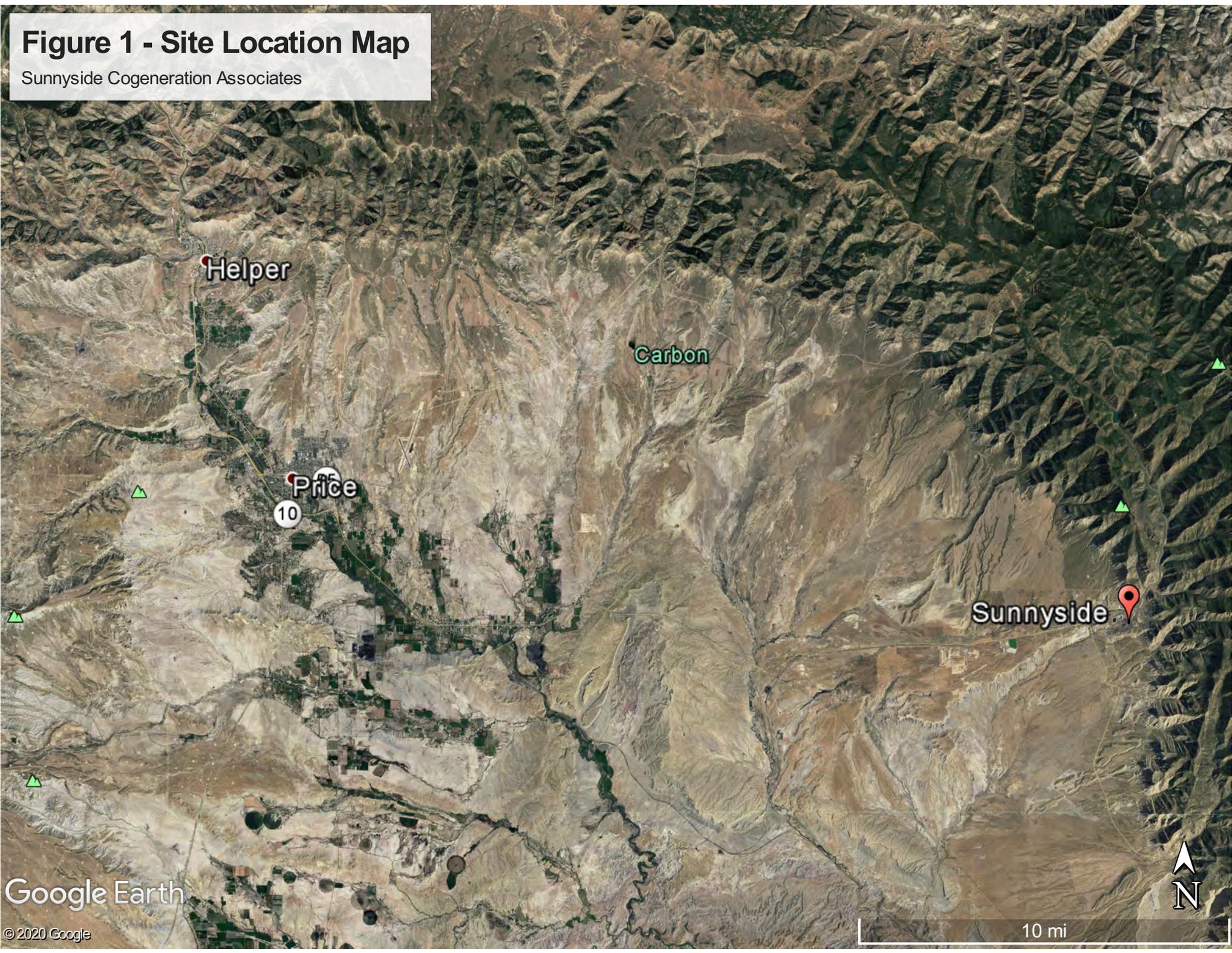
FIGURES

Figure 1 – Site Location Map

Figure 2 – Facility Map

Figure 1 - Site Location Map

Sunnyside Cogeneration Associates



Google Earth

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Figure 2 - Facility Map

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