WATER QUALITY MEMORANDUM

Utah Coal Regulatory Program

July 7, 2006

TO: Internal File

THRU: D. Wayne Hedberg, Permit Supervisor

FROM: Dana Dean, P.E., Senior Reclamation Hydrologist

RE: 2005 First Quarter Water Monitoring, Sunnyside Cogeneration Association, Sunyside Refuse/Slurry, C/007/0035-WQ-05-1, Task #2217

The Sunnyside Refuse/Slurry Mine is currently operational. The facility mines the old Sunnyside Mine coarse refuse and slurry cells, blends the material and burns it in an on-site co-generation facility. SCA started mining at this site in 1993 and projects a total mine life of at least 20 years.

Pertinent water monitoring requirement information is in the MRP in Section 730, and Appendix 7-8.

1. Was data submitted for all of the MRP required sites? YES ☒ NO ☐

Springs –

The Permittee is required to monitor springs CRS, CRB, and F-2 quarterly for the parameters listed in Table 7-2C.

The Permittee monitored and reported the essential data for all springs as required during this quarter. Only F-2 and CRB were flowing.

Streams –

The Permittee is required to sample ICE-1 quartely for the parameters outlined in Table 7-2C.

The Permittee monitored and reported the essential data for all streams as required during this quarter. There was no flow in ICE-1.

Wells–

The Permittee is required to sample Well-1, and B-6 quarterly for the parameters listed in Table 7-2C.

The Permittee monitored and reported the essential data for all wells as required during this quarter. Both wells were dry.

UPDES–

There are seven active UPDES sites at the Sunnyside Refuse/Slurry Mine. They are all under the permit UT0024759, and include outfalls 004, 007, 008, 009, 012, 014, and 016. The Permittee is required to monitor each UPDES site monthly according to Table 7-1B. They are required to sample flow and total suspended solids twice monthly at each outfall.

The Permittee monitored and reported the essential data for all UPDES sites as required during this quarter. None of the UPDES sites discharged during the quarter.

2. Were all required parameters reported for each site? YES ☒ NO ☐

3. Were any irregularities found in the data? YES ☒ NO ☐

Four parameters fell outside of two standard deviations from the mean encountered at the respective sites. They were:

Site	Parameter	Value	Standard Deviations from Mean	Mean
CRB	Dissolved Sodium	653 mg/L	2.19	502.20 mg/L
CRB	Total Sodium	674 mg/L	2.45	514.17 mg/L
F-2	Specific Conductivity	1140 µmhos/cm	2.48	1879.19 µmhos/cm
F-2	Total Calcium	121 mg/L	2.03	86.15 mg/L

There is a strong to fairly strong upward trend in total and dissolved sodium at CRB (R^2 = 0.7202 and 0.4351). There is a slight negative correlation to flow for the dissolved sodium and a weak negative correlation to flow for the total sodium. There is no water quality standard for sodium, but it does affect water hardness (making it "soft"), and water with more sodium than calcium + magnesium can negatively affect plant growth. This condition has never occurred (so far) at CRB, and the increased sodium is not of concern at this time.

There is a weak downward trend in specific conductivity at F-2, with no real correlation to flow. Specific conductivity is closely related to TDS, and except for one reading the TDS at this site has always been well above the EPA's secondary standard of 500 mg/L for drinking

water, even with this low conductivity reading.

The total calcium at F-2 has a slight upward trend with this quarter and last quarter's readings being outlying spikes on the graph. There is not a strong correlation to flow. There are no criteria for this metal, but it does contribute to water hardness. The hardness at F-2 has always fallen into the very hard (>300 mg/L) classification, with most samples (38/42) over 500 mg/L. It is not clear why the calcium level has been increasing, but this does not represent a degradation of water quality.

Several routine Reliability Checks were outside of standard values. They were:

Site	Reliability Check	Value Should Be...	Value is...
CRB	TDS/Conductivity	>0.55 & <0.75	1.23
CRB	Conductivity/Cations	> 90 & < 110	56
CRB	Mg/(Ca + Mg)	< 40 %	59%
CRB	Ca/ (Ca + SO4)	> 50 %	25%
F-2	TDS/Conductivity	>0.55 & <0.75	1.41
F-2	Conductivity/Cations	> 90 & < 110	42
F-2	Mg/(Ca + Mg)	< 40 %	65%
F-2	Ca/ (Ca + SO4)	> 50 %	28%

These inconsistencies do not necessarily mean that a sample is wrong, but it does indicate that something is unusual. An analysis and explanation of the inconsistencies by the Permittee would help to increase the Division's confidence in the samples. The Permittee should work with the lab to make sure that samples pass all quality checks so that the reliability of the samples does not come into question. The Permittee can learn more about these reliability checks and some of the geological and other factors that could influence them by reading Chapter 4 of *Water Quality Data: Analysis and Interpretation* by Arthur W. Hounslow.

4. On what date does the MRP require a five-year re-sampling of baseline water data.

The MRP states that "once every five years (prior to each application for permit renewal) one sample from each of the monitoring sites listed in Table 7-2A will be sampled and analyzed for the parameters listed in Table 7-2B". The next requirement will be in 2007.

5. Based on your review, what further actions, if any, do you recommend?

No actions are necessary at this time.

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