

WATER QUALITY MEMORANDUM

Utah Coal Regulatory Program

September 16, 2005

TO: Internal File

THRU: D. Wayne Hedberg, Permit Supervisor

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

RE: 2004 Fourth Quarter Water Monitoring, Sunnyside Cogeneration Association, Sunnyside Refuse/Slurry, C/007/0035-WQ-04-4, Task #2111

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 cogeneration 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.

Streams –

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

The Permittee monitored and reported the essential data for all streams as required during this quarter.

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.

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. Only outfalls 009 and 012 flowed during the period (October only).

2. Were all required parameters reported for each site? YES NO
3. Were any irregularities found in the data? YES NO

Several 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
F-2	pH	9.61	2.86	8.29
F-2	Dissolved Calcium	141 mg/L	3.40	85.97 mg/L
F-2	Dissolved Magnesium	157 mg/L	3.39	91.95 mg/L
F-2	Sulfate	908 mg/L	2.95	490.31 mg/L
F-2	Total Hardness	999 mg/L	2.88	616.66 mg/L
F-2	Total Dissolved Solids	1852 mg/L	2.32	1255.9 mg/L
F-2	Total Cations	32 meq/L	2.39	21.10 meq/L
F-2	Total Anions	31.1 meq/L	2.31	21.39 meq/L
Well-1	Dissolved Magnesium	101 mg/L	2.14	61.36 mg/L
Well-1	Chloride	74 mg/L	2.54	23.91 mg/l
Well-1	Total Iron	10.6 mg/L	3.22	0.30 mg/L
UT0024759-009	Flow	25 gpm	>9.99	0.18 gpm

The pH at F-2 has no real trend ($R^2 = 0.0016$), but this quarter's value is the highest ever

recorded at the site. This quarter's reading seems to be an outlier, especially since the subsequent reading (3/14/05) was back at 7.52. It is most likely related to the high total hardness and dissolved calcium and magnesium found at the spring this quarter.

The dissolved calcium at F-2 has a slight upward trend with this quarter's reading an outlying spike 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 hard (150-300 mg/L) to very hard (>300 mg/L) classifications, with most samples (34/39) 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.

The dissolved magnesium has a slight upward trend at F-2 and Well 1. There is a weak correlation to flow. There are no criteria for this metal, but it does contribute to water hardness. The hardness at F-2 and Well 1 has always been hard to very hard. It is not clear why the magnesium level has been increasing, but this does not represent a degradation of water quality.

The total hardness at F-2 has a slight upward trend with this quarter's reading being the highest ever recorded at the site. However, the hardness at F-2 has always fallen into the hard (150-300 mg/L) to very hard (>300 mg/L) classifications, with most samples (34/39) over 500 mg/L.

The sulfate at F-2 has a very slight upward trend with this quarter's reading being the highest ever recorded at the site. There is no correlation to flow. Since the pH was high this quarter, it is unlikely that the excess sulfate produced any strong acids. Sulfate alone is not toxic to plants or animals (even at very high concentration), but has a cathartic effect on humans in concentrations over 500 mg/L. For this reason, the EPA has set the secondary standard as 250 mg/L. The sulfate at F-2 has almost always been greater than 250 mg/L (38 of 39 samples).

The total dissolved solids at F-2 have almost no trend since they have fluctuated up and down quite a bit. This quarter's reading is the highest recorded at the site, however many of the samples are over 1300 mg/L TDS (17 of 39) and most are over 1000 mg/L TDS (35 of 39) which makes the water unpalatable to begin with.

The chloride at Well-1 has an upward trend, and this quarter's sample is the second highest recorded at the site. The criteria for protection of aquatic life are 600 mg/L for short-term exposure, and 1200 mg/L for long-term exposure. The levels of chloride recorded at Well-1 are well below any of these levels, and regardless of the origin, they are not of concern at this time.

The total iron at Well-1 has a slight upward trend, but this quarter's reading is dramatically higher than at any other time. It is unclear why this spike occurred, but the June

2005 sample was back down to 0.08 mg/L.

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

Site	Reliability Check	Value Should Be...	Value is...
F-2	TDS/Conductivity	>0.55 & <0.75	1.08
F-2	Conductivity/Cations	> 90 & < 110	54
F-2	Mg/(Ca + Mg)	< 40 %	65%
F-2	Ca/ (Ca + SO4)	> 50 %	27%
Well-1	TDS/Conductivity	>0.55 & <0.75	0.91
Well-1	Conductivity/Cations	> 90 & < 110	64
Well-1	Mg/(Ca + Mg)	< 40 %	72%
Well-1	Ca/ (Ca + SO4)	> 50 %	29%

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.