

# WATER QUALITY MEMORANDUM

## Utah Coal Regulatory Program

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May 20, 2016

TO: Internal File

THRU: Steve Christensen, Permit Supervisor 

FROM: Keenan Storrar, Hydrologist 

RE: Third Quarter 2015 Water Monitoring, Alton Coal Development LLC, Coal Hollow, C/025/0005, Task ID #4990

The Coal Hollow mine is an active surface mine. The permit application was approved on October 15, 2009 and a Permit was issued to Alton Coal Development, LLC (ACD) on November 8, 2010. Mining activity commenced in November 2010.

The water monitoring program for the Coal Hollow mine is described in Section 731.200 of the MRP. Water monitoring locations are listed in Table 7-5 and are shown on Drawing 7-10. Monitoring protocols are described in Table 7-4 and the specific protocol(s) assigned for each location are listed in Table 7-5. Operational/Reclamation and Baseline monitoring parameters are listed for surface water on Table 7-6A and Table 7-6B, respectively, and for groundwater on Table 7-7A and 7-7B, respectively. Special Condition No. 4 of the mine Permit requires the Permittee to monitor for selenium where water leaves the mine site, during operational and reclamation phases.

The 85.88 acre Dame Lease IBC has been highwall mined. A couple of the highwall boreholes undermined and nearly undermine wells, springs, and seeps in the NE ¼ sec. 29, T39S., R5W, mostly east of the sink valley fault. The water levels in wells C2, C3, and C4 have seen a dramatic drop in water levels because of groundwater draining into the Highwall Trench 2 to the west. The Division required weekly water monitoring beginning one month prior, during, and one month after highwall mining has ceased in the identified area. The Permittee has now gone to the monthly monitoring stage of these wells for the six months after highwall mining has ceased. The Permittee began weekly monitoring the sites weekly in June, 2014 and continued through ~October 2015. They switched to monthly monitoring in ~October 2015.

This report was prepared from monitoring data queried from the UDOGM database. The data that support this report were collected and submitted to the database by Alton Coal Development (ACD).

The Underground mining expansion was granted June 19, 2015. Monitoring of these points should be included in the 2<sup>nd</sup> quarter of 2015 water monitoring.

Area 1 of the North Private Lease was permitted on February 3<sup>rd</sup>, 2016. This will add a significant number of monitoring points to the MRP.

**Lamb Canal needs to be reactivated for the North Private Lease amendment.**

**1. Were data submitted for all required sites?**

**Springs**      **YES [X] NO [ ]**

Eleven springs are monitored quarterly (Table 7-5). All of the spring locations except one (SP-3) are located in Sink Valley Wash (Drawing 7-10). Five springs are monitored for field parameters only: Sorensen Spring, SP-3, SP-16, SP-22 and SP-23. Six springs are monitored for field parameters and operational analyses: SP-4, SP-6, SP-8, SP-14, SP-20, and SP-33. Sorensen spring, SP-8, SP-14, SP-20, and SP-22 have weekly measurements beginning one month prior to highwall mining and continuing until one month after highwall mining in the area, followed by monthly measurements for a period of six months. SP-3 is a control spring discharge measurement for the area.

All 11 springs were sampled during Q3 2015 the measured flow at each spring is as follows:

<b>SAMPLE</b>	<b>SITE</b>	<b>Flow (gpm)</b>
SORENSEN SPRING	Alluvial spring Sink Valley	0.034
SP-14	Alluvium - Sink Valley	0.174
SP-16	(Teal Spring) - Alluvium -Sink Valley	0.79
SP-20	Alluvium - Sink Valley	7.33
SP-22	Alluvium - Sink Valley	0.63
SP-23	Alluvium - Sink Valley	0.1
SP-3	Pediment Alluvium - Lower Sink Valley Wash	
SP-33	(Johnson Spring) - Alluvium - Sink Valley	3.16
SP-4	Alluvium/Fault? - Lower Sink Valley Wash	0.679
SP-6	Alluvium - seep in Sink Valley	< 5.
SP-8	Alluvial spring at Dames Ranch	16.2

Notes: Data were collected in mid-August 2015

**Streams**      **YES [X] NO [ ]**

Ten stream sites are monitored quarterly. Operational analyses are performed for BLM-1, SW-2 (Kanab Creek below Robinson Creek); SW-3 (Kanab Creek above permit area); SW-4 and SW-5 Lower Robinson Creek [LRC] above permit area and above Kanab Creek, respectively); SW-6 (Sink Valley wash at permit boundary); SW-8 (Swapp Hollow Creek above permit area); and SW-9 (Sink Valley Wash below permit area). Field parameters only are measured at RID-1 (irrigation ditch in Robinson Creek) and SW-101 (LRC in permit area). BLM-1, SW-5, SW-6, and SW-9 are monitored quarterly for total and dissolved selenium.

All required stream sites were monitored for this quarter.

**Wells**      **YES [X] NO [ ]**

Table 7-5 identifies 25 wells which will be monitored quarterly when accessible. Wells Y-100

and Y-101 are monitored for the underground. Wells will be monitored for water elevation only except for six wells, which will be monitored for water elevation and operational parameters: Y-61 (artesian Sink Valley alluvium above mining), LR-45 (LRC alluvium below mining), LS-28, LS-85 (artesian Sink Valley alluvium below mining), SS-30 (Sink Valley alluvium below mining) and UR-70 (LRC alluvium above mining). Several wells are expected to be destroyed or rendered inoperable due to mining activities (MRP page 7-59). Wells C0-18 and C0-54 were destroyed Fourth Quarter of 2011. C9-15, C9-25, C9-40 were destroyed in Q3 of 2013, Y-38 in Q4 2013, and C7-20 in Q3 2014.

Well LS-85 south of the permit area has turned from artesian or on average -2.7' above the casing to now be 0.42' below the casing. It will be important to monitor this well for material damage to the hydrologic balance. Erik Peterson thinks this change may be from a farmer just up gradient of LS-85 overdrawing well Y-62, but he did not mention the depth at which Y-62 is screened.

SS-75 is also showing a drawdown which is probably in response to mining activities to the north. As mentioned previously the drainage into HWT2 is significantly impacting the water levels in C3 and C4 wells.

**Division Order:** A division order will be written to install a well in the deepest backfill of HWT2. This well will monitor the resaturation of the backfilled area. According to the Permittee's commitment in Appendix 7-1 the PHC must be updated regarding the fall in water levels and to estimate the re-saturation time of the backfill (this will likely be on the order of decades to +100 yrs).

All groundwater wells were monitored during this quarter.

**UPDES**      **YES [X] NO [ ]**

Discharges from the Coal Hollow mine are authorized under UPDES General Permit for Coal Mining application number [UT0025992](#). The UPDES permit expires on July 31, 2018 and authorizes discharges from six outfalls: 001, 001B, 002, 003, 004, and 005. These outfalls correspond to sediment ponds 1, 1B, 2, 3 and 4 and discharge location 005. Sediment pond locations are shown on Drawing 5-25. The UPDES permit identifies monitoring frequency and required parameters, effluent limitations, and storm water requirements.

The Operator has submitted data electronically to the Division's water database this quarter. Special Condition No. 1 of the mine Permit requires the Operator to submit water quality data for the Coal Hollow Mine in an electronic format through the Electronic Data Input web site.

**Discharge at outfalls during Quarter**      **YES [ ] NO [ ]**

**2. Were all required parameters reported for each site?**

**Springs**      **YES [X] NO [ ]**

Five year baseline quality sampling was conducted on all operationally monitored springs that were flowing.

**Streams**      **YES [X] NO [ ]**

Stream samples were analyzed for the required operational monitoring parameters specified in the MRP. Special Condition No. 4 of the mine Permit requires the Permittee to monitor for selenium

where water leaves the mine site, during operational and reclamation phases. All operational samples from stream sites are being analyzed for dissolved selenium, while only BLM-1, SW-5, SW-6, and SW-9 are required.

Five year baseline quality sampling was conducted on all operationally monitored stream sites that were flowing.

**Wells**            **YES [X] NO [ ]**

Five year baseline quality sampling was conducted on all operationally monitored wells.

**UPDES**           **YES [X] NO [ ]**

The Operator has submitted data electronically to the Division's water database. In addition to the monitoring requirements established by the UPDES permit, Special Condition No. 4 of the mine Permit requires the Permittee to monitor for selenium where water leaves the mine site, during operational and reclamation phases.

**3. Were irregularities found in the data?**

Listed parameters are more than two standard deviations above the mean.

**Springs**           **YES [ ] NO [X]**

**Streams**           **YES [X] NO [ ]**

Selenium levels in Kanab Creek may be listed by DWQ as a non-point source pollutant. There have been significant spikes in T-Se in the past few years (see Figure 2). When Chemtech-Ford has a difficult time processing Selenium they show the value as <100, which I ignore.

SW-2, SW-3:Temp

**Wells**            **YES [X] NO [ ]**

There have been significant spikes in T-Se levels early in the year that have since gone down.

The C-2, C-3, C-4 wells are seeing dramatic drops in level. This is because the groundwater is draining into the HWT to the west.

Well 102 is dropping. These levels are dropping because the mine's production well is pumping just up-gradient (Figure 1).

LS-28 had a significant number of parameters higher than the mean.

SP-33: T-Hardns

SS-30:Temp, T-Hardns, D-Mg,

UR-70: T-Se

Y-61: TDS, T-Hardns, D-Ca

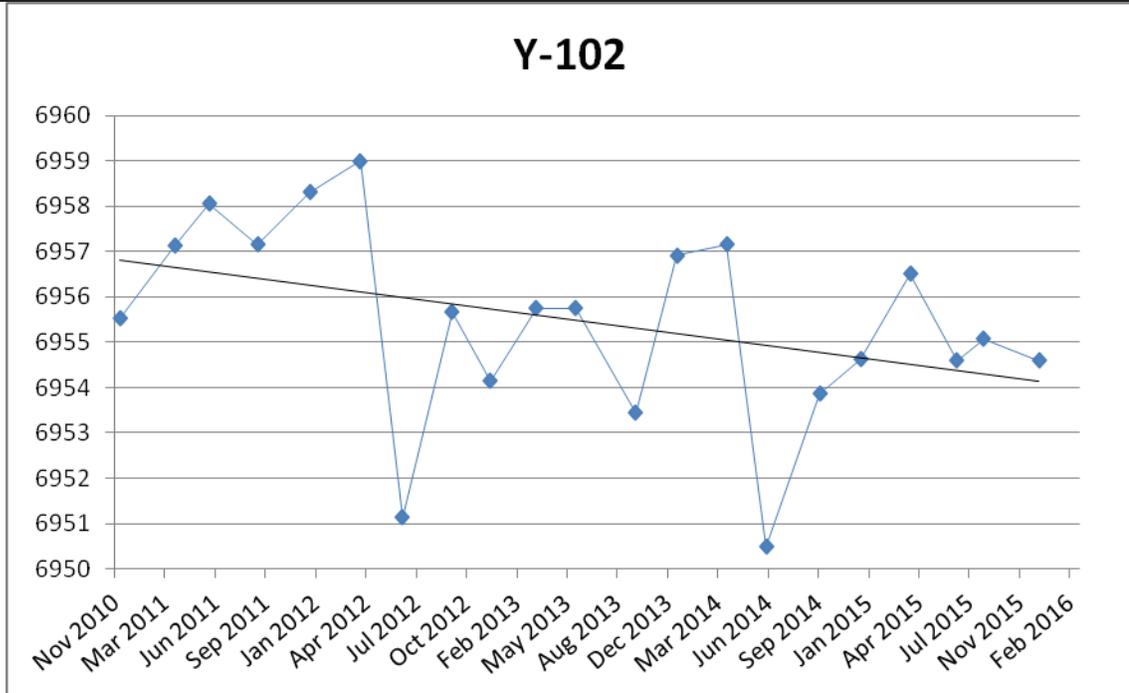
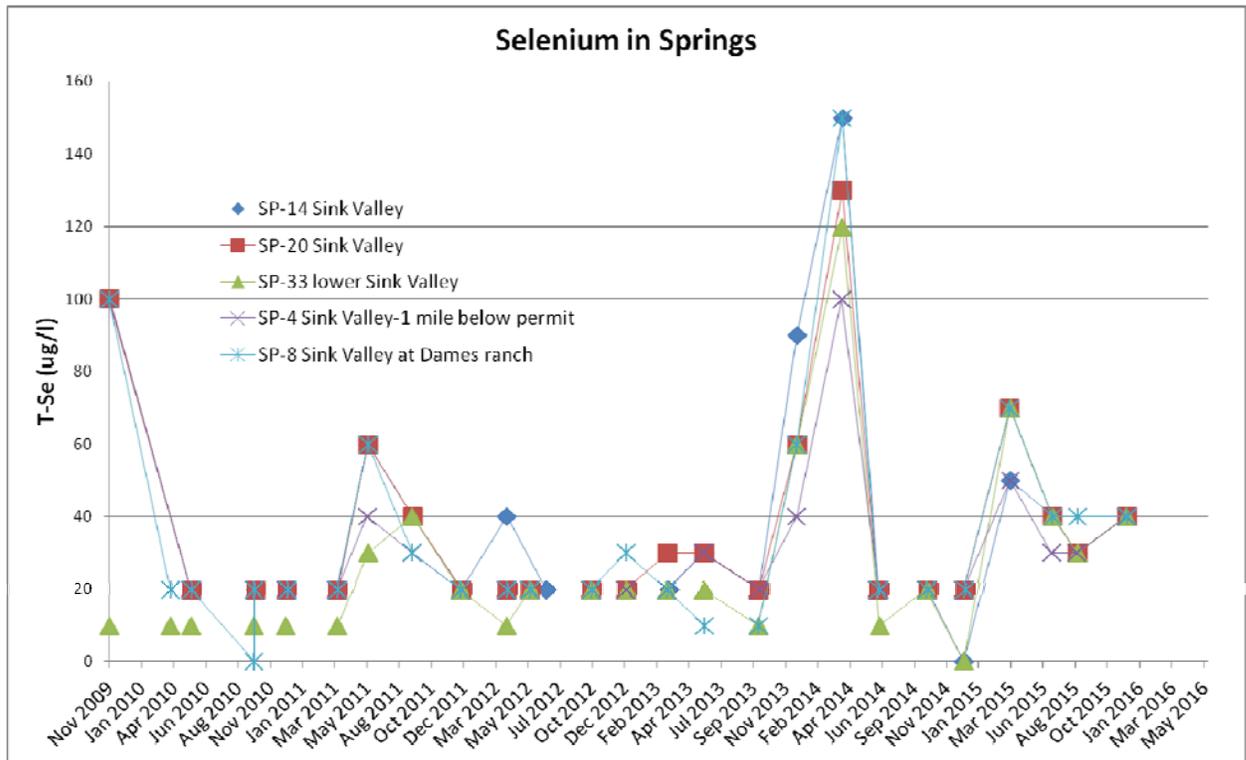


Figure 1. Well Y-102: Alluvial well in upper Sink Valley to the east of pit 9 in permit area.



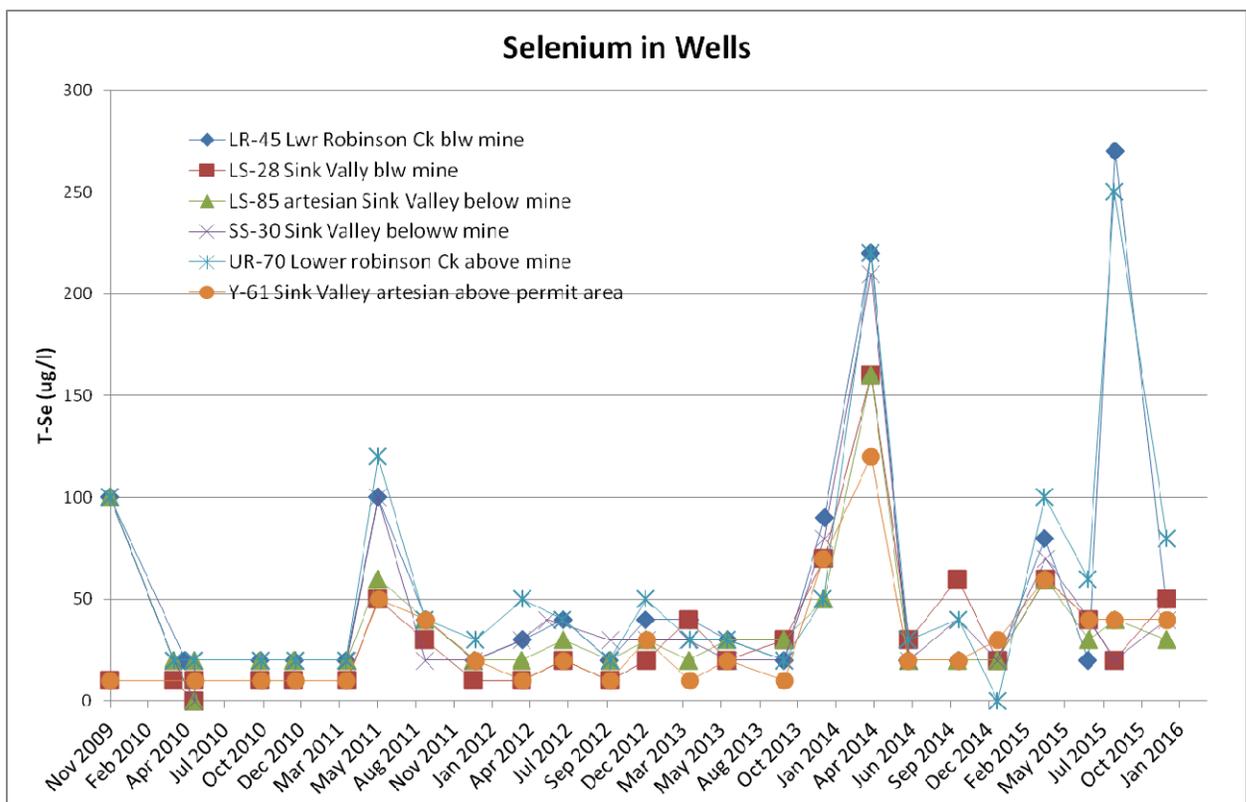
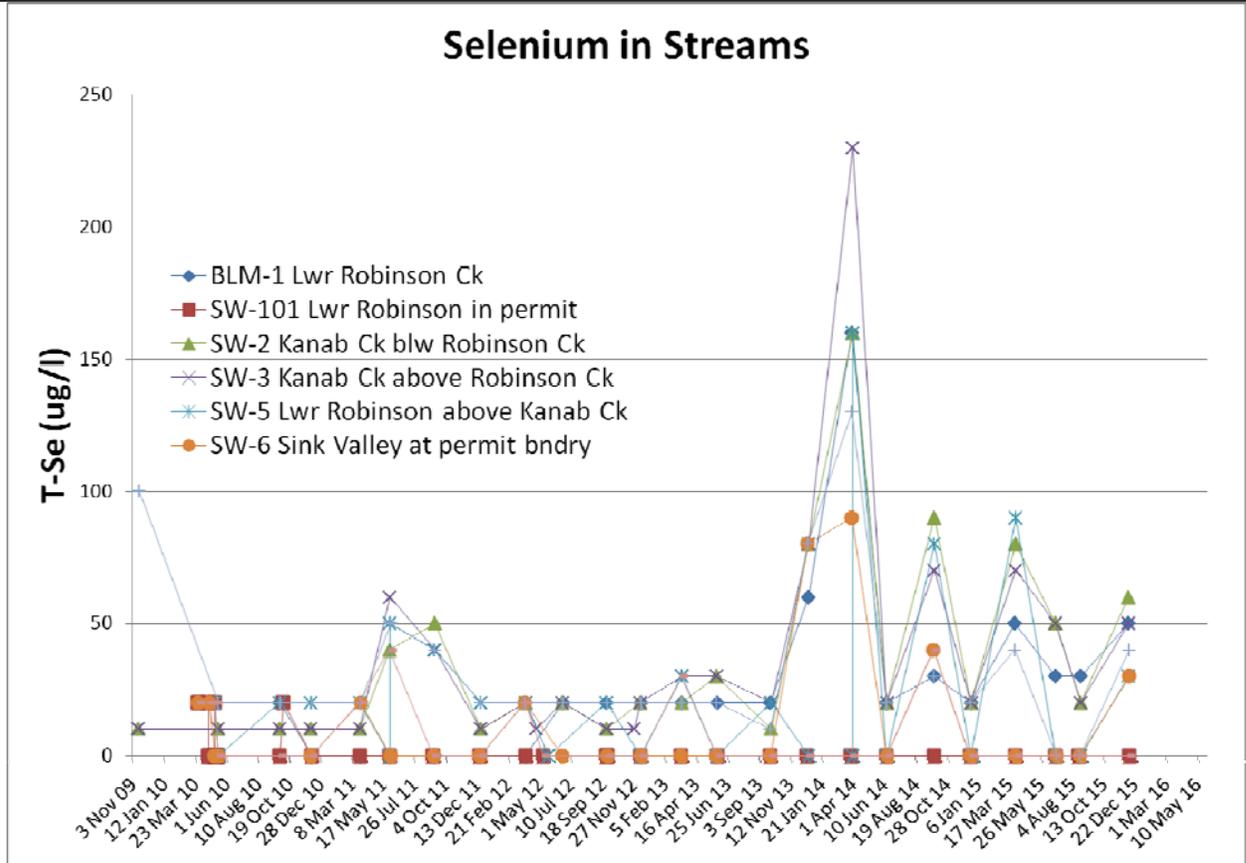


Figure 2. Elevated Selenium levels at Spring, Stream, and Well locations through Q4 2015. 20 ug/l and below on the y-axis is the ND limit for measuring Selenium.

**UPDES YES [ X ] NO [ ]**

Pond 3 discharged in September.

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

Re-sampling for baseline parameters is due every five years during the third or first quarter. Baseline parameters for surface water and groundwater monitoring are listed in Table 7-6B and Table 7-7B, respectively. Assuming that the five-year baseline resampling will coincide with permit renewal, the next baseline re-sampling is due during third or fourth quarter 2015.

**5. Based on your review, what further actions, if any, do you recommend? YES [ ] NO [X]**

None, however tracking the water elevation in well Y-102 would be worth continued examination. Monitor down gradient wells in Sink Valley and the C-series wells. Continue to monitor elevated selenium in springs, streams, and wells.

**6. Does the Mine Operator need to submit more information to fulfill this quarter's monitoring requirements? YES [ ] NO [X]**

**7. Follow-up from last quarter, if necessary.**

None

**Highwall Trench 2 up-to-date status of wells C-2, C-3, C-4**

These wells have seen dramatic drops in the last few months. This is happening because the aquifer is draining into the open HWT 2 to the west.

