WATER QUALITY
M E M O R A N D U M

Utah Coal Regulatory Program

March 27, 2018

TO: Internal File

THRU: Daron Haddock, Coal Program Manager

FROM: Steve Christensen, Environmental Scientist

RE: 2017 3rd Quarter Water Monitoring, Price River Terminal, LLC. Wellington Preparation Plant, C/007/0012, Task ID #5592

Water-monitoring requirements are in Sections 7.23 and 7.31.2 through 7.31.22, and Tables 7.24-2 and 7.24-5 of the MRP.

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

Baseline parameters are collected in the year preceding permit renewal. The next baseline collection event will be the 3rd quarter of 2019.

2. Were data submitted for all of the MRP required sites?

The Permittee had issues uploading the water quality data for 1st quarter 2017. The Permittee performed the requisite sampling and analysis; however, due to technical issues they were unable to upload the data. As such, enforcement action was not warranted. The Permittee was able to upload 1st quarter and 2nd quarter 2017 into the Division's water quality database. All required monitoring sites were sampled and requisite data obtained.

Streams and Ponds YES ☒ NO ☐

The surface water monitoring plan requires sampling of nine surface water sites (SW-1, SW-2, SW-2A, SW-3, SW-4, SW-5, SW-6, SW-7 and SW-8). The required water quality parameters are provided in Table 7.24.5 with the exception of SW-2. Flow is the only data collected at monitoring site SW-2. Surface water monitoring sites are no longer monitored for BTEX-N. The reduction in monitoring at these sites was the result of inactivity at the site (Task ID #4253). Four of the sites are retention ponds (SW-5, SW-6, SW-7 and SW-8).

Data was submitted for all surface water monitoring sites. Of the nine surface water monitoring sites, SW-1, SW-2 and SW-2A produced a measurable flow.

Wells YES ☒ NO ☐

The Permittee is required to analyze samples quarterly from 15 well sites. GW-12 is no longer required for monitoring (since 1st quarter 2012 mid-term). GW-1, GW-3, GW-4, GW-6, GW-7, GW-8, GW-9, GW-9B, GW-10, GW-13, GW-14, GW-15A, GW-15B, GW-16, and GW-17 for the parameters in Table 7.24-2, and to measure depth only at GW-2.

Data was submitted for all of the required monitoring well sites. Monitoring wells GW-3 and GW-17 did not have enough water to be sampled.

UPDES YES ☒ NO ☐

Six UPDES permitted outfalls at the Wellington Preparation Plant are monitored monthly: #UTG040010-003, 004, 005, 006, 007, and 008. None of the UPDES discharge points reported a discharge this quarter.

3. Were all required parameters reported for each site?

Streams and Ponds YES ☒ NO ☐

Wells YES ☒ NO ☐

UPDES YES ☒ NO ☐

4. Were any irregularities found in the data?

Surface Water Monitoring Sites:

SW-1 reported elevated total selenium (T-Se) during the 1st quarter of 2016 (2.15 standard deviations from the mean). The T-Se concentration for 2nd quarter 2017 was within historic ranges as were all other reported parameters. The total selenium concentrations were reported below the detection limit (<20 ppm) for both the 2nd, 3rd and 4th quarters of 2016. However; an elevated T-Se concentration was reported for 3rd quarter 2017. A concentration of 100 ug/l was reported which is 3.01 standard deviations from the mean of 29.39 ug/l. All other reported parameters were within historic ranges.

SW-2A reported elevated concentrations for Cl during the 3rd and 4th quarters of 2016. An elevated D-K concentration was reported the 3rd quarter of 2016; however, the D-K was

markedly lower than the historical average for 4th quarter 2016. T-Se was outside of two standard deviations (2.74) for first quarter 2017. All reported concentrations (including T-Se) were within established ranges for 2nd quarter 2017. However, an elevated T-Se concentration was reported for the 3rd quarter of 2017. The reported concentration of 120 ug/l is 3.12 standard deviations from the mean of 37.64 ug/l.

SW-2 reported T-Se concentrations below the detection limit during the period in question (i.e. 3rd and 4th quarter 2015). All required parameters were within historical ranges for all of 2015 and 2015 and 2016. The first, second and third quarters of 2017 followed the same pattern of reported concentrations within normal ranges (i.e. within 2 standard deviations from the mean).

Ground Water Monitoring Sites:

The following ground water monitoring sites did not report elevated T-Se concentrations for 1st, 2nd, 3rd and 4th quarter of 2016: GW-1, GW-10, GW-14, GW-17, GW-4, GW-6, GW-7, GW-8 and GW-9.

GW-1 reported significantly reduced concentrations for D-Ca, D-Mg and D-Na 1st quarter 2017. Oddly, elevated concentrations for D-K and D-Ca were reported 2nd quarter 2017. It's unclear what is causing these dramatic swings in concentrations. The depth to water increased fairly significantly the 2nd quarter of 2017. A depth of 21.15' was reported (average depth to water is 13.45'). A significant elevation in T-Se concentration was reported for 3rd quarter 2017. The reported concentration of 310 ug/l is 7.90 standard deviations from the mean of 50.43 ug/l. Additionally, an elevated D-K concentration was reported as well as Total-cations.

Monitoring well GW-10 reported a significant increase in T-Se for 3rd quarter 2017. The concentration of 270 ug/l is 9.01 standard deviations from the mean of 32.50 ug/l.

Monitoring well GW-13 reported elevated concentrations for D-K and D-Ca the 2nd quarter of 2017 (97.51 ppm and 483.5 ppm respectively). Elevated concentrations were reported for D-K and T-Se for 3rd quarter 2017. The T-Se concentration was 370 ug/l which is 2.07 standard deviations from the mean of 138.95 ug/l.

GW-14 reported an elevated concentration for D-K the 2nd quarter of 2016. The well could not be accessed during the 3rd quarter of 2016 due to the area being inundated with Price River water. A reduction in bicarbonate (CaCO3) was reported for the 4th quarter 2016. GW-14 also reported elevated concentrations for D-K and T-Se. The reported T-Se concentration was 360 ug/l which is 7.42 standard deviations from the mean of 50.28.

GW-15A reported elevated TDS and D-Mg concentrations the 2nd quarter of 2016. During the 3rd quarter, GW-15A reported elevated concentrations for Cl, SO4, TDS, T-cations and T-anions. Elevated concentrations were reported for D-Ca, D-Mg, D-Na, Cl, SO4, total hardness, TDS, total cations, total anions and field conductivity for 4th quarter 2016. First quarter 2017 again reported a slew of elevated concentrations outside two standard deviations from the mean. Elevated concentrations for conductivity, D-Mg, D-K, D-Na, Cl, SO4, T-Alk, T-Hardness, TDS, Total Cations and Total Anions were reported 1st quarter 2017. Concentrations appeared to stabilize for 2nd quarter 2017. D-K was the elevated concentration reported. The aforementioned parameters returned to normal ranges. The depth to water did increase to 17.25' (average depth to water 10.07'). The third quarter for 2017 reported elevated D-K and T-Se. T-Se was reported at 240 ug/l (5.60 standard deviations from the mean of 45.17 ug/l).

GW-15B reported reduced concentrations for T-alkalinity and bicarbonate for the 3rd quarter of 2016. For 4th quarter 2016, all required parameters reported concentrations within established historical ranges. Monitoring well GW-15B reported elevated D-Mn, T-Mn, T-Fe and D-K concentrations 1st quarter 2017. Only D-K was reported to be elevated the 2nd quarter of 2017. Elevated concentrations for D-K, Cl, T-Mn and T-Se were reported the 3rd quarter of 2017. The T-Se concentration of 230 ug/l is 8.09 standard deviations from the mean of 36.60 ug/l.

GW-16 reported reduced concentrations of D-Mg, D-Na, T-Alkalinity, T-hardness, TDS, bicarbonate, T-cations and T-anions for 3rd quarter 2016. The reduction in concentration continued for D-Mg the 4th quarter 2016. Reduced concentrations for D-Mg, T-Hardness, Total Cations were reported 1st quarter 2017. A slightly elevated D-K concentration was reported 1st quarter 2017 as well. During the 2nd quarter 2017, the depth to water greatly reduced with a reported depth of 18' (average depth to water is 41.79'). Slightly elevated D-Ca and D-K concentrations were reported. During the 3rd quarter for 2017, elevated concentrations were reported for D-Mg, D-K and T-Se. The reported concentration of 240 ug/l was 7.68 standard deviations from the mean of 45.36 ug/l.

GW-4 reported reduced concentrations for T-alkalinity, bicarbonate and T-anions the 3rd quarter of 2016. Reduced concentrations for D-Mg and bicarbonate (CaCO3) were reported for 4th quarter 2016. An elevated D-K concentration was reported 1st quarter 2017 and again in 2nd quarter 2017. Third quarter 2017 reported elevated concentrations for D-K as well as T-Se. The T-Se concentration was 280 ug/l which is 7.71 standard deviations from the mean concentration of 38.71 ug/l.

GW-6 reported a slightly elevated concentration for bicarbonate 2nd quarter 2016. However; bicarbonate was reported slightly lower than the mean for the 3rd quarter 2016. GW-8 produced an elevated concentration for D-K 2nd quarter of 2016. As with GW-6, the bicarbonate concentration reported for 3rd quarter 2016 was well below the mean of 959.76 ppm (reported concentration of 784 ppm). GW-9 reported an elevated D-K concentration the 2nd quarter of

2016. During the 3rd quarter GW-9 reported a reduction in bicarbonate and D-Na concentrations. The D-K concentration for GW-9 returned to historical range the 3rd quarter of 2016. A reduced bicarbonate value was reported for the 4th quarter of 2016. It was the only parameter outside of two standard deviations from the mean that quarter. Slightly elevated concentrations of D-K and CaCO3 were reported 1st quarter 2017. Only D-K was reported outside of two standard deviations for 2nd quarter 2017. A reported concentration of 13.28 ppm was reported (8.58 standard deviations outside the mean). GW-6 reported elevated concentrations for D-Mg, D-K and T-Se for 3rd quarter 2017. The T-Se concentration was 300 ug/l which is 8.66 standard deviations from the mean of 39.40 ug/l.

GW-7 reported a T-Se concentration 2.41 standard deviations from the mean of 35.62 ppm for 1st quarter 2017. The reported concentration was 80 ppm. Additionally a D-K concentration was reported that was 3.51 standard deviations from the mean. The T-Se concentration for GW-7 was within established ranges for the 2nd quarter of 2017. The D-K concentration remained elevated. GW-7 reported elevated D-K and T-Se concentrations for 3rd quarter 2017. The T-Se concentration was 280 ug/l which is 9.99 standard deviations from the mean of 35.62 ug/l.

GW-8 reported a reduced bicarbonate concentration 3rd quarter 2016. A reduced bicarbonate concentration was again reported for 4th quarter 2016 and 1st quarter 2017. The bicarbonate concentration was within normal ranges for 2nd quarter 2017. However; an elevated D-K concentration was reported (5.23 standard deviations from the mean). As with the other monitoring wells, GW-8 reported elevated concentrations for D-K, T-Se as well as total alkalinity and bicarbonate for 3rd quarter 2017. The T-Se concentration reported was 410 ug/l which is 6.91 standard deviations from the mean of 46.35 ug/l.

Monitoring well GW-9 reported reductions in D-Mg and CaCO3 1st quarter 2017. The concentrations returned to normal ranges the 2nd quarter of 2017. An elevated D-K concentration was reported 2nd quarter 2017. GW-9 reported elevated concentrations for D-K and T-Se for 3rd quarter 2017. The T-Se concentration was 1,170 ug/l which is 9.99 standard deviations from the mean of 48.50 ug/l.

GW-9B reported a spike in D-Mg for 1st quarter 2017. A reported value of 1,494 ppm was 7.35 standard deviations from the mean of 609.77 ppm. The D-Mg concentration was within normal ranges for 2nd quarter 2017; however, an elevated D-K concentration was reported for 2nd quarter 2017. Additionally, TSS was reported as 25 ppm for 2nd quarter. The mean for TSS is 8,685.71 ppm. GW-9B also reported elevated D-K and T-Se concentrations for 3rd quarter 2017. The T-Se concentration was 360 ug/l which is 8.51 standard deviations from the mean of 45.30 ug/l.

Monitoring well GW-17 reported an elevated concentration for D-K 1st quarter 2017 and again in 2nd and 3rd quarter 2017.

5. Does the Mine Permittee need to submit more information to fulfill this quarter's monitoring requirements?

YES ☐ NO ☒

6. Follow-up from last quarter, if necessary.

NA

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

An extensive number of water monitoring sites (both surface and ground water) reported significant increases in T-Se concentrations. Additionally, most of those sites reported elevated concentrations for D-K. Based on a phone conversation with the Permittee's consultant who performs the water monitoring, it appears that the lab that conducted the analyses of the samples may have a quality control issue. As a result, these samples will need to be re-run in order to provide some level of quality control assurance that the data is reliable.

Based on the phone conversation with the Permittee's consultant (March 26th, 2018), it was discussed that the lab results for 4th quarter 2017 showed elevated T-Se concentrations across the board. The consultant indicated that 4th quarter 2017's samples would need to be run again. As a result of the aforementioned T-Se spikes, the 3rd quarter samples will need to be re-run as well.

Ground water monitoring sites 1, 10, 13, 14, 15A, 15B, 16, 4, 6, 7, 8, 9 and 9B all had elevated T-Se and in most cases dissolved potassium as well.

Surface water monitoring sites 1 and 2A reported slightly elevated T-Se concentrations (in the neighborhood of 3 standard deviations from the mean).