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To: Brandi Lubliner, WDOE
From: Colin Elliott
Subject: Narrative for 4th Quarter WQ Lab Results for IAA No. 1500077
Project #: SIC: F92AA

The following narrative summarizes the data quality issues encountered with the analysis of the WQ samples collected September through December, 2015. The QC reports are attached.

1. Sample Preservation, Storage and Holding Time Compliance
   All samples met the preservation, storage and holding time limits listed in Table 17 of the QAPP except:
   - Ortho-Phosphate analysis for 11 samples (L63714-1 thru -6 and L63715-1 thru -5) were done one day past the 2-day holding time. Those samples with Ortho-phosphate levels above the quantitation limit of 0.002 mg/L have been qualified with a J flag to indicate the results are estimated values. Samples L63715-2 and -3 have been flagged with a JT flag to indicate the estimated result is above the detection limit but below the quantitation limit. One sample (L63715-4) has been qualified with a UJ flag to indicate the parameter was not detected above the estimated detection limit.

2. Method Blank Contamination:
   Method blanks were analyzed at the frequency listed in Table 19 and the following parameters were detected above the KCEL method detection limit:
   a. Dissolved Zinc was detected in the method blank for Batch WG143056. All dissolved metals samples in that batch that had Zinc levels above the detection limit were re-prepared and analyzed in a new batch. The second batch showed no Zinc in the re-prepared method blank so no Zinc data required qualification.
   b. Naphthalene in the method blank for WG142130 was detected at 0.0052 ug/L, just above the method detection limit of 0.005 ug/L. All samples associated with that method blank (L63718-1 thru -6) have been qualified with a UJ flag since the levels of Naphthalene were within 5 times the amount in the method blank. The values qualified with the UJ flag should be considered the estimated detection limit for those samples.

3. Matrix Spikes (MS), lab control samples (LCS), Spike Blanks (SB) and Surrogates:
   Matrix spikes, lab control samples, spike blanks and surrogates were analyzed at the frequency listed in Table 19 of the QAPP. All recovery values for these QC types were within acceptance limits listed in Table 20 except for the following:

a. The SB and MS analyzed with the PAH samples collected in September showed recoveries for 2-Methylnaphthalene that were below the acceptance limits in Table 20. 2-Methylnaphthalene results for all samples in that batch (L63718-1 thru -6) were qualified with a UJ flag to indicate no response was detected above the estimated detection limit. Acenaphthene results in the MS were also low but since both the SB and MSD recovery results were acceptable, no sample data was qualified.
b. The SB and MS analyzed with one batch of PAH samples collected in December showed recoveries for 2-Methylnaphthalene and Naphthalene that were below the acceptance limits in Table 20. 2-Methylnaphthalene and Naphthalene results that were below the detection limit in that batch (L64460-1 thru -6 and L64463-1 thru -6) were qualified with a UJ flag to indicate no response was detected above the estimated detection limit. Samples where Naphthalene was measured above the detection limit (L64460-1-6 and L64463-6) were qualified with a JTG or JG flag to indicate the value may be greater than the reported estimate.

4. Lab Duplicates (LD) and Matrix Spike Duplicates (MSD)
Lab duplicates were analyzed at a frequency of at least 5% for all Metals, Conventionals and Microbiological methods. Matrix spike duplicates were analyzed at a frequency of 5% for the Organics parameters. The relative percent difference (RPD) was not calculated for any set of lab duplicates where both results were less than the RDL (quantitation limit). When the RPD was calculated, the measured precision for these 2 QC types were all within the acceptance limits listed in Table 20 of the QAPP except for:
    a. The lab duplicate for Fecal Coliform in Sample L64460-3 exceeded the precision criteria for method SM 9222D. This exceedance is due to the low levels detected in both the sample and lab duplicate rather than a systematic problem with the analysis therefore the sample results have not been qualified.

5. Field Replicates
A total of 10 sets of field replicates were collected for lab analysis during the 4th quarter sampling events. The precision of all field replicates, where the results were greater than the quantitation limit, were within the limits listed in the QAPP (Table 20) except for:
    a. Station 0024-OUGA for September:
        i. Total Chromium, Copper and Lead results showed RPD values of 64, 84 and 79%, respectively, all above the acceptance limit of 20%. The variability is likely due to actual differences between the grab samples plus analytical variability since all values are near or below the quantitation limits.
        ii. The RPD for the Fecal Coliform results was 133% compared to the 50% limit in Table 20. This level of variability is expected since both results were at or below 5 CFU/100mL.
    b. Station 0034-WUGA for September:
        i. Dissolved Organic Carbon and Ortho-Phosphate results showed RPD values of 39% and 126%, respectively, compared to the acceptance limit of 20%. The variability is likely due to actual differences between the grab samples since this field replicate was analyzed as the lab duplicate and showed very good precision.
    c. Station 0038-OUGA for October:
        i. Total Suspended Solids and Turbidity results showed RPD values of 48% and 26%, respectively, compared to the acceptance limit of 25%. This

level of variability is expected since all results were near the quantitation limit.

d. Station 0048-WUGA for December:
    i. Dissolved Chromium showed an RPD value of 27%, just above the acceptance limit of 20%. The variability is likely due analytical variability since all values are near or below the quantitation limit.
e. Station 0072-OUGA for December:
    i. Dissolved Chromium showed an RPD value of 82%, compared to the acceptance limit of 20%. The variability is likely due analytical variability since all values are near or below the quantitation limit.
f. Station 0018-WUGA for December:
    i. Dissolved Copper showed an RPD value of 62%, compared to the acceptance limit of 20%. The variability is likely due analytical variability since all values are near or below the quantitation limit.
g. Station 0002-WUGA for December:
    i. The RPD for the Fecal Coliform results was 125% compared to the 50% limit in Table 20. The variability is likely due to actual differences between the grab samples plus analytical variability since both values are near the detection limit.
    ii. Naphthalene showed an RPD value of 108% compared to the 40% acceptance limit in Table 20. This level of variability is expected since both results were below or just above the quantitation limit.

6. Other Issues
    a. The analysis for Ammonia for the 19 samples and 4 field replicates collected in December was conducted using Method SM4500NH3F, a manual version of Method SM4500NH3G. This method change was done due to a major problem with the auto-analyzer normally used to perform SM4500NH3G. A Hach kit was used to perform SM4500NH3F which is a manual process with the same chemical reagents and detection technique used in SM4500NH3G but with no gas diffusion membrane. The gas diffusion membrane eliminates matrix interferences, including background turbidity. The method detection limit and quantitation limit for the HACH method is 0.01 and 0.04 mg/L, respectively compared to 0.01 and 0.02 mg/L for method SM4500NH3G. As with all previous WQ samples, none of the December samples were filtered prior to analysis. It was observed that higher levels of Ammonia were detected at all stations in the December samples relative to the 3 previous months, although most results (21 out of 23) were less than the quantitation limit of 0.04 mg/L. Note: The EIM method code for the December results will be SM4500NH3F and “Hach Kit used for testing” will be added to the Result Comment field.
    b. The differences between the total and dissolved metals for all samples were evaluated. If the result for the dissolved metal was only slightly above the total metal value and both results were less than or near the quantitation limit, no corrective action was taken. Two samples showed higher values for dissolved metals compared to the total metals results, when at least one value was a factor of 2 above the quantitation limit and the relative difference was greater than 20%:

i. Sample L64460-3 (0042-WUGA) had a Dissolved Copper result of 2.5 ug/L while the Total Copper result was 1.91 ug/L. Both the dissolved and total portions of this sample were reanalyzed and the original results were confirmed.
ii. Sample L64460-4 (0034-WUGA) had a Dissolved Copper result of 1.51 ug/L while the Total Copper was 1.12 ug/L. Both samples were reanalyzed and the original results were confirmed.

Since the dissolved and total metals samples are collected as separate grab samples, it is suspected this difference is due to variability between the grab samples rather than a systematic error.