Appendix E

Narrative Summaries from Data Validation Reports

Former Gulf States Creosoting Site
Hattiesburg, Mississippi

Section 1 Quality Assurance Review

A. Organic Data

The organic analysis of 150 samples (inclusive of QC samples and sample reanalyses) was performed by Lancaster Laboratories (Lancaster) of Lancaster, Pennsylvania. These 150 samples were collectively analyzed for the Target Compound List (TCL) volatile organic compounds by SW-846 Method 8260B and TCL semivolatile organic compounds by SW-846 Method 8270C, as indicated on Table 1. The analytical results are presented in Section 2 of this report.

The findings in this report are based upon a rigorous review of sample holding times, blank analysis results, laboratory control sample (LCS) recoveries, matrix spike and matrix spike duplicate results, surrogate recoveries, gas chromatography/mass spectroscopy (GC/MS) instrument mass tuning, calibrations, sample preparation, internal standard performance, analytical sequence, and the quantitation of positive results.

In the Data Support Documentation (Section 3) of this report, the data reviewer has included copies of all relevant raw data, QC forms, and other documentation needed to support any changes made to the data package. It should be emphasized that the following items do not necessarily affect data usability. Usability issues are addressed in a subsequent section. This report has been prepared according to sections that provide information that applies to specific analyses performed on the project samples.

Correctable Deficiencies

1. The second page of the continuing calibration summary forms for the semivolatile continuing calibration analyzed on 6/26/98, instrument HP06588, and the third page of the continuing calibration summary form for the semivolatile calibration analyzed on 7/01/98, instrument HP06588, were not included in the data package supplied by the laboratory. The information was requested from the laboratory but had not been received at the time this validation was completed. The Environmental Standards data reviewer evaluated the raw data for these calibrations and found all calibration criteria to be acceptable.

2. Hexachlorobutadiene and butylbenzylphthalate were detected at 2 µg/L in SDG HMS01 samples CPT-10-GW and CPT-21-GW. Both compounds are reported on the quantitation report and are confirmed by mass spectra but were not reported on the sample analysis summary form. The Environmental Standards data reviewer has corrected the EDD and the data tables.

Noncorrectable Deficiency

- The recoveries of several surrogate compounds in the semivolatile fraction of SDG HMS02 sample SD-12, SDG HMS03 sample SW-09, and SDG HMS04 samples GEO-22/5-6', GEO-22/5-6', and GEO-24/5-6' were outside QC limits. The laboratory appropriately reextracted and reanalyzed the semivolatile fraction of these samples. However, these reextractions were performed outside the extraction holding time. The laboratory provided the hard copy data for both extraction analyses; the results from the initial extraction analysis were reported on the EDD.

Comments

1. As noted in the laboratory Case Narrative, the volatile analysis of SDG HMS03 samples GEO-17-GW, GEO-19-GW, and GEO-21-GW were analyzed by medium level. The quantitation limits were raised accordingly.

2. Zero percent surrogate recoveries were reported for the semivolatile analysis of SDG HMS04 sample GEO-22/5-6'. In addition, the semivolatile surrogate recoveries of sample GEO-24/5-6' are approximately double that which would be expected. No interferences are apparent in either sample and reextraction/reanalysis results for target analytes are similar to the initial analysis and surrogate recoveries are acceptable. It appears that sample GEO-24/5-6' was spiked with twice the specified amount of surrogate solution. In addition, it appears that the surrogate solution was not spiked into sample GEO-22/5-6'. When the laboratory reextracted and reanalyzed the semivolatile fraction of these samples, acceptable surrogate recoveries were obtained. As a result, no qualification of the data has been performed.

3. As noted in the laboratory case narratives for both the volatile and semivolatile analyses, a number of compound concentrations were calculated using either a first or second degree quadratic fit due to a poor curve fit.

4. The data usability results for the LCS and matrix spike/matrix spike duplicate analyses were evaluated utilizing the laboratory-generated precision and accuracy limits.

5. The laboratory reported "not-detected" results down to the method detection limits (MDLs). In addition, positive results less than the quantitation limit, but greater than the MDL, were qualified by the laboratory as estimated ("J").

6. As noted in the laboratory case narrative, *initial dilutions* were required for the analysis of semivolatile samples SD-2, SD-4, GEO-20/0-1', GEO-34/0-1', and GEO-29/0-1'. Sample detection limits have been raised accordingly for these samples.

7. It should be noted that matrix spike/matrix spike duplicate samples were not collected for SDG HMS06 samples. The laboratory included a matrix spike and matrix spike duplicate analyses for a non-project sample.

8. The laboratory analyzed the semivolatile fraction of several samples at dilutions due to high concentrations of target analytes in the samples. The laboratory provided the hardcopy raw data for both the initial undiluted analyses and the subsequent dilution analyses for all these samples. However, the laboratory reported the results for all target analytes that exceeded the calibration range in the initial analysis from the secondary dilution analysis on the sample analysis summary forms and EDD. Furthermore, the laboratory reported the results for all other target analytes from the initial undiluted analysis on the sample analysis summary form and EDD.

9. As noted in the laboratory Case Narrative for SDG HMS04, the laboratory was not able to adequately resolve the peaks for benzo(b)fluoranthene and benzo(k)fluoranthene in samples GEO-22/2-3', GEO-23/0-1', GEO-23/2-3', GEO-25/0-1', and GEO-25/2-3'. Consequently, the reported results for benzo(b)fluoranthene and benzo(k)fluoranthene in these samples represent the sum total for both isomers.

10. As noted in the laboratory Case Narrative for SDG HMS06, the laboratory utilized 940-ml and 921-ml extraction volumes for the extraction of the semivolatile fraction of samples RB-6-9-98 and RB-6-10-98, respectively, because insufficient sample volume was received at the laboratory.

With regard to data usability, the principal areas of concern are blank contamination, low surrogate recoveries, matrix spike/matrix spike duplicate results, laboratory control sample recoveries, calibration issues, and quantitation of results below the quantitation limit. Based upon a review of the data package provided, the following data qualifiers are offered. (It should be noted that the following data usability issues represent an interpretation of the QC results obtained for the project samples. Quite often, data qualifications address issues relating to sample matrix problems. Similarly, the validation guidelines routinely specify areas of the data that require qualification, yet the methods used for analysis do not require any corrective action by the laboratory. Accordingly, the following data usability issues should <u>not</u> necessarily be construed as an indication of laboratory performance.)

Organic Data Qualifiers

- Due to the trace-level presence of the following compounds in field, trip, and/or laboratory blanks, these compounds in the samples listed below should be considered "not-detected"; consequently, the reported positive results have been flagged "U*" on the data tables. Furthermore, results that were reported below the sample-specific quantitation limit were replaced with the quantitation limit and the appropriate "U*" qualifier. It should be noted that dilution factors and sample volume were taken into consideration when evaluating blank contamination.

Compound	SDG	Sample(s) With Results Qualified as "Not-Detected" ("U")
bis(2-ethylhexyl)phthalate	HMS01	CPT-07-GW, CPT-08-GW, CPT-09-GW, CPT-11-GW, CPT-12-GW, CPT-13-GW, CPT-18-GW, CPT-21-GW, and CPT-22-GW
	HMS02	SD-1, SD-3, SD-5, and SD-10
di-n-octylphthalate	HMS01	CPT-08-GW, CPT-11-GW, CPT-18-GW, CPT-21-GW, and CPT-22-GW
di-n-butylphthalate	HMS03	SW-02 and CFO
butylbenzylphthalate	HMS03	SW-02 and CFO

- Although there is no direct reason to qualitatively question the reported positive results for bis(2-ethylhexyl)phthalate, di-n-butylphthalate, butylbenzylphthalate, and di-n-octylphthalate in the following samples, these low-level results should be used with caution if used in a decision-making process such as risk assessment. Phthalate esters are common field and laboratory contaminants.

Compound	Samples With Reported Positive Results
bis(2-ethylhexyl)phthalate	GEO-32/2-3', GEO-32/5-6', GEO-13/5-6', GEO-13/5-6', GEO-22/0-1', GEO-23/0-1', SD-04, SW-02, and CFO
butylbenzylphthalate	GEO-22/0-1' and CPT-21-GW
di-n-butylphthalate	CPT-07-GW, CPT-08-GW, CPT-09-GW, CPT-11-GW, CPT-12-GW, CPT-10-GW, CPT-18-GW, CPT-21-GW, and CPT-22-GW
di-n-octylphthalate	SW-09

- The analyses for the compounds in the samples listed below are unusable; consequently, the "not-detected" results have been flagged "R" on the data tables. Very low (<0.050) relative response factors (RRFs) were observed for these compounds in the associated initial multipoint calibration standards and/or continuing calibrations.

Compound	SDG	Sample(s) With Unreliable Detection Limits ("R")
hexachlorobenzene	HMS05	GEO-34/0-1', GEO-34/2-3', GEO-34/5-6', GEO-28/2-3', GEO-28/5-6', GEO-29/0-1', GEO-29/2-3', GEO-29/5-6', GEO-30/0-1', GEO-30/2-3', GEO-30/5-6', GEO-31/0-1', GEO-31/2-3', and GEO 28/0-1'
	HMS06	RB/6-09-98 and RB/6-10-98
2,4-dinitrophenol	HMS06	RB/6-09-98 and RB/6-10-98
hexachlorocyclopentadiene	HMS06	RB/6-09-98 and RB/6-10-98

- The actual reporting limits for the following compounds in the associated samples may be higher than reported; consequently, the "not-detected" results (not previously qualified 'R') for these compounds have been flagged "UJ" on the data tables. High percent differences (25.0% < %D≤90.0%) with increases in instrument sensitivity were obtained between the average RRFs of the associated initial calibrations and the RRFs in the associated continuing calibrations. It should be noted that although the reporting limits have been qualified according to protocol, these high percent differences represent increases in instrument sensitivity; consequently, the reporting limits may be valid as reported.

Compound	SDG	Sample(s) With Biased Detection Limits ("UJ")
2,4-dinitrophenol	HMS06	RB/6-09-98 and RB/6-10-98
4,6-dinitro-2-methylphenol	HMS06	RB/6-10-98
pyrene	HMS06	RB/6-09-98
chrysene	HMS06	GEO-31/5-6', GEO-32/2-3', GEO-03/2-3', GEO-03/5-6', GEO-10/2-3', GEO-10/5-6', GEO-13/0-1', GEO-13/5-6', GEO-16/2-3', GEO-16/5-6', GEO-17/ 2-3', GEO-17/5-6', GEO-18/2-3, and GEO-18/5-6'

- The actual detection limits for the following compounds in the samples listed below may be higher than reported; consequently, the “not-detected” results for these compounds have been flagged “UJ” on the data tables. High percent differences (25.0% < %D>90.0%) coupled with decreases in instrument sensitivity were obtained between the average relative response factors of the initial calibrations and the relative response factors in the associated continuing calibrations.

Compound	SDG	Sample(s) With Biased Detection Limits (“UJ”)
2,4-dinitrophenol	HMS01	CPT-13-GW
	HMS05	GEO-28/0-1’
	HMS06	GEO-16/5-6’, GEO-17/ 2-3’, GEO-17/5-6’, GEO-18/2-3, GEO-18/5-6’, and GEO-32/0-1’
hexachlorocyclopentadiene	HMS01	CPT-113-GW
	HMS03	GEO-16-GW, GEO-17-GW, GEO-19-GW, GEO-21-GW, and RB/6-11-98
2,2’-oxybis(1-chloropropane)	HMS04	GEO-33/5-6’, GEO-20/9-10’, GEO-21/0-1’, GE)-20/5-6’, GEO-21/2-3’, GEO-21/5-6’, GEO-21/9-10’, GEO-22/0-1’, GEO-22/2-3’, and GEO-22/5-6’
	HMS05	GEO-28/0-1’
4,6-dinitro-2-methylphenol	HMS06	GEO-16/5-6’, GEO-17/ 2-3’, GEO-17/5-6’, GEO-18/2-3, GEO-18/5-6’, and GEO-32/0-1’

- The reported positive results for chrysene in SDG HMS06 samples GEO-32/0-1’ and GEO-32/5-6’ should be considered estimated; consequently, these results have been flagged “J” on the data tables. A high percent difference (>25%) was observed between the relative response factors for this compound in the associated continuing calibration standards and the average relative response factor from the associated multipoint calibration.

- The actual detection limits for the semivolatile acid and base/neutral compounds in the samples listed below may be higher than reported by the laboratory; consequently, these limits have been flagged “UJ” on the data tables. In addition, any reported positive results (not previously flagged “U”) for semivolatile acid and base/neutral compounds in these samples should be considered estimated and have been flagged “J” on the data tables. Low recoveries were observed for two or more of the semivolatile acid and base/neutral surrogate compounds in these samples. In addition, the reextraction results did not confirm the initial analysis results.

SDG	Sample(s) With Biased Detection Limits ("UJ") and Estimated Positive Results ("J") for Semivolatile Base/Neutral Compounds
HMS02	SD-12
HMS04	GEO-22/5-6'
HMS03	SW-09

- The reported positive results for the following compounds in the samples listed below should be considered estimated and have been flagged "J" on the data tables. High recoveries were observed for these compounds in the associated laboratory control sample analyses.

Compounds	SDG	Sample(s) With Estimated Positive Results ("J")
benzo(a)pyrene	HMS01	SD-01, SD-02, SD-03, SD-04, SD-05, SD-07, SD-08, SD-09, and SD-12
di-n-octylphthalate	HMS03	SW-09
chrysene	HMS06	GEO-32/0-1' and GEO-32/5-6'

- The actual detection limits for the following compounds in the samples listed below may be higher than reported; consequently, the "not-detected" results have been flagged "UJ" on the data tables. Low recoveries were observed for these compounds in the associated matrix spike or matrix spike duplicate analyses.

Compound	SDG	Sample(s) With Biased Detection Limits ("UJ")
2,4-dinitrophenol	HMS01	CPT-13-GW
1,3-dichlorobenzene, 1,2-dichlorobenzene, and hexachloroethane	HMS04	GEO-33/5-6'

- The reported positive result for phenol in SDG HMS05 sample GEO-34/0-1' should be considered estimated and has been flagged "J" on the data tables. A high relative percent difference was observed between the recoveries for this compound in the associated matrix spike and matrix spike duplicate analyses.

- According to reporting conventions, all positive results reported below the sample-specific quantitation limits should be considered estimated and have been flagged "J" on the data tables.

A complete support documentation of this organic data QA review is presented in Section 3 of this report.

C. Conclusions

This QA review has identified several aspects of the analytical data that required qualification. The majority of the data are acceptable. However, all of the organic data has been qualified due to blank contamination, calibration issues, low surrogate recoveries, matrix spike/matrix spike duplicate results, laboratory control sample recoveries, and quantitation of results below the quantitation limit. To confidently use any of the analytical data within these sample sets, the data user should understand the qualifications and limitations of the results.

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Section 1 Quality Assurance Review

A. Organic Data

The organic analysis of 21 aqueous samples (including QC samples, dilutions, trip blanks and rinsate blanks) was performed by Lancaster Laboratories, Lancaster, Pennsylvania. Seven samples were analyzed for volatile organic compounds by SW-846 Method 8260B; 20 samples were analyzed for semivolatile organic compounds by SW-846 Method 8270C and PAH by SW-846 8310, as indicated on Table 1. The analytical results are presented in Section 2 of this report.

The findings in this report are based upon a rigorous review of sample holding times, blank analysis results, laboratory control sample (LCS) recoveries, matrix spike and matrix spike duplicate recoveries, sample dilution results, surrogate recoveries, gas chromatography/mass spectroscopy (GC/MS) instrument mass tuning, calibrations, sample preparation, internal standard performance, analytical sequence, surrogate retention time shifts, and the quantitation of positive results. A few deficiencies were identified during the validation of this data set.

In the Data Support Documentation (Section 3) of this report, the data reviewer has included copies of all relevant raw data, QC forms, and other documentation needed to support any changes made to the data package. It should be emphasized that the following items do not necessarily affect data usability. Usability issues are addressed in a subsequent section. This report has been prepared according to sections that provide information that apply to specific analyses performed on the project samples.

Correctable Deficiencies

1. The laboratory incorrectly reported a sample volume of 935mls for sample W19-- (Kerr McGee sample number MW-19) on the Case Narrative for the semivolatiles fraction. According to the associated Organic Extraction Batchlog, the correct sample volume is 985mls. There is no impact on data quality due to this deficiency because the laboratory used the correct volume to calculate all sample results. The Environmental Standards data reviewer has corrected the aforementioned Case Narrative included in the Project Case Narratives and Chain-of-Custody Records (Section 4).

2. In the PAH fraction, the laboratory incorrectly reported on the analysis data sheet and data tables that fluorene was not detected in sample MW-09. According to the associated raw data, fluorene was detected in this sample at a level of 93 µg/L. The Environmental Standards data reviewer has corrected the associated analysis data sheet included in the Organic Data Support Documentation (Section 3). In addition, the data tables have been modified to reflect the correct data (including the associated flagcode).

3. In the PAH fraction, the laboratory incorrectly reported a result of 15.5 µg/L for fluorene for sample MW-06 on the analysis data sheet and data tables. Specifically, the laboratory incorrectly reported the fluorene result from the diluted analysis of this sample instead of the undiluted analysis (i.e., 15.1 µg/L), which is within the calibration range of the instrument. Consequently, the detection limit for fluorene was also incorrectly reported because it was adjusted to reflect the diluted analysis. The Environmental Standards data reviewer has corrected the associated analysis data sheet included in the Organic Data Support Documentation (Section 3). In addition, the data tables have been modified to reflect the correct data (including the associated flagcode).

4. In the PAH fraction, the laboratory incorrectly flagged several surrogate recoveries for samples MW-06, MW-09, and MW-19 with a "D" on the Water Pesticide Surrogate Recovery form (FORM II PEST-1); the "D" flags indicate that the surrogates were diluted out when, in fact, these samples were not analyzed at a dilution. There is no impact on data quality due to this deficiency. The Environmental Standards data reviewer has corrected the aforementioned form included in the Organic Data Support Documentation (Section 3).

5. In the PAH fraction, the laboratory incorrectly reported a surrogate recovery of 0% for nitrobenzene in samples MW-06DL, MW-09DL, and MW-19DL on the Water Pesticide Surrogate Recovery form (FORM II PEST-1). According to the associated raw data, the correct recoveries are 66%, 71%, and 60%, respectively. There is no impact on data quality due to this deficiency because the correct recoveries are within the acceptance criteria. The Environmental Standards data reviewer has corrected the aforementioned form included in the Organic Data Support Documentation (Section 3).

6. In the PAH fraction, the laboratory incorrectly reported several surrogate retention times on the Pesticide Analytical Sequence forms (FORM VIII PESTs) for instrument P1562A. In some instances, no surrogate retention times were reported. The Environmental Standards data reviewer has corrected the aforementioned forms included in the Organic Data Support Documentation (Section 3) and has included several examples of the raw data showing the correct retention times.

7. In the PAH fraction, the laboratory made several errors in reporting the acenapthene and fluorene retention time data on the Pesticide Initial Calibration - Retention Time Summary (FORM VI PEST-1) for the initial calibration performed on 10/20/98 on instrument P1562A. There is no impact on data quality due to this deficiency. The Environmental Standards data reviewer has corrected the aforementioned form included in the Organic Data Support Documentation (Section 3) and has included an example of the raw data reflecting the correct retention times.

8. In the PAH fraction, the laboratory incorrectly reported the "calculated amount" and the "%D" for benzo(k)fluoranthene on the Pesticide Calibration Verification Summary (FORM VII PEST-2) for the calibration verification analyzed on 10/24/98 at 22:17 on instrument P1562B. There is no impact on data quality due to this deficiency. The Environmental Standards data reviewer has corrected the aforementioned form included in the Organic Data Support Documentation (Section 3)

Comments

1. It should be noted that matrix spike and matrix spike duplicate samples were not collected for the volatiles fraction. The laboratory included a matrix spike and matrix spike duplicate which was performed on a non-project sample.

2. It should be noted that the Chain-of-Custody Record specifies that SW-846 Method 8240 be used for analysis of the volatiles fraction. However, the laboratory actually used SW-846 Method 8260B for the analyses, which is the current promulgated SW-846 method for the GC/MS analysis for volatiles.

3. As noted in the Case Narrative for the semivolatiles fraction, reduced volumes were used in the extraction of samples MW-05, MW-09, MW-19, MW-08, MW-06, MW-13, and MW-23 due to insufficient sample volume. In addition, although not noted in the Case Narrative for the PAH fraction, reduced-volume sample extracts were also used in the PAH analyses.

4. As noted in the Case Narratives for the semivolatiles and PAH fractions, samples MW-09, MW-19, and MW-06 were reanalyzed at dilutions due to the presence of target compounds which exceeded the calibration range of the instrument in the initial analyses. The laboratory reported one set of results from all analyses; however, the raw data for all analyses were provided. The laboratory reported the results for target compounds whose concentrations exceeded the calibration range in the initial analyses from the secondary dilution analyses. All target compounds that were within the calibration range in the initial analyses were reported from those analyses. The data reviewer has only qualified the results reported by the laboratory.

5. As noted in the Case Narrative for the PAH fraction, the laboratory quantitated the surrogate compounds using the UV detector, which is indicated as column 1 or as instrument P1562A on the surrogate QC summary forms. Therefore, the surrogate recoveries reported for the alternate detector (indicated as column 2) on the Water Pesticide Surrogate Recovery forms (FORM II PEST-1's) are meaningless and were not used to assess data quality. In addition, the retention times reported for the alternate detector

(indicated as instrument P1562B) on the Pesticide Analytical Sequence forms (FORM VIII PESTs) are meaningless and were not used to assess data quality.

6. As noted in the Case Narrative for the PAH fraction, the triphenylene surrogate recoveries in samples MW-01, MW-05, MW-06, MW-07, MW-08, MW-13 and MW-23 were outside the acceptance criteria. The impact on data quality is addressed in the subsequent data qualifiers section.

7. In the PAH fraction, it should be noted that the initial calibration dates reported on the Pesticide Calibration Verification Summaries (FORM VII PEST-2's) actually reflect the dates that the laboratory updated the retention time windows and not necessarily the dates of the associated initial calibration.

8. In the PAH fraction, it should be noted that the retention time for the surrogate triphenylene in sample MW-11 and the retention times for the surrogate nitrobenzene in samples MW-09DL, MW-19DL, and MW-06DL were outside the established retention time windows. SW-846 Method 8000B (Section 7.6.8) states that whenever the observed retention time of a surrogate is outside the established retention time window, the analyst is advised to determine the cause and correct the problem before continuing analyses. It does not appear that the analyst did this. The Environmental Standards data reviewer reviewed the raw data with expanded retention time windows and verified that no PAH compounds were misidentified or misreported as "not-detected" in these samples due to the retention time shift.

9. Data usability based on the LCS and matrix spike/matrix spike duplicate analyses was evaluated utilizing the laboratory-generated precision and accuracy limits.

10. The laboratory reported "not-detected" results down to the method detection limits (MDLs). In addition, positive results less than the quantitation limit, but greater than the MDL, were qualified by the laboratory as estimated ("J").

With regard to data usability, the principal areas of concern are calibration issues, low surrogate recoveries, low matrix spike/matrix spike duplicate recoveries, and results reported at concentrations below the quantitation limit. Based upon a review of the data package provided, the following data qualifiers are offered. (It should be noted that the following data usability issues represent an interpretation of the QC results obtained for the project samples. Quite often, data qualifications address issues relating to sample matrix problems. Similarly, the validation guidelines routinely specify areas of the data that require qualification, yet the methods used for analysis do not require any corrective action by the laboratory. Accordingly, the following data usability issues should not necessarily be construed as an indication of laboratory performance.)

Organic Data Qualifiers

- The analyses for acetone in all samples in SDG HMS07 are unusable; consequently, the "not-detected" results have been flagged "R" on the data tables. Very low (<0.05) relative response factors (RRFs) were observed for these compounds in the associated initial multipoint calibration standards and continuing calibration standards.

- Although there is no direct reason to question the reported positive result for bis(2-ethylhexyl)phthalate in sample MW-07, this compound is a very common laboratory contaminant. In addition, the reported result for bis(2-ethylhexyl)phthalate in sample MW-07 represents a low-level, on-column detection. Accordingly, extreme caution should be exercised if this result is to be used in a decision-making process, such as risk assessment.

- In the PAH fraction, the reported positive results for benzo(a)pyrene in samples MW-05 and MW-19 should be considered estimated and have been flagged "J' on the data tables. In addition, the actual reporting limits for benzo(a)pyrene in samples MW-01, MW-09, MW-08, MW-12, MW-10, MW-06, and MW-07 and for benzo(g,h,i)perylene in all samples except MW-03 and MW-04 may be higher than reported; consequently, the "not-detected" results have been flagged "UJ" on the data tables. High percent drifts (15%<%D≤90%) coupled with increases in instrument sensitivity were observed for benzo(g,h,i)perylene and benzo(a)pyrene in the associated calibration verifications. It should be noted that although the reporting limits have been qualified according to protocol, these high percent drifts represent increases in instrument sensitivity. Consequently, the reporting limits may be valid as reported.

- All reported positive results for PAH compounds in samples MW-01, MW-05, MW-06, MW-07, MW-08, MW-13 and MW-23, with the exception of napthalene in sample MW-06, should be considered estimated and have been flagged "J" on the data tables. In addition, the actual reporting limits for all PAH compounds in samples MW-01, MW-05, MW-06, MW-07, MW-08, MW-13 and MW-23 may be higher than reported; consequently, the "not-detected" results have been flagged "UJ" on the data tables. Low percent recoveries (10%≤%R<60%) were observed the for surrogate compound triphenylene in the analyses of these samples.

- In the PAH fraction, the reported positive result for pyrene in sample MW-04 should be considered estimated and has been flagged "J" on the data tables. A low percent recovery (10%≤%R<51%) was observed for pyrene in the associated matrix spike and matrix spike duplicate analyses of this sample.

- As per reporting conventions, all positive results reported below the sample-specific reporting limits should be considered estimated and have been flagged "J" on the data tables.

A complete support documentation of this organic data QA review is presented in Section 3 of this report.

B. Conclusions

This QA review has identified several aspects of the analytical data that required qualification. The majority of the data are acceptable. However, a portion of the organic data has been qualified due calibration issues, low surrogate recoveries, low matrix spike/matrix spike duplicate recoveries and results reported at concentrations below the quantitation limit. To confidently use any of the analytical data within these sample sets, the data user should understand the qualifications and limitations of the results.

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