SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
Organic Data Review Checklist - Standard Validation

Project: Harley-Davidson

SDG No: 180-40481-1

Laboratory: TestAmerica Pittsburgh

Analysis: VOC

Method: 8260 LL

Matrix: Water

The above data package has been reviewed and the analytical quality control/quality assurance performance data have been summarized. The general criteria used to assess the analytical integrityof the data were based on an examination of the following:

Case Narrative	Analytical Surrogate Recoveries
Analytical Holding Times	Internal Standard Performance
Sample Preservation	MS/MSD Recoveries and Differences
Method Calibration	LCS Recoveries
Method and Project Blanks	Re-analysis and Secondary Dilution

Project Specific QA/QC or contract requirements may take priority over validation criteria in this procedure.

Overall Remarks: Initial and Continuing Calibration and LCS 135465.
Fixed limits used for LCS recovery criteria instead of Lab limits (Compound specific) which result in potentially unnecessary J-flags. - OAR

Definition of Qualifiers:

"U", not detected at the associated level
"UJ", not detected and associated value estimated
"J", associated value estimated
"R", associated value unusable or analyte identity unfounded
"=", compound properly identified and value positive

Reviewed by: Alan G. Miller Jr. Date: 2/26/15

QA Reviewed by: C A Bruce Date: 6-23-15.

3/3/15 AGM

I. Case Narrative

Verify direct statements made within the Laboratory Case Narrative (note discrepancies).

Remarks: No issues

II. Re-analysis and Secondary Dilutions

Verify that re-analysis and secondary dilutions were performed and reported as necessary. Determine appropriate results to report.

Remarks: No issues

III. Holding Times

VOC - Waters - unpreserved: aromatic within 7 days, non-aromatic within 14 days of sample collection
VOC - Waters - preserved: aromatic and non-aromatic within 14 days of sample collection
VOC - Soils - preserve or analyze within 48 hours of sample collection; analyze within 14 days of preservation

SVOC, Pest., PCB - Waters - extract within 7 days of sample collection, analyze within 40 days of extraction
SVOC, Pest., PCB - Soils - extract within 14 days of sample collection, analyze within 40 days of extraction

Deviations:

Sample #	VOC		SVOC			Pest/PCB		
	Date Collected	Date Analyzed	Date Collected	Date Extracted	Date Analyzed	Date Collected	Date Extracted	Date Analyzed

Actions:
1. If holding times are exceeded, all results are qualified as estimated (J/UJ)
2. If holding times are exceeded by more than 2X, reviewer may qualify non-detected results as unusable (R)

Remarks: No issues see attached

IV. System Monitoring Compounds (SMC) Recoveries (VOC, SVOC, Pesticides, PCBs)

List SMC compounds with unacceptable recoveries:

Deviations:

Sample #	VOC			SVOC B/N Compounds			SVOC Acid Compounds			Pest	PCB
	TOL	BFB	DCE	NBZ	FBP	TPH	PHL	2FP	TBP	TCX	DCB
QC Limits											

Actions:

1. If any SMC recovery is <10%, qualify all positive results in associated fractions as estimated (J)
2. If any SMC recovery is <10%, qualify all nondetects in associated fractions as unusable (R)
3. If SMC recoveries fall between 10% and the lower recovery limit, qualify results as estimated (J/UJ)
4. If SMC recoveries fall above the upper recovery limit, qualify positive results as estimated (J)
5. Use professional judgement to qualify Pest/PCB results when SMC recoveries are >10%
6. Use professional judgement to qualify results when SMC recoveries have been diluted out of spec.
7. For SVOC, qualification of the data is required only when 2 or more SMC per fraction are not within control limits
8. Note: SMC formerly known as surrogates.

Remarks: No issues

V. Internal Standards Performance (VOC, SVOC)

VOC internal standard area counts within -50% to +100% of standard (Y/N)
VOC internal standard retention times within ± 30 seconds of standard (Y/N)

SVOC internal standard area counts within -50% to +100% of standard (Y/N)
SVOC internal standard retention times within + 30 seconds of standard (Y/N)

Deviations:

Sample #	IS Affected	Area Counts	Acceptable Range	RT	Std. RT Value

Actions:

1. If area counts are outside limits, qualify positive results associated with that IS as estimated (J)
2. Non-detected compounds quantitated using an IS area count >100% should not be qualified
3. Non-detected compounds quantitated using an IS area count <50%, qualify as estimated (UJ)
4. If extremely low area counts are reported (<50% of the lower limit), qualify non-detects as unusable (R)
5. If an IS retention time varies more than 30 seconds, review the chromatographic profile for shifts and irregularities. Use professional judgement to qualify the data estimated (J/UJ) or unusable (R)

Remarks: No issues

VI. Blanks

All blanks were reported per matrix per concentration level for each 12 hour period on each GC/ MS system used to analyze VOCs and SVOCs Yes ☑ No ☐

Review associated laboratory and project blank samples. List documented contamination below:

Laboratory Method Blanks:

Date:	Lab ID #	Fraction	Compound	Conc. (ppb)

Associated Project Blanks (e.g., equipment rinsates, trip blanks, etc.)

Date	Lab ID #	Fraction	Compound	Conc. (ppb)

Remarks: No detections

VI. Blanks (continued)

Calculate action levels based on 10X the highest blank concentration of "common laboratory solvents", VOCs (methylene chloride, acetone, toluene, 2-butanone, cyclohexane) or SVOCs (phthalates), and 5X the highest blank concentration for all other VOC, SVOC, Pesticides, and PCB compounds. Sample weights, volumes, and dilution factors must be taken into account when applying the 5X and 10X criteria. This allows the total amount of contaminant present to be considered.

Deviations:

Compound	Maximum Conc. Detected, (ppb)	Action Level (ppb)	Samples Affected

Actions:

1. If compound results exceed the action levels, the data are not qualified
2. If compound results are below the required reporting level, report results as non-detect (U) at the reporting level
3. If the compound is detected above the reporting level, but below the action level, qualify as not-detected (U)
4. If gross contamination exists in blanks (i.e.,, saturated peaks by GC/ MS), all affected compounds in the associated samles should be qualifed as unusable (R) due to interference.
5. If blanks were not analyzed per matrix per concentration level for each 12 hour period on each GC/MS system used to analyze VOCs and SVOCs use professional judgement to qualifty data. Data may be rejected (R).

Remarks: No deficiencies

VII. Initial & Contining Calibration (VOC, SVOC)

GC/MS instrument performance checks (BFB / DFTPP) Acceptable Y or N
All compounds must have and RRF > 0.01, %RSD < 30, and %D < 25

VOC - Date of initial calibration: 12/15/14
VOC - Date(s) of continuing calibration: 1/16/15 , 1/19/15
Was the 12 hour critieria met? Y or N

SVOC- Date of initial calibration: N/A
SVOC - Date(s) of continuing calibration:
Was the 12 hour critieria met? Y or N

Deviations:

Compound	Date	RRF	%RSD	%D	Samples Affected
1,4-Dioxane	12/15/14	0.003			1,2,3,4,5,6,7,8,9 - R
Trichlorofluoromethane	1/19/15			35.5	None
2,2-Dichloropropane	1/19/15			45.7	None

* % Difference = $((RF_{CCV} - RF_{ICAL\ AVG})/RF_{ICAL\ AVG}) \times 100$. In instances where the bias of the CCV impacts validation qualifiers, review the RF values or amount reported to confirm that the % Difference or % Drift are reported with the correct negative or positive value.

Actions:

1. If any compound has an intial or continuing RRF of < 0.01, qualify positive results as estimated (J)
2. If any compound has an intial or continuing RRF of < 0.01, qualify non-detects as unusable (R)
3. If any compound has a %RSD >30 or a %D >25, qualify positive results as estimated (J)
4. If any compound has a %RSD >40 or a %D >40, qualify non-detects as estimated (UJ)
5. If BFB or DFTPP mass assignment / ION abundance criteria are all associated data as unusable (R).
6. If samples were analyzed outside the 12 hour BFB or DFTPP performance check time period, qualify the affected sample data as estimated (J/UJ).
7. If separate calibration for water and soil were not performed, use professional judgement to evaluate the data. Data may be rejected (R).
8. If calibrations were not completed within the 12 hour criterion, qualifty all associated data as estimated (J/UJ). If the 12 hour criterion was grossly exceeded, reject all associated data (R).

Remarks: See above.

VIII. Initial & Continuing Calibration (Pesticides, PCBs)

Linearity evaluation, are %RSD <20? (Y/N) _____

Is the RPD between calibration factors ≤25? (Y/N) _____

Are multicomponent calibration data provided for each analysis date? (Y/N) _____

Is the difference between columns check ≤ 25%D? (Y/N) _____

Are 4, 4'- DDT and endrin breakdown (PEM) ≤ 20% and combined breakdown ≤ 30% (Y/N)

Deviations:

Compound	%RSD	RPD	Samples Affected

* % Difference = $((RF_{CCV} - RF_{ICAL\ AVG})/RF_{ICAL\ AVG}) \times 100$. In instances where the bias of the CCV impacts validation qualifiers, review the RF values or amount reported to confirm that the % Difference or % Drift are reported with the correct negative or positive value.

Actions:

1. If %RSD criteria are not met, qualify positive results as estimated (J) and non-detects as estimated (UJ)
2. If RPD criteria are not met, qualify positive results as estimated (J) and non-detects as estimated (UJ)
3. If %D criteria is not met, qualify positive results as estimated (J) and non-detects as estimated (UJ)
4. If breadkwon criteria are not met, positive 4, 4'-DDT and endrin should be qualified as estimated (J). And non-detects should be rejected (R).

Remarks: _____

IX. Matrix Spike/Matrix Spike Duplicate Information

General MS/MSD Criteria:
percent recovery (%R)
relative percent difference (RPD)

VOC	SVOC	Pest	PCB
70-130	45-135	40-140	40-140
<30	<50	<50	<50

Project Sample(s) Spiked: _____

Deviations:

Compound	%R	%R Limits	RPD	RPD Limits	Samples Affected

Actions:

1. If the spike recovery is above the upper control limit (UCL), qualify all positive values in the unspiked sample as estimated (J) and non-detects as estimated (UJ).
2. If the spike recovery is below the lower control limit (LCL), qualifty positive values as estimated (J). And non-detects as estimated (UJ).
3. If the spike recovery is <10%, qualify non-detect values as unusable (R)
4. If the RPD does not meet criteria, qualify positive values in the unspiked sample as estimated (J)
5. Use professional judgement to qualify additional samples in the analytical group based on MS/MSD results
6. Use professional judgement for qualification of data for unspiked compounds

Remarks: None Collected.

X. Laboratory Control Sample Information

General LCS Criteria:
percent recovery (%R)

VOC	SVOC	Pest	PCB
80-120	60-120	50-130	50-130

Laboratory LCS Identifications: LCS 180-130947/9, LCS 180-131060/8, LCSD 180-130947/10

Deviations:

Compound	Date	%R	Samples Affected/Qualifiers Applied
2-Hexanone	1/19/15	78	6, 7, 8 — J or UJ
1,1-Dichloroethane	↓	75	↓
Chloromethane		75	
Vinyl Chloride		74	
Chloroethane	↓	73	↓

these are all within the lab's QC limits

Actions:

Action should be based on both the number of compounds outside the criterion and the magnitude of the exceedance.

1. If the LCS recovery is below limits but > one- half the lower limit, qualify valves as estimated (J/UJ).
2. If the LCS recovery is < one-half the lower limit, qualify all data for that analyte as unusable (R).
3. If the LCS recovery is greater than the upper limit, qualify positive valves for that analyte as estimated (J).
4. If more than half the compounds in this LCS are not within recovery criteria, then qualify associated detected compounds as estimated (J).
5. Use professional judgement for qualification of data for compounds with no LCS information

Remarks: See above.

Hold Time Summary

Sample Number	Method	Date Collected	Analysis Date	Date Extracted	Days to Analysis
180-40481-1	MCAWW 300.0	1/14/2015	1/15/2015		1
180-40481-2	MCAWW 300.0	1/14/2015	1/15/2015		1
180-40481-3	MCAWW 300.0	1/14/2015	1/15/2015		1
180-40481-4	MCAWW 300.0	1/14/2015	1/15/2015		1
180-40481-5	MCAWW 300.0	1/14/2015	1/15/2015		1
180-40481-6	MCAWW 300.0	1/14/2015	1/15/2015		1
180-40481-7	MCAWW 300.0	1/14/2015	1/15/2015		1
180-40481-8	MCAWW 300.0	1/14/2015	1/15/2015		1
180-40481-1	SM SM 2320B	1/14/2015	1/23/2015		9
180-40481-2	SM SM 2320B	1/14/2015	1/23/2015		9
180-40481-3	SM SM 2320B	1/14/2015	1/23/2015		9
180-40481-4	SM SM 2320B	1/14/2015	1/23/2015		9
180-40481-5	SM SM 2320B	1/14/2015	1/23/2015		9
180-40481-6	SM SM 2320B	1/14/2015	1/23/2015		9
180-40481-7	SM SM 2320B	1/14/2015	1/23/2015		9
180-40481-8	SM SM 2320B	1/14/2015	1/23/2015		9
180-40481-1	SW846 6020A	1/14/2015	1/21/2015	1/16/2015	7
180-40481-2	SW846 6020A	1/14/2015	1/21/2015	1/16/2015	7
180-40481-3	SW846 6020A	1/14/2015	1/21/2015	1/16/2015	7
180-40481-4	SW846 6020A	1/14/2015	1/21/2015	1/16/2015	7
180-40481-5	SW846 6020A	1/14/2015	1/21/2015	1/16/2015	7
180-40481-6	SW846 6020A	1/14/2015	1/21/2015	1/16/2015	7
180-40481-7	SW846 6020A	1/14/2015	1/21/2015	1/16/2015	7
180-40481-8	SW846 6020A	1/14/2015	1/21/2015	1/16/2015	7
180-40481-1	SW846 8260C	1/14/2015	1/16/2015		2
180-40481-2	SW846 8260C	1/14/2015	1/16/2015		2
180-40481-3	SW846 8260C	1/14/2015	1/16/2015		2
180-40481-4	SW846 8260C	1/14/2015	1/16/2015		2
180-40481-5	SW846 8260C	1/14/2015	1/16/2015		2
180-40481-6	SW846 8260C	1/14/2015	1/16/2015		2
180-40481-6	SW846 8260C	1/14/2015	1/19/2015		5
180-40481-7	SW846 8260C	1/14/2015	1/19/2015		5
180-40481-8	SW846 8260C	1/14/2015	1/19/2015		5
180-40481-9	SW846 8260C	1/14/2015	1/16/2015		2

Trip Blank Detections

Sample ID	Sample	Analyte	Result	Method	Units	Qual

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
Inorganic Data Review Checklist - Standard Validation
(Chloride, Fluoride, Nitrate/Nitrite, Sulfate, Sulfide, Phosphate, etc.)

Project: Harley - Davidson

SDG No: 180-40481-1

Analysis: Chloride, Nitrate, Sulfate, Alkalinity

Method: 9320B, 300.0

Laboratory: TestAmerica Pittsburgh

Matrix: Water

The above data package has been reviewed and the analytical quality control/quality assurance performance data have been summarized. The general criteria used to assess the analytical integrityof the data were based on an examination of the following:

Case Narrative	Method and Project Blanks
Analytical Holding Times	Matrix Spike Recoveries
Sample Preservation	Duplicate Differences
Method Calibration	LCS Recoveries
	Re-analysis and Secondary Dilution

Overall Remarks: No major issues

Definition of Qualifiers:

"U", not detected at the associated level
"UJ", not detected and associated value estimated
"J", associated value estimated
"R", associated value unusable or analyte identity unfounded
"=", compound properly identified and value positive

Reviewed by: Alan G. Miller Jr. Date: 3/2/15

QA Reviewed by: CA Bruce Date: 6-23-15.

3/3/15 AGM

I. Case Narrative

Verify direct statements made within the Laboratory Case Narrative (note discrepancies).

Remarks: No major issues

II. Re-analysis and Secondary Dilutions

Verify that re-analysis and secondary dilutions were performed and reported as necessary. Determine appropriate results to report.

Remarks: No issues

III. Holding Times

Sample should be preserved and analyzed according to the appropriate analytical method
In general the following preservations and holding times for waters can be applied:

Sulfate, 4 degress C, 28 days
Sulfide, 4 degrees C, pH ≥9 with zinc acetate/sodium hydroxide, 7 days
Bromide/Chloride/Fluoride, no preservative required, 28 days
Nitrate/Nitrite or Ammonia, 4 degrees C, pH ≤ 2 with sulfuric acid, 28 days
Nitrate or Nitrite, 4 degrees C, 48 hours
Alkalinity, 4 degrees C, 14 days
TDS/TSS, 4degrees C, 7 days
Phosphate (total), 4 degrees C, pH < 2 with sulfuric acid, 28 days
Hexavalent Chromium, Cool 4 degress C, water- 24 hours, soil - 30 days

Deviations:

Sample #	Analyte	Date Collected	Date Extracted	Date Analyzed	Notes:

Actions:

1. If holding times are exceeded, all results are qualified as estimated (J/UJ)
2. If holding times are exceeded by more than 2X, reviewer may qualify non-detected results as unusable (R)
3. If samples were not properly preserved, use professional judgement to qualify the data

Remarks: No issues.

IV. Initial & Continuing Calibration

A blank and at least three standards should be analyzed, with one of the standards being within 2X the MDL
Correlation coefficients must be ≥ 0.995
Initial calibration check recoveries must be within 90-110%
Continuing calibration check recoveries must be within 85-115%

Deviations:

Compound	Correlation Coefficient	ICV/ CCV	%R	Samples Affected

Actions:

1. If any compounds initial calibration linearity is <0.995, qualifiy the data as estimated (J/UJ)
2. If any compounds initial calibration linearity is <0.95, qualify the data as unusable (R)
3. If ICV or CCV criteria are not met, qualify positive results as estimated (J) and non-detects as estimated (UJ)
4. If ICV or CCV recoveries fall below 50%, qualify results as unusable (R)

Remarks: _____

V. Blanks (Method Blanks and Project Blanks)

An analytical method blank must be analyzed with each batch of samples
Calculate action levels based on 5X the highest blank concentration of any given analyte
Sample weights, volumes, and dilution factors must be taken into account when applying the 5X criteria

Deviations:

Analyte	Maximum Conc. Detected, (ppb)	Action Level (ppb)	Samples Affected
Total Alkalinity	3.96	19.8	None
Bicarbonate Alkalinity	3.96	19.8	↓
Nitrate as N	0.00912	0.00456	↓

Actions:

1. If analyte results exceed the action levels, the data are not qualified
2. If analyte results are below the required reporting level, report results as non-detect (U) at the reporting level
3. If the analyte is detected above the reporting level, but below the action level, qualify as not-detected (U)

Remarks: No Samples Impacted

VI. Laboratory Control Sample Information

Each analyte's LCS % recovery must be within the control limits established by the laboratory
In general LCS % recoveries should all be within 85-115%

Deviations:

Analyte	Date	%R	Samples Affected/Qualifiers Applied

Actions:

1. If the LCS recovery is outside limits but >10%, qualify all positive values as esimated (J)
2. If the LCS recovery is outside limits but >10%, qualify non-detect values as estimated (UJ)
3. If the LCS recovery is <10%, qualify all data for that analyte as unusable (R)
4. Use professional judgement for qualification of data for compounds with no LCS information

Remarks: No issues

VII. Matrix Spike Information

Each analyte's Matrix Spike % recovery should be within the laboratory established control limits
In general matrix spike % recoveries should all be within 75-125%

Deviations:

Analyte	%R	%R Limits	Samples Affected

Actions:

1. If the spike recovery is outside limits, qualify all values in the unspiked sample as estimated (J/UJ)
2. If the spike recovery is <10%, qualify non-detect values as unusable (R)
3. Use professional judgement to qualify additional samples in the analytical group based on MS results
4. Use professional judgement for qualification of data for unspiked analytes

Remarks: No Issues

VIII. Laboratory Duplicate Information

Each analyte's RPD should be within the laboratory established control limits
In general RPDs should all be within 20%

Deviations:

Analyte	RPD	RPD Limits	Samples Affected

Actions:

1. If the RPD is outside limits, qualify all values in the unspiked sample as estimated (J/UJ)
2. Use professional judgement to qualify additional samples in the analytical group based on RPD results
3. Use professional judgement for qualification of data when laboratory duplicates were not analyzed

Remarks: No issues

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
Metals Data Review Checklist - Standard Validation

Project: Harley-Davidson

SDG No: 180-40481-1

Analysis: Na,Ca,Mg

Method: 6020A

Laboratory: TestAmerica Pittsburgh

Matrix: Water

The above data package has been reviewed and the analytical quality control/quality assurance performance data have been summarized. The general criteria used to assess the analytical integrity of the data were based on an examination of the following:

Case Narrative	MS/MSD Recoveries and Differences
Analytical Holding Times	Duplicate Relative Percent Differences
Sample Preservation	ICP Serial Dilution
Method Calibration	Furnace Atomic Absorption QC
Method and Project Blanks	Re-analysis and Secondary Dilution
LCS Recoveries	Internal Standard Performance (if applicable)

Project specific QA/QC or contract requirements may take priority over validation criteria in this procedure.

Overall Remarks: No major issues

Definition of Qualifiers:

"U", not detected at the associated level
"UJ", not detected and associated value estimated
"J", associated value estimated
"R", associated value unusable or analyte identity unfounded
"=", compound properly identified and value positive

Reviewed by: Alan G. Mikus Jr. Date: 3/2/15

QA Reviewed by: A B Bruce Date: 6-23-15.

3/3/15 AGM

I. Case Narrative

Verify direct statements made within the Laboratory Case Narrative (note discrepancies).

Remarks: No mgmt issues

II. Re-analysis and Secondary Dilutions

Verify that re-analysis and secondary dilutions were performed and reported as necessary. Determine appropriate results to report.

Remarks:

III. Holding Times

Metals - Waters - preserved to pH<2, 180 days from sample collection
Metals - Soils - 180 days from sample collection
Mercury - Waters - preserved to pH<2, 28 days from sample collection
Mercury - Soils - 28 days from sample collection

Deviations:

Sample #	Metals				Mercury			
	Date Collected	Date Analyzed	Days >HT	pH Check	Date Collected	Date Analyzed	Days >HT	pH Check

Actions:

1. If preserved samples exceed holding time, qualifty all associated results as estimated (J/UJ).
2. If unpreserved samples exceed holding time, qualify all associated results as unusable (R).
3. If holding times are exceeded by more than 2X, reviewer may qualify non-detected results as unusable (R)
4. If water samples are not acidified, use professional judgement. Minimally, qualify data as estimated (J) and non-detects unusable (R).
5. If soil samples exceed holding time, use professional judgement to qualify data.

Remarks: No issues

IV. Initial & Contining Calibration (ICP, GFAA, CVAA, etc.)

Initial calibration linearity criteria is r ≥ 0.995
ICV and CCV criteria are ± 10% recovery, low level check standard allowed ± 30%
ICP inter-element check standard criteria ± 20%

Deviations:

Element	Date	Intial Calib.	ICV/ CCV	%R	Samples Affected

Actions:

1. If any elements initial claibration linearity is <0.995, qualify the data as estimated (J/UJ)
2. If any elements initial claibration linearity is <0.95, qualify the data as unusable (R)

3a. If any elements ICV or CCV recovery is <90%, qualify the data as estimated (J/UJ)

3b. If any elements ICV or CCV recovery is > 110%, qualify results ≥ MDL as estimated (J), do not qualify non-detects

4a. If any elements ICV or CCV recovery is <75%, qualify the data as unusable (R)

4b. If any elements ICV or CCV recovery is > 125%, qualify positive results as estimated (J) or non-detects unusable (R)

4c. If any elements ICV or CCV recovery is > 160%, qualify positive results ≥ MDL us unusable (R). Do not qualify non-detects.

5a. If any elements CRI recovery is 50-69% (30-49% for Sb, Pb, Tl), qualify results ≥ MDL (but < 2 x CRQL) as estimated (J/UJ) and results > 2 x CRQL are not qualified.

5b. If any elements CRI recovery is < 50% (< 30% for Sb, Pb, Tl), qualify results ≥ MDL (but < 2 x CRQL) as unusable (R) and results > 2 x CRQL as estimate (J).

5c. If any elements CRI recovery is > 130% but < 180 % (> 150% but ≤ 200% for Sb, Pb, Tl) quality results ≥ MDL (but < 2 x CRQL) as esimated (J) and non-detects and results > 2 x CRQL are not qualified.

5d. If CRI or (R) > 180% (> 200% for Sb, Pb, Ti), qualify results that are ≥ MDL as unusable (R).

Remarks: No issues

IV. Initial & Contining Calibration (ICP, GFAA, CVAA, etc.) (continued)

Analytical Sequence and MS Tune

	(Y/N)
1. Were the appropriate number of ICP standards used?	Y
2. Were the appropriate number of AA standards used?	
3. Was calibration performed and documented at the beginning of each run?	Y
4. Were calibration check standards run at 10% frequency or every two hours?	
5. Were low level standard checks analyzed at approximately 2X the PQL?	
6. Was ICP-MS mass calibration within 0.1 AMU?	
7. Was ICP-MS % RSD of the absolute signals for all analytes < 5%?	

Deviations:

Element	Deviation	Samples Affected

Actions:

1. If instrument calibration is questionable, use professional judgement, qualify the data as estimated (J/UJ)
2. If instrument calibration documentation can not be obtained or is inadequate, qualify the data as unusable (R)
3. If mass calibration for ICP-MS was not within 0.1 AMU, qualify analyte results as estimated (J/UJ).
4. If % RSD for ICP-MS was > 5% for any analyte in the tuning solution, qualify associated resuts as estimated (J/UJ).

Remarks:

V. Blanks (ICB, CCB, Method Blank, Equipment Rinsate Blank)

A. Blank Results

If the blank level is > CRQL for any analyte check that the analyte's concentration in a sample is > 10 x the blank value.The highest blank concentration of observed elements is the action level.
Sample weights, volumes, and dilution factors must be taken into account when applying the action level.
Blank results given in ug/L must be converted to mg/kg to compare them with soil sample results.
use the following equation:

ug/L x V/W x 1L/1000mL x 1000g/1kg x 1mg/1000ug = mg/kg

where: V = volume of samples digest solution (usually 200 mL)
W = weight of sample digested (usually 1 g)

Deviations:

Blank ID	Element	Max. Conc. Detected	Action Level	Samples Affected
MB 180-130921/1-A	Calcium	10.1	101	None
↓	Magnesium	2.86	28.6	↓
	Potassium	13.6	136	
↓	Sodium	5.65	56.5	↓

If additional space is required, use next page

Actions:

1. For blank results ≥ MDL but ≤ CRQL, qualify sample results ≥ MDL but < CRQL as CRQL U. Use professional judgement to qualify sample results exceeding the CRQL.

2a. If blank results are > CRQL: for sample values ≥ MDL but ≤ CRQL, qualify results as CRQL U; for sample values > CRQL but < 10 x the blank, qualify results as unusable (R) or estimated (J). No action is taken for sample results ≥ 10 x the blank values.

2b. If ICB/ CCB results are > CRQL: for sample values ≥ MDL but ≤ CRQL, qualify results as CRQL U; for sample values > CRQL but < blank results, qualfiy results as not detected (U) at the level of the blank or unusable (R). Use proffessional judgement for sample results > blank results.

Remarks: No samples impacted

V. Blanks (continued)

The highest blank concentration of observed elements is the action level.
Sample weights, volumes, and dilution factors must be taken into account.
Blank results given in ug/L must be converted to mg/kg to compare them with soil sample results.
use the following equation:

ug/L x V/W x 1L/1000mL x 1000g/1kg x 1mg/1000ug = mg/kg

where: V = volume of samples digest solution (usually 200 mL)
W = weight of sample digested (usually 1 g)

Deviations:

Blank ID	Element	Max. Conc. Detected	Action Level	Samples Affected

V. Blanks (continued)

B. Frequency Requirements

	(Y/N)
1. Was a method (preparation) blank analyzed for each matrix?	Y
2. Was a method blank processed for every analytical batch (20 samples)?	Y
3. Was a calibration blank analyzed at 10% frequency or every two hours?	NA
	NA

Deviations:

Element	Deviation	Samples Affected

Remarks: _____

C. Baseline Shift Evaluation

List the highest negative blank concentration for each analyte observed in laboratory or project blanks.

Deviations:

Blank ID	Element	Max. Neg. Conc.	Action Level	Samples Affected

Actions:

1. If the absolute value of the maximum negative blank result is > the CRQL, qualify positive results as estimated (J) and non-detects as estimated (UJ).

Remarks: _____

VI. Laboratory Control Sample Evaluation

All LCS recovery criteria are set at 80-120%
An LCS must be analyzed for each matrix and for each digestion batch or set of twenty samples

Deviations:

Element	Date	%R	Matrix	Samples Affected

Actions:

1. If any element's LCS recovery is >120%, qualify positive results as (J) .
2. If any element's LCS recovery is 50-79%, qualify positive results as (J) and non-detect results as (UJ).
3a. If any element's LCS recovery is <50%, qualify positive results as (J) and non-detect results as (R).
3b. If the LCS recovery is > 150%, qualify all results as unusable (R).
4. For soil LCS recovery > upper limit, qualify sample results ≥ MDL as estimated (J).
5. For soil LCS recovery < lower limit, qualify results ≥ MDL as estimated (J) and non-detects estimated (UJ).
6. Use professional judgement to qualify data if the LCS frequency criteria are not met.

Remarks: No issues

VII. Matrix Spike Evaluation

All MS recovery criteria are set at 75-125%
An MS must be analyzed for each matrix and for each digestion batch or set of twenty samples
Verify that a field blank or PE sample was not used for spiked sample analysis.
Verify that a post-digestion spike was analyzed for those analytes where the pre-digestion spike recovery is outside control limits and the sample result is < 4 x the spike added.

Project Sample(s) Spiked: None

Deviations:

Element	Spiked Sample Result	Sample Result	Spike Amount	%R	Samples Affected

Actions:

1. If the sample concentration exceeds the spiking level by a factor of 4X or more, do not qualify the data
2. If the spike recovery is >125%, qualify all positive values as (J).
3. If the spike recovery is between 30-74%, qualify positive values as (J) and non-detect values as estimated (UJ)
4. If the spike recovery is <30%, qualify positive values as (J) and non-detects are qualified unusable (R) if the post-digestion spike recovery is < 75% (or none was performed); non-detects are qualified as estimated (UJ) if the post-digestion spike recovery is ≥ 75%. There is no post-digestion spike performed for mercury.
5. Qualify all samples of similar matrix to the spiked sample in the same manner
6. Use professional judgement to qualify data if the MS frequency criteria are not met.
7. Use professional judgement for qualification of data for unspiked elements

Remarks: None Collected

VIII. Laboratory Duplicate Evaluation

Duplicate relative percent difference (RPD) for water is 20% (both results > 5 times CRDL) or < CRDL difference (if either result is < 5 times CRDL) and RPD for soil is 35% (if both results are > 5 times CRDL or < 2 times CRDL if either result is < 5 times CRDL.
When duplicate sample values are both less than the reporting level they are considered acceptable
When dupicate sample values are within 5X the reporting level they are acceptable if their absolute difference is within 3X the reporting level
Verify that a field blank or PE samples was not used for duplicate analysis.

Deviations:

Element	Sample #	Duplicate #	RPD	Samples Affected

Actions:

1. If an element's RPD is >20% (water) / 35% (soil), qualify positive results as (J) and non-detect results as (UJ)
2. For low concentrations, if an element's duplicate absolute difference is > 3X the reporting level, qualify positive results as (J) and non-detect results as (UJ)
3. Use professional judgement to qualify data if the duplicate frequency criteria are not met.

Remarks: None collected / analyzed

IX. Inductively Coupled Plasma (ICP) Serial Dilution Analysis

Verify that a field blank or PE sample was not used for serial dulution.
Serial dilution of positive results are performed when values exceed 50X the IDL
Results from serial dilutions should agree within 10% of the original undiluted analysis

Deviations:

Element	Sample #	Sample Result	Serial Dilution	%D	Action

Actions:

1. If the serial dilution %D is >10 and the analyte results are >50X the IDL, qualify all positive results as estimated (J) and non-detects as estimated (UJ).

Remarks: None were Run on Sample

X. Furnace Atomic Absorption QC

A. Duplicate Precision

(Y/N)

1. Were duplicate injections performed for all samples? _____
2. Were one point analytical spikes performed for all samples? _____
3. Did duplicate injections agree within ± 20%? _____

Deviations:

Element	Deviation	Sample Affected

Actions:

1. If duplicate injection results are outside ± 20%, qualify positive results as (J) and non-detect results as (UJ)

Remarks: _____

B. Post Digestion Spike Recoveries

(Y/N)

1. Did post digestion spike recoveries meet an 85-115% recovery criteria? _____
2. If spike recoveries did not meet recovery criteria were samples analyzed by MSA? _____
3. If MSA was used to analyze samples, was its' correlation coefficient ≥ 0.995? _____

Deviations:

Element	Deviation	Sample Affected

Actions:

1. If post digestion spike recoveries are >115%, qualify positive results as (J) and non-detect results as (U)
2. If post digestion spike recoveries are 11-84%, qualify positive results as (J) and non-detect results as (UJ)
3. If post digestion spike recoveries are <10%, qualify positive results as (R) and non-detect results as (R)
4. If MSA was used to quantitate values and the correlation coefficient was <0.995, qualify data as (J or UJ)
5. If MSA was used to quantitate values and the correlation coefficient was <0.95, qualify data as (R)

Remarks: _____