

**APPENDIX H**  
**ANALYTICAL RESULTS**

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# DATA VALIDATION REPORT

Date:

August 19, 2005

To:

Steve Passig

From:

David Lee

Laboratory:

Paragon Analytics, Severn Trent Laboratories (Dioxin)

SDG #:

404291,406099, 407062,  
412103, 412130,  
H4E05116(Dioxin)

Attached you will find the results from the data validation technical review for the Westinghouse - Hematite Remedial Investigation samples and analyses that are associated with the above referenced laboratory and sample delivery group (SDG) numbers. These data points have been selected for data validation and the sample index on the following page specifically identifies the samples and analyses associated with this validation review. The SDGs included in the data validation technical review represent 10% of the data generated for the Remedial Investigation.

The Westinghouse - Hematite validation technical review was performed in accordance with the *Contract Laboratory Program Data Validation Functional Guidelines for Evaluating Inorganic Analytical Data*, and the *Laboratory Data Validation Guidelines for Evaluating Radionuclide Analyses and Radiochemical Data Verification and Validation*. It was based on the information and documentation supplied by the associated laboratory. The analyses were evaluated against criteria established in the related analytical procedures and the Westinghouse - Hematite data quality requirements.

Attachment A outlines the validation qualifiers and reason codes used in the validation of the data.

Report Summary	
Total Number of Samples	69
Total Number of Data Points	9897
Total Number of Rejected Data Points	0
Percent Completeness (approval to rejection ratio)	100 %

# Sample Index

*Date:*

**August 19, 2005**

*Laboratory:*

**Paragon Analytics, Severn Trent Laboratories (Dioxin)**

*SDG #:*

**404291,406099, 407062,  
412103, 412130,  
H4E05116(Dioxin)**

SampleID	Analyses
CB-01-00-SL	BNA, DIOX, Gamma Spec, METAL, PAH, PCB, PEST, and VOC.
CB-01-00-SL-FD	DIOX, Gamma Spec, METAL, PCB, and PEST.
EP-13-03-SL	Gamma Spec
EP-13-06-SL	ANION, METAL, and VOC.
EP-13-13-SL	ANION, Gamma Spec, METAL, and VOC.
EP-13-25-SL	ANION, Gamma Spec, METAL, and VOC.
EP-13-30-SL	ANION, Gamma Spec, METAL, and VOC.
EP-14-05-SL	ANION, Gamma Spec, METAL, and VOC.
EP-14-13-SL	ANION, Gamma Spec, METAL, RADS, and VOC.
EP-14-25-SL	ANION, Gamma Spec, METAL, RADS, and VOC.
EP-14-31-SL	ANION, Gamma Spec, METAL, RADS, and VOC.
EP-15-05-SL	Gamma Spec, PEST, and VOC.
EP-15-13-SL	Gamma Spec, PEST, and VOC.
EP-15-25-SL	Gamma Spec, PEST, and VOC.
EP-15-29-SL	Gamma Spec, PEST, RADS, and VOC.
EP-17-05-SL	Gamma Spec, PEST, and VOC.
EP-17-15-SL	Gamma Spec, PEST, and VOC.
EP-17-25-SL	Gamma Spec, PEST, and VOC.
EP-17-30-SL	Gamma Spec, PEST, RADS, and VOC.
EP-18-09-SL	ANION, Gamma Spec, METAL, and VOC.
EP-18-09-SL-FD	ANION, Gamma Spec, METAL, and VOC.
EP-18-15-SL	ANION, Gamma Spec, METAL, RADS, and VOC.
EP-18-29-SL	ANION, Gamma Spec, METAL, RADS, and VOC.
EP-19-05-SL	ANION, Gamma Spec, METAL, and VOC.
EP-19-13-SL	ANION, Gamma Spec, METAL, and VOC.
EP-19-25-SL	ANION, Gamma Spec, METAL, and VOC.
EP-19-31-SL	ANION, Gamma Spec, METAL, RADS, and VOC.
GW-BD6-121404	Alpha Spec, RADS, and VOC.
GW-BR4JC-121404	Alpha Spec, METAL, RADS, and VOC.
GW-BR4RB-121004	Alpha Spec, ANION, RADS, and VOC.
GW-BR5RB-121004	Alpha Spec, ANION, RADS, and VOC.
GW-BR7RB-121404	Alpha Spec, METAL, RADS, and VOC.
GW-BR9JC-121404	Alpha Spec, RADS, and VOC.
GW-CB02-121404	Alpha Spec, RADS, and VOC.
GW-EP15-121004	Alpha Spec, METAL, RADS, and VOC.
GW-FD4-121404	Alpha Spec, RADS, and VOC.
GW-NB46-121004	Alpha Spec, METAL, RADS, and VOC.
GW-NB57A-121404	Alpha Spec, RADS, and VOC.
GW-NB82-121004	Alpha Spec, RADS, and VOC.

## Sample Index (cont.)

Date:

**August 19, 2005**

SampleID	Analyses
GW-OB1-121404	Alpha Spec, METAL, RADS, and VOC.
GW-OB2-121404	Alpha Spec, RADS, and VOC.
GW-SW07-121004	Alpha Spec, RADS, and VOC.
GW-WS34-121404	Alpha Spec, RADS, and VOC.
NB-40-05-SL	Gamma Spec, PEST, RADS, and VOC.
NB-40-05-SL-FD	Gamma Spec, PEST, RADS, and VOC.
NB-40-17-SL	Gamma Spec, PEST, RADS, and VOC.
NB-40-25-SL	Gamma Spec, PEST, RADS, and VOC.
NB-40-31-SL	Gamma Spec, PEST, RADS, and VOC.
OA-01-00-SL	BNA, Gamma Spec, METAL, PAH, PCB, PEST, and VOC.
OA-01-00-SL-FD	BNA, Gamma Spec, METAL, PAH, PCB, PEST, RADS, and VOC.
OA-02-00-SL	BNA, Gamma Spec, METAL, PAH, PEST, and VOC.
OA-03-00-SL	BNA, Gamma Spec, METAL, PAH, PEST, RADS, and VOC.
RB-061004	Alpha Spec, Gamma Spec, PEST, RADS, and VOC.
RB-070704	Alpha Spec, Gamma Spec, METAL, RADS, and VOC.
RB-121004	Alpha Spec, RADS, and VOC.
RB-121404	Alpha Spec, RADS, and VOC.
RR-01-00-SL	BNA, Gamma Spec, METAL, PAH, PCB, PEST, and VOC.
RR-02-00-SL	Gamma Spec, METAL, and PEST.
RR-03-00-SL	Gamma Spec, METAL, PCB, PEST, RADS, and VOC.
SW-01-00-SL	BNA, Gamma Spec, METAL, PAH, PCB, PEST, and VOC.
SW-02-00-SL	BNA, Gamma Spec, METAL, PAH, PCB, PEST, and VOC.
SW-02-SS	BNA, Gamma Spec, METAL, PAH, PEST, and VOC.
SW-02-SW	Alpha Spec, METAL, PEST, and RADS.
SW-03-00-SL	Gamma Spec, METAL, PEST, RADS, and VOC.
SW-03-SS	BNA, Gamma Spec, METAL, PAH, PEST, and VOC.
SW-04-00-SL	Gamma Spec, METAL, PEST, RADS, and VOC.
SW-04-SS	Alpha Spec, Gamma Spec, METAL, PEST, and VOC.
SW-05-SS	Gamma Spec, METAL, PEST, and VOC.
SW-06-SS	BNA, Gamma Spec, METAL, PAH, PEST, and VOC.
TB-061004-01	VOC
TB-070704-01	VOC
TB-121004-1	VOC
TB-121404-1	VOC

**ANALYTICAL CATEGORY: Alpha Spec**

Americium-241, Neptunium-237, Plutonium-238, Plutonium-239/240, Thorium-228, Thorium-230, Thorium-232, Uranium-234, Uranium-235, and Uranium-238.

1. The following items (as applicable) have been addressed during the validation review:

- sample custody, integrity & preservation
  - sample handling & preparation
  - holding times
  - instrument calibration & performance
  - dilution factors
  - detection limits
  - laboratory background & carry-over
  - overall appearance of the data
- Quality Control:
    - calibration checks & background
    - preparation blanks
    - laboratory control samples
    - field blanks (if available)
    - field duplicates (if available)

2. The above items were found to be acceptable, except as follows:

- Blanks  
For the samples listed below, the sample data were qualified as a result of the method blank. This may indicate that contamination could have been introduced during the laboratory preparation. Those samples where the normalized absolute difference between the sample and the method blank were less than 2.58 were qualified as estimated, J, F01.

404291  
SW-02-SW  
U-235  
412103  
GW-SW07-121004  
U-234

- Radionuclide Quantitation  
For the samples listed below, the analytical result is less than both the associated counting uncertainty and method detection activity (MDA). Sample results are qualified as estimated, J/UJ, T06.

404291  
SW-02-SW  
Th-228  
Th-230  
Th-232  
412103  
GW-BR4RB-121004  
Th-228  
Th-230  
Th-232  
GW-BR5RB-121004  
Th-228  
Th-230

	Th-232
GW-EP15-121004	
	Th-228
	Th-230
	Th-232
	U-234
	U-235
	U-238
GW-NB46-121004	
	Th-228
	Th-230
	Th-232
	U-234
	U-235
	U-238
GW-NB82-121004	
	Th-228
	Th-230
	Th-232
	U-235
GW-SW07-121004	
	Am-241
	Np-237
	Pu-238
	Pu-239/240
	Th-228
	Th-230
	Th-232
	U-235
412130	
GW-BD6-121404	
	Th-230
	Th-232
GW-BR4JC-121404	
	Th-228
	Th-230
	Th-232
GW-BR7RB-121404	
	Th-230
	Th-232
GW-BR9JC-121404	
	Am-241
	Np-237
	Pu-238
	Pu-239/240
	Th-228
	Th-230
	Th-230
	Th-232

GW-CB02-121404

Am-241  
Np-237  
Pu-238  
Pu-239/240  
Th-228  
Th-230  
Th-230  
Th-232  
U-235

GW-FD4-121404

Am-241  
Np-237  
Pu-238  
Pu-239/240  
Th-228  
Th-230  
Th-230  
Th-232  
U-235

GW-NB57A-121404

Th-228  
Th-230  
Th-230  
Th-232

GW-OB1-121404

Th-228  
Th-230  
Th-232

GW-OB2-121404

U-235

GW-WS34-121404

Th-228  
Th-230  
Th-232  
U-234  
U-235  
U-238

3. Additional comments:

- None.

**ANALYTICAL CATEGORY: Anions**

Chloride, Fluoride, Nitrate as N, and Sulfate.

1. The following items (as applicable) have been addressed during the validation review:

- sample custody, integrity & preservation
  - sample handling & preparation
  - holding times
  - instrument calibration & performance
  - dilution factors
  - detection limits
  - laboratory background & carry-over
  - overall appearance of the data
- Quality Control:
    - calibration checks & background
    - preparation blanks
    - laboratory control samples
    - field blanks (if available)
    - field duplicates (if available)

2. The above items were found to be acceptable, except as follows:

- Blanks For the samples listed below, the sample data were qualified as a result of the equipment rinsate. This may indicate that contamination could have been introduced during the field activities. Those samples where the sample result was less than ten times the contamination concentration were qualified non-detect, U, F03.

412103

GW-BR4RB-121004

Chloride

GW-BR5RB-121004

Chloride

- Matrix Spike/Matrix Spike Duplicate (MS/MSD) For the samples listed below, the MS/MSD recovery was below the lower control limit. The spiked sample analysis is designed to provide information about the effect of each sample matrix on the sample preparation procedures and the measurement methodology. The low percent recovery is an indication of negative interference from the sample matrix upon the detection of the analyte which may bias the data low. Therefore, sample results were qualified as estimated, J/UJ, H02.

407062

EP-13-06-SL

Fluoride

EP-13-13-SL

Fluoride

EP-13-25-SL

Fluoride

EP-13-30-SL

Fluoride

EP-14-05-SL

Fluoride

EP-14-13-SL	Fluoride
EP-14-25-SL	Fluoride
EP-14-31-SL	Fluoride
EP-18-09-SL	Fluoride
EP-18-09-SL-FD	Fluoride
EP-18-15-SL	Fluoride
EP-18-29-SL	Fluoride
EP-19-05-SL	Fluoride
EP-19-13-SL	Fluoride
EP-19-25-SL	Fluoride
EP-19-31-SL	Fluoride

3. Additional comments:

- None.

**ANALYTICAL CATEGORY: Semi-Volatile Organics (BNA)**

1,1'-Oxybis[2-ethane], 1,2-Dichlorobenzene, 2,4,5-Trichlorophenol, 2,4,6-Trichlorophenol, 2,4-Dichlorophenol, 2,4-Dimethylphenol, 2,4-Dinitrophenol, 2,4-Dinitrotoluene, 2-Chlorophenol, 2-Methyl-1,3-dinitrobenzene, 2-Methylphenol, 3,3'-Dichlorobenzidine, 4-Chlorobenzeneamine, Benzoic Acid, Benzyl butyl phthalate, Bis(2-ethylhexyl)phthalate, Carbazole, Diethyl phthalate, Di-n-butyl phthalate, Di-n-octyl phthalate, Fluoranthene, Fluorene, Hexachlorobenzene, Hexachlorocyclopentadiene, Hexachloroethane, Isophorone, Naphthalene, Nitrobenzene, N-Nitrosodiphenylamine, n-Nitrosodipropylamine, p-Dichlorobenzene, Pentachlorophenol, and Phenol.

1. The following items (as applicable) have been addressed during the validation review:

- sample custody, integrity & preservation
  - sample handling & preparation
  - holding times
  - instrument calibration & performance
  - dilution factors
  - detection limits
  - laboratory background & carry-over
  - overall appearance of the data
- Quality Control:
    - calibration checks & background
    - preparation blanks
    - laboratory control samples
    - field blanks (if available)
    - field duplicates (if available)

2. The above items were found to be acceptable, except as follows:

- Internal Area Summary For the samples listed below, the area counts were outside the control limits. Sample results are qualified as estimated, J/UJ, K01.

404291

CB-01-00-SL

Benzo[a]pyrene  
Benzo[k]fluoranthene  
Dibenz[a,h]anthracene  
Di-n-octyl phthalate  
Indeno(1,2,3-cd)pyrene

OA-01-00-SL

3,3'-Dichlorobenzidine  
Benzanthracene  
Benzo[a]pyrene  
Benzo[k]fluoranthene  
Bis(2-ethylhexyl)phthalate  
Chrysene  
Dibenz[a,h]anthracene  
Di-n-octyl phthalate  
Indeno(1,2,3-cd)pyrene  
Pyrene

OA-01-00-SL-FD

3,3'-Dichlorobenzidine  
Benzanthracene  
Benzo[a]pyrene  
Benzo[k]fluoranthene

	<p>Bis(2-ethylhexyl)phthalate            Chrysene            Dibenz[a,h]anthracene            Di-n-octyl phthalate            Indeno(1,2,3-cd)pyrene            Pyrene</p>
OA-02-00-SL	<p>3,3'-Dichlorobenzidine            Benzanthracene            Benzo[a]pyrene            Benzo[k]fluoranthene            Bis(2-ethylhexyl)phthalate            Chrysene            Dibenz[a,h]anthracene            Di-n-octyl phthalate            Indeno(1,2,3-cd)pyrene            Pyrene</p>
OA-03-00-SL	<p>3,3'-Dichlorobenzidine            Benzanthracene            Benzo[a]pyrene            Benzo[k]fluoranthene            Bis(2-ethylhexyl)phthalate            Chrysene            Dibenz[a,h]anthracene            Di-n-octyl phthalate            Indeno(1,2,3-cd)pyrene            Pyrene</p>
RR-01-00-SL	<p>3,3'-Dichlorobenzidine            Benzanthracene            Benzo[a]pyrene            Benzo[k]fluoranthene            Bis(2-ethylhexyl)phthalate            Chrysene            Dibenz[a,h]anthracene            Di-n-octyl phthalate            Indeno(1,2,3-cd)pyrene            Pyrene</p>
SW-01-00-SL	<p>Benzo[a]pyrene            Benzo[k]fluoranthene            Dibenz[a,h]anthracene            Di-n-octyl phthalate            Indeno(1,2,3-cd)pyrene</p>
SW-02-00-SL	<p>3,3'-Dichlorobenzidine            Benzanthracene            Benzo[a]pyrene</p>

	Benzo[k]fluoranthene Bis(2-ethylhexyl)phthalate Chrysene Dibenz[a,h]anthracene Di-n-octyl phthalate Indeno(1,2,3-cd)pyrene Pyrene
SW-02-SS	
	Benzo[a]pyrene Benzo[k]fluoranthene Dibenz[a,h]anthracene Di-n-octyl phthalate Indeno(1,2,3-cd)pyrene
SW-03-SS	
	Benzo[a]pyrene Benzo[k]fluoranthene Dibenz[a,h]anthracene Di-n-octyl phthalate Indeno(1,2,3-cd)pyrene
SW-06-SS	
	Benzo[a]pyrene Benzo[k]fluoranthene Dibenz[a,h]anthracene Di-n-octyl phthalate Indeno(1,2,3-cd)pyrene

3. Additional comments:

- None.

**ANALYTICAL CATEGORY: Dioxins**

1,2,3,4,6,7,8-HPCDD, 1,2,3,4,6,7,8-HpCDF, 1,2,3,4,7,8,9-HpCDF, 1,2,3,4,7,8-HXCDD, 1,2,3,4,7,8-HXCDF, 1,2,3,6,7,8-HxCDD, 1,2,3,6,7,8-HxCDF, 1,2,3,7,8,9-HxCDD, 1,2,3,7,8,9-HxCDF, 1,2,3,7,8-PeCDD, 1,2,3,7,8-PeCDF, 2,3,4,6,7,8-HxCDF, 2,3,4,7,8-PeCDF, 2,3,7,8-TCDD, 2,3,7,8-TCDF, OCDD, and OCDF.

1. The following items (as applicable) have been addressed during the validation review:

- sample custody, integrity & preservation
  - sample handling & preparation
  - holding times
  - instrument calibration & performance
  - dilution factors
  - detection limits
  - laboratory background & carry-over
  - overall appearance of the data
- Quality Control:
    - calibration checks & background
    - preparation blanks
    - laboratory control samples
    - field blanks (if available)
    - field duplicates (if available)

2. The above items were found to be acceptable, except as follows:

- Blanks For the samples listed below, the sample data were qualified as a result of the method blank. This may indicate that contamination could have been introduced during the laboratory preparation. Those samples where the sample result was less than five times the contamination concentration were qualified as non-detect U, F01.

H4E05116

CB-01-00-SL

1,2,3,4,6,7,8-HpCDF  
1,2,3,4,7,8,9-HpCDF  
1,2,3,4,7,8-HxCDD  
1,2,3,4,7,8-HxCDF  
1,2,3,6,7,8-HxCDD  
1,2,3,6,7,8-HxCDF  
1,2,3,7,8,9-HxCDD  
1,2,3,7,8-PeCDD  
2,3,4,6,7,8-HxCDF  
2,3,4,7,8-PeCDF

CB-01-00-SL-FD

1,2,3,4,6,7,8-HpCDF  
1,2,3,4,7,8,9-HpCDF  
1,2,3,4,7,8-HxCDD  
1,2,3,4,7,8-HxCDF  
1,2,3,6,7,8-HxCDD  
1,2,3,6,7,8-HxCDF  
1,2,3,7,8,9-HxCDD  
1,2,3,7,8-PeCDD  
2,3,4,6,7,8-HxCDF  
2,3,4,7,8-PeCDF



**ANALYTICAL CATEGORY: Gamma Spec**

Actinium-228, Aluminum-26, Americium-241, Antimony-124, Antimony-125, Beryllium-7, Bismuth-212, Bismuth-214, Cadmium-109, Cerium-139, Cerium-144, Cesium-134, Cesium-137, Chromium-51, Cobalt-56, Cobalt-57, Cobalt-58, Cobalt-60, Europium-152, Europium-154, Europium-155, Iodine-131, Iron-59, Lead-212, Lead-214, Manganese-54, Neptunium-237, Niobium-94, Niobium-95, Potassium-40, Protactinium-234, Ruthenium-106, Scandium-46, Silver-110, Sodium-22, Thallium-208, Thorium-227, Thorium-234, Uranium-235, and Zinc-65.

1. The following items (as applicable) have been addressed during the validation review:

- sample custody, integrity & preservation
  - sample handling & preparation
  - holding times
  - instrument calibration & performance
  - dilution factors
  - detection limits
  - laboratory background & carry-over
  - overall appearance of the data
- Quality Control:
    - calibration checks & background
    - preparation blanks
    - laboratory control samples
    - field blanks (if available)
    - field duplicates (if available)

2. The above items were found to be acceptable, except as follows:

- Initial/Continuing Calibration - Organics For the samples listed below, professional judgment was used to qualify the data. The laboratory stated these samples had densities that differed from the laboratory control samples. These sample results may be biased high. Sample results are qualified as estimated, J, C14.

407062

EP-13-03-SL

Ac-228  
Bi-214  
K-40  
Pb-212  
Pb-214  
Th-234  
Tl-208  
U-235

EP-13-13-SL

Ac-228  
Bi-214  
K-40  
Pb-212  
Pb-214  
Tl-208

EP-13-25-SL

Ac-228  
Bi-214  
K-40  
Pb-212  
Pb-214

EP-13-30-SL	Tl-208 Ac-228 Al-26 Bi-214 K-40 Pb-212 Pb-214
EP-14-05-SL	Ac-228 Bi-214 K-40 Pb-212 Pb-214 Tl-208
EP-14-13-SL	Ac-228 Bi-214 K-40 Pb-212 Pb-214 Tl-208
EP-14-25-SL	Ac-228 Bi-212 Bi-214 K-40 Pb-212 Pb-214 Tl-208
EP-14-31-SL	Bi-214 K-40 Pb-212 Pb-214 Tl-208
EP-18-09-SL	Bi-214 Cd-109 K-40 Pb-212 Pb-214 Th-234 Tl-208 U-235
EP-18-09-SL-FD	Ac-228 Bi-214 Cd-109

	K-40
	Pb-212
	Pb-214
	Th-234
	Tl-208
EP-18-15-SL	
	Ac-228
	Bi-214
	K-40
	Pb-212
	Pb-214
	Tl-208
EP-18-29-SL	
	Ac-228
	Bi-214
	Cd-109
	K-40
	Pb-212
	Pb-214
	Tl-208
EP-19-05-SL	
	Ac-228
	Bi-214
	K-40
	Pb-212
	Pb-214
	Th-234
	Tl-208
	U-235
EP-19-13-SL	
	Ac-228
	Bi-214
	K-40
	Pb-212
	Pb-214
	Th-234
	Tl-208
	U-235
EP-19-25-SL	
	Ac-228
	Bi-214
	K-40
	Pb-212
	Pb-214
	Tl-208
EP-19-31-SL	
	Ac-228
	K-40
	Pb-212

		Pb-214
		Tl-208
· Radiological Calibration	For the samples listed below, professional judgment was used to qualify the data. The laboratory states that the calibration methodology creates a low bias. Sample results are qualified as estimated, J/UJ, R08.	
	406099	
	EP-15-05-SL	Bi-214 Pb-212
	EP-15-13-SL	Bi-214 Pb-212
	EP-15-25-SL	Bi-214 Pb-212
	EP-15-29-SL	Bi-214 Pb-212
	EP-17-05-SL	Bi-214 Pb-212
	EP-17-15-SL	Bi-214 Pb-212
	EP-17-25-SL	Bi-214 Pb-212
	EP-17-30-SL	Bi-214 Pb-212
	NB-40-05-SL	Bi-214 Pb-212
	NB-40-05-SL-FD	Bi-214 Pb-212
	NB-40-17-SL	Bi-214 Pb-212
	NB-40-25-SL	Bi-214 Pb-212
	NB-40-31-SL	Bi-214 Pb-212

Radionuclide  
Quantitation

For the samples listed below, the analytical result is less than both the associated counting uncertainty and MDA. Sample results are qualified as estimated, J/UJ, T06.

404291

CB-01-00-SL

Ag-110M  
Al-26  
Am-241  
Be-7  
Bi-212  
Cd-109  
Ce-139  
Ce-144  
Co-56  
Co-57  
Co-58  
Co-60  
Cr-51  
Cs-134  
Cs-137  
Eu-152  
Eu-154  
Eu-155  
Fe-59  
I-131  
Mn-54  
Na-22  
Nb-94  
Nb-95  
Np-237  
Pa-234M  
Ru-106  
Sb-124  
Sb-125  
Sc-46  
Th-227  
Zn-65

CB-01-00-SL-FD

Ac-228  
Ag-110M  
Am-241  
Be-7  
Bi-212  
Cd-109  
Ce-139  
Ce-144  
Co-56  
Co-57

Co-58  
Co-60  
Cr-51  
Cs-134  
Cs-137  
Eu-152  
Eu-154  
Eu-155  
Fe-59  
I-131  
Mn-54  
Na-22  
Nb-94  
Nb-95  
Np-237  
Pa-234M  
Ru-106  
Sb-124  
Sb-125  
Sc-46  
Th-227  
Tl-208  
Zn-65

OA-01-00-SL

Ag-110M  
Al-26  
Am-241  
Be-7  
Bi-212  
Bi-214  
Ce-139  
Ce-144  
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Am-241  
Be-7  
Bi-212  
Ce-139  
Ce-144  
Co-56  
Co-57  
Co-58  
Co-60  
Cr-51  
Cs-134  
Cs-137  
Eu-152  
Eu-154  
Eu-155  
Fe-59  
I-131  
Mn-54  
Na-22  
Nb-94  
Nb-95

Np-237  
Pa-234M  
Ru-106  
Sb-124  
Sb-125  
Sc-46  
Th-227  
U-235  
Zn-65

EP-18-15-SL

Ag-110M  
Al-26  
Am-241  
Be-7  
Bi-212  
Cd-109  
Ce-139  
Ce-144  
Co-56  
Co-57  
Co-58  
Co-60  
Cr-51  
Cs-134  
Cs-137  
Eu-152  
Eu-154  
Eu-155  
Fe-59  
I-131  
Mn-54  
Na-22  
Nb-94  
Nb-95  
Np-237  
Pa-234M  
Ru-106  
Sb-124  
Sb-125  
Sc-46  
Th-227  
Th-234  
U-235  
Zn-65

EP-18-29-SL

Ag-110M  
Al-26  
Am-241  
Be-7

Bi-212  
Ce-139  
Ce-144  
Co-56  
Co-57  
Co-58  
Co-60  
Cr-51  
Cs-134  
Cs-137  
Eu-152  
Eu-154  
Eu-155  
Fe-59  
I-131  
Mn-54  
Na-22  
Nb-94  
Nb-95  
Np-237  
Pa-234M  
Ru-106  
Sb-124  
Sb-125  
Sc-46  
Th-227  
Th-234  
U-235  
Zn-65

EP-19-05-SL

Ag-110M  
Al-26  
Am-241  
Be-7  
Bi-212  
Cd-109  
Ce-139  
Ce-144  
Co-56  
Co-57  
Co-58  
Co-60  
Cr-51  
Cs-134  
Cs-137  
Eu-152  
Eu-154  
Eu-155  
Fe-59

I-131  
Mn-54  
Na-22  
Nb-94  
Nb-95  
Np-237  
Pa-234M  
Ru-106  
Sb-124  
Sb-125  
Sc-46  
Th-227  
Zn-65

EP-19-13-SL

Ag-110M  
Al-26  
Am-241  
Be-7  
Bi-212  
Cd-109  
Ce-139  
Ce-144  
Co-56  
Co-57  
Co-58  
Co-60  
Cr-51  
Cs-134  
Cs-137  
Eu-152  
Eu-154  
Eu-155  
Fe-59  
I-131  
Mn-54  
Na-22  
Nb-94  
Nb-95  
Np-237  
Pa-234M  
Ru-106  
Sb-124  
Sb-125  
Sc-46  
Th-227  
Zn-65

EP-19-25-SL

Ag-110M  
Al-26

Am-241  
Be-7  
Bi-212  
Cd-109  
Ce-139  
Ce-144  
Co-56  
Co-57  
Co-58  
Co-60  
Cr-51  
Cs-134  
Cs-137  
Eu-152  
Eu-154  
Eu-155  
Fe-59  
I-131  
Mn-54  
Na-22  
Nb-94  
Nb-95  
Np-237  
Pa-234M  
Ru-106  
Sb-124  
Sb-125  
Sc-46  
Th-227  
Th-234  
U-235  
Zn-65

EP-19-31-SL

Ag-110M  
Al-26  
Am-241  
Be-7  
Bi-212  
Bi-214  
Cd-109  
Ce-139  
Ce-144  
Co-56  
Co-57  
Co-58  
Co-60  
Cr-51  
Cs-134  
Cs-137

Eu-152  
 Eu-154  
 Eu-155  
 Fe-59  
 I-131  
 Mn-54  
 Na-22  
 Nb-94  
 Nb-95  
 Np-237  
 Pa-234M  
 Ru-106  
 Sb-124  
 Sb-125  
 Sc-46  
 Th-227  
 Th-234  
 U-235  
 Zn-65

- System Performance For the samples listed below, the peak-tailing or peak splitting that may result in inaccurate quantitation were observed. Sample results are qualified as estimated, J/UJ, V04.

407062

EP-13-03-SL	Bi-214 Pb-214
EP-13-13-SL	Bi-214 Pb-214
EP-13-25-SL	Bi-214 Pb-214
EP-13-30-SL	Bi-214 Pb-214
EP-14-05-SL	Bi-214 Pb-214
EP-14-13-SL	Bi-214 Pb-214
EP-14-25-SL	Bi-214 Pb-214
EP-14-31-SL	Bi-214 Pb-214

EP-18-09-SL	Bi-214 Pb-214
EP-18-09-SL-FD	Bi-214 Pb-214
EP-18-15-SL	Bi-214 Pb-214
EP-18-29-SL	Bi-214 Pb-214
EP-19-05-SL	Bi-214 Pb-214
EP-19-13-SL	Bi-214 Pb-214
EP-19-25-SL	Bi-214 Pb-214
EP-19-31-SL	Bi-214 Pb-214

3. Additional comments:

- None.

**ANALYTICAL CATEGORY: Inorganics**

Cyanide, total.

1. The following items (as applicable) have been addressed during the validation review:

- sample custody, integrity & preservation
- sample handling & preparation
- holding times
- instrument calibration & performance
- dilution factors
- detection limits
- laboratory background & carry-over
- overall appearance of the data
- Quality Control:
  - calibration checks & background
  - preparation blanks
  - laboratory control samples
  - field blanks (if available)
  - field duplicates (if available)

2. The above items were found to be acceptable, except as follows:

- None.

3. Additional comments:

- None.

**ANALYTICAL CATEGORY: Metals**

Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, and Zinc.

1. The following items (as applicable) have been addressed during the validation review:

- sample custody, integrity & preservation
  - sample handling & preparation
  - holding times
  - instrument calibration & performance
  - dilution factors
  - detection limits
  - laboratory background & carry-over
  - overall appearance of the data
- Quality Control:
    - calibration checks & background
    - preparation blanks
    - laboratory control samples
    - field blanks (if available)
    - field duplicates (if available)

2. The above items were found to be acceptable, except as follows:

- Blanks For the samples listed below, the sample data were qualified as a result of the equipment rinsate. This may indicate that contamination could have been introduced during the field activities. Those samples where the sample result was less than ten times the contamination concentration was qualified non-detect, U, F03.

412103

GW-EP15-121004  
Zinc

GW-NB46-121004  
Zinc

412130

GW-BR4JC-121404  
Iron  
Manganese

GW-BR7RB-121404  
Manganese

GW-OB1-121404  
Iron

- Laboratory Duplicate For the samples listed below, the duplicate RPD/NAD was outside the control limit. The NAD between the parent sample and its duplicate was greater than 1.96 (95% confidence level). The purpose of a laboratory duplicate is to monitor the precision of the analytical method, provided the sample is fully homogenized prior to preparation and analysis. Affected samples are qualified as estimated, J/UJ, J01.

404291

CB-01-00-SL  
Barium

CB-01-00-SL-FD	Manganese
	Barium
	Manganese
OA-01-00-SL	
	Barium
	Manganese
OA-01-00-SL-FD	
	Barium
	Manganese
OA-02-00-SL	
	Barium
	Manganese
OA-03-00-SL	
	Barium
	Manganese
RR-01-00-SL	
	Barium
	Manganese
RR-02-00-SL	
	Barium
	Manganese
RR-03-00-SL	
	Barium
	Manganese
SW-01-00-SL	
	Barium
	Manganese
SW-02-00-SL	
	Barium
	Manganese
SW-02-SS	
	Barium
	Manganese
SW-02-SW	
	Barium
	Manganese
SW-03-00-SL	
	Barium
	Manganese
SW-03-SS	
	Barium
	Manganese
SW-04-00-SL	
	Barium
	Manganese
SW-04-SS	
	Barium
	Manganese

	SW-05-SS	Barium Manganese
	SW-06-SS	Barium Manganese
407062	EP-13-06-SL	Barium
	EP-13-13-SL	Barium
	EP-13-25-SL	Barium
	EP-13-30-SL	Barium
	EP-14-05-SL	Barium
	EP-14-13-SL	Barium
	EP-14-25-SL	Barium
	EP-14-31-SL	Barium
	EP-18-09-SL	Barium
	EP-18-09-SL-FD	Barium
	EP-18-15-SL	Barium
	EP-18-29-SL	Barium
	EP-19-05-SL	Barium
	EP-19-13-SL	Barium
	EP-19-25-SL	Barium
	EP-19-31-SL	Barium

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

For the samples listed below, the MS/MSD recovery was above the upper control limit. The spiked sample analysis is designed to provide information about the effect of each sample matrix on the sample preparation procedures and the measurement methodology. The high percent recovery is an indication of positive interference from the sample matrix upon the detection of the analyte which may bias the data high. Therefore, the positive results were qualified as estimated, J,H01.

404291 CB-01-00-SL

	Aluminum Antimony Barium Iron Manganese
CB-01-00-SL-FD	
	Aluminum Antimony Barium Iron Manganese
OA-01-00-SL	
	Aluminum Antimony Barium Iron Manganese
OA-01-00-SL-FD	
	Aluminum Antimony Barium Iron Manganese
OA-02-00-SL	
	Aluminum Antimony Barium Iron Manganese
OA-03-00-SL	
	Aluminum Antimony Barium Iron Manganese
RR-01-00-SL	
	Aluminum Antimony Barium Iron Manganese
RR-02-00-SL	
	Aluminum Antimony Barium Iron Manganese
RR-03-00-SL	
	Aluminum

	Antimony Barium Iron Manganese
SW-01-00-SL	
	Aluminum Antimony Barium Iron Manganese
SW-02-00-SL	
	Aluminum Antimony Barium Iron Manganese
SW-02-SS	
	Aluminum Antimony Barium Iron Manganese
SW-02-SW	
	Aluminum Antimony Barium Iron Manganese
SW-03-00-SL	
	Aluminum Antimony Barium Iron Manganese
SW-03-SS	
	Aluminum Antimony Barium Iron Manganese
SW-04-00-SL	
	Aluminum Antimony Barium Iron Manganese
SW-04-SS	
	Aluminum Antimony

		Barium Iron Manganese
	SW-05-SS	
		Aluminum Antimony Barium Iron Manganese
	SW-06-SS	
		Aluminum Antimony Barium Iron Manganese
407062		
	EP-13-06-SL	
		Antimony Barium
	EP-13-13-SL	
		Antimony Barium
	EP-13-25-SL	
		Antimony Barium
	EP-13-30-SL	
		Antimony Barium
	EP-14-05-SL	
		Antimony Barium
	EP-14-13-SL	
		Antimony Barium
	EP-14-25-SL	
		Antimony Barium
	EP-14-31-SL	
		Antimony Barium
	EP-18-09-SL	
		Antimony Barium
	EP-18-09-SL-FD	
		Antimony Barium
	EP-18-15-SL	
		Antimony Barium

EP-18-29-SL	Antimony Barium
EP-19-05-SL	Antimony Barium
EP-19-13-SL	Antimony Barium
EP-19-25-SL	Antimony Barium
EP-19-31-SL	Antimony Barium

3. Additional comments:

- None.

**ANALYTICAL CATEGORY: Total Petroleum Hydrocarbons**

Diesel Range Organics and Gasoline Range Organics.

1. The following items (as applicable) have been addressed during the validation review:

- sample custody, integrity & preservation
- sample handling & preparation
- holding times
- instrument calibration & performance
- dilution factors
- detection limits
- laboratory background & carry-over
- overall appearance of the data
- Quality Control:
  - calibration checks & background
  - preparation blanks
  - laboratory control samples
  - field blanks (if available)
  - field duplicates (if available)

2. The above items were found to be acceptable, except as follows:

- None.

3. Additional comments:

- None.

**ANALYTICAL CATEGORY: Poly-Aromatic Hydrocarbons**

Acenaphthene, Anthracene, Benz[e]acephenanthrylene, Benzanthracene, Benzo[a]pyrene, Benzo[k]fluoranthene, Chrysene, Dibenz[a,h]anthracene, Indeno(1,2,3-cd)pyrene, and Pyrene.

1. The following items (as applicable) have been addressed during the validation review:

- sample custody, integrity & preservation
  - sample handling & preparation
  - holding times
  - instrument calibration & performance
  - dilution factors
  - detection limits
  - laboratory background & carry-over
  - overall appearance of the data
- Quality Control:
    - calibration checks & background
    - preparation blanks
    - laboratory control samples
    - field blanks (if available)
    - field duplicates (if available)

2. The above items were found to be acceptable, except as follows:

- Internal Area Summary For the samples listed below, the area counts were outside the control limits. Sample results are qualified as estimated, J/UJ, K01.

404291

CB-01-00-SL

Benzo[a]pyrene  
Benzo[k]fluoranthene  
Dibenz[a,h]anthracene  
Di-n-octyl phthalate  
Indeno(1,2,3-cd)pyrene

OA-01-00-SL

3,3'-Dichlorobenzidine  
Benzanthracene  
Benzo[a]pyrene  
Benzo[k]fluoranthene  
Bis(2-ethylhexyl)phthalate  
Chrysene  
Dibenz[a,h]anthracene  
Di-n-octyl phthalate  
Indeno(1,2,3-cd)pyrene  
Pyrene

OA-01-00-SL-FD

3,3'-Dichlorobenzidine  
Benzanthracene  
Benzo[a]pyrene  
Benzo[k]fluoranthene  
Bis(2-ethylhexyl)phthalate  
Chrysene  
Dibenz[a,h]anthracene  
Di-n-octyl phthalate  
Indeno(1,2,3-cd)pyrene

OA-02-00-SL	<p>Pyrene</p> <p>3,3'-Dichlorobenzidine</p> <p>Benanthracene</p> <p>Benzo[a]pyrene</p> <p>Benzo[k]fluoranthene</p> <p>Bis(2-ethylhexyl)phthalate</p> <p>Chrysene</p> <p>Dibenz[a,h]anthracene</p> <p>Di-n-octyl phthalate</p> <p>Indeno(1,2,3-cd)pyrene</p> <p>Pyrene</p>
OA-03-00-SL	<p>3,3'-Dichlorobenzidine</p> <p>Benanthracene</p> <p>Benzo[a]pyrene</p> <p>Benzo[k]fluoranthene</p> <p>Bis(2-ethylhexyl)phthalate</p> <p>Chrysene</p> <p>Dibenz[a,h]anthracene</p> <p>Di-n-octyl phthalate</p> <p>Indeno(1,2,3-cd)pyrene</p> <p>Pyrene</p>
RR-01-00-SL	<p>3,3'-Dichlorobenzidine</p> <p>Benanthracene</p> <p>Benzo[a]pyrene</p> <p>Benzo[k]fluoranthene</p> <p>Bis(2-ethylhexyl)phthalate</p> <p>Chrysene</p> <p>Dibenz[a,h]anthracene</p> <p>Di-n-octyl phthalate</p> <p>Indeno(1,2,3-cd)pyrene</p> <p>Pyrene</p>
SW-01-00-SL	<p>Benzo[a]pyrene</p> <p>Benzo[k]fluoranthene</p> <p>Dibenz[a,h]anthracene</p> <p>Di-n-octyl phthalate</p> <p>Indeno(1,2,3-cd)pyrene</p>
SW-02-00-SL	<p>3,3'-Dichlorobenzidine</p> <p>Benanthracene</p> <p>Benzo[a]pyrene</p> <p>Benzo[k]fluoranthene</p> <p>Bis(2-ethylhexyl)phthalate</p> <p>Chrysene</p> <p>Dibenz[a,h]anthracene</p> <p>Di-n-octyl phthalate</p>

	Indeno(1,2,3-cd)pyrene Pyrene
SW-02-SS	
	Benzo[a]pyrene Benzo[k]fluoranthene Dibenz[a,h]anthracene Di-n-octyl phthalate Indeno(1,2,3-cd)pyrene
SW-03-SS	
	Benzo[a]pyrene Benzo[k]fluoranthene Dibenz[a,h]anthracene Di-n-octyl phthalate Indeno(1,2,3-cd)pyrene
SW-06-SS	
	Benzo[a]pyrene Benzo[k]fluoranthene Dibenz[a,h]anthracene Di-n-octyl phthalate Indeno(1,2,3-cd)pyrene

3. Additional comments:

- None.

**ANALYTICAL CATEGORY: PCBs**

Arochlor 1242, Arochlor 1248, Arochlor 1260, Arochlor 1016, Arochlor 1221, Arochlor 1232, and PCB 1254.

1. The following items (as applicable) have been addressed during the validation review:

- sample custody, integrity & preservation
  - sample handling & preparation
  - holding times
  - instrument calibration & performance
  - dilution factors
  - detection limits
  - laboratory background & carry-over
  - overall appearance of the data
- Quality Control:
    - calibration checks & background
    - preparation blanks
    - laboratory control samples
    - field blanks (if available)
    - field duplicates (if available)

2. The above items were found to be acceptable, except as follows:

- Surrogate For the samples listed below, the surrogate was below the lower control limit. Surrogates are added to every blank, sample, matrix spike, matrix spike duplicate, and standard. They are used as a measure of extraction, clean-up (if required), and analytical efficiency by measuring recovery. Due to low recoveries, sample results are qualified as estimated, J/UJ, G02.

404291

CB-01-00-SL-FD

Arochlor 1242  
Arochlor 1248  
Arochlor 1260  
Arochlor-1016  
AROCLOR-1221  
AROCLOR-1232  
PCB-1254

- Target Compound Identification For the samples listed below, the percent difference (%D) between the two pesticide/PCB column checks was > 25%. Affected sample results are qualified as estimated, J/UJ, M08.

404291

CB-01-00-SL

Arochlor 1260

CB-01-00-SL-FD

Arochlor 1260

OA-01-00-SL

PCB-1254

OA-01-00-SL-FD

PCB-1254

RR-01-00-SL

PCB-1254

RR-03-00-SL

SW-01-00-SL	PCB-1254
	Arochlor 1260
SW-02-00-SL	Arochlor 1260

3. Additional comments:

- None.

**ANALYTICAL CATEGORY: Pesticides**

4,4'-DDD, 4,4'-DDE, 4,4'-DDT, Aldrin, alpha-BHC, Chlorodane, Dieldrin, Endosulfan I, Endosulfan II, Endrin, Heptachlor, Heptachlor epoxide, Lindane, Methoxychlor, and Toxaphene.

1. The following items (as applicable) have been addressed during the validation review:

- sample custody, integrity & preservation
  - sample handling & preparation
  - holding times
  - instrument calibration & performance
  - dilution factors
  - detection limits
  - laboratory background & carry-over
  - overall appearance of the data
- Quality Control:
    - calibration checks & background
    - preparation blanks
    - laboratory control samples
    - field blanks (if available)
    - field duplicates (if available)

2. The above items were found to be acceptable, except as follows:

- Initial/Continuing Calibration - Organics For the samples listed below, the continuing calibration %D was outside the control limits. Sample results are qualified as estimated, J/UJ, C05.

404291

CB-01-00-SL	4,4'-DDD Methoxychlor
CB-01-00-SL-FD	4,4'-DDD 4,4'-DDT Methoxychlor
OA-01-00-SL	4,4'-DDD Methoxychlor
OA-01-00-SL-FD	4,4'-DDD Methoxychlor
OA-02-00-SL	4,4'-DDD 4,4'-DDT Methoxychlor
OA-03-00-SL	4,4'-DDD 4,4'-DDT Methoxychlor
RR-01-00-SL	4,4'-DDD 4,4'-DDT Methoxychlor
RR-02-00-SL	4,4'-DDD

	RR-03-00-SL	4,4'-DDT Methoxychlor
	SW-01-00-SL	4,4'-DDD 4,4'-DDT Methoxychlor
	SW-02-00-SL	4,4'-DDD 4,4'-DDT Methoxychlor
	SW-02-SS	4,4'-DDD
	SW-02-SW	4,4'-DDD
	SW-03-00-SL	4,4'-DDD
	SW-03-SS	4,4'-DDD
	SW-04-00-SL	4,4'-DDD
	SW-04-SS	4,4'-DDD
	SW-05-SS	4,4'-DDD Methoxychlor
	SW-06-SS	4,4'-DDD Methoxychlor
406099	EP-15-05-SL	4,4'-DDD 4,4'-DDE 4,4'-DDT Aldrin alpha-BHC Chlorodane Dieldrin Endosulfan I Endosulfan II Endrin Heptachlor Heptachlor epoxide Lindane Methoxychlor Toxaphene

EP-15-13-SL

4,4'-DDD  
4,4'-DDE  
4,4'-DDT  
Aldrin  
alpha-BHC  
Chlorodane  
Dieldrin  
Endosulfan I  
Endosulfan II  
Endrin  
Heptachlor  
Heptachlor epoxide  
Lindane  
Methoxychlor  
Toxaphene

EP-15-25-SL

4,4'-DDD  
4,4'-DDE  
4,4'-DDT  
Aldrin  
alpha-BHC  
Chlorodane  
Dieldrin  
Endosulfan I  
Endosulfan II  
Endrin  
Heptachlor  
Heptachlor epoxide  
Lindane  
Methoxychlor  
Toxaphene

EP-15-29-SL

4,4'-DDD  
4,4'-DDE  
4,4'-DDT  
Aldrin  
alpha-BHC  
Chlorodane  
Dieldrin  
Endosulfan I  
Endosulfan II  
Endrin  
Heptachlor  
Heptachlor epoxide  
Lindane  
Methoxychlor  
Toxaphene

EP-17-05-SL

4,4'-DDD  
4,4'-DDE  
4,4'-DDT  
Aldrin  
alpha-BHC  
Chlorodane  
Dieldrin  
Endosulfan I  
Endosulfan II  
Endrin  
Heptachlor  
Heptachlor epoxide  
Lindane  
Methoxychlor  
Toxaphene

EP-17-15-SL

4,4'-DDD  
4,4'-DDE  
4,4'-DDT  
Aldrin  
alpha-BHC  
Chlorodane  
Dieldrin  
Endosulfan I  
Endosulfan II  
Endrin  
Heptachlor  
Heptachlor epoxide  
Lindane  
Methoxychlor  
Toxaphene

EP-17-25-SL

4,4'-DDD  
4,4'-DDE  
4,4'-DDT  
Aldrin  
alpha-BHC  
Chlorodane  
Dieldrin  
Endosulfan I  
Endosulfan II  
Endrin  
Heptachlor  
Heptachlor epoxide  
Lindane  
Methoxychlor  
Toxaphene

EP-17-30-SL

4,4'-DDD

	4,4'-DDE
	4,4'-DDT
	Aldrin
	alpha-BHC
	Chlorodane
	Dieldrin
	Endosulfan I
	Endosulfan II
	Endrin
	Heptachlor
	Heptachlor epoxide
	Lindane
	Methoxychlor
	Toxaphene
NB-40-05-SL	
	4,4'-DDD
	4,4'-DDE
	4,4'-DDT
	Aldrin
	alpha-BHC
	Chlorodane
	Dieldrin
	Endosulfan I
	Endosulfan II
	Endrin
	Heptachlor
	Heptachlor epoxide
	Lindane
	Methoxychlor
	Toxaphene
NB-40-05-SL-FD	
	4,4'-DDD
	4,4'-DDE
	4,4'-DDT
	Aldrin
	alpha-BHC
	Chlorodane
	Dieldrin
	Endosulfan I
	Endosulfan II
	Endrin
	Heptachlor
	Heptachlor epoxide
	Lindane
	Methoxychlor
	Toxaphene
NB-40-17-SL	
	4,4'-DDD
	4,4'-DDE

4,4'-DDT  
 Aldrin  
 alpha-BHC  
 Chlorodane  
 Dieldrin  
 Endosulfan I  
 Endosulfan II  
 Endrin  
 Heptachlor  
 Heptachlor epoxide  
 Lindane  
 Methoxychlor  
 Toxaphene

NB-40-25-SL

4,4'-DDD  
 4,4'-DDE  
 4,4'-DDT  
 Aldrin  
 alpha-BHC  
 Chlorodane  
 Dieldrin  
 Endosulfan I  
 Endosulfan II  
 Endrin  
 Heptachlor  
 Heptachlor epoxide  
 Lindane  
 Methoxychlor  
 Toxaphene

NB-40-31-SL

4,4'-DDD  
 4,4'-DDE  
 4,4'-DDT  
 Aldrin  
 alpha-BHC  
 Chlorodane  
 Dieldrin  
 Endosulfan I  
 Endosulfan II  
 Endrin  
 Heptachlor  
 Heptachlor epoxide  
 Lindane  
 Methoxychlor  
 Toxaphene

· Target Compound Identification For the samples listed below, the %D between the two pesticide/PCB column checks was > 25%. Affected sample results are qualified as estimated, J/UJ, M08.

404291

CB-01-00-SL	4,4'-DDT
CB-01-00-SL-FD	4,4'-DDT
OA-01-00-SL	4,4'-DDE
OA-01-00-SL-FD	4,4'-DDE
RR-01-00-SL	Endrin
RR-03-00-SL	Endrin
SW-02-00-SL	4,4'-DDT
	Endrin

3. Additional comments:

- None.

**ANALYTICAL CATEGORY: Miscellaneous Radiological**

Gross Alpha, Gross Beta, Radium-226, Radium-228, and Technetium-99.

1. The following items (as applicable) have been addressed during the validation review:

- sample custody, integrity & preservation
  - sample handling & preparation
  - holding times
  - instrument calibration & performance
  - dilution factors
  - detection limits
  - laboratory background & carry-over
  - overall appearance of the data
- Quality Control:
    - calibration checks & background
    - preparation blanks
    - laboratory control samples
    - field blanks (if available)
    - field duplicates (if available)

2. The above items were found to be acceptable, except as follows:

· Radionuclide Quantitation	For the samples listed below, the analytical result is less than the associated MDA, but greater than the counting uncertainty. Sample results are qualified as estimated, J/UJ, T05.
	404291
	OA-01-00-SL-FD
	Tc-99
	OA-03-00-SL
	Tc-99
	RR-03-00-SL
	Tc-99
	SW-02-SW
	Tc-99
	SW-03-00-SL
	Tc-99
	SW-04-00-SL
	Tc-99
	406099
	EP-15-29-SL
	Tc-99
	EP-17-30-SL
	Tc-99
	NB-40-05-SL
	Tc-99
	NB-40-05-SL-FD
	Tc-99
	NB-40-17-SL
	Tc-99
	NB-40-31-SL
	Tc-99
	407062
	EP-14-31-SL
	Tc-99

	EP-18-15-SL	Tc-99
	EP-18-29-SL	Tc-99
	EP-19-31-SL	Tc-99
412103		
	GW-BR4RB-121004	Tc-99
	GW-BR5RB-121004	Tc-99
	GW-EP15-121004	Gross Alpha
	GW-NB46-121004	Gross Alpha Gross Beta Tc-99
	GW-NB82-121004	Gross Beta Tc-99
	GW-SW07-121004	Gross Beta Tc-99
412130		
	GW-BD6-121404	Tc-99
	GW-BR4JC-121404	Tc-99
	GW-BR7RB-121404	Tc-99
	GW-BR9JC-121404	Tc-99
	GW-CB02-121404	Tc-99
	GW-FD4-121404	Tc-99
	GW-NB57A-121404	Gross Beta Tc-99
	GW-OB1-121404	Tc-99
	GW-OB2-121404	Tc-99
	GW-WS34-121404	Tc-99

3. Additional comments:

· None.

**ANALYTICAL CATEGORY: Volatile Organics**

1,1,2,2-Tetrachloroethane (reported as T, 1,1,2-Trichloroethane, 1,1-Dichloroethane, 1,2,4-Trichlorobenzene, 1,2-Dibromo-3-chloropropane, 1,2-Dichloropropane, 2-Hexanone, 2-Propanone, 4-Methyl-2-pentanone, Benzene, Bromodichloromethane, Carbon disulfide, Chlorobenzene, Chlorodibromomethane, Chloroethene, cis-1,2-Dichloroethene, cis-1,3-Dichloropropene, Ethenyl ester acetic acid, Ethyl chloride, Ethylbenzene, Ethylene dibromide, Ethylene dichloride, Methyl bromide, Methyl chloride, Methyl ethyl ketone, Methylchloroform, Methylene chloride, m-Xylene & p-Xylene, O-Xylene, Perchloroethylene, Styrene, Tetrachloromethane, Toluene, trans-1,2-Dichloroethene, trans-1,3-Dichloropropene, Tribromomethane, Trichloroethene, Trichloromethane, and Vinylidene chloride.

1. The following items (as applicable) have been addressed during the validation review:

- sample custody, integrity & preservation
  - sample handling & preparation
  - holding times
  - instrument calibration & performance
  - dilution factors
  - detection limits
  - laboratory background & carry-over
  - overall appearance of the data
- Quality Control:
    - calibration checks & background
    - preparation blanks
    - laboratory control samples
    - field blanks (if available)
    - field duplicates (if available)

2. The above items were found to be acceptable, except as follows:

- Blanks For the samples listed below, the sample data were qualified as a result of the method blank. This may indicate that contamination could have been introduced during the laboratory preparation. Those samples where the sample result was less than five (ten for common laboratory contaminants) times the contamination concentration were qualified non-detect, U, F01.

404291

CB-01-00-SL	Methylene chloride
OA-01-00-SL	Methylene chloride
OA-01-00-SL-FD	Methylene chloride
OA-02-00-SL	Methylene chloride
OA-03-00-SL	Methylene chloride
RR-01-00-SL	Methylene chloride
RR-03-00-SL	Methylene chloride
SW-01-00-SL	Methylene chloride
SW-02-00-SL	Methylene chloride

	SW-02-SS	2-Propanone 2-Propanone Methylene chloride
	SW-03-00-SL	Methylene chloride
	SW-03-SS	2-Propanone 2-Propanone Methylene chloride
	SW-04-00-SL	Methylene chloride
	SW-04-SS	Methylene chloride
	SW-05-SS	2-Propanone 2-Propanone Methyl ethyl ketone Methyl ethyl ketone Methylene chloride Toluene Toluene
	SW-06-SS	2-Propanone 2-Propanone Methylene chloride
406099	EP-15-29-SL	2-Propanone
	EP-17-30-SL	2-Propanone
	NB-40-31-SL	2-Propanone
407062	EP-13-13-SL	Methylene chloride Methylene chloride
	EP-13-25-SL	Methylene chloride Methylene chloride
	EP-13-30-SL	Methylene chloride Methylene chloride
	EP-18-09-SL	Methylene chloride Methylene chloride
	EP-18-09-SL-FD	Methylene chloride Methylene chloride

EP-18-15-SL  
Methylene chloride  
Methylene chloride  
EP-18-29-SL  
Methylene chloride  
Methylene chloride  
412130  
GW-BD6-121404  
Toluene

Compound  
Quantitation and  
Reported CRQLs

For the sample listed below, professional judgment was used to  
qualify the data. The sample container was received at the laboratory  
with headspace in the vial. Sample results are qualified as estimated,  
J/UJ, N03.

412130

GW-CB02-121404  
1,1,2,2 Tertachloroethene  
1,1,2-Trichloroethane  
1,1-Dichloroethane  
1,2,4-Trichlorobenzene  
1,2-Dibromo-3-  
1,2-Dichloropropane  
2-Hexanone  
2-Propanone  
4-Methyl-2-pentanone  
Benzene  
Bromodichloromethane  
Carbon disulfide  
Chlorobenzene  
Chlorodibromomethane  
Chloroethene  
cis-1,2-Dichloroethene  
cis-1,3-Dichloropropene  
Ethenyl ester acetic acid  
Ethyl chloride  
Ethylbenzene  
Ethylene dibromide  
Ethylene dichloride  
Methyl bromide  
Methyl chloride  
Methyl ethyl ketone  
Methylchloroform  
Methylene chloride  
m-Xylene & p-Xylene  
O-Xylene (1,2-  
Perchloroethylene  
Styrene  
Tetrachloromethane

Toluene  
trans-1,2-Dichloroethene  
trans-1,3-Dichloropropene  
Tribromomethane  
Trichloroethene  
Trichloromethane  
Vinylidene chloride

Initial/Continuing  
Calibration -  
Organics

For the samples listed below, the initial calibration RRF was < 0.05. Sample results are qualified as estimated, J/UJ, C01.

406099

EP-15-05-SL	2-Propanone
EP-15-13-SL	2-Propanone
EP-15-25-SL	2-Propanone
EP-15-29-SL	2-Propanone
EP-17-05-SL	2-Propanone
EP-17-15-SL	2-Propanone
EP-17-25-SL	2-Propanone
EP-17-30-SL	2-Propanone
NB-40-05-SL	2-Propanone
NB-40-05-SL-FD	2-Propanone
NB-40-17-SL	2-Propanone
NB-40-25-SL	2-Propanone
NB-40-31-SL	2-Propanone
TB-061004-01	2-Propanone

412103

GW-BR4RB-121004	2-Propanone
	2-Propanone
GW-BR5RB-121004	2-Propanone
	2-Propanone
GW-EP15-121004	

		2-Propanone
		2-Propanone
	GW-NB46-121004	
		2-Propanone
		2-Propanone
	GW-NB82-121004	
		2-Propanone
		2-Propanone
	GW-SW07-121004	
		2-Propanone
		2-Propanone
	TB-121004-1	
		2-Propanone
		2-Propanone
412130		
	GW-BD6-121404	
		Bromodichloromethane
	GW-BR4JC-121404	
		Bromodichloromethane
	GW-BR7RB-121404	
		Bromodichloromethane
	GW-BR9JC-121404	
		Bromodichloromethane
	GW-CB02-121404	
		Bromodichloromethane
		Carbon disulfide
	GW-FD4-121404	
		Bromodichloromethane
	GW-NB57A-121404	
		Bromodichloromethane
	GW-OB1-121404	
		Bromodichloromethane
	GW-OB2-121404	
		Bromodichloromethane
	GW-WS34-121404	
		Bromodichloromethane
	TB-121404-1	
		Bromodichloromethane

Internal Area  
Summary

For the samples listed below, the area counts were outside the control limits. Sample results are qualified as estimated, J/UJ, K01.

404291

OA-03-00-SL

1,1,2,2 Tetrachlorethane  
1,1,2-Trichloroethane  
1,1-Dichloroethane  
1,2,4-Trichlorobenzene  
1,2-Dibromo-3-

1,2-Dichloropropane  
2-Hexanone  
2-Propanone  
4-Methyl-2-pentanone  
Benzene  
Bromodichloromethane  
Carbon disulfide  
Chlorobenzene  
Chlorodibromomethane  
Chloroethene  
cis-1,2-Dichloroethene  
cis-1,3-Dichloropropene  
Ethenyl ester acetic acid  
Ethyl chloride  
Ethylbenzene  
Ethylene dibromide  
Ethylene dichloride  
Methyl bromide  
Methyl chloride  
Methyl ethyl ketone  
Methylchloroform  
Methylene chloride  
m-Xylene & p-Xylene  
O-Xylene (1,2-  
Perchloroethylene  
Styrene  
Tetrachloromethane  
Toluene  
trans-1,2-Dichloroethene  
trans-1,3-Dichloropropene  
Tribromomethane  
Trichloroethene  
Trichloromethane  
Vinylidene chloride

SW-02-00-SL

1,1,2,2 Tetrachlorethane  
1,1,2-Trichloroethane  
1,1-Dichloroethane  
1,2,4-Trichlorobenzene  
1,2-Dibromo-3-  
1,2-Dichloropropane  
2-Hexanone  
2-Propanone  
4-Methyl-2-pentanone  
Benzene  
Bromodichloromethane  
Carbon disulfide  
Chlorobenzene  
Chlorodibromomethane

Chloroethene  
 cis-1,2-Dichloroethene  
 cis-1,3-Dichloropropene  
 Ethenyl ester acetic acid  
 Ethyl chloride  
 Ethylbenzene  
 Ethylene dibromide  
 Ethylene dichloride  
 Methyl bromide  
 Methyl chloride  
 Methyl ethyl ketone  
 Methylchloroform  
 Methylene chloride  
 m-Xylene & p-Xylene  
 O-Xylene (1,2-  
 Perchloroethylene  
 Styrene  
 Tetrachloromethane  
 Toluene  
 trans-1,2-Dichloroethene  
 trans-1,3-Dichloropropene  
 Tribromomethane  
 Trichloroethene  
 Trichloromethane  
 Vinylidene chloride

Matrix Spike/Matrix  
 Spike Duplicate  
 (MS/MSD)

For the samples listed below, the MS/MSD recovery was below the lower control limit. The spiked sample analysis is designed to provide information about the effect of each sample matrix on the sample preparation procedures and the measurement methodology. The low percent recovery is an indication of negative interference from the sample matrix upon the detection of the analyte which may bias the data low. Therefore, sample results were qualified as estimated, J/UJ, H02.

407062

EP-13-06-SL

Benzene  
 Chlorobenzene  
 Toluene  
 Trichloroethene

EP-13-13-SL

Benzene  
 Chlorobenzene  
 Toluene  
 Trichloroethene

EP-13-25-SL

Benzene  
 Chlorobenzene

EP-13-30-SL	Toluene Trichloroethene
EP-14-05-SL	Benzene Chlorobenzene Toluene Trichloroethene
EP-14-13-SL	Benzene Chlorobenzene Toluene Trichloroethene
EP-14-25-SL	Benzene Chlorobenzene Toluene Trichloroethene
EP-14-31-SL	Benzene Chlorobenzene Toluene Trichloroethene
EP-18-09-SL	Benzene Chlorobenzene Toluene Trichloroethene
EP-18-09-SL-FD	Benzene Chlorobenzene Toluene Trichloroethene
EP-18-15-SL	Benzene Chlorobenzene Toluene Trichloroethene
EP-18-29-SL	Benzene Chlorobenzene Toluene Trichloroethene
EP-19-05-SL	Benzene

	Chlorobenzene Toluene Trichloroethene
EP-19-13-SL	
	Benzene Chlorobenzene Toluene Trichloroethene
EP-19-25-SL	
	Benzene Chlorobenzene Toluene Trichloroethene
EP-19-31-SL	
	Benzene Chlorobenzene Toluene Trichloroethene
TB-070704-01	
	Benzene Chlorobenzene Toluene Trichloroethene

3. Additional comments:

- None.

# ATTACHMENT A

## KEY TO THE WESTINGHOUSE DATA VALIDATION QUALIFIERS

QUALIFIERS	
=	Indicates that the data met all QA/QC requirements, and that the radionuclide has been positively identified and the associated concentration value is accurate.
U	Indicates that the data met all QA/QC requirements, and that the radionuclide was analyzed for but was not detected above the reported sample quantitation limit.
J	Indicates that the radionuclide was positively identified; the associated numerical value is the approximate concentration of the radionuclide in the sample.
UJ	Indicates that the radionuclide was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
N	The analysis indicates the presence of a radionuclide for which there is presumptive evidence to make a "tentative identification."
R	Indicates that the sample results for the radionuclide are rejected or unusable due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the radionuclide cannot be verified.

## Data Validation Reason Codes

### Holding Times

- A01 Extraction holding times were exceeded.
- A02 Extraction holding times were grossly exceeded.
- A03 Analysis holding times were exceeded.
- A04 Analysis holding times were grossly exceeded.
- A05 Samples were not preserved properly.
- A06 Professional judgment was used to qualify the data.

### GC/MS Tuning

- B01 Mass calibration was in error, even after applying expanded criteria.
- B02 Mass calibration was not performed every 12 hours.
- B03 Mass calibration did not meet ion abundance.
- B04 Professional judgment was used to qualify the data.

### Initial/Continuing Calibration – Organics

- C01 Initial calibration RRF was  $<0.05$ .
- C02 Initial calibration RSD was  $>30\%$ .
- C03 Initial calibration sequence was not followed as required.
- C04 Continuing calibration RRF was  $<0.05$ .
- C05 Continuing calibration %D was  $>25\%$ .
- C06 Continuing calibration was not performed at the required frequency.
- C07 Resolution criteria were not met.
- C08 RPD criteria were not met.
- C09 RSD criteria were not met.
- C10 Retention time of compounds was outside windows.
- C11 Compounds were not adequately resolved.
- C12 Breakdown of endrin or DDT was  $>20\%$ .
- C13 Combined breakdown of endrin/DDT was  $>30\%$ .
- C14 Professional judgment was used to qualify the data.

### Initial/Continuing Calibration – Inorganics

- D01 ICV or CCV were not performed for every analyte.
- D02 ICV recovery was above the upper control limit.
- D03 ICV recovery was below the lower control limit.
- D04 CCV recovery was above the upper control limit.
- D05 CCV recovery was below the lower control limit.
- D06 Standard curve was not established with the minimum number of standards.
- D07 Instrument was not calibrated daily or each time the instrument was set up.
- D08 Correlation coefficient was  $< 0.995$ .
- D09 Mid-range cyanide standard was not distilled.
- D10 Professional judgment was used to qualify the data.

### **ICP and Furnace Requirements**

- E01 Interference check sample recovery was outside the control limit.
- E02 Duplicate injections were outside the control limit.
- E03 Post digestion spike recovery was outside the control limit.
- E04 MSA was required but not performed.
- E05 MSA correlation coefficient was  $< 0.995$ .
- E06 MSA spikes were not at the correct concentration.
- E07 Serial dilution criteria were not met.
- E08 Professional judgment was used to qualify the data.

### **Blanks**

- F01 Sample data were qualified as a result of the method blank.
- F02 Sample data were qualified as a result of the field blank.
- F03 Sample data were qualified as a result of the equipment rinsate.
- F04 Sample data were qualified as a result of the trip blank.
- F05 Gross contamination exists.
- F06 Concentration of the contaminant was detected at a level below the CRQL.
- F07 Concentration of the contaminant was detected at a level less than the action limit, but greater than the CRQL.
- F08 Concentration of the contaminant was detected at a level that exceeds the action level.
- F09 No laboratory blanks were analyzed.
- F10 Blank had a negative value  $>2x$ 's the IDL.
- F11 Blanks were not analyzed at required frequency.
- F12 Professional judgment was used to qualify the data.

### **Surrogate/Radiological Chemical Recovery**

- G01 Surrogate/radiological chemical recovery was above the upper control limit.
- G02 Surrogate/radiological chemical recovery was below the lower control limit.
- G03 Surrogate recovery was  $<10\%$ .
- G04 Surrogate/radiological chemical recovery was zero.
- G05 Surrogate/radiological chemical recovery was not present.
- G06 Professional judgment was used to qualify the data.
- G07 Radiological chemical recovery was  $<20\%$ .
- G08 Radiological chemical recovery was  $>150\%$ .

### **Matrix Spike/Matrix Spike Duplicate**

- H01 MS/MSD recovery was above the upper control limit.
- H02 MS/MSD recovery was below the lower control limit.
- H03 MS/MSD recovery was  $<10\%$ .
- H04 MS/MSD pairs exceed the RPD limit.
- H05 No action was taken on MS/MSD results.
- H06 Professional judgment was used to qualify the data.
- H07 Radiological MS/MSD recovery was  $<20\%$ .
- H08 Radiological MS/MSD recovery was  $>160\%$ .
- H09 Radiological MS/MSD samples were not analyzed at the required frequency.

### **Matrix Spike**

- I01 MS recovery was above the upper control limit.
- I02 MS recovery was below the lower control limit.
- I03 MS recovery was < 30%.
- I04 No action was taken on MS data.
- I05 Professional judgment was used to qualify the data.
- I06 MS samples were not analyzed at the required frequency.

### **Laboratory Duplicate**

- J01 Duplicate RPD/normalized absolute difference (NAD) was outside the control limit.
- J02 Duplicate sample results were >5x the CRDL.
- J03 Duplicate sample results were <5x the CRDL.
- J04 Professional judgment was used to qualify the data.
- J05 Duplicate was not analyzed at the required frequency.

### **Internal Area Summary**

- K01 Area counts were outside the control limits.
- K02 Extremely low area counts or performance was exhibited by a major drop
- K03 IS retention time varied by more than 30 seconds.
- K04 Professional judgment was used to qualify the data.

### **Pesticide Cleanup Checks**

- L01 10% recovery was obtained during either check.
- L02 Recoveries during either check were > 120%.
- L03 GPC Cleanup recoveries were outside the control limits.
- L04 Florisil cartridge cleanup recoveries were outside the control.
- L05 Professional judgment was used to qualify the data.

### **Target Compound Identification**

- M01 Incorrect identifications were made.
- M02 Qualitative criteria were not met.
- M03 Cross contamination occurred.
- M04 Confirmatory analysis was not performed.
- M05 No results were provided.
- M06 Analysis occurred outside 12 hr GC/MS window.
- M07 Professional judgment was used to qualify the data.
- M08 The %D between the two pesticide/PCB column checks was >25%.

### **Compound Quantitation and Reported CRQLs**

- N01 Quantitation limits were affected by large off-scale peaks.
- N02 MDLs reported by the laboratory exceeded corresponding CRQLs.
- N03 Professional judgment used to qualify the data.

### **Tentatively Identified Compounds (TICs)**

- O01 Compound was suspected laboratory contaminant and was not detected in the blank.
- O02 TIC result was not above 10x the level found in the blank.
- O03 Professional judgment was used to qualify analytical data.

### **Laboratory Control Samples (LCSs)**

- P01 LCS recovery was above upper control limit.
- P02 LCS recovery was below lower control limit.
- P03 LCS recovery was <50%.
- P04 No action was taken on the LCS data.
- P05 LCS was not analyzed at required frequency.
- P06 Radiological LCS recovery was <50% for aqueous samples; <40% for solid samples.
- P07 Radiological LCS recovery was >150% for aqueous samples; >160% for solid samples.
- P08 Professional judgment was used to qualify the data.

### **Field Duplicate**

- Q01 No action was taken on the basis of field duplicate RPDs.
- Q02 Radiological field duplicate normalized absolute difference (NAD) was outside the control limit.
- Q03 Duplicate sample results were >5x the CRDL.
- Q04 Duplicate sample results were <5x the CRDL.

### **Radiological Calibration**

- R01 Efficiency calibration criteria were not met.
- R02 Energy calibration criteria were not met.
- R03 Resolution calibration criteria were not met
- R04 Background determination criteria were not met.
- R05 Quench curve criteria were not met.
- R06 Absorption curve criteria were not met.
- R07 Plateau curve criteria were not met.
- R08 Professional judgment was used to qualify the data.

### **Radiological Calibration Verification**

- S01 Efficiency verification criteria were not met.
- S02 Energy verification criteria were not met.
- S03 Resolution verification criteria were not met
- S04 Background verification criteria were not met.
- S05 Cross-talk verification criteria were not met.
- S06 Professional judgment was used to qualify the data.

### **Radionuclide Quantitation**

- T01 Detection limits were not met.
- T02 Analytical uncertainties were not met and/or not reported.
- T03 Inappropriate aliquot sizes were used.
- T04 Professional judgment was used to qualify the data.
- T05 Analytical result is less than the associated MDA, but greater than the counting uncertainty.
- T06 Analytical result is less than both the associated counting uncertainty and MDA.
- T07 Negative analytical result where the absolute value exceeds 2x the associated MDA.

### **System Performance**

- V01 High background levels or a shift in the energy calibration were observed.
- V02 Extraneous peaks were observed.
- V03 Loss of resolution was observed.
- V04 Peak-tailing or peak splitting that may result in inaccurate quantitation were observed.
- V05 Professional judgment was used to qualify the data.