Appendix E

Analytical Data Review and Validation Report Summaries

GENERAL MOTORS CORPORATION
NORTH AMERICAN OPERATIONS
FLINT OPERATIONS SITE

FLINT, MICHIGAN

TIER II
DATA VALIDATION REPORT

SDG# 3030261

VOLATILE, SEMIVOLATILE,
PCB AND INORGANIC ANALYSES

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Summary

The following is an assessment of data package 3030261 for sampling in support of the RCRA Facility Investigation at the GM-NAO Flint Operations Site in Flint, Michigan. Included in this assessment are checklists used in the review of the samples and a summary of non-conformances and their impact on the reported data. Analyses were performed on the following samples:

Sample ID	Laboratory ID	Matrix	Sample Date	Analyses				
				VOC	SVOC	PCB	TAL	MISC
36-07 (011603)NL[1]	3030261001	NAPL	1/16/03	X	X	X	X	

1 MS/MSD analyses performed on sample.

Sample Analysis: Volatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)			X
	Blank spike (%Recovery)			X
	Control sample (%Recovery)		X	
	Internal standard (Response, RT)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)			X
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The continuing calibration %D was above the acceptable limit due to a decrease in response by bromomethane, 1,1,2-trichloro-1,2,2-trifluoroethane, acetone, 2-butanone, 1,2-dichloroethane, tetrachloroethene and styrene. Data for the listed compounds have been qualified as estimated based on the deviations.

The LCS %R was below control limits for 1,1,2-trichloro-1,2,2-trifluoroethane. Data for the listed compound has been qualified as estimated based on the deviation.

Sample 36-07 (011603)NL contained ethylbenzene, o-xylene, p&m-xylene and toluene above the linear range. Data for the listed compounds have been replaced with data from the dilution analysis.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Semivolatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)			X
	Blank spike (%Recovery)			X
	Control sample (%Recovery)			X
	Internal standard (Response, RT)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)			X
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The continuing calibration %D was above the acceptable limit due to a decrease in response by benzaldehyde and 3&4-Methylphenol. Data have been qualified as estimated for the listed compounds based on the deviations.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: PCBs

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)	X		
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)	X		
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)	X		
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

All data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Metals

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%R, R2)	X		
	Continuing calibration (%D)	X		
	Matrix spike (%Recovery)		X	
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	CRDL standard (%R)			X
	Serial dilution (%D)	X		
	Internal standard (Response)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)		X	
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples		X	

Notes

The MS/MSD %Rs were below the acceptable limit for antimony and mercury. Data have been qualified as estimated for antimony and mercury based on the deviations.

The MS %R were above control limits for arsenic, beryllium, chromium, manganese, selenium and vanadium. Data for the listed analytes have been qualified as estimated based on the deviation.

The MS/MSD RPD was above control limits for all analytes except mercury. Positive data for all listed analytes except mercury have been qualified as estimated based on the deviations.

Arsenic, lead, chromium and selenium were detected in the method blank. Based on the blank content data for the arsenic, lead and selenium have been qualified as undetected.

Other than for the deviation noted in this review, all data quality parameters were within method-

specified limits and the data is acceptable for use as reported by the laboratory.

Analyses performed by:	CT&E, Inc. Luddington, Michigan
Date of Report:	January 30, 2003
Validation performed by:	(Melissa Cash)
Date of Validation:	March 19, 2003

GENERAL MOTORS CORPORATION
NORTH AMERICAN OPERATIONS
FLINT OPERATIONS SITE

FLINT, MICHIGAN

TIER II
DATA VALIDATION REPORT

SDG# 3030673

VOLATILE, SEMIVOLATILE,
PCB AND INORGANIC ANALYSES

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Summary

The following is an assessment of data package 3030673 for sampling in support of the RCRA Facility Investigation at the GM-NAO Flint Operations Site in Flint, Michigan. Included in this assessment are checklists used in the review of the samples and a summary of non-conformances and their impact on the reported data. Analyses were performed on the following samples:

Sample ID	Laboratory ID	Matrix	Sample Date	Analyses				
				VOC	SVOC	PCB	TAL	MISC
RFI-40-11 (0.9-2.9)	3030673001	Soil	02/17/03	X				
RFI-40-11 (4.9-6.9)	3030673002	Soil	02/17/03	X				
RFI-16-24 (1.0-3.0)	3030673003	Soil	02/18/03	X				
RFI-16-24 (05-07)	3030673004	Soil	02/18/03	X				
RFI-16-25 (01-03)	3030673005	Soil	02/18/03	X				
RFI-16-25 (08-10)	3030673006	Soil	02/18/03	X				
RFI-12-23 (0.9-1.4)	3030673007	Soil	02/19/03	X	X	X	X	
RFI-12-23 (2.5-4.5)	3030673008	Soil	02/19/03	X	X	X	X	
RFI-12-23 (8.5-10.5)	3030673009	Soil	02/19/03	X	X	X	X	
RFI-12-23 (12.5-14.5)	3030673010	Soil	02/19/03	X	X	X	X	
RFI-16-RB-214	3030673011	Soil	02/19/03	X	X	X	X	
12- 23 (10.5-12.5)	3030673012	Soil	02/19/03	X	X	X	X	
Trip Blank	3030673013	Water	--	X				

Sample Analysis: Volatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)		X	
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)	X		
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	Internal standard (Response, RT)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The initial calibration RRF was below control limits for bromomethane. Data for bromomethane have been qualified as estimated in samples RFI-40-11 (0.9-2.9), RFI-40-11 (4.9-6.9), RFI-16-24 (01-03), RFI-16-24 (05-07), RFI-16-25 (01-03), RFI-16-25 (08-10), RFI-12-23 (0.9-1.4), RFI-12-23 (2.5-4.5), RFI-12-23 (8.5-10.5), RFI-12-23 (12.5-14.5) and RFI-12-23 (10.5-12.5) based on the deviations.

The initial calibration %RSD was above control limits for methyl acetate and 2-butanone. Data for methyl acetate has been qualified as estimated in sample RFI-16-25 (08-10), and data for 2-butanone have been qualified as estimated in samples RFI-40-11 (0.9-2.9), RFI-40-11 (4.9-6.9), RFI-16-24 (01-03), RFI-16-24 (05-07) and RFI-16-25 (01-03) based on the deviation.

The continuing calibration %D was above the acceptable limit due to a decrease in response by carbon disulfide, cyclohexane, 2-butanone and 1,2-dichloroethane. Data for the carbon disulfide and cyclohexane have been qualified as estimated in samples RFI-16-RB-214 and Trip Blank, and data for 2-butanone and 1,2-dichloroethane have been qualified as estimated in samples RFI-40-11 (0.9-2.9), RFI-40-11 (4.9-6.9), RFI-16-24 (01-03), RFI-16-24 (05-07), RFI-16-25 (01-03), RFI-16-25 (08-10), RFI-

12-23 (0.9-1.4), RFI-12-23 (2.5-4.5), RFI-12-23 (8.5-10.5), RFI-12-23 (12.5-14.5) and RFI-12-23 (10.5-12.5) based on the deviations.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Semivolatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)		X	
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)	X		
	Blank spike (%Recovery)			X
	Control sample (%Recovery)			X
	Internal standard (Response, RT)		X	
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The initial calibration %RSD was above control limits for benzaldehyde and benzo(b)fluoranthene. Data for benzaldehyde have been qualified as estimated in samples RFI-12-23 (2.5-4.5), RFI-12-23 (8.5-10.5) and RFI-12-23 (10.5-12.5) and data for benzo(b)fluoranthene has been qualified as estimated in sample RFI-12-23 (2.5-4.5) based on the deviations.

The continuing calibration %D was above the acceptable limit due to a decrease in response by benzaldehyde, 3&4-Methylphenol, butylbenzylphthalate and bis(2-ethylhexyl)phthalate. Data have been qualified as estimated for 3&4-methylphenol and benzaldehyde in samples RFI-12-23 (0.9-1.4), RFI-12-23 (2.5-4.5), RFI-12-23 (8.5-10.5), RFI-12-23 (12.5-14.5), RFI-16-RB-214 and RFI-12-23 (10.5-12.5), and data for butylbenzylphthalate and bis(2-ethylhexyl)phthalate have been qualified as estimated in samples RFI-12-23 (2.5-4.5), RFI-12-23 (8.5-10.5) and RFI-12-23 (10.5-12.5) based on the deviations.

The response for one internal standard, perylene-d12, was below control limits in sample RFI-12-23 (10.5-12.5). Data have been qualified as estimated for all compounds associated with the deviant

internal standard.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: PCBs

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)	X		
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)	X		
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)	X		
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

All data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Metals

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%R, R2)	X		
	Continuing calibration (%D)		X	
	Matrix spike (%Recovery)		X	
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	CRDL standard (%R)			X
	Serial dilution (%D)		X	
	Internal standard (Response)			X
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples		X	

Notes

The continuing calibration %R was above control limits for beryllium. Data for beryllium have been qualified as estimated in samples RFI-12-23 (0.9-1.4), RFI-12-23 (2.5-4.5), RFI-12-23 (8.5-10.5), RFI-12-23 (12.5-14.5) and RFI-12-23 (10.5-12.5) based on the deviations.

The MS/MSD %Rs were below the acceptable limit for antimony arsenic, barium, chromium, cobalt, copper, lead, nickel, vanadium, zinc, beryllium, mercury and cyanide. Data for the listed analytes have been qualified as estimated in samples RFI-12-23 (0.9-1.4), RFI-12-23 (2.5-4.5), RFI-12-23 (8.5-10.5), RFI-12-23 (12.5-14.5) and RFI-12-23 (10.5-12.5) and data for cobalt and cyanide have been qualified as estimated in sample RFI-16-RB-214 based on the deviations.

Antimony and cobalt were detected in the instrument blank. Based on the blank content data for antimony and cobalt have been qualified as undetected in sample RFI-16-RB-214.

The serial dilution results were above control limits for nickel, copper, chromium, lead and zinc. Data for the listed analytes have been qualified as estimated in sample RFI-16-RB-214 based on the deviations.

Other than for the deviation noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Analyses performed by:	CT&E, Inc. Luddington, Michigan
Date of Report:	March 14, 2003
Validation performed by:	(Melissa Cash)
Date of Validation:	March 24, 2003

GENERAL MOTORS CORPORATION
NORTH AMERICAN OPERATIONS
FLINT OPERATIONS SITE

FLINT, MICHIGAN

TIER II
DATA VALIDATION REPORT

SDG# 3030774

VOLATILE, SEMIVOLATILE,
PCB AND INORGANIC ANALYSES

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Summary

The following is an assessment of data package 3030774 for sampling in support of the RCRA Facility Investigation at the GM-NAO Flint Operations Site in Flint, Michigan. Included in this assessment are checklists used in the review of the samples and a summary of non-conformances and their impact on the reported data. Analyses were performed on the following samples:

Sample ID	Laboratory ID	Matrix	Sample Date	Analyses				
				VOC	SVOC	PCB	TAL	MISC
RFI-86-TB(022703)	--	Water	2/27/2003					
RFI-02-12(1.2-3.2)	3030774001	Soil	2/24/2003	X	X	X	X	
RFI-02-12(07-09)	3030774002	Soil	2/24/2003	X	X	X	X	
RFI-02-DUP-417[1]	3030774003	Soil	2/24/2003	X	X	X	X	
RFI-09-49(00-02)	3030774004	Soil	2/25/2003	X	X	X	X	
RFI-09-49(04-06)	3030774005	Soil	2/25/2003	X	X	X	X	
RFI-09-03R(0.5-2.5)	3030774006	Soil	2/26/2003		X			
RFI-09-01R(04-06)	3030774007	Soil	2/26/2003				X	
RFI-09-01R(06-08)	3030774008	Soil	2/26/2003				X	
RFI-09-01R(08-10)	3030774009	Soil	2/26/2003				X	
RFI-09-50(0.5-2.5)	3030774010	Soil	2/26/2003				X	
RFI-09-50(2.5-4.5)	3030774011	Soil	2/26/2003	X			X	
RFI-09-45R(0.3-2.3)	3030774012	Soil	2/26/2003		X			
RFI-86-16(0.8-2.8)	3030774013	Soil	2/27/2003	X	X	X	X	
RFI-86-16(7.8-9.8)	3030774014	Soil	2/27/2003	X	X	X	X	
RFI-86-16(9.8-11.8)	3030774015	Soil	2/27/2003	X	X	X	X	
RFI-86-RB-215	3030774016	Water	2/27/2003	X	X	X	X	
RFI-09-03R(0.5-2.5)RE	3030774017	Soil	2/26/2003		X			
RFI-09-45R(0.3-2.3)DL	3030774018	Soil	2/26/2003		X			

[1] Duplicate of sample RFI-02-12(07-09).

Sample Analysis: Volatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)		X	
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)	X		
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	Internal standard (Response, RT)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)			X
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The initial calibration RRF was below control limits for bromomethane. Data for bromomethane have been qualified as estimated in samples RFI-02-12(1.2-3.2), RFI-02-12(07-09), RFI-02-DUP-417, RFI-09-49(00-02), RFI-09-49(04-06), RFI-09-50(2.5-4.5), RFI-86-16(0.8-2.8), RFI-86-16(7.8-9.8) and RFI-86-16(9.8-11.8) based on the deviations.

The continuing calibration %D was above the acceptable limit due to a decrease in response by carbon disulfide, bromomethane, 1,1,1-trichloroethane, and 1,2-dichloroethane. Data for the bromomethane, 1,1,1-trichloroethane and 1,2-dichloroethane have been qualified as estimated in samples RFI-02-12(1.2-3.2), RFI-02-12(07-09), RFI-02-DUP-417, RFI-09-49(00-02), RFI-09-49(04-06), RFI-09-50(2.5-4.5), RFI-86-16(0.8-2.8), RFI-86-16(7.8-9.8) and RFI-86-16(9.8-11.8), and data for bromomethane and carbon disulfide have been qualified as estimated in sample RFI-86-RB-215 based on the deviations.

Acetone, 2-butanone (MEK) and methylene chloride were detected in a method blank. Based on the blank content data for acetone have been qualified as non-detect in samples RFI-02-12(07-09), RFI-

02-DUP-417' RFI-09-50(2.5-4.5), RFI-86-16(0.8-2.8), RFI-86-16(7.8-9.8) and RFI-86-16(9.8-11.8); data for 2-butanone (MEK) have been qualified as non-detect in samples RFI-09-49(00-02), RFI-09-49(04-06), RFI-09-50(2.5-4.5) and data for methylene chloride have been qualified as non-detect in samples RFI-02-12(07-09), RFI-02-DUP-417 and RFI-86-16(0.8-2.8) based on the deviatons.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Semivolatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)		X	
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)		X	
	Blank spike (%Recovery)			X
	Control sample (%Recovery)			X
	Internal standard (Response, RT)		X	
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The initial calibration %RSD was above control limits for benzaldehyde. Data for benzaldehyde have been qualified as estimated in samples RFI-02-12(1.2-3.2), RFI-02-12(07-09), RFI-02-DUP-417, RFI-09-49(00-02), RFI-09-49(04-06), RFI-09-50(2.5-4.5), RFI-86-16(0.8-2.8), RFI-86-16(7.8-9.8), RFI-86-16(9.8-11.8) and RFI-86-RB-215 based on the deviations.

The continuing calibration %D was above the acceptable limit due to a decrease in response by benzaldehyde, 3&4-Methylphenol, butylbenzylphthalate and bis(2-ethylhexyl)phthalate. Data have been qualified as estimated for 3&4-methylphenol and benzaldehyde in samples samples RFI-02-12(1.2-3.2), RFI-02-12(07-09), RFI-02-DUP-417, RFI-09-49(00-02), RFI-09-49(04-06), RFI-09-50(2.5-4.5), RFI-86-16(0.8-2.8), RFI-86-16(7.8-9.8), and RFI-86-16(9.8-11.8), and data for 3&4-Methylphenol, butylbenzylphthalate and bis(2-ethylhexyl)phthalate have been qualified as estimated in sample RFI-86-RB-215 based on the deviations.

The response for one internal standard, perylene-d12, was below control limits in sample RFI-09-03R(0.5-2.5). Data have been qualified as estimated for all compounds associated with the deviant

internal standard.

The MS/MSD %R for sample RFI-86-16(0.8-2.8) for compounds 2,4-Dinitrophenol and Pentachlorophenol were below the lower control limits. The data for these two compounds have been qualified as rejected for sample RFI-86-16(0.8-2.8).

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: PCBs

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)	X		
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)	X		
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)	X		
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

All data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Metals

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%R, R2)	X		
	Continuing calibration (%D)	X		
	Matrix spike (%Recovery)			X
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	CRDL standard (%R)			X
	Serial dilution (%D)		X	
	Internal standard (Response)			X
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)			X
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples		X	

Notes

The serial dilution RPD result was above control limits for beryllium. Data for the listed analyte have been qualified as estimated in samples RFI-02-12(1.2-3.2), RFI-02-12(07-09), RFI-02-DUP-417, RFI-09-49(00-02), RFI-09-49(04-06), RFI-09-50(2.5-4.5), RFI-86-16(0.8-2.8) and RFI-86-16(7.8-9.8) based on the deviations.

Other than for the deviation noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Analyses performed by:	CT&E, Inc. Luddington, Michigan
Date of Report:	April 30, 2003
Validation performed by:	(Douglas Fischi)
Date of Validation:	April 30, 2003

GENERAL MOTORS CORPORATION
NORTH AMERICAN OPERATIONS
V8 FLINT OPERATIONS SITE

FLINT, MICHIGAN

TIER II
DATA VALIDATION REPORT

SDG# 3030941

VOLATILE, SEMIVOLATILE,
PCB AND INORGANIC ANALYSES

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Summary

The following is an assessment of data package 3030941 for sampling in support of the RCRA Facility Investigation at the GM-V8 Flint Operations Site in Flint, Michigan. Included in this assessment are checklists used in the review of the samples and a summary of non-conformances and their impact on the reported data. Analyses were performed on the following samples:

Sample ID	Laboratory ID	Matrix	Sample Date	Analyses				
				VOC	SVOC	PCB	TAL	MISC
RFI-83/84-43(1.5-3.5)	3030941001	Soil	03/05/03				X	
RFI-83/84-42(01-03)	3030941002	Soil	03/05/03				X	
RFI-83/84-41(01-02)	3030941003	Soil	03/05/03				X	
RFI-83/84-17R(01-03)	3030941004	Soil	03/06/03				X	
RFI-83/84-45(0.9-2.9)	3030941005	Soil	03/06/03	X	X	X	X	
RFI-83/84-45(7.9-9.9)	3030941006	Soil	03/06/03	X	X	X	X	
RFI-83/84-DUP-418	3030941007	Soil	03/06/03	X	X	X	X	
RFI-83/84-40(1.0-2.5)	3030941008	Soil	03/06/03				X	
Trip Blank(030603)	3030941009	Water	--	X				
DACDG31502 AML@1041	3030941010	Water	--	X	X	X	X	
DACDG31002 AML@0750	3030941011	Water	--	X	X	X	X	
83/84-39(0.9-2.9)	3030941012	Soil	03/07/03	X	X	X	X	
RFI-03-11(00-02)	3030941013	Soil	03/07/03				X	
TB(030703)	3030941014	Water	03/07/03	X				
RFI-83/84-TB(031003)	3030941015	Water	03/10/03	X				
83/84-44(01-03)	3030941016	Soil	03/10/03	X	X	X	X	
RFI-83/84-44(07-09)	3030941017	Soil	03/10/03	X	X	X	X	
83/84-39(0.9-2.9)RE	3030941018	Soil	03/07/03		X			
83/84-44(01-03)DL	3030941019	Soil	03/10/03		X			
83/84-44(01-03)RE	3030941020	Soil	03/10/03		X			

Sample Analysis: Volatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)		X	
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)			X
	Blank spike (%Recovery)			X
	Control sample (%Recovery)		X	
	Internal standard (Response, RT)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)			X
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The initial calibration RRF was below control limits for bromomethane. Data for bromomethane have been qualified as estimated in samples Trip Blank(030603), DACDG31502 AML@1041, DACDG31002 AML@0750, TB(030703) and RFI-83/84-TB(031003) based on the deviations

The continuing calibration %D was above the acceptable limit due to a decrease in response by carbon disulfide, bromomethane, acetone, tetrachloroethene and 2-butanone. Data for carbon disulfide have been qualified as estimated in samples Trip Blank(030603), DACDG31502 AML@1041, DACDG31002 AML@0750, TB(030703) and RFI-83/84-TB(031003) and data for bromomethane, acetone, tetrachloroethene and 2-butanone have been qualified as estimated in samples RFI-83/84-45(0.9-2.9), RFI-83/84-45(7.9-9.9), RFI-83/84-DUP-418, 83/84-39(0.9-2.9), 83/84-44(01-03) and RFI-83/84-44(07-09) based on the deviations.

The LCS %R for methyl acetate was below control limits. Data for methyl acetate has been qualified as estimated for samples Trip Blank(030603), DACDG31502 AML@1041, DACDG31002 AML@0750, TB(030703) and RFI-83/84-TB(031003) based on this deviations.

The LCS %R for 1,1,2-Trichloroethane, 1,2-Dibromo-3-chloropropene, 1,2-Dibromoethane, 1,2-Dichloropropane, Chloroethane, cis-1,2-Dichloroethene, methyl acetate and Methyl Tertiary butyl ether was below control limits. Data for these analytes have been qualified as estimated for samples RFI-83/84-45(0.9-2.9), RFI-83/84-45(7.9-9.9), RFI-83/84-DUP-418, 83/84-39(0.9-2.9), 83/84-44(01-03) and RFI-83/84-44(07-09) based on the deviations.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Semivolatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)		X	
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)	X		
	Blank spike (%Recovery)			X
	Control sample (%Recovery)			X
	Internal standard (Response, RT)		X	
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)			X
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The initial calibration %RSD was above control limits for benzaldehyde, atrazine, indeno[1,2,3-cd]pyrene, dibenz[a,h]anthracene and benzo[g,h,i]perylene. Data for benzaldehyde, atrazine, indeno[1,2,3-cd]pyrene, dibenz[a,h]anthracene and benzo[g,h,i]perylene have been qualified as estimated in samples DACDG31502 AML@1041 and DACDG31002 AML@0750 and data for benzaldehyde has been qualified as estimated in samples RFI-83/84-45(0.9-2.9), RFI-83/84-45(7.9-9.9), RFI-83/84-DUP-418, 83/84-39(0.9-2.9), RFI-83/84-44(07-09) and 83/84-44(01-03) based on the deviations.

The continuing calibration %D was above the acceptable limit due to a decrease in response by benzaldehyde and 3&4-Methylphenol. Data have been qualified as estimated for benzaldehyde in samples DACDG31502 AML@1041 and DACDG31002 AML@0750, and data for benzaldehyde and 3&4-Methylphenol have been qualified as estimated in samples RFI-83/84-45(0.9-2.9), RFI-83/84-45(7.9-9.9), RFI-83/84-DUP-418, 83/84-39(0.9-2.9), RFI-83/84-44(07-09) and 83/84-44(01-03) based on the deviations.

The response for the internal standard perylene-d12, was below control limits in sample 83/84-39(0.9-2.9) and 83/84-44(01-03). Data have been qualified as estimated for all compounds associated with the deviant internal standard for sample 83/84-39(0.9-2.9) and 83/84-44(01-03).

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: PCBs

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)	X		
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)	X		
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)	X		
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

All data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Metals

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%R, R2)	X		
	Continuing calibration (%D)	X		
	Matrix spike (%Recovery)	X		
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	CRDL standard (%R)			X
	Serial dilution (%D)	X		
	Internal standard (Response)			X
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The ICP Interference check sample % recovery for Copper, Silver and Zinc were below the acceptable limits. Data for the Silver and Zinc have been qualified as estimated in samples DACDG31502 AML@1041 and DACDG31002 AML@0750 and data for Copper, Silver and Zinc have been qualified as estimated in sample RFI-83/84-45(0.9-2.9), RFI-83/84-45(7.9-9.9), RFI-83/84-DUP-418, 83/84-39(0.9-2.9), 83/84-44(01-03) and RFI-83/84-44(07-09) based on the deviations.

Other than for the deviation noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Analyses performed by:	CT&E, Inc. Luddington, Michigan
Date of Report:	April 29, 2003
Validation performed by:	(Douglas Fischi)
Date of Validation:	April 29, 2003

GENERAL MOTORS CORPORATION
NORTH AMERICAN OPERATIONS
OPERATIONS SITE

FLINT, MICHIGAN

TIER II
DATA VALIDATION REPORT

SDG# 3031005

VOLATILE, SEMIVOLATILE, PCB
AND INORGANIC ANALYSES

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Summary

The following is an assessment of data package 3031005 for sampling in support of the RCRA Facility Investigation at the Flint Operations Site in Flint, Michigan. Included in this assessment are checklists used in the review of the samples and a summary of non-conformances and their impact on the reported data. Analyses were performed on the following samples:

Sample ID	Laboratory ID	Matrix	Sample Date	Analyses				
				VOC	SVOC	PCB	TAL	MISC
TB(031203)								
RFI-03-12(0.8-2.8)	3031005001	Soil	3/11/2003				X	
RFI-03-14(0.8-2.8)	3031005002	Soil	3/11/2003				X	
RFI-03-13(0.8-2.8)	3031005003	Soil	3/11/2003				X	
RFI-05-31(07-09)	3031005004	Soil	3/11/2003				X	
RFI-81-38(01-03)	3031005005	Soil	3/12/2003	X	X	X	X	
RFI-81-40(00-02)	3031005006	Soil	3/12/2003				X	
RFI-86-18(01-03)	3031005007	Soil	3/12/2003				X	
RFI-86-17(01-03)	3031005008	Soil	3/12/2003				X	
RFI-81-41(00-02)	3031005009	Soil	3/12/2003				X	
RFI-83/84-38(05-07)	3031005010	Soil	3/12/2003				X	
RFI-81-36(08-10)	3031005011	Soil	3/12/2003				X	
RFI-81-37(08-10)	3031005012	Soil	3/12/2003				X	
RFI-83/84-RB-216	3031005013	Water	3/12/2003	X	X	X	X	
RFI-07-13(0.3-2.3)	3031005014	Soil	3/17/2003	X	X	X	X	
RFI-07-13(8.3-10.3)	3031005015	Soil	3/17/2003	X	X	X	X	
RFI-07-13(14.3-16.3)	3031005016	Soil	3/17/2003	X	X	X	X	
RFI-07-TB(031703)	3031005017	Water	3/17/2003	X	X	X	X	
RFI-07-12(0.3-2.3)	3031005018	Soil	3/17/2003	X	X	X	X	
RFI-81-38(01-03)RE	3031005019	Soil	3/12/2003		X			
RFI-81-38(01-03)RE	3031005020	Soil	3/12/2003		X			
RFI-81-38(01-03)DL	3031005022	Soil	3/12/2003	X	X			
RFI-07-13(0.3-2.3)RE	3031005023	Soil	3/17/2003		X			
RFI-07-12(0.3-2.3)RE	3031005024	Soil	3/17/2003		X			

Sample Analysis: Volatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)			X
	Blank spike (%Recovery)			X
	Control sample (%Recovery)		X	
	Internal standard (Response, RT)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)			X
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The continuing calibration %D was above the acceptable limit due to a decrease in response by carbon disulfide, Dichlorodifluoromethane, Acetone, methyl acetate, 2-Butanone, bromomethane, Methyl-tert-butyl Ether, methyl cyclohexane, 4-methyl-2-pentanone, 2-hexanone and 1,1,2,2,-tetrachloroethane. Data have been qualified as estimated for the associated samples based on the deviations.

The LCS %R was above the upper control limits for methyl acetate. The associated sample was non-detect for this compound and therefroe for the listed compound was not qualified based on the deviation.

The result for 1,1-Dichloroethene was above the linear range for sample RFI-81-38(01-03). The subsequent dilution result was non-detect. The result was qualified as estimated (J).

Other than for the deviations noted in this review, all data quality parameters were within method-

specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Semivolatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)		X	
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)		X	
	Matrix spike (%Recovery)			X
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	Internal standard (Response, RT)		X	
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)			X
	Laboratory duplicate (RPD)		X	
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The initial calibration RRF was below control limits for benzaldehyde, atrazine, indeno[1,2,3-cd]pyrene, dibenz[a,h]anthracene and benzo[g,h,i]perylene. The initial calibration %RSD was above acceptable control limits for Di-n-octylphthalate. The associated samples were qualified as estimated based on the deviations.

The continuing calibration %D was above the acceptable limit due to a decrease in response by 3&4-Methylphenol, Carbazole, and 3,3-Dichlorobenzidine. The associated samples were qualified as estimated based on the deviations.

The response for all but one internal standard %R and the surrogate recoveries were below control limits in the undiluted sample RFI-81-38(01-03). The sample was reanalyzed at a 25X dilution (RFI-81-38(01-03)RE) with one internal standard %R, 1,4 dichlorobezene-d4, below acceptable limits and the surrogate recovery of 0% for both 2-Fluorophenol and Phenol-d5. Data have been qualified as estimated for all compounds associated with the deviant internal standard. Data have been qualified as Rejected for the acid portion of the sample based on the deviations.

The response for one internal standard, perylene-d12, was below acceptable limits for samples RFI-07-13(0.3-2.3) and RFI-07-12(0.3-2.3). Data have been qualified as estimated for all compounds associated with the deviant internal standard.

The LCS % Recovery for benzaldehyde was above acceptable limits. The associated sample RFI-83/84-RB-216 was non-dectect for this compound and therefore no qualification was necessary.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: PCBs

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)	X		
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)	X		
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)	X		
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

All data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Metals

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%R, R2)	X		
	Continuing calibration (%D)	X		
	Matrix spike (%Recovery)		X	
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	CRDL standard (%R)			X
	Serial dilution (%D)	X		
	Internal standard (Response)			X
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)		X	
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples		X	

Notes

The MS/MSD RPD was above the acceptable limit for antimony. Data for the analyte has been qualified as estimated in samples RFI-81-38(01-03), RFI-07-13(0.3-2.3), RFI-07-13(8.3-10.3), RFI-07-13(14.3-16.3) and RFI-07-12(0.3-2.3) .

Cadmium was detected in the instrument blank. Based on the blank content data for cadmium has been qualified as undetected in samples RFI-07-13(8.3-10.3) and RFI-07-13(14.3-16.3).

The serial dilution results were above control limits for manganese, lead, zinc, barium and arsenic. Data for the listed analytes have been qualified as estimated in the associated samples based on the deviations.

Other than for the deviation noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Analyses performed by:	CT&E, Inc. Luddington, Michigan
Date of Report:	
Validation performed by:	(Douglas Fischi)
Date of Validation:	April 23, 2003

GENERAL MOTORS CORPORATION
NORTH AMERICAN OPERATIONS
FLINT OPERATIONS SITE

FLINT, MICHIGAN

TIER II
DATA VALIDATION REPORT

SDG# 3031081

VOLATILE, SEMIVOLATILE,
PCB AND INORGANIC ANALYSES

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Summary

The following is an assessment of data package 3031081 for sampling in support of the RCRA Facility Investigation at the GM-NAO Flint Operations Site in Flint, Michigan. Included in this assessment are checklists used in the review of the samples and a summary of non-conformances and their impact on the reported data. Analyses were performed on the following samples:

Sample ID	Laboratory ID	Matrix	Sample Date	Analyses				
				VOC	SVOC	PCB	TAL	MISC
36-07 (031703)NL	3031081001	NL	03/17/03	X	X	X	X	

NL- Non-Aqueous Liquid

Sample Analysis: Volatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)		X	
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)			X
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	Internal standard (Response, RT)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)			X
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The initial calibration was above control limits for methyl cyclohexane. Data for methyl cyclohexane have been qualified as estimated based on the deviation.

The continuing calibration %D were above control limits due to a decrease in response by several compounds. Data have been qualified as estimated for 1,1,2-trichloro-1,2,2-flourethane, acetone, carbon disulfide, methyl acetate, methyl-tert-butyl ether, 2-butanone, cyclohexane, methyl cyclohexane, 4-methyl-2-pentanone, 2-hexanone and 1,1,2,2-tetrachloroethane based on the %D.

Toluene was detected above the linear range in sample 36-07 (031703)NL. Data for toluene have been replaced with data for the dilution analyses based on the results.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Semivolatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)			X
	Matrix spike (%Recovery)	X		
	Blank spike (%Recovery)			X
	Control sample (%Recovery)			X
	Internal standard (Response, RT)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)			X
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The continuing calibration %D were above the acceptable limit due to a decrease in response by 3&4-methylphenol and benzaldehyde. Data have been qualified as estimated for 3&4-Methylphenol and benzaldehyde based on the deviations.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: PCBs

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)	X		
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)	X		
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)	X		
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

All data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Metals

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times		X	
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%R, R2)	X		
	Continuing calibration (%D)	X		
	Matrix spike (%Recovery)	X		
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	CRDL standard (%R)			X
	Serial dilution (%D)	X		
	Internal standard (Response)			X
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)		X	
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The MS/MSD RPD was above control limits for cyanide. Since the sample was non-detect for cyanide, no data have been qualified based on the deviation.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Analyses performed by:	CT&E, Inc. Luddington, Michigan
Date of Report:	April 14, 2003
Validation performed by:	(Melissa Cash)
Date of Validation:	January 5, 2004

GENERAL MOTORS CORPORATION
NORTH AMERICAN OPERATIONS
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FLINT, MICHIGAN

TIER II
DATA VALIDATION REPORT

SDG# 3031102

VOLATILE, SEMIVOLATILE,
PCB AND INORGANIC ANALYSES

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Summary

The following is an assessment of data package 3031102 for sampling in support of the RCRA Facility Investigation at the GM-NAO Flint Operations Site in Flint, Michigan. Included in this assessment are checklists used in the review of the samples and a summary of non-conformances and their impact on the reported data. Analyses were performed on the following samples:

Sample ID	Laboratory ID	Matrix	Sample Date	Analyses				
				VOC	SVOC	PCB	TAL	MISC
RFI-07-12(8.3-10.3)	3031102001	Soil	3/17/2003	X	X	X	X	
RFI-07-12(14.3-16.3)	3031102002	Soil	3/17/2003	X	X	X	X	
RFI-07-RB-217	3031102003	Water	3/17/2003	X	X	X	X	
RFI-07-TB(031803)	3031102004	Water	3/17/2003	X				
RFI-07-DUP-419[1]	3031102005	Soil	3/17/2003	X	X	X	X	
RFI-07-11(00-02)	3031102006	Soil	3/17/2003	X	X	X	X	
RFI-83/84-46(1.5-3.5)	3031102007	Soil	3/17/2003	X	X	X	X	
RFI-83/84-46(7.5-9.5)	3031102008	Soil	3/17/2003	X	X	X	X	
RFI-83/84-46(9.5-11.5)	3031102009	Soil	3/17/2003	X	X	X	X	
RFI-07-10(00-02)	3031102010	Soil	3/19/2003	X	X	X	X	
RFI-07-10(06-08)	3031102011	Soil	3/19/2003	X	X	X	X	
RFI-07-14(00-02)	3031102012	Soil	3/19/2003	X	X	X	X	
RFI-83/84-39(1.1-3.1)	3031102013	Soil	3/19/2003	X	X	X	X	
RFI-83/84-39(5.1-7.1)	3031102014	Soil	3/19/2003	X	X	X	X	
RFI-83/84-TB(031903)	3031102015	Water	3/19/2003	X				
RFI-83/84-46(7.5-9.5)RE	3031102016	Soil	3/17/2003		X			

[1] Field duplicate of sample RFI-07-12(8.3-10.3)

Sample Analysis: Volatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)		X	
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	Internal standard (Response, RT)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)		X	
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)	X		
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The continuing calibration %D was above the acceptable limit due to a decrease in response by carbon disulfide, methyl acetate, 2-butanone (MEK), acetone methyl-tert-butyl ether, methyl cyclohexane, 4-methyl-2-pentanone (MIBK), 2-hexanone and 1,1,2,2-tetrachloroethane. Data for compounds methyl acetate and 2-butanone (MEK) have been qualified as estimated in samples RFI-07-12(8.3-10.3), RFI-07-12(14.3-16.3) and RFI-07-DUP-419 based on the deviations. Data for compounds carbon disulfide, methyl acetate, 2-butanone (MEK), acetone, methyl-tert-butyl ether, methyl cyclohexane, 4-methyl-2-pentanone (MIBK), 2-hexanone and 1,1,2,2-tetrachloroethane have been qualified as estimated in samples RFI-07-11(00-02), RFI-83/84-46(1.5-3.5), RFI-83/84-46(7.5-9.5), RFI-83/84-46(9.5-11.5), RFI-07-10(00-02), RFI-07-10(06-08), RFI-07-14(00-02), RFI-83/84-39(1.1-3.1) and RFI-83/84-39(5.1-7.1).

The MS/MSD %Rs were below the acceptable limit for bromomethane, dichlorodifluoromethane, methyl cyclohexane and tetrachloroethane. Data for these compounds have been qualified as estimated in RFI-07-11(00-02) based on the deviations. The RPD for bromomethane was also above acceptable limits.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Semivolatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)		X	
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)		X	
	Blank spike (%Recovery)			X
	Control sample (%Recovery)		X	
	Internal standard (Response, RT)		X	
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)		X	
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The initial calibration %RSD was above control limits for Indeno[1,2,3-cd] pyrene, Dibenz[a,h] anthracene and benzaldehyde. Data for these compounds have been qualified as estimated in those samples affected based on the deviations.

The continuing calibration %D was above the acceptable limit due to a decrease in response by 3&4-Methylphenol and Benzaldehyde. Data have been qualified as estimated for 3&4-methylphenol in samples RFI-07-12(8.3-10.3), RFI-07-12(14.3-16.3), RFI-07-DUP-419 , RFI-83/84-46(1.5-3.5), RFI-83/84-46(7.5-9.5), RFI-83/84-46(9.5-11.5), RFI-07-10(00-02), RFI-07-10(06-08), RFI-07-14(00-02), and RFI-83/84-39(1.1-3.1) and data for Benzaldehyde has been qualified as estimated in sample RFI-83/84-39(5.1-7.1) and RFI-07-RB-217 and based on the deviations.

The response for the internal standard perylene-d12, was below control limits in RFI-83/84-46(7.5-9.5). Data have been qualified as estimated for all compounds associated with the deviant internal standard for sample RFI-83/84-46(7.5-9.5).

The MS/MSD %R for sample RFI-07-11(00-02) for compound Benzaldehyde were below the lower control limits. The data for this compound has been qualified as rejected for sample RFI-07-11(00-02).

The LCS %R for Benzaldehyde was below control limits. Data for these analytes have been qualified as rejected in the associated samples based on the deviations.

The LCS %R for Benzaldehyde and bis(2-ethylhexyl) pthalate were below control limits. Data for these analytes have been qualified as rejected for Benzaldehyde and estimated for bis(2-ethylhexyl) pthalate in the associated sample RFI-07-RB-217 based on the deviations.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: PCBs

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)	X		
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)			X
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)			X
	Laboratory duplicate (RPD)	X		
	Field duplicate (RPD)	X		
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

All data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Metals

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%R, R2)	X		
	Continuing calibration (%D)	X		
	Matrix spike (%Recovery)		X	
	Blank spike (%Recovery)			X
	Control sample (%Recovery)		X	
	CRDL standard (%R)			X
	Serial dilution (%D)	X		
	Internal standard (Response)			X
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)		X	
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)	X		
8.	Target analyte concentrations below detection limit in all blank samples		X	

Notes

Cadmium was detected in the instrument blank. Based on the blank content data for cadmium has been qualified as undetected in all samples except RFI-07-RB-217.

Copper, Manganese and Zinc were detected in the instrument blank. Based on the blank content data for Manganese and Zinc have been qualified as undetected in sample RFI-07-RB-217.

The MS/MSD %Rs were below the acceptable limit for manganese. Data for manganese have been qualified as estimated in sample RFI-07-11(00-02).

The MS/MSD %Rs was below the acceptable limit for lead. Data for lead has been qualified as estimated in the associated samples.

The MS/MSD RPD was above control limits for manganese. Data for manganese has been qualified as estimated in all associated samples based on the deviations.

Other than for the deviation noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Analyses performed by:	CT&E, Inc. Luddington, Michigan
Date of Report:	May 5, 2003
Validation performed by:	(Douglas Fischi)
Date of Validation:	May 5, 2003

GENERAL MOTORS CORPORATION
NORTH AMERICAN OPERATIONS
FLINT OPERATIONS SITE

FLINT, MICHIGAN

TIER II
DATA VALIDATION REPORT

SDG# 3031142

VOLATILE AND INORGANIC ANALYSES

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Summary

The following is an assessment of data package 3031142 for sampling in support of the RCRA Facility Investigation at the GM-NAO Flint Operations Site in Flint, Michigan. Included in this assessment are checklists used in the review of the samples and a summary of non-conformances and their impact on the reported data. Analyses were performed on the following samples:

Sample ID	Laboratory ID	Matrix	Sample Date	Analyses				
				VOC	SVOC	PCB	TAL	MISC
55-1(032003)	3031142001	Water	3/20/2003	X				
55-2(032003)	3031142002	Water	3/20/2003	X				
MW-22(032003)	3031142003	Water	3/20/2003	X				
MW-23(032003)	3031142004	Water	3/20/2003	X				
MW-24(032003)	3031142005	Water	3/20/2003	X				
MW-21(032003)	3031142006	Water	3/20/2003	X				
55-5(032003)	3031142007	Water	3/20/2003	X				
Trip Blank(032003)	3031142008	Water	3/20/2003	X				
DUP-420[1]	3031142009	Water	3/20/2003	X				
Trip Blank(032103)	3031142010	Water	3/21/2003	X				
MW-25(032103)	3031142011	Water	3/21/2003	X				
55-3(032103)	3031142012	Water	3/21/2003				X	
55-4(032103)	3031142013	Water	3/21/2003	X			X	
40-305(032103)	3031142014	Water	3/21/2003	X			X	
40-304(032103)	3031142015	Water	3/21/2003	X				
RFI-09-11(032103)	3031142016	Water	3/21/2003	X				
RFI-09-08(032103)	3031142017	Water	3/21/2003	X				
RFI-09-09(032103)	3031142018	Water	3/21/2003	X				
RFI-09-12(032103)	3031142019	Water	3/21/2003	X			X	
RFI-09-44(032103)	3031142020	Water	3/21/2003	X			X	
RFI-09-11(032103)DL	3031142021	Water	3/21/2003	X				
RFI-09-08(032103)DL	3031142022	Water	3/21/2003	X				

[1] Field duplicate of sample 55-1(032003)

Sample Analysis: Volatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)		X	
	Blank spike (%Recovery)			X
	Control sample (%Recovery)		X	
	Internal standard (Response, RT)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)	X		
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The continuing calibration %D was above the acceptable limit due to a decrease in response by chloromethane, 1,1,2,-Trichloro-1,2,2-fluoroethane, carbon disulfide and bromomethane. Data for chloromethane, 1,1,2,-Trichloro-1,2,2-fluoroethane and carbon disulfide have been qualified as estimated in samples 55-1(032003), 55-2(032003), MW-22(032003), MW-23(032003), MW-24(032003), MW-21(032003), 55-5(032003), Trip Blank(032003), and DUP-420 based on the deviations. Data for chloromethane, bromomethane and carbon disulfide have been qualified as estimated in samples Trip Blank(032103), MW-25(032103), 55-4(032103), 40-305(032103), 40-304(032103), RFI-09-11(032103), RFI-09-08(032103), RFI-09-09(032103), RFI-09-12(032103), and RFI-09-44(032103) based on the deviations.

The LCS %R was above control limits for methyl acetate. Data for methyl acetate has been qualified as estimated in samples Trip Blank(032103), MW-25(032103), 55-4(032103), 40-305(032103), 40-304(032103), RFI-09-11(032103), RFI-09-08(032103), RFI-09-09(032103), RFI-09-12(032103), and RFI-09-44(032103) based on the deviation.

The MS %R was below control limits for carbon disulfide. Data for carbon disulfide have been qualified as estimated in sample 55-5(032003) based on the deviation.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Metals

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%R, R2)	X		
	Continuing calibration (%D)	X		
	Matrix spike (%Recovery)	X		
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	CRDL standard (%R)			X
	Serial dilution (%D)	X		
	Internal standard (Response)			X
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)	X		
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

Other than for the deviation noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Analyses performed by:	CT&E, Inc. Luddington, Michigan
Date of Report:	May 6, 2003
Validation performed by:	(Douglas Fischi)
Date of Validation:	May 6, 2003

GENERAL MOTORS CORPORATION
NORTH AMERICAN OPERATIONS
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FLINT, MICHIGAN

TIER II
DATA VALIDATION REPORT

SDG# 3031193

VOLATILE, SEMIVOLATILE,
PCB AND INORGANIC ANALYSES

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Summary

The following is an assessment of data package 3031193 for sampling in support of the RCRA Facility Investigation at the GM-NAO Flint Operations Site in Flint, Michigan. Included in this assessment are checklists used in the review of the samples and a summary of non-conformances and their impact on the reported data. Analyses were performed on the following samples:

Sample ID	Laboratory ID	Matrix	Sample Date	Analyses				
				VOC	SVOC	PCB	TAL	MISC
RFI-07-11(08-10)	3031193001	Soil	3/24/2003	X	X	X	X	
RFI-07-11(12-14)	3031193002	Soil	3/24/2003	X	X	X	X	
RFI-40-12(00-02)	3031193003	Soil	3/24/2003	X	X	X	X	
RFI-40-12(08-10)	3031193004	Soil	3/24/2003	X	X	X	X	
RFI-40-12(12-14)	3031193005	Soil	3/24/2003	X	X	X	X	
RFI-07-TB(032403)	3031193006	Water	3/24/2003	X				
RFI-40-13(0.5-2.5)	3031193007	Soil	3/25/2003	X	X	X	X	
RFI-40-13(8.5-10.5)	3031193008	Soil	3/25/2003	X	X	X	X	
RFI-40-13(12.5-14.5)	3031193009	Soil	3/25/2003	X	X	X	X	
RFI-40-14(0.5-2.5)	3031193010	Soil	3/25/2003	X	X	X	X	
RFI-40-14(4.5-6.5)	3031193011	Soil	3/25/2003	X	X	X	X	
RFI-40-TB(032503)	3031193012	Water	3/25/2003	X				
RFI-40-DUP-422[2]	3031193013	Soil	3/25/2003	X	X	X	X	
RFI-40-RB-218	3031193014	Water	3/26/2003	X	X	X	X	
RFI-36-50(02-04)	3031193015	Soil	3/26/2003	X	X	X	X	
RFI-36-50(08-10)	3031193016	Soil	3/26/2003	X	X	X	X	
RFI-36-50(10-12)[1]	3031193017	Soil	3/26/2003	X	X	X	X	
RFI-36-51(00-02)	3031193018	Soil	3/26/2003	X	X	X	X	
RFI-36-51(08-10)	3031193019	Soil	3/26/2003	X	X	X	X	
RFI-36-51(10-12)	3031193020	Soil	3/26/2003	X	X	X	X	
RFI-36-TB(032603)	3031193021	Water	3/26/2003	X				
RFI-40-12(00-02)RE	3031193022	Soil	3/24/2003	X				
RFI-40-12(00-02)DL	3031193023	Soil	3/24/2003	X				

[1] MS/MSD analysis performed on sample
[2] Field duplicate of sample RFI-40-13(8.5-10.5)

Sample Analysis: Volatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)	X		
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	Internal standard (Response, RT)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)	X		
8.	Target analyte concentrations below detection limit in all blank samples		X	

Notes

The continuing calibration %D was above the acceptable limit due to a decrease in response by 1,1,2-Trichloro-1,2,2-fluoroethane, acetone, carbon disulfide, methyl acetate, 2-butanone (MEK), methyl cyclohexane, 4-methyl-2-pentanone (MIBK), 2-hexanone, 1,1,2,2-tetrachloroethane, bromomethane and chloromethane. Data for 1,1,2-Trichloro-1,2,2-fluoroethane, acetone, carbon disulfide, methyl acetate, 2-butanone (MEK), methyl cyclohexane, 4-methyl-2-pentanone (MIBK), 2-hexanone, and 1,1,2,2-tetrachloroethane have been qualified as estimated in samples RFI-07-11(12-14), RFI-40-12(08-10), RFI-40-12(12-14), RFI-40-13(0.5-2.5), RFI-40-13(8.5-10.5), RFI-40-13(12.5-14.5), RFI-40-14(0.5-2.5), RFI-40-14(4.5-6.5), and RFI-40-DUP-422 based on the deviations. Data for bromomethane and chloromethane have been qualified as estimated in samples RFI-07-TB(032403), RFI-36-TB(032603), RFI-40-TB(032503) and RFI-40-RB-218 based on the deviations.

Methylene chloride was detected in the method blank. Associated sample results below the blank action limit were qualified as non-detect.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Semivolatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)		X	
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)	X		
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	Internal standard (Response, RT)		X	
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The initial calibration %RSD was above control limits for Indeno[1,2,3-cd] pyrene, dibenz[a,h] anthracene and benzaldehyde. Data for these compounds have been qualified as estimated in the associated samples based on the deviations.

The continuing calibration %D was above the acceptable limit due to a decrease in response by benzaldehyde, 3&4-Methylphenol and atrazine. Data have been qualified as estimated for benzaldehyde and 3&4-methylphenol in samples RFI-07-11(08-10), RFI-07-11(12-14), RFI-40-12(08-10), RFI-40-12(12-14), RFI-40-13(8.5-10.5), RFI-40-13(12.5-14.5), RFI-40-14(4.5-6.5), RFI-40-DUP-422 , RFI-36-50(02-04), RFI-36-50(08-10), RFI-40-13(0.5-2.5), RFI-40-14(0.5-2.5), RFI-40-12(00-02), RFI-36-50(10-12), RFI-36-51(08-10), RFI-36-51(10-12) and RFI-36-51(00-02) based on the deviations.

The response for one internal standard, perylene-d12, was below control limits in sample RFI-40-12(00-02). Data have been qualified as estimated for all compounds associated with the deviant internal standard.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: PCBs

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)	X		
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)			X
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)			X
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

All data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Metals

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%R, R2)	X		
	Continuing calibration (%D)	X		
	Matrix spike (%Recovery)		X	
	Blank spike (%Recovery)			X
	Control sample (%Recovery)		X	
	CRDL standard (%R)			X
	Serial dilution (%D)		X	
	Internal standard (Response)			X
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples		X	

Notes

The MS/MSD %Rs were below the acceptable limit of 30% for antimony. Data for antimony have been qualified as estimated in samples RFI-07-11(08-10), RFI-07-11(12-14), RFI-40-12(00-02), RFI-40-12(08-10), RFI-40-13(0.5-2.5), RFI-40-13(8.5-10.5), RFI-40-13(12.5-14.5), RFI-40-14(0.5-2.5), RFI-40-14(4.5-6.5), RFI-40-DUP-422, RFI-36-50(02-04), RFI-36-50(08-10), RFI-36-50(10-12), RFI-36-51(00-02), RFI-36-51(08-10), RFI-36-51(10-12) and rejected in sample RFI-40-12(12-14) based on the deviations.

The serial dilution RPD was below control limits for manganese and zinc. Data for the manganese and zinc have been qualified as estimated in samples RFI-07-11(08-10), RFI-07-11(12-14), RFI-40-12(00-02), RFI-40-12(08-10), RFI-40-12(12-14), RFI-40-13(0.5-2.5), RFI-40-13(8.5-10.5), RFI-40-13(12.5-14.5), RFI-40-14(0.5-2.5), RFI-40-14(4.5-6.5), RFI-40-DUP-422, RFI-36-50(02-04), RFI-36-50(08-10), RFI-36-50(10-12), RFI-36-51(00-02), RFI-36-51(08-10) and RFI-36-51(10-12) based on the deviations.

Cadmium and Selenium were detected in the method blank. Associated sample results below the blank action limit were qualified as non-detect.

Other than for the deviation noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Analyses performed by:	CT&E, Inc. Luddington, Michigan
Date of Report:	May 12, 2003
Validation performed by:	(Douglas Fischi)
Date of Validation:	May 12, 2003

GENERAL MOTORS CORPORATION
NORTH AMERICAN OPERATIONS
FLINT OPERATIONS SITE

FLINT, MICHIGAN

TIER II
DATA VALIDATION REPORT

SDG# 3031194

VOLATILE, SEMIVOLATILE, PCB AND INORGANIC ANALYSES

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Summary

The following is an assessment of data package 3031194 for sampling in support of the RCRA Facility Investigation at the GM-NAO Flint Operations Site in Flint, Michigan. Included in this assessment are checklists used in the review of the samples and a summary of non-conformances and their impact on the reported data. Analyses were performed on the following samples:

Sample ID	Laboratory ID	Matrix	Sample Date	Analyses				
				VOC	SVOC	PCB	TAL	MISC
Trip Blank(032403)GW	3031194001	Water	3/25/2003	X				
RFI-09-04R(032403)	3031194002	Water	3/24/2003	X				
MW-26(032403)	3031194003	Water	3/24/2003	X				
RFI-09-01(032403)	3031194004	Water	3/24/2003	X				
RFI-94-07(032403)[2]	3031194005	Water	3/24/2003	X	X			
40-2(032403)	3031194006	Water	3/24/2003	X				
40-3(032403)	3031194007	Water	3/24/2003	X				
RFI-44-05(032403)	3031194008	Water	3/24/2003			X	X	
RFI-84-05(032403)	3031194009	Water	3/24/2003	X				
DUP-421[1]	3031194010	Water	3/24/2003			X		
40-4R(032403)	3031194011	Water	3/24/2003	X			X	
RFI-09-36R(032403)	3031194012	Water	3/24/2003	X				
36-FP8(032503)	3031194013	Water	3/25/2003	X			X	
RFI-36-47(032503)	3031194014	Water	3/25/2003	X				
RFI-36-45(032503)	3031194015	Water	3/25/2003	X				
RFI-36-44(032503)[3]	3031194016	Water	3/25/2003	X				
RFI-36-03(032503)	3031194017	Water	3/25/2003	X			X	
RFI-36-46(032503)	3031194018	Water	3/25/2003	X			X	
RFI-36-09(032503)	3031194019	Water	3/25/2003				X	
RFI-38-06(032503)	3031194020	Water	3/25/2003				X	
RFI-38-04(032503)	3031194021	Water	3/25/2003				X	
RFI-36-02(032503)	3031194022	Water	3/25/2003				X	
RFI-DUP-423	3031194023	Water	3/25/2003	X				
Trip Blank(032403)S	3031194024	Water	3/24/2003	X				
RFI-36-08(032503)	3031194025	Water	3/25/2003	X			X	
36-100(032503)	3031194026	Water	3/25/2003	X			X	
36-FP2(032503)	3031194027	Water	3/25/2003	X			X	
40-305(032503)	3031194028	Water	3/25/2003	X			X	
40-2(032403)DL	3031194029	Water	3/24/2003	X				
40-4R(032403)DL	3031194030	Water	3/24/2003	X				
RFI-36-45(032503)DL	3031194032	Water	3/25/2003	X				
RFI-36-03(032503)DL	3031194033	Water	3/25/2003	X				
RFI-DUP-423DL	3031194034	Water	3/25/2003	X				
RFI-36-08(032503)DL	3031194035	Water	3/25/2003	X				
36-100(032503)DL	3031194036	Water	3/25/2003	X				
36-FP2(032503)DL	3031194037	Water	3/25/2003	X				

[1] Field duplicate of sample RFI-44-05(032403)
[2] Field duplicate of sample RFI-36-45(032503)
[3] MS/MSD analysis performed on sample

Sample Analysis: Volatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)		X	
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	Internal standard (Response, RT)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The continuing calibration %D was above the acceptable limit due to a decrease in response by bromomethane, chloromethane, carbon disulfide and methyl cyclohexane. Data for bromomethane, chloromethane and carbon disulfide have been qualified as estimated in Trip Blank(032403)GW, Trip Blank(032403)S, RFI-36-44(032503), RFI-09-04R(032403), MW-26(032403), RFI-09-01(032403) and 40-2(032403) based on the deviations. Data for bromomethane chloromethane, carbon disulfide and methyl cyclohexane have been qualified as estimated in 40-3(032403), RFI-84-05(032403), 40-4R(032403), 36-FP8(032503), RFI-36-47(032503), RFI-36-45(032503), RFI-36-46(032503), RFI-DUP-423, 36-100(032503), 36-FP2(032503), RFI-09-36R(032403), RFI-36-03(032503) and RFI-36-08(032503).

The MS %R was below control limits for 1,1-Dichloroethane, carbon disulfide and methyl cyclohexane. Data for these compounds have been qualified as estimated in sample RFI-36-44(032503) based on the deviations.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Semivolatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)		X	
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)			X
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	Internal standard (Response, RT)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)			X
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The initial calibration %RSD was above control limits for Indeno[1,2,3-cd] pyrene, Dibenz[a,h] anthracene and benzaldehyde. Data for Indeno[1,2,3-cd] pyrene, Dibenz[a,h] anthracene and benzaldehyde have been qualified as estimated in sample RFI-94-07(032403) based on the deviations.

The continuing calibration %D was above the acceptable limit due to a decrease in response by 3&4-Methylphenol, Atrazine and 3,3'-Dichlorobenzidine. Data have been qualified as estimated for 3&4-Methylphenol, Atrazine and 3,3'-Dichlorobenzidine in sample RFI-94-07(032403) based on the deviations.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: PCBs

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)	X		
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)			X
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)			X
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)	X		
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

All data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Metals

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%R, R2)	X		
	Continuing calibration (%D)	X		
	Matrix spike (%Recovery)		X	
	Blank spike (%Recovery)			X
	Control sample (%Recovery)		X	
	CRDL standard (%R)			X
	Serial dilution (%D)	X		
	Internal standard (Response)			X
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)		X	
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)	X		
8.	Target analyte concentrations below detection limit in all blank samples		X	

Notes

The MSD %Rs were below the acceptable limit for barium and zinc. Data for barium and zinc have been qualified as estimated in the associated based on the deviations.

Zinc was detected in the method blank. Based on the blank content data for zinc have been qualified as undetected in all samples except for RFI-36-03(032502).

The ICP interference check sample %R for Zinc was above control limits. Data for sample RFI-36-03(032502) has been qualified as estimated based on the deviation.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Analyses performed by:	CT&E, Inc. Luddington, Michigan
Date of Report:	May 8, 2003
Validation performed by:	(Douglas Fischi)
Date of Validation:	May 8, 2003

GENERAL MOTORS CORPORATION
NORTH AMERICAN OPERATIONS
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FLINT, MICHIGAN

TIER II
DATA VALIDATION REPORT

SDG# 3031233

VOLATILE, PCB AND INORGANIC ANALYSES

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Summary

The following is an assessment of data package 3031233 for sampling in support of the RCRA Facility Investigation at the GM-NAO Flint Operations Site in Flint, Michigan. Included in this assessment are checklists used in the review of the samples and a summary of non-conformances and their impact on the reported data. Analyses were performed on the following samples:

Sample ID	Laboratory ID	Matrix	Sample Date	Analyses				
				VOC	SVOC	PCB	TAL	MISC
RFI-10-03(032503)	3031233001	Water	3/25/2003	X			X	
RFI-36-14(032503)[4]	3031233002	Water	3/25/2003				X	
RFI-55-01(032603)	3031233003	Water	3/26/2003	X				
20-121(032603)	3031233004	Water	3/26/2003	X				
RFI-55-09(032603)	3031233005	Water	3/26/2003	X				
RFI-10-04(032603)	3031233006	Water	3/26/2003				X	
RFI-10-05(032603)	3031233007	Water	3/26/2003	X			X	
RFI-10-24(032603)	3031233008	Water	3/26/2003	X				
RFI-10-25(032603)[1]	3031233009	Water	3/26/2003	X				
RFI-10-07(032603)	3031233010	Water	3/26/2003	X				
RFI-09-13(032603)	3031233011	Water	3/26/2003	X				
RFI-DUP-424	3031233012	Water	3/25/2003				X	
Trip Blank(032503)	3031233013	Water	3/25/2003	X				
RFI-55-02(032503)	3031233014	Water	3/25/2003				X	
20-500(032603)	3031233015	Water	3/26/2003	X				
20-105R(032603)	3031233016	Water	3/26/2003	X				
RFI-10-06(032603)	3031233017	Water	3/26/2003	X				
70-109(032603)	3031233018	Water	3/26/2003	X				
RFI-16-11(032603)	3031233019	Water	3/26/2003	X				
RFI-02-12(032603)	3031233020	Water	3/26/2003				X	
RFI-40-09(032603)	3031233021	Water	3/26/2003	X				
RFI-10-01(032603)	3031233022	Water	3/26/2003				X	
RFI-10-11(032603)[2,3]	3031233023	Water	3/26/2003				X	
70-100(032603)	3031233024	Water	3/26/2003	X				
04-04(032703)[1]	3031233025	Water	3/27/2003			X		
20-FP6(032703)	3031233026	Water	3/27/2003	X				
20-101RD(032703)	3031233027	Water	3/27/2003	X				
40-303R(032703)	3031233028	Water	3/27/2003	X			X	
20-101RD(032703)DL	3031233029	Water	3/27/2003	X				
RFI-10-03(032503)DL	3031233030	Water	3/25/2003	X				
20-121(032603)DL	3031233031	Water	3/26/2003	X				
RFI-10-05(032603)DL	3031233032	Water	3/26/2003	X				
20-105R(032603)DL	3031233033	Water	3/26/2003	X				
RFI-10-06(032603)DL	3031233034	Water	3/26/2003	X				
RFI-40-09(032603)DL	3031233035	Water	3/26/2003	X				
RFI-09-13(032603)DL	3031233036	Water	3/26/2003	X				

[1] MS/MSD analysis performed on sample (8260 and 8082 only)
[2] MS/MSD analysis performed on sample (metals only)
[3] MS/MSD analysis performed on sample (Cyanide only)
[4] Field duplicate of sample RFI-36-14(032503)

Sample Analysis: Volatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)		X	
	Blank spike (%Recovery)			X
	Control sample (%Recovery)		X	
	Internal standard (Response, RT)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)	X		
8.	Target analyte concentrations below detection limit in all blank samples		X	

Notes

The continuing calibration %D was above the acceptable limit due to a decrease in response by carbon disulfide. Data for carbon disulfide has been qualified as estimated in samples Trip Blank(032503), 70-100(032603), 70-109(032603), and 40-303R(032703) based on the deviations.

The MS/MSD %R was below control limits for carbon disulfide, methyl acetate and methyl cyclohexane. Data for carbon disulfide, methyl acetate and methyl cyclohexane have been qualified as estimated in sample RFI-10-25(032603) based on the deviation.

The LCS %R was above control limits for methyl acetate. Data for methyl acetate have been qualified as estimated in samples Trip Blank(032503), 70-109(032603), 70-100(032603), and 40-303R(032703) based on the deviations.

Methylene Chloride was detected in the method blanks. All data associated with the method blanks (except for sample RFI-10-05(032603)) were non-detects for methylene chloride and therefore no

qualification was necessary. Sample RFI-10-05(032603) contained methylene chloride at a level higher than the blank action limit and therefore no qualification was necessary.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: PCBs

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)	X		
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)	X		
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

All data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Metals

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%R, R2)	X		
	Continuing calibration (%D)	X		
	Matrix spike (%Recovery)		X	
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	CRDL standard (%R)			X
	Serial dilution (%D)	X		
	Internal standard (Response)			X
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)	X		
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The MS %R was below the acceptable limit for silver. Data for silver have been qualified as estimated in samples RFI-10-03(032503), RFI-36-14(032503), RFI-10-04(032603), RFI-10-5(032603), RFI-DUP-424, RFI-55-02(032503), 20-500(032603), 20-105R(032603), RFI-10-06(032603), RFI-02-12(032603), RFI-10-01(032603), RFI-10-11(032603) and 40-303R(032703) based on the deviations.

Other than for the deviation noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Analyses performed by:	CT&E, Inc. Luddington, Michigan
Date of Report:	May 13, 2003
Validation performed by:	(Douglas Fischi)
Date of Validation:	May 13, 2003

GENERAL MOTORS CORPORATION
NORTH AMERICAN OPERATIONS
FLINT OPERATIONS SITE

FLINT, MICHIGAN

TIER II
DATA VALIDATION REPORT

SDG# 3031269

VOLATILE AND INORGANIC ANALYSES

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Summary

The following is an assessment of data package 3031269 for sampling in support of the RCRA Facility Investigation at the GM-NAO Flint Operations Site in Flint, Michigan. Included in this assessment are checklists used in the review of the samples and a summary of non-conformances and their impact on the reported data. Analyses were performed on the following samples:

Sample ID	Laboratory ID	Matrix	Sample Date	Analyses				
				VOC	SVOC	PCB	TAL	MISC
RFI-40-03(032703)	3031269001	Water	3/27/2003	X				
RFI-36-10(032703)	3031269002	Water	3/27/2003				X	
TRIPBLANK(032603)	3031269003	Water	3/26/2003	X				
RFI-DUP-427[5]	3031269004	Water	3/27/2003				X	
20-102(032703)	3031269005	Water	3/27/2003	X			X	
RFI-10-26(032703)	3031269006	Water	3/27/2003				X	
RFI-05-21(032703)	3031269007	Water	3/27/2003				X	
RFI-81-03(032703)	3031269008	Water	3/27/2003				X	
RFI-02-07(032703)	3031269009	Water	3/27/2003				X	
RFI-05-08R(032703)	3031269010	Water	3/27/2003				X	
RFI-10-02(032703)	3031269011	Water	3/27/2003	X			X	
RFI-10-02d(032703)	3031269012	Water	3/27/2003	X			X	
RFI-DUP-428[6]	3031269013	Water	3/27/2003				X	
36-FP1(032703)	3031269014	Water	3/27/2003	X			X	
30-140(032703)	3031269015	Water	3/27/2003	X			X	
70-165(032803)[3]	3031269016	Water	3/28/2003				X	
70-163(032803)	3031269017	Water	3/28/2003				X	
70-160(032803)	3031269018	Water	3/28/2003				X	
RFI-DUP-429[7]	3031269019	Water	3/28/2003				X	
RFI-05-19S(032803)[1,2]	3031269020	Water	3/28/2003	X			X	
RFI-DUP-426[4]	3031269021	Water	3/28/2003	X				
RFI-81-13(032703)	3031269022	Water	3/27/2003				X	
Trip Blank(032803)	3031269023	Water	3/28/2003	X				
RFI-40-03(032703)DL	3031269024	Water	3/27/2003	X				
RFI-10-02(032703)DL	3031269026	Water	3/27/2003	X				
36-FP1(032703)DL	3031269027	Water	3/27/2003	X				

1 MS/MSD analysis performed on sample (8260)
2 MS/MSD analysis performed on sample (metals only)
3 MS/MSD analysis performed on sample (Cyanide only)
4 Field duplicate of sample RFI-05-19S(032803)
5 Field duplicate of sample RFI-36-10(032703)
6 Field duplicate of sample RFI-10-02(032703)
7 Field duplicate of sample 70-160(032803))

Sample Analysis: Volatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)	X		
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)		X	
	Blank spike (%Recovery)			X
	Control sample (%Recovery)		X	
	Internal standard (Response, RT)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)	X		
8.	Target analyte concentrations below detection limit in all blank samples		X	

Notes

The LCS %R was below control limits for methyl acetate and 1,2-dibromo-3-chloropropane. Data for methyl acetate has been qualified as estimated in samples RFI-40-03(032703), 20-102(032703), 36-FP1(032703) and 30-140(032703) based on the deviation. Data for 1,2-dibromo-3-chloropropane has been qualified as estimated in sample 20-102(032703) based on the deviation.

The MS/MSD %R was above control limits for vinyl chloride. Data for vinyl chloride has been qualified as estimated in sample RFI-05-19S(032803) based on the deviation.

Methylene chloride was detected in the method blank. Methylene chloride was not detected in any of the associated samples.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Metals

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%R, R2)	X		
	Continuing calibration (%D)	X		
	Matrix spike (%Recovery)		X	
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	CRDL standard (%R)			X
	Serial dilution (%D)	X		
	Internal standard (Response)			X
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)	X		
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The MS %R was below the acceptable limit for cyanide. Data for cyanide has been qualified as estimated in the associated samples based on the deviations.

Other than for the deviation noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Analyses performed by:	CT&E, Inc. Luddington, Michigan
Date of Report:	July 1, 2003
Validation performed by:	(Douglas Fischi)
Date of Validation:	July 1, 2003

GENERAL MOTORS CORPORATION
NORTH AMERICAN OPERATIONS
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FLINT, MICHIGAN

TIER II
DATA VALIDATION REPORT

SDG# 3031245

VOLATILE, SEMIVOLATILE,
PCB AND INORGANIC ANALYSES

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Summary

The following is an assessment of data package 3031245 for sampling in support of the RCRA Facility Investigation at the GM-NAO Flint Operations Site in Flint, Michigan. Included in this assessment are checklists used in the review of the samples and a summary of non-conformances and their impact on the reported data. Analyses were performed on the following samples:

Sample ID	Laboratory ID	Matrix	Sample Date	Analyses				
				VOC	SVOC	PCB	TAL	MISC
RFI-36-RB-219	3031245001	Water	3/27/2003	X				
RFI-10-31(01-03) [1]	3031245002	Soil	3/27/2003	X	X	X	X	
RFI-10-30(00-02)	3031245003	Soil	3/27/2003	X	X	X	X	
RFI-10-30(02-04)	3031245004	Soil	3/27/2003	X	X	X	X	
RFI-10-TB(032703)	3031245005	Water	3/27/2003	X				
RFI-10-DUP-425 [2]	3031245006	Soil	3/27/2003	X	X	X	X	
RFI-12-24(01-03)	3031245007	Soil	3/28/2003	X	X	X	X	
RFI-12-24(05-07)	3031245008	Soil	3/28/2003	X	X	X	X	
RFI-12-25(01-03)	3031245009	Soil	3/28/2003	X	X	X	X	
RFI-12-TB(032803)	3031245010	Water	3/28/2003	X				
RFI-12-26(01-03)	3031245011	Soil	3/31/2003	X	X	X	X	
RFI-12-26(06-08)	3031245012	Soil	3/31/2003	X	X	X	X	
RFI-12-26(09-11)	3031245013	Soil	3/31/2003	X	X	X	X	
RFI-12-26(11-13)	3031245014	Soil	3/31/2003	X	X	X	X	
RFI-12-TB(033103)	3031245015	Water	3/31/2003	X				
RFI-12-26(06-08)RE	3031245016	Soil	3/31/2003	X				
RFI-12-26(09-11)RE	3031245017	Soil	3/31/2003	X				
RFI-12-26(11-13)RE	3031245018	Soil	3/31/2003	X				

[1] MS/MSD analysis performed on sample (metals, 8082, 8260 and 8270)
[2] Field duplicate of sample RFI-10-30(00-02)

Sample Analysis: Volatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)	X		
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)		X	
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	Internal standard (Response, RT)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)	X		
8.	Target analyte concentrations below detection limit in all blank samples		X	

Notes

The MS/MSD %R was above control limits for dichlorodifluoromethane. Data for dichlorodifluoromethane has been qualified as estimated in sample RFI-12-24(01-03) based on the deviation.

Methylene chloride was detected in the method blank. Based on the blank content, data for methylene chloride have been qualified as undetected in samples RFI-10-30(00-02), RFI-10-30(02-04), RFI-10-DUP-425, RFI-12-24(01-03), RFI-12-24(05-07), RFI-12-26(01-03), RFI-12-26(06-08), RFI-12-26(09-11) and RFI-12-26(11-13).

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Semivolatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)		X	
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)		X	
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	Internal standard (Response, RT)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)		X	
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The initial calibration %RSD was above control limits for Indeno[1,2,3-cd] pyrene, Dibenz[a,h] anthracene and benzaldehyde. Data for Indeno[1,2,3-cd] pyrene, Dibenz[a,h] anthracene and benzaldehyde have been qualified as estimated in the associaed samples based on the deviations.

The continuing calibration %D was above the acceptable limit due to a decrease in response by benzaldehyde, 3&4-Methylphenol and atrazine. Data have been qualified as estimated for benzaldehyde, 3&4-methylphenol and atrazine in the associated samples based on the deviations.

Data have been qualified as estimated for benzaldehyde, 3&4-methylphenol and 4-nitroaniline in the associated samples based on the deviations. Data have been qualified as estimated in the associated samples based on the deviations.

The response for two internal standards, chrysene-d12 and perylene-d12, were below control limits in samples RFI-12-26(06-08), RFI-12-26(09-11) and RFI-12-26(11-13). Data have been qualified as estimated for all compounds associated with the deviant internal standard.

The MS %R was below lower control limits for 2,4-Dinitrophenol (0%), 2-Methyl-4,6-dinitrophenol (0%), 3,3'-dichlorobenzidine(0%), 4-chloroaniline(0%), 4-nitrophenol(0%). Data for these compounds have been qualified as rejected in sample RFI-10-31(01-03) based on the deviations.

The MS %R was below control limits for benzaldehyde, 2,6-dinitrotoluene, 2-nitrophenol and pentachlorophenol. Data for these compounds have been qualified as estimated in sample RFI-10-31(01-03) based on the deviations.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: PCBs

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)	X		
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)		X	
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)		X	
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)	X		
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The RPD was above the control limit for Aroclor 1260. Data for Aroclor 1260 have been qualified as estimated in sample RFI-10-31(01-03) based on the deviations.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Metals

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%R, R2)	X		
	Continuing calibration (%D)	X		
	Matrix spike (%Recovery)		X	
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	CRDL standard (%R)			X
	Serial dilution (%D)	X		
	Internal standard (Response)			X
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The MS %R were above control limits for beryllium, copper, mercury and zinc. Data for beryllium, copper, mercury and zinc have been qualified as estimated in the associated samples based on the deviation.

Zinc was detected in the method blank. The associated samples contained zinc amounts greater than 10 times the level of the blank therefore no qualification was necessary.

Other than for the deviation noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Analyses performed by:	CT&E, Inc. Luddington, Michigan
Date of Report:	June 24, 2003
Validation performed by:	(Douglas Fischi)
Date of Validation:	June 24, 2003

GENERAL MOTORS CORPORATION
NORTH AMERICAN OPERATIONS
FLINT OPERATIONS SITE

FLINT, MICHIGAN

TIER II
DATA VALIDATION REPORT

SDG# 3031291

VOLATILE, SEMIVOLATILE,
PCB AND INORGANIC ANALYSES

BBL
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engineers & scientists

Summary

The following is an assessment of data package 3031291 for sampling in support of the RCRA Facility Investigation at the GM-NAO Flint Operations Site in Flint, Michigan. Included in this assessment are checklists used in the review of the samples and a summary of non-conformances and their impact on the reported data. Analyses were performed on the following samples:

Sample ID	Laboratory ID	Matrix	Sample Date	Analyses				
				VOC	SVOC	PCB	TAL	MISC
Trip Blank(033103)	3031291001	Water	3/31/2003	X				
RFI-05-01(033103)	3031291002	Water	3/31/2003	X				
03-114R(033103)	3031291003	Water	3/31/2003	X				
RFI-09-14(033103)	3031291004	Water	3/31/2003	X				
RFI-09-32(033103)	3031291005	Water	3/31/2003	X			X	
Trip Blank(033103)gw	3031291006	Water	3/31/2003	X				
RFI-83/84-11(040103)	3031291007	Water	4/1/2003	X				
RFI-65-01(040103)	3031291008	Water	4/1/2003	X				
20-140(033103)[1,2]	3031291009	Water	3/31/2003	X			X	
86-100(040103)	3031291010	Water	4/1/2003	X			X	
RFI-81-09(040103)	3031291011	Water	4/1/2003	X				
88-9(040103)	3031291012	Water	4/1/2003	X				
RFI-44-06R(040103)A	3031291013	Water	4/1/2003			X		
RFI-44-06R(040103)B	3031291014	Water	4/1/2003	X	X			
RFI-DUP-432[4]	3031291015	Water	4/1/2003	X				
RFI-81-08(040103)	3031291016	Water	4/1/2003	X			X	
RFI-81-11(040103)[3]	3031291017	Water	4/1/2003	X			X	
88-9(040103)DL	3031291018	Water	4/1/2003	X				
RFI-DUP-432DL	3031291019	Water	4/1/2003	X				

1 MS/MSD analysis performed on sample (8260 only)
2 MS/MSD analysis performed on sample (metals only)
3 MS/MSD analysis performed on sample (Cyanide only)
4 Field duplicate of sample 88-9(040103)

Sample Analysis: Volatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)	X		
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)	X		
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	Internal standard (Response, RT)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)	X		
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The LCS %R was below control limits for 1,2-Dibromo-3-chloropropane. Data for 1,2-Dibromo-3-chloropropane have been qualified as estimated in the associated samples based on the deviation.

The MS %R was above control limits for Vinyl chloride. Positive data for vinyl chloride has been qualified in sample 20-140(033103) based on the deviation.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Semivolatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)		X	
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)			X
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	Internal standard (Response, RT)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)			X
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The initial calibration %RSD was above control limits for benzaldehyde and 4-chloroaniline. Data for benzaldehyde and 4-chloroaniline have been qualified as estimated in sample RFI-44-06R(040103)B based on the deviations.

The continuing calibration %D was above the acceptable limit due to a decrease in response by 3&4-Methylphenol and benzaldehyde. Data have been qualified as estimated for by 3&4-Methylphenol and benzaldehyde in sample RFI-44-06R(040103)B based on the deviations.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: PCBs

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)	X		
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)			X
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)			X
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

All data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Metals

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%R, R2)	X		
	Continuing calibration (%D)	X		
	Matrix spike (%Recovery)		X	
	Blank spike (%Recovery)			X
	Control sample (%Recovery)		X	
	CRDL standard (%R)			X
	Serial dilution (%D)	X		
	Internal standard (Response)			X
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)		X	
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)	X		
8.	Target analyte concentrations below detection limit in all blank samples		X	

Notes

The MS %R was above control limits for manganese. Positive data for manganese has been qualified as estimated in the associated samples based on the deviations.

Other than for the deviation noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Analyses performed by:	CT&E, Inc. Luddington, Michigan
Date of Report:	May 14, 2003
Validation performed by:	(Douglas Fischi)
Date of Validation:	May 14, 2003

GENERAL MOTORS CORPORATION
NORTH AMERICAN OPERATIONS
FLINT OPERATIONS SITE

FLINT, MICHIGAN

TIER II
DATA VALIDATION REPORT

SDG# 3031340

VOLATILE, SEMIVOLATILE,
PCB AND INORGANIC ANALYSES

BBL
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Summary

The following is an assessment of data package 3031340 for sampling in support of the RCRA Facility Investigation at the GM-NAO Flint Operations Site in Flint, Michigan. Included in this assessment are checklists used in the review of the samples and a summary of non-conformances and their impact on the reported data. Analyses were performed on the following samples:

Sample ID	Laboratory ID	Matrix	Sample Date	Analyses				
				VOC	SVOC	PCB	TAL	MISC
05-North (040103)NL	3031340001	NL	04/01/2003			X		
05-East (040103)NL	3031340002	NL	04/01/2003			X		
RFI-12-12 (040203)NL	3031340003	NL	04/02/2003	X	X	X	X	X
09-47 (040203)NL	3031340004	NL	04/02/2003	X	X	X	X	X
20-503 (040203)NL	3031340005	NL	04/02/2003	X	X	X	X	X

NL- Non-Aqueous Liquid

Sample Analysis: Volatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)			X
	Blank spike (%Recovery)			X
	Control sample (%Recovery)		X	
	Internal standard (Response, RT)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)			X
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The laboratory control sample recoveries were above control limits for chloromethane and dichlorodifluoromethane. Since all samples were non-detect for the listed compounds, no data have been qualified based on the deviations.

The continuing calibration %D were above control limits due to a decrease in response by several compounds. Based on the %D, data have been qualified as estimated for methyl acetate, 2-butanone and 1,2-dibromo-3-chloropropane.

Sample 09-47 (040203)NL contained cyclohexane, ethylbenzene, methyl cyclohexane, o-xylene, p&m-xylene and toluene above the linear range. Data for the listed compounds have been replaced with data from the dilution analysis.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Semivolatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)		X	
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)			X
	Blank spike (%Recovery)			X
	Control sample (%Recovery)			X
	Internal standard (Response, RT)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)			X
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The initial calibration was above control limits for several compounds. Data for benzaldehyde have been qualified as estimated in all samples, positive data for 4-chloroaniline, hexachlorocyclopentadiene, 2,4-dinitrophenol and pentachlorophenol have been qualified as estimated in sample RFI-12-23 (040203)NL and positive data for 2,4-dinitrophenol, pentachlorophenol and di-n-octylphthalate have been qualified as estimated in samples 09-47 (040203)NL and 20-503 (040203)NL based on the deviations.

The continuing calibration %D were above the control limits due to a decrease in response by 3&4-methylphenol, benzaldehyde and 3,3'-dichlorobenzidine. Data have been qualified as estimated for benzaldehyde, 3&4-Methylphenol and 3,3'-dichlorobenzidine in samples 09-47 (040203) NL and 20-503 (040203)NL and benzaldehyde and 3&4-methylphenol in sample RFI-12-23 (040203)NL based on the deviations.

Other than for the deviations noted in this review, all data quality parameters were within method

specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: PCBs

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)	X		
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)	X		
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)	X		
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

All data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Metals

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%R, R2)	X		
	Continuing calibration (%D)	X		
	Matrix spike (%Recovery)		X	
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	CRDL standard (%R)			X
	Serial dilution (%D)	X		
	Internal standard (Response)			X
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples		X	

Notes

Zinc was detected in the method blank. Based on the blank content data for zinc have been qualified as non-detect in samples RFI-12-23 (040203)NL and 09-47 (040203)NL.

The MS/MSD %R were below the acceptable limit for zinc. Data have been qualified as estimated for zinc based on the deviations.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Analyses performed by:	CT&E, Inc. Luddington, Michigan
Date of Report:	May 19, 2003
Validation performed by:	(Melissa Cash)
Date of Validation:	January 5, 2004

GENERAL MOTORS CORPORATION
NORTH AMERICAN OPERATIONS
FLINT OPERATIONS SITE

FLINT, MICHIGAN

TIER II
DATA VALIDATION REPORT

SDG# 3031345

VOLATILE, SEMIVOLATILE,
PCB AND INORGANIC ANALYSES

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Summary

The following is an assessment of data package 3031345 for sampling in support of the RCRA Facility Investigation at the GM-NAO Flint Operations Site in Flint, Michigan. Included in this assessment are checklists used in the review of the samples and a summary of non-conformances and their impact on the reported data. Analyses were performed on the following samples:

Sample ID	Laboratory ID	Matrix	Sample Date	Analyses				
				VOC	SVOC	PCB	TAL	MISC
RFI-81-35(040103)	3031345001	Water	4/1/2003				X	
RFI-83/84-29(040103)	3031345002	Water	4/1/2003				X	
RFI-09-46(040103)	3031345003	Water	4/1/2003	X				
Trip Blank(040103)	3031345004	Water	4/1/2003	X				
88-8(040103)[1]	3031345005	Water	4/1/2003	X				
RFI-85-06(040203)	3031345006	Water	4/2/2003	X				
36-FP5(040203)	3031345007	Water	4/2/2003	X				
RFI-36-05(040203)	3031345008	Water	4/2/2003	X				
RFI-36-32(040203)	3031345009	Water	4/2/2003				X	
RFI-36-04(040203)	3031345010	Water	4/2/2003				X	
RFI-86-06R(040203)	3031345011	Water	4/2/2003	X		X		
RFI-84-06R(040203)a	3031345012	Water	4/2/2003			X		
RFI-85-07(040203)	3031345013	Water	4/2/2003	X				
RFI-83/84-27(040203)	3031345014	Water	4/2/2003	X				
RFI-81-02(040203)	3031345015	Water	4/2/2003	X				
RFI-05-10(040203)	3031345016	Water	4/2/2003				X	
RFI-12-02(040203)	3031345017	Water	4/2/2003				X	
Trip Blank(040203)	3031345018	Water	4/2/2003	X				
07-02(040203)	3031345019	Water	4/2/2003	X				
RFI-86-05(040203)	3031345020	Water	4/2/2003	X				
RFI-86-01R(040203)	3031345021	Water	4/2/2003	X			X	
RFI-83/84-20(040203)	3031345022	Water	4/2/2003				X	
RFI-84-06R(040303)[2,3]	3031345023	Water	4/3/2003		X		X	
RFI-DUP-433[4]	3031345024	Water	4/3/2003		X			
RFI-36-29R(040303)	3031345025	Water	4/3/2003	X			X	
RFI-36-29Rd(040303)	3031345026	Water	4/3/2003				X	
43-140(040303)	3031345027	Water	4/3/2003	X				
RFI-05-20(040303)	3031345028	Water	4/3/2003	X				
RFI-86-15(040303)	3031345029	Water	4/3/2003	X				
RFI-86-06D(040303)	3031345030	Water	4/3/2003	X				
RFI-86-06S(040303)	3031345031	Water	4/3/2003	X				
RFI-09-46(040103)DL	3031345032	Water	4/1/2003	X				
RFI-36-05(040203)DL	3031345033	Water	4/2/2003	X				
RFI-36-29R(040303)DL	3031345034	Water	4/3/2003	X				
43-140(040303)DL	3031345035	Water	4/3/2003	X				
RFI-05-20(040303)DL	3031345036	Water	4/3/2003	X				

1 MS/MSD analysis performed on sample (8260 and 8082 only)
2 MS/MSD analysis performed on sample (metals only)
3 MS/MSD analysis performed on sample (Cyanide only)
4 Field duplicate of sample RFI-84-06R(040303)

Sample Analysis: Volatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)	X		
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)		X	
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	Internal standard (Response, RT)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)	X		
8.	Target analyte concentrations below detection limit in all blank samples		X	

Notes

The MS/MSD %R was above control limits for Vinyl Chloride. Data for Vinyl Chloride has been qualified as estimated in sample 88-8(040103) based on the deviation.

Acetone, Methylene Chloride and 1,2,4-trichlorobenzene were detected in the method blanks. All data associated with the method blanks were non-detects for these compounds and therefore no qualification was necessary.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Semivolatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)		X	
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)	X		
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	Internal standard (Response, RT)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)	X		
8.	Target analyte concentrations below detection limit in all blank samples		X	

Notes

The initial calibration %RSD was above control limits for Pentachlorophenol. The initial calibration linear R^2 was below the acceptable control limit for 4-chloroaniline and benzaldehyde. Data for Pentachlorophenol has been qualified as estimated in samples RFI-84-06R(040303) and RFI-DUP-433 and data for 4-chloroaniline and benzaldehyde have been qualified as estimated in samples RFI-84-06R(040303) and RFI-DUP-433 based on the deviations.

The continuing calibration %D was above the acceptable limit due to a decrease in response by 3&4-Methylphenol. Data have been qualified as estimated for 3&4-methylphenol in samples RFI-84-06R(040303) and RFI-DUP-433 based on the deviations.

Di-n-butylphthalate was detected in the method blank. Associated sample results below the blank action limit were qualified as non-detect.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: PCBs

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)	X		
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)			X
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)			X
	Laboratory duplicate (RPD)	X		
	Field duplicate (RPD)	X		
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

All data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Metals

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%R, R2)	X		
	Continuing calibration (%D)	X		
	Matrix spike (%Recovery)		X	
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	CRDL standard (%R)			X
	Serial dilution (%D)	X		
	Internal standard (Response)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)	X		
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The MS %R was above the acceptable limit for manganese. Data for manganese have been qualified as estimated in all associated positive samples based on the deviations.

Other than for the deviation noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Analyses performed by:	CT&E, Inc. Luddington, Michigan
Date of Report:	May 16, 2003
Validation performed by:	(Douglas Fischi)
Date of Validation:	May 16, 2003

GENERAL MOTORS CORPORATION
NORTH AMERICAN OPERATIONS
FLINT OPERATIONS SITE

FLINT, MICHIGAN

TIER II
DATA VALIDATION REPORT

SDG# 3031356

VOLATILE, SEMIVOLATILE,
PCB AND INORGANIC ANALYSES

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Summary

The following is an assessment of data package 3031356 for sampling in support of the RCRA Facility Investigation at the GM-NAO Flint Operations Site in Flint, Michigan. Included in this assessment are checklists used in the review of the samples and a summary of non-conformances and their impact on the reported data. Analyses were performed on the following samples:

Sample ID	Laboratory ID	Matrix	Sample Date	Analyses				
				VOC	SVOC	PCB	TAL	MISC
BD01-04(0.3-2.3)	3031356001	Soil	4/2/2003	x	x	x	x	
BD01-04(6.3-8.3)	3031356002	Soil	4/2/2003	x	x	x	x	
BD01-04-DUP-431[2]	3031356006	Soil	4/2/2003	x	x	x	x	
RFI-09-48(0.5-2.5)[1]	3031356003	Soil	4/2/2003	x	x	x	x	
RFI-09-48(8.5-10.5)	3031356004	Soil	4/2/2003	x	x	x	x	
RFI-09-RB-220	3031356005	Water	4/2/2003	x	x	x	x	
RFI-09-TB(040203)[3]		Water	4/2/2003					
RFI-12-25(07-09)	3031356007	Soil	4/3/2003	x	x	x	x	
RFI-12-25(11-13)	3031356008	Soil	4/3/2003	x	x	x	x	
RFI-40-15(02-04)	3031356009	Soil	4/3/2003	x	x	x	x	
RFI-40-15(08-10)	3031356010	Soil	4/3/2003	x	x	x	x	
RFI-40-15(14-16)	3031356012	Soil	4/3/2003	x	x	x	x	
RFI-40-RB(040303)	3031356011	Water	4/3/2003	x				
RFI-36-49(01-03)	3031356013	Soil	4/5/2003	x	x	x	x	
RFI-36-49(07-09)	3031356014	Soil	4/5/2003	x	x	x	x	
RFI-36-49(17-19)	3031356015	Soil	4/5/2003	x	x	x	x	
RFI-36-TB(040503)	3031326016	Water	4/5/2003	x				
RFI-81-39R(1.7-3.7)	3031356018	Soil	4/5/2003	x	x	x	x	
RFI-81-39R(7.7-9.7)	3031356019	Soil	4/5/2003	x	x	x	x	
RFI-81-42(0.7-2.0)	3031356017	Soil	4/5/2003	x	x	x	x	

1 MS/MSD analysis performed on sample
2 Field duplicate of sample BD01-04(6.3-8.3)
3 Sample was received at the lab in a broken bottle. No analysis was therefore performed on the sample

Sample Analysis: Volatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)		X	
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)		X	
	Matrix spike (%Recovery)	X		
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	Internal standard (Response, RT)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)	X		
8.	Target analyte concentrations below detection limit in all blank samples		X	

Notes

The initial calibration %RSD was above control limits for acetone. Data for acetone have been qualified as estimated in samples RFI-12-25 (07-09), RFI-40-15 (14-16) and RFI-36-49 (07-09) based on the deviation.

The continuing calibration %D was above the acceptable limit due to a decrease in response by several compounds. Based on the deviations data for the following have been qualified as estimated: methyl acetate and 2-butanone in all soil samples; 1,2-dibromo-3-chloropropane in samples RFI-36-49 (17-19) and RFI-81-39R (7.7-9.7); bromomethane in samples BD01-04 (0.3-2.3), BD01-04 (6.3-8.3), RFI-09-48 (0.5-2.5), RFI-36-49 (07-09), RFI-81-42 (0.7-2.0), RFI-81-39R (1.7-3.7), RFI-12-25 (07-09), RFI-12-25 (11-13) and RFI-40-15 (14-16); carbon disulfide in samples RFI-12-25 (07-09), RFI-12-25 (11-13) and RFI-40-15 (14-16); cyclohexane and methyl cyclohexane in all water samples.

Recovery for one surrogate was above control limits in sample RFI-81-39R (7.7-9.7). Positive data in the listed sample has been qualified as estimated based on the recoveries.

Acetone and methylene chloride were detected in the method blanks. Associated sample result was either undetected for these compounds or less than the blank action limit, therefore no data have been qualified based on the blank content.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Semivolatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)		X	
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)		X	
	Matrix spike (%Recovery)		X	
	Blank spike (%Recovery)			X
	Control sample (%Recovery)		X	
	Internal standard (Response, RT)		X	
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)	X		
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The initial calibration %RSD was above control limits for benzaldehyde. Data for benzaldehyde have been qualified as estimated in samples BD01-04 (0.3-2.3), BD01-04 (6.3-8.3), BD01-04-DUIP-431, RFI-36-49 (01-03), RFI-36-49 (17-19), RFI-81-42 (0.7-2.0) and RFI-81-39R (7.7-9.7) based on the deviation.

The continuing calibration %D was above the acceptable limit due to a decrease in response by several compounds. Data for the following have been qualified as estimated based on the deviations: 3&4-Methylphenol in all samples; 4-nitroaniline in samples RFI-12-25 (11-13), RFI-40-15 (02-04), RFI-40-15 (08-10), RFI-40-15 (14-16) and RFI-36-49 (07-09); benzaldehyde in samples RFI-09-RB-220, RFI-12-25 (07-09), RFI-81-39R (1.7-3.7), RFI-09-48 (0.5-2.5), RFI-09-48 (8.5-10.5), BD01-04-DUP-431, BD01-04 (6.3-8.3), BD01-04 (0.3-2.3), RFI-36-49 (17-19), RFI-81-39R (7.7-9.7) and RFI-36-49 (01-03); carbazole in samples RFI-09-48 (0.5-2.5) and RFI-09-48 (8.5-10.5).

The continuing calibration %D was above the acceptable limit due to an increase in response by indeno (1,2,3-cd_pyrene, dibenz(a,h)anthracene and benzo(g,h,i)perylene. Data have been qualified

as estimated for the listed compounds in sample RFI-81-42 (0.7-2.0) based on the deviations.

Recoveries for three acid surrogates were below control limits and less than 10% in sample RFI-81-42 (0.7-2.0). Positive data have been qualified as estimated and undetected data have been rejected for all acid compounds in sample RFI-81-42 (0.7-2.0) based on the recoveries.

The matrix spike recovery for 3,3'-dichlorobenzidine was below control limits. Data for 3,3'-dichlorobenzidine have been qualified as estimated in sample RFI-09-48 (0.5-2.5) based on the deviation.

The laboratory control sample recovery for bis(2-ethylhexyl)phthalate was above control limits. Data for the listed compound has been qualified as estimated in sample RFI-09-RB-220 based on the deviation.

Internal standard responses were below the acceptable limit in several samples. Based on the deviations data have been qualified as estimated for all compounds associated with the deviant internal standards in the associated samples: Perylene-d12 in samples RFI-12-25 (11-13), RFI-81-39R (7.7-9.7), BD01-04 (0.3-2.3), RFI-12-25 (07-09), RFI-09-48 (0.5-2.5), RFI-36-49 (01-03), RFI-36-49 (17-19) and RFI-81-42 (0.7-2.0) and Chrysene-d12 in sample RFI-36-49 (17-19).

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: PCBs

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)	X		
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)	X		
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)	X		
	Field duplicate (RPD)	X		
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

All data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Metals

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%R, R2)	X		
	Continuing calibration (%D)	X		
	Matrix spike (%Recovery)		X	
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	CRDL standard (%R)			X
	Serial dilution (%D)	X		
	Internal standard (Response)			X
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)		X	
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)	X		
8.	Target analyte concentrations below detection limit in all blank samples		X	

Notes

The MS/MSD %Rs were below the acceptable limit for manganese and silver. Data for manganese and silver have been qualified as estimated in sample RFI-09-RB-220 based on the deviations.

The MS/MSD %Rs were below control limits for antimony, arsenic, beryllium, cobalt, copper, lead, nickel, selenium, vanadium and zinc. Positive data for the listed compounds have been qualified as estimated in all soil samples based on the deviations.

Cadmium, zinc and copper were detected in the method blank. Based on the blank content data for copper have been qualified as undetected in sample RFI-09-RB-220 and data for cadmium have been qualified as undetected in samples BD01-04 (0.3-2.3), RFI-40-15 (02-04), RFI-40-15 (08-10), RFI-40-15 (14-16), RFI-36-49 (01-03), RFI-36-49 (17-19) and RFI-81-39R (7.7-9.7).

Other than for the deviation noted in this review, all data quality parameters were within method-

specified limits and the data is acceptable for use as reported by the laboratory.

Analyses performed by:	CT&E, Inc. Luddington, Michigan
Date of Report:	May 14, 2003
Validation performed by:	(Melissa Cash)
Date of Validation:	May 21, 2003

GENERAL MOTORS CORPORATION
NORTH AMERICAN OPERATIONS
FLINT OPERATIONS SITE

FLINT, MICHIGAN

TIER II
DATA VALIDATION REPORT

SDG# 3031381

VOLATILE, SEMIVOLATILE,
PCB AND INORGANIC ANALYSES

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Summary

The following is an assessment of data package 3031381 for sampling in support of the RCRA Facility Investigation at the GM-NAO Flint Operations Site in Flint, Michigan. Included in this assessment are checklists used in the review of the samples and a summary of non-conformances and their impact on the reported data. Analyses were performed on the following samples:

Sample ID	Laboratory ID	Matrix	Sample Date	Analyses				
				VOC	SVOC	PCB	TAL	MISC
RFI-81-33(040303)	3031381001	Water	4/3/2003	X			X	
RFI-44-04(040303)	3031381002	Water	4/3/2003			X		
RFI-09-49R(040303)	3031381003	Water	4/3/2003	X				
BD01-02R(040303)	3031381004	Water	4/3/2003	X				
RFI-05-02(040303)	3031381005	Water	4/3/2003				X	
RFI-05-05(040303)[1,2]	3031381006	Water	4/3/2003	X			X	
RFI-86-08R(040303)	3031381007	Water	4/3/2003	X				
RFI-84-06R(040203)b	3031381008	Water	4/3/2003				X	
RFI-DUP-435[4]	3031381009	Water	4/3/2003	X				
Trip Blank(040303)	3031381010	Water	4/3/2003	X				
87-FP5(040303)	3031381011	Water	4/3/2003	X				
40-1R(040303)	3031381012	Water	4/3/2003	X			X	
RFI-16-25(040303)	3031381013	Water	4/3/2003	X				
RFI-16-24(040303)	3031381014	Water	4/3/2003	X				
RFI-40-11(040303)	3031381015	Water	4/3/2003	X				
RFI-94-02R(040303)	3031381016	Water	4/3/2003			X		
RFI-94-02R(040403)	3031381017	Water	4/4/2003	X	X		X	
87-FP3(040403)	3031381018	Water	4/4/2003	X				
RFI-12-24(040403)	3031381019	Water	4/4/2003	X	X	X	X	
RFI-DUP-434[3]	3031381020	Water	4/3/2003	X				
RFI-86-08R(040303)DL	3031381021	Water	4/3/2003	X				
RFI-94-02R(040403)DL	3031381022	Water	4/4/2003	X				
87-FP3(040403)DL	3031381023	Water	4/4/2003	X				

1 MS/MSD analysis performed on sample (metals only)
2 MS/MSD analysis performed on sample (Cyanide only)
3 Field duplicate of sample RFI-16-25(040303)
4 Field duplicate of sample RFI-05-02(040303)

Sample Analysis: Volatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)	X		
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)			X
	Blank spike (%Recovery)			X
	Control sample (%Recovery)		X	
	Internal standard (Response, RT)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)			X
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)	X		
8.	Target analyte concentrations below detection limit in all blank samples		X	

Notes

Acetone, Methylene Chloride and 1,2,4-trichlorobenzene were detected in the method blanks. All data associated with the method blanks were non-detects for these compounds and therefore no qualification was necessary.

The LCS %R was below control limits for methyl acetate. Data for methyl acetate have been qualified as estimated in the associated samples based on the deviation.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Semivolatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)		X	
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)			X
	Blank spike (%Recovery)			X
	Control sample (%Recovery)			X
	Internal standard (Response, RT)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)			X
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The initial calibration %RSD was above control limits for Pentachlorophenol. The initial calibration linear R^2 was below the acceptable control limit for 4-chloroaniline and benzaldehyde. Data for Pentachlorophenol, 4-chloroaniline and benzaldehyde have been qualified as estimated in samples RFI-94-02R(040403) and RFI-12-24(040403) based on the deviations.

The continuing calibration %D was above the acceptable limit due to a decrease in response by 3&4-Methylphenol, benzaldehyde and 3,3'-Dichlorobenzidine. Data have been qualified as estimated for 3&4-Methylphenol, benzaldehyde and 3,3'-Dichlorobenzidine in samples RFI-94-02R(040403) and RFI-12-24(040403) based on the deviations.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: PCBs

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)	X		
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)			X
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)			X
	Laboratory duplicate (RPD)	X		
	Field duplicate (RPD)	X		
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

All data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Metals

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%R, R2)	X		
	Continuing calibration (%D)	X		
	Matrix spike (%Recovery)		X	
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	CRDL standard (%R)			X
	Serial dilution (%D)	X		
	Internal standard (Response)			X
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)	X		
8.	Target analyte concentrations below detection limit in all blank samples		X	

Notes

Copper was detected in the method blank. Based on the blank content data for copper has been qualified as undetected in sample RFI-81-33(040303).

The MS/MSD %Rs were below the acceptable limit for manganese and silver. Data for manganese and silver have been qualified as estimated in the associated samples based on the deviations.

Other than for the deviation noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Analyses performed by:	CT&E, Inc. Luddington, Michigan
Date of Report:	June 18, 2003
Validation performed by:	(Douglas Fischi)
Date of Validation:	June 18, 2003

GENERAL MOTORS CORPORATION
NORTH AMERICAN OPERATIONS
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FLINT, MICHIGAN

TIER II
DATA VALIDATION REPORT

SDG# 3031405

VOLATILE, SEMIVOLATILE,
PCB AND INORGANIC ANALYSES

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Summary

The following is an assessment of data package 3031405 for sampling in support of the RCRA Facility Investigation at the GM-NAO Flint Operations Site in Flint, Michigan. Included in this assessment are checklists used in the review of the samples and a summary of non-conformances and their impact on the reported data. Analyses were performed on the following samples:

Sample ID	Laboratory ID	Matrix	Sample Date	Analyses				
				VOC	SVOC	PCB	TAL	MISC
RFI-83/84-DUP-436[4]	3031405001	Soil	4/7/2003	X	X	X	X	
RFI-83/84-47(01-03)	3031405002	Soil	4/7/2003	X	X	X	X	
RFI-83/84-47(08-10)	3031405003	Soil	4/7/2003	X	X	X	X	
RFI-83/84-48(01-03) [1,2,3]	3031405004	Soil	4/7/2003	X	X	X	X	
RFI-83/84-48(07-09)	3031405005	Soil	4/7/2003	X	X	X	X	
RFI-83/84-TB(040703)	3031405006	Water	4/7/2003	X				
RFI-40-RB-221	3031405007	Water	4/9/2003	X	X	X	X	
RFI-83/84-49(0.9-2.9)	3031405008	Soil	4/9/2003	X	X	X	X	
RFI-83/84-49(4.5-6.5)	3031405009	Soil	4/9/2003	X	X	X	X	
RFI-83/84-49(8.5-10.5)	3031405010	Soil	4/9/2003	X	X	X	X	
RFI-83/84-DUP-437[5]	3031405011	Soil	4/9/2003	X	X	X	X	
RFI-83/84-TB(040903)	3031405012	Water	4/9/2003	X				
RFI-09-51(01-03)	3031405013	Soil	4/7/2003				X	
RFI-09-17(01-03)	3031405014	Soil	4/7/2003				X	
RFI-83/84-DUP-436RE	3031405015	Soil	4/7/2003		X			
RFI-83/84-47(08-10)RE	3031405016	Soil	4/7/2003		X			
RFI-83/84-48(01-03)RE	3031405017	Soil	4/7/2003		X			
RFI-83/84-48(07-09)RE	3031405018	Soil	4/7/2003		X			
RFI-83/84-49(4.5-6.5)RE	3031405019	Soil	4/9/2003		X			
RFI-83/84-49(8.5-10.5)RE	3031405020	Soil	4/9/2003		X			
RFI-83/84-DUP-437RE	3031405021	Soil	4/9/2003		X			
RFI-83/84-47(01-03)RE	3031405022	Soil	4/7/2003		X			
RFI-83/84-49(0.9-2.9)RE	3031405023	Soil	4/9/2003		X			

1 MS/MSD analysis performed on sample (8260 and 8082 only)
2 MS/MSD analysis performed on sample (metals only)
3 MS/MSD analysis performed on sample (Cyanide only)
4 Field duplicate of sample RFI-83/84-47(01-03)
5 Field duplicate of sample RFI-83/84-49(8.5-10.5)

Sample Analysis: Volatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)	X		
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	Internal standard (Response, RT)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)	X		
8.	Target analyte concentrations below detection limit in all blank samples		X	

Notes

The continuing calibration %D was above the acceptable limit due to a decrease in response by 2-butanone (MEK). Data for the listed compound has been qualified as estimated in the associated samples based on the deviation.

Methylene chloride was detected in the method blank. Based on the blank content, data for methylene chloride has been qualified as undetected in the associated samples.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Semivolatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)		X	
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)		X	
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	Internal standard (Response, RT)		X	
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The initial calibration %RSD was above control limits for Indeno[1,2,3-cd] pyrene, Dibenz[a,h] anthracene and benzaldehyde. Data for Indeno[1,2,3-cd] pyrene, Dibenz[a,h] anthracene and benzaldehyde have been qualified as estimated in the associaed samples based on the deviations.

The continuing calibration %D was above the acceptable limit due to a decrease in response by benzaldehyde, 3&4-Methylphenol and carbazole. Data have been qualified as estimated for benzaldehyde, 3&4-methylphenol and carbazole in the associated samples based on the deviations.

The response for one internal standard, perylene-d12, was below control limits in several samples. The response for two internal standards, chrysene-d12 and perylene-d12, were below control limits in sample RFI-83/84-DUP-436. Data have been qualified as estimated for all compounds associated with the deviant internal standard.

The MS %R was below control limits for 2,4-Dinitrophenol (8%) and 2-Methyl-4,6-dinitrophenol (7%). Data for these compounds have been qualified as rejected in sample 83/84-48(01-03) based on the

deviations.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: PCBs

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)	X		
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)			X
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)			X
	Laboratory duplicate (RPD)	X		
	Field duplicate (RPD)	X		
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

All data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Metals

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%R, R2)	X		
	Continuing calibration (%D)	X		
	Matrix spike (%Recovery)		X	
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	CRDL standard (%R)			X
	Serial dilution (%D)	X		
	Internal standard (Response)			X
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)		X	
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)	X		
8.	Target analyte concentrations below detection limit in all blank samples		X	

Notes

The MS/MSD %R was above the acceptable limit for barium. Data for barium has been qualified as estimated in the positive associated samples based on the deviations.

The MS/MSD RPD was above control limits for cyanide. Positive data for cyanide has been qualified as estimated in the associated samples based on the deviations.

Cadmium was detected in the method blank. Based on the blank content data for cadmium has been qualified as undetected in the associated samples.

Other than for the deviation noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Analyses performed by:	CT&E, Inc. Luddington, Michigan
Date of Report:	June 19, 2003
Validation performed by:	(Douglas Fischi)
Date of Validation:	June 19, 2003

GENERAL MOTORS CORPORATION
NORTH AMERICAN OPERATIONS
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FLINT, MICHIGAN

TIER II
DATA VALIDATION REPORT

SDG# 3031483

VOLATILE, SEMIVOLATILE,
PCB AND INORGANIC ANALYSES

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Summary

The following is an assessment of data package 3031483 for sampling in support of the RCRA Facility Investigation at the GM-NAO Flint Operations Site in Flint, Michigan. Included in this assessment are checklists used in the review of the samples and a summary of non-conformances and their impact on the reported data. Analyses were performed on the following samples:

Sample ID	Laboratory ID	Matrix	Sample Date	Analyses				
				VOC	SVOC	PCB	TAL	MISC
RFI-83/84-50(03-05) [1, 2, 3]	3031483001	Soil	4/10/2003	X	X	X	X	
RFI-83/84-50(05-07)	3031483002	Soil	4/10/2003	X	X	X	X	
RFI-83/84-51(03-05)	3031483003	Soil	4/10/2003	X	X	X	X	
RFI-83/84-51(05-07)	3031483004	Soil	4/10/2003	X	X	X	X	
RFI-83/84-DUP-438[5]	3031483005	Soil	4/10/2003	X	X	X	X	
RFI-83/84-DUP-439[6]	3031483006	Soil	4/10/2003	X	X	X	X	
RFI-83/84-TB(041003)	3031483007	Water	4/10/2003	X				
RFI-83/84-RB-222	3031483008	Soil	4/10/2003	X	X	X	X	
RFI-03-15(0.9-2.9)	3031483009	Soil	4/10/2003	X	X	X	X	
RFI-03-15(6.9-8.9)	3031483010	Soil	4/10/2003	X	X	X	X	
RFI-03-DUP-440[4]	3031483011	Soil	4/10/2003	X	X	X	X	
RFI-83/84-RB-223	3031483012	Water	4/11/2003	X	X	X	X	
RFI-83/84-52(0.9-2.9)	3031483013	Soil	4/11/2003	X	X	X	X	
RFI-83/84-52(2.9-4.9)	3031483014	Soil	4/11/2003	X	X	X	X	
RFI-83/84-52(6.9-8.9)	3031483015	Soil	4/11/2003	X	X	X	X	
RFI-83/84-53(0.9-2.9)	3031483016	Soil	4/11/2003	X	X	X	X	
RFI-83/84-53(6.9-8.9)	3031483017	Soil	4/11/2003	X	X	X	X	
RFI-83/84-53(6.9-8.9)RE	3031483017	Soil	4/11/2003	X	X	X	X	
RFI-83/84-53(8.9-10.9)	3031483018	Soil	4/11/2003	X	X	X	X	
RFI-83/84-54(0.6-2.6)	3031483019	Soil	4/11/2003	X	X	X	X	
RFI-83/84-DUP-441[7]	3031483020	Soil	4/11/2003	X	X	X	X	
Trip Blank(041103)	3031483021	Water	4/11/2003	X	X			
RFI-83/84-DUP-439DL	3031483022	Soil	4/10/2003		X			
RFI-03-15(0.9-2.9)DL	3031483023	Soil	4/10/2003		X			
RFI-03-15(6.9-8.9)RE	3031483024	Soil	4/10/2003		X			
RFI-03-DUP-440RE	3031483025	Soil	4/10/2003		X			
RFI-83/84-54(0.6-2.6)RE	3031483026	Soil	4/11/2003		X			
RFI-03-15(6.9-8.9)DL	3031483027	Soil	4/10/2003		X			
RFI-03-DUP-440DL	3031483028	Soil	4/10/2003		X			
RFI-83/84-52(2.9-4.9)RE	3031483029	Soil	4/11/2003		X			
RFI-83/84-53(6.9-8.9)RE	3031483030	Soil	4/11/2003		X			
RFI-83/84-53(8.9-10.9)RE	3031483031	Soil	4/11/2003		X			
RFI-83/84-DUP-441DL	3031483032	Soil	4/11/2003		X			
RFI-83/84-52(6.9-8.9)RE	3031483033	Soil	4/11/2003		X			
RFI-83/84-52(0.9-2.9)RE	3031483034	Soil	4/11/2003		X			
RFI-83/84-53(0.9-2.9)RE	3031483035	Soil	4/11/2003		X			

[1] MS/MSD analysis performed on sample (8260)

[2] MS/MSD analysis performed on sample (metals only)
[3] MS/MSD analysis performed on sample (Cyanide only)
[4] Field duplicate of sample RFI-03-15(6.9-8.9)
[5] Field duplicate of sample RFI-83/84-50(05-07)
[6] Field duplicate of sample RFI-83/84-51(05-07)
[7] Field duplicate of sample RFI-83/84-52(2.9-4.9)

Sample Analysis: Volatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)		X	
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	Internal standard (Response, RT)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)	X		
8.	Target analyte concentrations below detection limit in all blank samples		X	

Notes

The continuing calibration %D was above the acceptable limit due to a decrease in response by bromomethane and methyl acetate. Data for the listed compounds have been qualified as estimated in the associated samples based on the deviations.

The MS %R was below control limits for bromomethane. Data for bromomethane has been qualified as estimated in sample RFI-83/84-50(03-05) based on the deviations.

Methylene chloride was detected in the method blank. Associated sample results below the blank action limit were qualified as non-detect.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Semivolatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)		X	
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)			X
	Blank spike (%Recovery)			X
	Control sample (%Recovery)			X
	Internal standard (Response, RT)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)			X
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The initial calibration %RSD was above control limits for Di-n-octylpthalate, benzo[g,h,i] perylene, 4-chloroaniline, Indeno[1,2,3-cd] pyrene, Dibenz[a,h] anthracene and benzaldehyde. Data for for Di-n-octylpthalate, benzo[g,h,i] perylene, 4-chloroaniline, Indeno[1,2,3-cd] pyrene, Dibenz[a,h] anthracene and benzaldehyde have been qualified as estimated in the associated samples based on the deviations.

The continuing calibration %D was above the acceptable limit due to a decrease in response by 3&4-Methylphenol. Data have been qualified as estimated for 3&4-methylphenol in the associated samples based on the deviations.

The response for two internal standards, chrysene-d12 and perylene-d12, were below control limits in sample RFI-83/84-52(0.9-2.9). Data have been qualified as estimated for all compounds associated with the deviant internal standard.

Other than for the deviations noted in this review, all data quality parameters were within method-

specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: PCBs

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)	X		
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)			X
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)			X
	Laboratory duplicate (RPD)	X		
	Field duplicate (RPD)	X		
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

All data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Metals

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%R, R2)	X		
	Continuing calibration (%D)	X		
	Matrix spike (%Recovery)		X	
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	CRDL standard (%R)			X
	Serial dilution (%D)	X		
	Internal standard (Response)			X
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)		X	
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)	X		
8.	Target analyte concentrations below detection limit in all blank samples		X	

Notes

The MS %R was below the acceptable limit for mercury. All positive data for mercury has been qualified as estimated and all undetected associated samples have been qualified as rejected based on the deviation.

The MS/MSD RPD was above control limits for cyanide. Positive data for cyanide has been qualified as estimated in the associated samples based on the deviations.

Cadmium was detected in the method blank. Associated sample results below the blank action limit were qualified as non-detect.

Other than for the deviation noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Analyses performed by:	CT&E, Inc. Luddington, Michigan
Date of Report:	July 2, 2003
Validation performed by:	(Douglas Fischi)
Date of Validation:	July 2, 2003

GENERAL MOTORS CORPORATION
NORTH AMERICAN OPERATIONS
FLINT OPERATIONS SITE

FLINT, MICHIGAN

TIER II
DATA VALIDATION REPORT

SDG# 3031634

VOLATILE, SEMIVOLATILE,
PCB AND INORGANIC ANALYSES

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Summary

The following is an assessment of data package 3031634 for sampling in support of the RCRA Facility Investigation at the GM-NAO Flint Operations Site in Flint, Michigan. Included in this assessment are checklists used in the review of the samples and a summary of non-conformances and their impact on the reported data. Analyses were performed on the following samples:

Sample ID	Laboratory ID	Matrix	Sample Date	Analyses				
				VOC	SVOC	PCB	TAL	MISC
RFI-40-14R(042203)[2]	3031634001	Water	4/22/2003	X			X	
RFI-40-15(042203)	3031634002	Water	4/22/2003	X			X	
RFI-DUP-442[4]	3031634003	Water	4/22/2003	X				
RFI-12-24(042303)	3031634004	Water	4/23/2003	X	X	X	X	
RFI-12-25(042303)[1]	3031634005	Water	4/23/2003	X	X	X	X	
40-6R(042303)[2,3]	3031634006	Water	4/23/2003	X			X	
RFI-10-31(042403)	3031634007	Water	4/24/2003	X			X	
RFI-10-30(042403)	3031634008	Water	4/24/2003	X			X	
RFI-40-10R(042303)	3031634009	Water	4/24/2003	X				
BD01-04(042403)	3031634010	Water	4/24/2003	X				
RFI-09-48(042403)	3031634011	Water	4/24/2003	X			X	
RFI-40-15(042203)DL	3031634012	Water	4/22/2003	X				

1 MS/MSD analysis performed on sample (8260 only)
2 MS/MSD analysis performed on sample (metals only)
3 MS/MSD analysis performed on sample (Cyanide only)
4 Field duplicate of sample RFI-40-14R(042203)

Sample Analysis: Volatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)	X		
	Surrogate (%Recovery)		X	
	Matrix spike (%Recovery)	X		
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	Internal standard (Response, RT)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)	X		
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The surrogate recovery for 1,2-Dichlorothane-d4 was below control limits for sample RFI-40-15(042203). Associated compounds have been qualified as estimated based on the deviation.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Semivolatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)		X	
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)			X
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	Internal standard (Response, RT)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)			X
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The initial calibration %RSD was above control limits for di-n-octylphthalate. The intial calibration RRF was below control limits for benzaldehyde, indeno[1,2,3-cd]pyrene, dibenz[a,h]anthracene and benzo[g,h,i]perylene. Data for di-n-octylphthalate, benzaldehyde, indeno[1,2,3-cd]pyrene, dibenz[a,h]anthracene and benzo[g,h,i]perylene have been qualified as estimated in samples RFI-12-24(042303) and RFI-12-25(042303) based on the deviations.

The continuing calibration %D was above the acceptable limit due to a decrease in response by 3&4-Methylphenol, 3-nitroaniline, 3,3'-dichlorobenzidine and 4-nitroaniline. Data have been qualified as estimated for 3&4-Methylphenol, 3-nitroaniline, 3,3'-dichlorobenzidine and 4-nitroaniline in samples RFI-12-24(042303) and RFI-12-25(042303) based on the deviations.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: PCBs

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)	X		
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)			X
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)			X
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

All data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Metals

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%R, R2)	X		
	Continuing calibration (%D)	X		
	Matrix spike (%Recovery)		X	
	Blank spike (%Recovery)			
	Control sample (%Recovery)	X		
	CRDL standard (%R)			X
	Serial dilution (%D)	X		
	Internal standard (Response)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)	X		
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The MS/MSD %Rs was below the acceptable limit for silver. Data for silver have been qualified as estimated in the associated samples based on the deviations.

Other than for the deviation noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Analyses performed by:	CT&E, Inc. Luddington, Michigan
Date of Report:	June 23, 2003
Validation performed by:	(Douglas Fischi)
Date of Validation:	June 23, 2003

GENERAL MOTORS CORPORATION
NORTH AMERICAN OPERATIONS
FLINT OPERATIONS SITE

FLINT, MICHIGAN

TIER II
DATA VALIDATION REPORT

SDG# 3031713

VOLATILE AND INORGANIC ANALYSES

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Summary

The following is an assessment of data package 3031713 for sampling in support of the RCRA Facility Investigation at the GM-NAO Flint Operations Site in Flint, Michigan. Included in this assessment are checklists used in the review of the samples and a summary of non-conformances and their impact on the reported data. Analyses were performed on the following samples:

Sample ID	Laboratory ID	Matrix	Sample Date	Analyses				
				VOC	SVOC	PCB	TAL	MISC
RFI-36-51(042803)	3031713001	Water	4/28/2003	X			X	
RFI-36-51(042803)DL	3031713002	Water	4/28/2003	X				

Sample Analysis: Volatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)	X		
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)			X
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	Internal standard (Response, RT)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)			X
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)	X		
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Metals

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%R, R2)	X		
	Continuing calibration (%D)	X		
	Matrix spike (%Recovery)	X		
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	CRDL standard (%R)			X
	Serial dilution (%D)	X		
	Internal standard (Response)			X
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)	X		
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

Other than for the deviation noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Analyses performed by:	CT&E, Inc. Luddington, Michigan
Date of Report:	June 23, 2003
Validation performed by:	(Douglas Fischi)
Date of Validation:	June 22, 2003

GENERAL MOTORS CORPORATION
NORTH AMERICAN OPERATIONS
FLINT OPERATIONS SITE

FLINT, MICHIGAN

TIER II
DATA VALIDATION REPORT

SDG# 3032044

INORGANIC ANALYSES

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Summary

The following is an assessment of data package 3032044 for sampling in support of the RCRA Facility Investigation at the GM-NAO Flint Operations Site in Flint, Michigan. Included in this assessment are checklists used in the review of the samples and a summary of non-conformances and their impact on the reported data. Analyses were performed on the following samples:

Sample ID	Laboratory ID	Matrix	Sample Date	Analyses				
				VOC	SVOC	PCB	TAL [1]	MISC
RFI-12-23 (051903)NL	3032044001	NL	05/19/03				X	
20-503 (051903)NL	3032044002	NL	05/19/03				X	

1 Inorganic analyses include mercury and cyanide only.
NL- Non-Aqueous Liquid

Sample analysis: Metals

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%R, R2)	X		
	Continuing calibration (%D)	X		
	Matrix spike (%Recovery)		X	
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	CRDL standard (%R)			X
	Serial dilution (%D)			X
	Internal standard (Response)			X
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)		X	
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The matrix spike recovery was below control limits for cyanide and the relative percent difference between recoveries was above control limits for cyanide. Data for cyanide have been qualified as estimated based on the deviations.

Other than for the deviation noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Analyses performed by:	CT&E, Inc. Luddington, Michigan
Date of Report:	June 2, 2003
Validation performed by:	(Melissa Cash)
Date of Validation:	January 5, 2004

GENERAL MOTORS CORPORATION
NORTH AMERICAN OPERATIONS
FLINT OPERATIONS SITE

FLINT, MICHIGAN

TIER II
DATA VALIDATION REPORT

SDG# 3032117

VOLATILE, SEMIVOLATILE,
PCB AND INORGANIC ANALYSES

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Summary

The following is an assessment of data package 3032117 for sampling in support of the RCRA Facility Investigation at the GM-NAO Flint Operations Site in Flint, Michigan. Included in this assessment are checklists used in the review of the samples and a summary of non-conformances and their impact on the reported data. Analyses were performed on the following samples:

Sample ID	Laboratory ID	Matrix	Sample Date	Analyses				
				VOC	SVOC	PCB	TAL	MISC
Outfall 004(052103)NL	3032117	NAPL	5/21/2003	x	x	x	x	

Sample Analysis: Volatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)			X
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	Internal standard (Response, RT)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)			X
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The continuing calibration was outside control limits due to a decrease in response by bromomethane. Data for bromomethane have been qualified as estimated in sample Outfall004 (052103)NL based on the deviation.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Semivolatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)			X
	Blank spike (%Recovery)			X
	Control sample (%Recovery)			X
	Internal standard (Response, RT)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)			X
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The continuing calibration %D was above the acceptable limit due to a decrease in response by bis (2-chloroethyl)ether and 3&4-methylphenol. Data have been qualified as estimated for the listed compounds based on the deviations.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: PCBs

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)	X		
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)	X		
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)		X	
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The laboratory control sample and laboratory control sample duplicate RPD for Aroclor 1260 was above control limits. Since the sample was non-detect for Aroclor 1260, no data have been qualified based on the deviation.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Metals

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%R, R2)	X		
	Continuing calibration (%D)	X		
	Matrix spike (%Recovery)		X	
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	CRDL standard (%R)			X
	Serial dilution (%D)	X		
	Internal standard (Response)			X
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)		X	
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples		X	

Notes

The MS %R was below the acceptable limit for cyanide. Data for cyanide have been qualified as estimated based on the deviations.

Selenium was detected above the CRDL in the method blank. Since no selenium was detected in the sample, no data have been qualified based on the blank content.

Other than for the deviation noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Analyses performed by:	CT&E, Inc. Luddington, Michigan
Date of Report:	June 19, 2003
Validation performed by:	(Melissa Cash)
Date of Validation:	September 29, 2003

GENERAL MOTORS CORPORATION
NORTH AMERICAN OPERATIONS
FLINT OPERATIONS SITE

FLINT, MICHIGAN

TIER II
DATA VALIDATION REPORT

SDG# 3033041

VOLATILE, SEMIVOLATILE,
PCB AND INORGANIC ANALYSES

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Summary

The following is an assessment of data package 3033041 for sampling in support of the RCRA Facility Investigation at the GM-NAO Flint Operations Site in Flint, Michigan. Included in this assessment are checklists used in the review of the samples and a summary of non-conformances and their impact on the reported data. Analyses were performed on the following samples:

Sample ID	Laboratory ID	Matrix	Sample Date	Analyses				
				VOC	SVOC	PCB	TAL	MISC
RFI-12-28(01-03)	3033041001	Soil	7/23/2003	X	X	X	X	
RFI-12-28(08-10)	3033041002	Soil	7/23/2003	X	X	X	X	
RFI-12-28(11-13)	3033041003	Soil	7/23/2003	X	X	X	X	
RFI-12-DUP-443[2]	3033041004	Soil	7/23/2003	X	X	X	X	
RFI-12-29(0.7-2.7)	3033041005	Soil	7/24/2003	X	X	X	X	
RFI-12-29(4.7-6.7)	3033041006	Soil	7/24/2003	X	X	X	X	
RFI-12-30(0.7-2.7)	3033041007	Soil	7/24/2003	X	X	X	X	
RFI-12-27(01-03)[1]	3033041008	Soil	7/24/2003	X	X	X	X	
RFI-12-27(03-05)	3033041009	Soil	7/24/2003	X	X	X	X	
Trip Blank(072403)	3033041010	Water	7/24/2003	X				
RFI-12-RB-224	3033041011	Water	7/24/2003	X	X	X	X	
EQ Blank	3033041012	Water	7/24/2003	X	X	X	X	
RFI-12-31(0.7-2.7)	3033041013	Soil	7/25/2003	X	X	X	X	
RFI-07-01R(04-06)	3033041014	Soil	7/25/2003	X	X	X	X	

1 MS/MSD analysis performed on sample.
2 Field duplicate of sample RFI-12-28 (01-03)

Sample Analysis: Volatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)		X	
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)		X	
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	Internal standard (Response, RT)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)	X		
8.	Target analyte concentrations below detection limit in all blank samples		X	

Notes

The initial calibration RSD was above control limits for methylene chloride. Data for methylene chloride have been qualified as estimated in samples RFI-12-29 (0.7-2.7), RFI-12-29 (4.7-6.7), RFI-12-30 (0.7-2.7), RFI-12-27 (01-03), RFI-12-27 (03-05), RFI-12-31 (0.7-2.7) and RFI-07-01R (04-06) based on the deviation.

The continuing calibrations %D were above control limits due to a decrease in response by several compounds. Data have been qualified as estimated for bromomethane in samples RFI-12-28 (01-03), RFI-12-28 (08-10), RFI-12-28 (11-13) and RFI-12-DUP-443 and acetone, carbon disulfide, methyl acetate and 2-butanone in samples RFI-12-29 (0.7-2.7), RFI-12-29 (4.7-6.7), RFI-12-30 (0.7-2.7), RFI-12-27 (01-03), RFI-12-27 (03-05), RFI-12-31 (0.7-2.7) and RFI-0701R (04-06) based on the %D.

The MS/MSD recoveries were above control limits for several compounds. Based on the deviations, data have been qualified as estimated for 2-butanone and acetone in sample RFI-12-RB-224.

Several compounds were detected in the method blank, rinse blank and equipment blank. Since none

of the compounds detected in the blanks were detected in the samples, no data have been qualified based on the blank content.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Semivolatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)		X	
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)		X	
	Matrix spike (%Recovery)		X	
	Blank spike (%Recovery)			X
	Control sample (%Recovery)		X	
	Internal standard (Response, RT)		X	
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)	X		
	Field duplicate (RPD)		X	
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The initial calibration %RSD was above control limits for benzaldehyde. Data for benzaldehyde have been qualified as estimated in samples RFI-12-28(01-03), RFI-12-28 (08-10), RFI-12-28 (11-13), RFI-12-RB-224 and EQ Blank based on the deviations.

The continuing calibration %D was above the acceptable limit due to a decrease in response by benzaldehyde, 3&4-Methylphenol, 2-nitroaniline, biphenyl, atrazine, diethylphthalate, 4-chlorophenyl phenylether, carbazole and benzo(k)fluoranthene. Data have been qualified as estimated for benzaldehyde and 3&4-Methylphenol in samples RFI-12-28(01-03), RFI-12-28 (08-10), RFI-12-28 (11-13), RFI-12-RB-224, RFI-12-27 (01-03) and EQ Blank, atrazine in sample RFI-12-27 (01-03), benzaldehyde, 3&4-methylphenol, biphenyl, 2-nitroaniline and atrazine in samples RFI-12-DUP-443, RFI-12-29 (0.7-2.7), RFI-12-29 (4.7-6.7), and RFI-12-30 (0.7-2.7), 3&4-methylphenol, biphenyl, diethylphthalate, 4-chlorophenyl phenylether, atrazine, carbazole and benzo(k)fluoranthene in samples RFI-12-27 (03-05), RFI-12-31 (0.7-2.7)RE and RFI-07-01 (04-06)RE based on the deviations.

The matrix spike recovery was below control limits for 2,4-dinitrophenol and the matrix spike and

matrix spike duplicate recoveries were above control limits for di-n-octylphthalate. Data for 2,4-dinitrophenol have been qualified as estimated in sample RFI-12-27 (01-03) based on the recoveries.

The laboratory control sample and laboratory control sample duplicate recoveries were above control limits for benzaldehyde. Since associated samples were non-detect for benzaldehyde, no data have been qualified based on the deviations.

Recovery for one surrogate was outside control limits in samples RFI-12-28 (01-03), RFI-12-DUP-443, RFI-12-31 (0.7-2.7) and RFI-07-01 (04-06). Since recovery for the remaining surrogates were within control limits, no data have been qualified based on the deviations.

The response for one or more internal standards were below control limits in samples RFI-12-28 (01-03), RFI-12-28 (11-13), RFI-12-30 (0.7-2.7), RFI-12-31 (0.7-2.7)RE, RFI-07-01 (04-06)RE, RFI-12-27 (01-03) and RFI-12-27 (03-05). Data have been qualified as estimated for all compounds quantitated under the non-compliant internal standards.

The RPD between original sample RFI-12-28 (01-03) and field duplicate RFI-12-DUP-443 were above control limits for several compounds. Data have been qualified as estimated in the listed samples for acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, carbazole, chrysene, dibenzo(a,h)anthracene, dibenzofuran, fluorene, indeno (1,2,3-cd)pyrene and phenanthrene based on the RPD.

Pyrene was detected above the linear range in sample RFI-07-01 (04-06) RE. Data for pyrene have been replaced with data from the dilution analysis.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: PCBs

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)	X		
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)	X		
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)	X		
	Field duplicate (RPD)	X		
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

All data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Metals

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%R, R2)	X		
	Continuing calibration (%D)		X	
	Matrix spike (%Recovery)		X	
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	CRDL standard (%R)			X
	Serial dilution (%D)		X	
	Internal standard (Response)			X
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)		X	
8.	Target analyte concentrations below detection limit in all blank samples		X	

Notes

The continuing calibration recoveries were above control limits for beryllium. Data for beryllium have been qualified as estimated in all soil samples based on the deviations.

Several analytes were detected above the CRDL in the blanks. Based on the blank content, data have been qualified as non-detect for cadmium in samples RFI-12-28 (01-03), RFI-12-28 (08-10), RFI-12-28 (11-13), RFI-12-27 (01-03), RFI-12-27 (03-05) and RFI-07-01 (04-06)

The MS/MSD %R were below the acceptable limit for antimony and above the acceptable limit for lead and zinc. Data for antimony and positive data for lead and zinc have been qualified as estimated in all soil samples based on the deviations.

The MS was below control limits for mercury. Data for mercury have been qualified as estimated in samples RFI-12-28 (08-10) and RFI-12-28 (11-13) based on the deviation.

The serial dilution results were above control limits for zinc, barium, copper, manganese and vanadium. Data for zinc have been qualified as estimated in all samples and data for barium, copper, manganese and vanadium have been qualified as estimated in water samples.

The RPD between original sample RFI-12-28 (01-03) and duplicate samples RFI-12-DUP-443 was above control limits for lead. Data for lead in the listed samples have been qualified as estimated based on the deviation.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Analyses performed by:	CT&E, Inc. Luddington, Michigan
Date of Report:	September 2, 2003
Validation performed by:	(Melissa Cash)
Date of Validation:	September 30, 2003

GENERAL MOTORS CORPORATION
NORTH AMERICAN OPERATIONS
FLINT OPERATIONS SITE

FLINT, MICHIGAN

TIER II
DATA VALIDATION REPORT

SDG# 3033141

VOLATILE, SEMIVOLATILE,
PCB AND INORGANIC ANALYSES

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Summary

The following is an assessment of data package 3033141 for sampling in support of the RCRA Facility Investigation at the GM-NAO Flint Operations Site in Flint, Michigan. Included in this assessment are checklists used in the review of the samples and a summary of non-conformances and their impact on the reported data. Analyses were performed on the following samples:

Sample ID	Laboratory ID	Matrix	Sample Date	Analyses				
				VOC	SVOC	PCB	TAL	MISC
RFI-12-RB-225	3033141001	Water	7/28/2003	X	X	X	X	
RFI-09-52(0.5-2.5	3033141002	Soil	7/28/2003	X	X	X	X	
RFI-09-52(2.5-4.5)	3033141003	Soil	7/28/2003	X	X	X	X	
RFI-09-52 (4.5-6.5)	3033141004	Soil	7/28/2003	X	X	X	X	
RFI-12-32 (00-02)	3033141005	Soil	7/28/2003	X	X	X	X	
RFI-12-DUP-444[1]	3033141006	Soil	7/28/2003	X	X	X	X	
TB (072803)	3033141007	Soil	7/28/2003	X				

1 Field duplicate of sample RFI-12-32 (00-02)

Sample Analysis: Volatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)		X	
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)		X	
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	Internal standard (Response, RT)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)	X		
8.	Target analyte concentrations below detection limit in all blank samples		X	

Notes

The initial calibration RSD was above control limits for bromomethane. Data for bromomethane have been qualified as estimated in samples RFI-09-52 (0.5-2.5), RFI-09-52 (2.5-4.5), RFI-09-52 (4.5-6.5), RFI-12-32 (00-02) and RFI-12-DUP-444 based on the deviation.

The continuing calibrations %D were above control limits due to a decrease in response by several compounds. Data have been qualified as estimated for bromomethane in samples RFI-09-52 (0.5-2.5), RFI-09-52 (2.5-4.5), RFI-09-52 (4.5-6.5), RFI-12-32 (00-02) and RFI-12-DUP-444, acetone, carbon disulfide, methyl acetate and methylene chloride in samples RFI-12-RB-225 and TB (072803) based on the %D.

The MS/MSD was performed on a non-site sample therefore no data have been qualified based on the MS/MSD results.

Several compounds were detected in the method blanks and rinse blank. Since all associated samples were either non-detect for compounds found in the blank or at a concentration greater than

that in the blank, no data have been qualified based on the blank content.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Semivolatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)		X	
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)	X		
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	Internal standard (Response, RT)		X	
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)	X		
	Field duplicate (RPD)		X	
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The initial calibration %RSD was above control limits for several compounds. Since associated samples were non-detect for all deviant compounds, no data have been qualified based on the deviations.

The continuing calibration %D were above the acceptable limit due to a decrease in response by 3&4-methylphenol, atrazine, 2,4-dinitrophenol, di-n-butylphthalate, butylbenzylphthalate and bis(2-ethylhexyl)phthalate. Data have been qualified as estimated for 3&4-Methylphenol in all samples, atrazine in samples RFI-12-RB-225, RFI-09-52 (0.5-2.5), RFI-09-52 (2.5-4.5), RFI-09-52 (4.5-6.5) and RFI-12-DUP-444, 2,4-dinitrophenol, di-n-butylphthalate, butylbenzylphthalate and bis(2-ethylhexyl)phthalate in sample RFI-12-RBN-225 based on the deviations.

The MS/MSD was performed on a non-site sample, therefore, no data have been qualified based on the MS/MSD results.

The laboratory control sample duplicate recovery was above control limits for 4-nitroanilie. Since

associated samples were non-detect for 4-nitroaniline, no data have been qualified based on the deviation.

The responses for two internal standards were below control limits in sample RFI-09-52 (0.5-2.5). Data have been qualified as estimated for all compounds quantitated under the non-compliant internal standards.

The RPD between original sample RFI-12-32 (00-02) and field duplicate RFI-12-DUP-444 were above control limits for several compounds. Data have been qualified as estimated in the listed samples for anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, carbazole, chrysene, fluoranthene, pyrene and phenanthrene based on the RPD.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: PCBs

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)	X		
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)	X		
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)	X		
	Field duplicate (RPD)		X	
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The RPD between original sample RFI-12-32 (00-02) and duplicate sample RFI-12-DUP-444 was above control limits for Aroclor 1254. Data for Aroclor 1254 have been qualified as estimated in the listed samples based on the deviation.

Other than for the deviations mentioned in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

-Sample Analysis: Metals

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%R, R2)	X		
	Continuing calibration (%D)		X	
	Matrix spike (%Recovery)		X	
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	CRDL standard (%R)			X
	Serial dilution (%D)		X	
	Internal standard (Response)			X
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)		X	
8.	Target analyte concentrations below detection limit in all blank samples		X	

Notes

The continuing calibration recoveries were above control limits for beryllium. Data for beryllium have been qualified as estimated in sample RFI-12-RB-225 based on the deviations.

Several analytes were detected the blanks. Based on the blank content, data have been qualified as non-detect for cadmium in samples RFI-09-52 (2.5-4.5), RFI-09-52 (4.5-6.5) and RFI-12-DUP-444

The MS/MSD %R were below the acceptable limit for antimony, beryllium, cobalt, nickel, selenium and zinc and above the acceptable limit for copper. Data for antimony, beryllium, cobalt, nickel, selenium and zinc and positive data for copper have been qualified as estimated in all soil samples based on the deviations.

The serial dilution results were above control limits for several compounds. Based on the serial dilution results, data have been qualified as estimated for cobalt, copper, manganese, vanadium and

zinc in sample RFI-12-RB-225 and silver and selenium in all soil samples.

The RPD between original sample RFI-12-32 (00-02) and duplicate samples RFI-12-DUP-444 was above control limits for selenium. Data for selenium in the listed samples have been qualified as estimated based on the deviation.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Analyses performed by:	CT&E, Inc. Luddington, Michigan
Date of Report:	September 5, 2003
Validation performed by:	(Melissa Cash)
Date of Validation:	October 02, 2003

GENERAL MOTORS CORPORATION
NORTH AMERICAN OPERATIONS
FLINT OPERATIONS SITE

FLINT, MICHIGAN

TIER II
DATA VALIDATION REPORT

SDG# 3033699

VOLATILE, SEMIVOLATILE,
PCB AND INORGANIC ANALYSES

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Summary

The following is an assessment of data package 3033699 for sampling in support of the RCRA Facility Investigation at the GM-NAO Flint Operations Site in Flint, Michigan. Included in this assessment are checklists used in the review of the samples and a summary of non-conformances and their impact on the reported data. Analyses were performed on the following samples:

Sample ID	Laboratory ID	Matrix	Sample Date	Analyses				
				VOC	SVOC	PCB	TAL	MISC
RFI-12-34 (4.8-6.8)	3033699001	Soil	8/28/2003	X	X	X	X	
RFI-12-34 (2.8-4.8)	3033699002	Soil	8/28/2003	X	X	X	X	
RFI-12-34 (0.8-2.8)	3033699003	Soil	8/28/2003	X	X	X	X	
RFI-12-33 (01-02)	3033699004	Soil	8/28/2003	X	X	X	X	
RFI-12-33 (2.5-4.5)	3033699005	Soil	8/28/2003	X	X	X	X	
RFI-12-35 (03-04)	3033699006	Soil	8/29/2003	X	X	X	X	
RFI-12-DUP-445	3033699007	Soil	8/29/2003	X	X	X	X	
RFI-12-RB-226	3033699008	Water	8/29/2003	X	X	X	X	
TB	3033699009	Water	8/29/2003	X				

1 Field duplicate of sample RFI-12-35 (03-04)

Sample Analysis: Volatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)		X	
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)		X	
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	Internal standard (Response, RT)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)		X	
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)		X	
8.	Target analyte concentrations below detection limit in all blank samples		X	

Notes

The initial calibration RSD was above control limits for bromomethane. Data for bromomethane have been qualified as estimated in all soil samples based on the deviation.

The continuing calibrations %D were above control limits due to a decrease in response by several compounds. Data have been qualified as estimated for bromomethane and methylene chloride in all soil samples and methylene chloride, tetrachloroethene and 1,2-dibromo-3-chloropropane in all water samples based on the %D.

The MSD recovery was below control limits for carbon disulfide. Data for carbon disulfide have been qualified as estimated in all water samples based on the deviations.

Several compounds were detected in the rinse blank. Since associated samples were either non-detect for compounds found in the blank or at a concentration greater than the blank action level, no data have been qualified based on the blank content.

The RPD between sample RFI-12-35 (03-04) and duplicate RFI-12-DUP-445 were above control limits for cyclohexane, methyl cyclohexane, o-xylene and p&m-xylene. Data have been qualified as estimated for the listed compounds in samples RFI-12-35 (03-04) and RFI-12-DUP-445 based on the deviations.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Semivolatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)		X	
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)		X	
	Matrix spike (%Recovery)	X		
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	Internal standard (Response, RT)		X	
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)		X	
	Field duplicate (RPD)	X		
8.	Target analyte concentrations below detection limit in all blank samples		X	

Notes

The initial calibration %RSD was above control limits for several compounds. Since associated samples were non-detect for all non-compliant compounds, no data have been qualified based on the deviations.

The continuing calibration %D were above the acceptable limit due to a decrease in response by 3&4-methylphenol, indeno(1,2,3-cd)pyrene, dibenzo(a,h)anthracene, benzo(g,h,i)perylene, bis(2-ethylhexyl)phthalate, 3-nitroaniline, 4-nitroaniline and carbazole. Data have been qualified as estimated for 3&4-Methylphenol in all samples, indeno(1,2,3-cd)pyrene, dibenzo(a,h)anthracene and benzo(g,h,i)perylene in samples RFI-12-33 (01-02), RFI-12-33 (2.5-4.5) and RFI-12-RB-226, bis(2-ethylhexyl)phthalate in sample RFI-12-RB-226, 3-nitroaniline, 4-nitroaniline and carbazole in samples RFI-12-34 (4.8-6.8), RFI-12-34 (2.8-4.8), RFI-12-34 (0.8-2.8), RFI-12-35 (03-04) and RFI-12-DUP-445 based on the deviations.

The LCS/LCSD RPD was above control limits for benzaldehyde and hexachloroethane. Since associated samples were non-detect for the listed compounds, no data have been qualified based on

the deviations.

The response for one internal standard was below control limits in samples RFI-12-33 (01-02), RFI-12-33 (2.5-4.5) and RFI-12-35 (03-04). Data have been qualified as estimated for all compounds quantitated under the non-compliant internal standards.

Several compounds were detected in the method blanks. Since all samples were non-detect for the compounds, no data have been qualified based on the blank content.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: PCBs

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)	X		
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)	X		
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)		X	
	Laboratory duplicate (RPD)	X		
	Field duplicate (RPD)	X		
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The MS/MSD RPD was above control limits for Aroclor 1260. Since the associated sample was non-detect for Aroclor 1260 no data have been qualified based on the deviation.

Other than for the deviations mentioned in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Metals

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%R, R2)	X		
	Continuing calibration (%D)	X		
	Matrix spike (%Recovery)		X	
	Blank spike (%Recovery)			X
	Control sample (%Recovery)		X	
	CRDL standard (%R)			X
	Serial dilution (%D)		X	
	Internal standard (Response)			X
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)		X	
8.	Target analyte concentrations below detection limit in all blank samples		X	

Notes

Several analytes were detected the blanks. Based on the blank content, data have been qualified as non-detect for cadmium in samples RFI-12-35 (03-04).

The MS/MSD %R were below the acceptable limit for antimony, arsenic, beryllium, chromium, cobalt, copper, nickel, vanadium and zinc. Data for the listed compounds have been qualified as estimated in all soil samples based on the deviations.

The LCS recovery was above control limits for zinc. Data for zinc have been qualified as estimated in the water sample, based on the deviation.

The serial dilution results were above control limits for arsenic. Based on the results, data have been qualified as estimated for arsenic in sample RFI-12-DUP-445.

The RPD between original sample RFI-12-35 (03-04) and duplicate samples RFI-12-DUP-445 was above control limits for mercury, selenium and zinc. Data have been qualified as estimated for the listed compounds in the listed samples based on the deviation.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Analyses performed by:	CT&E, Inc. Luddington, Michigan
Date of Report:	September 24, 2003
Validation performed by:	(Melissa Cash)
Date of Validation:	October 08, 2003

GENERAL MOTORS CORPORATION
NORTH AMERICAN OPERATIONS
FLINT OPERATIONS SITE

FLINT, MICHIGAN

TIER II
DATA VALIDATION REPORT

SDG# 3033958

VOLATILE, SEMIVOLATILE,
PCB AND INORGANIC ANALYSES

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Summary

The following is an assessment of data package 3033958 for sampling in support of the RCRA Facility Investigation at the GM-NAO Flint Operations Site in Flint, Michigan. Included in this assessment are checklists used in the review of the samples and a summary of non-conformances and their impact on the reported data. Analyses were performed on the following samples:

Sample ID	Laboratory ID	Matrix	Sample Date	Analyses				
				VOC	SVOC	PCB	TAL	MISC
RFI-55-RB-277	3033958001	Water	9/12/2003	X	X	X	X	
TB (091203)	3033958002	Water	9/12/2003	X				
RFI-55-11 (01-03)	3033958003	Soil	9/12/2003	X	X	X	X	
RFI-55-11 (03-05)	3033958004	Soil	9/12/2003	X	X	X	X	
RFI-55-11 (05-07)	3033958005	Soil	9/12/2003	X	X	X	X	
RFI-55-12 (01-03)	3033958006	Soil	9/12/2003	X	X	X	X	
RFI-55-12 (03-05)	3033958007	Soil	9/12/2003	X	X	X	X	
RFI-55-12 (05-07)	3033958008	Soil	9/12/2003	X	X	X	X	

Sample Analysis: Volatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)	X		
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	Internal standard (Response, RT)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples		X	

Notes

The continuing calibration %D were above control limits due to a decrease in response by several compounds. Data have been qualified as estimated for bromomethane, acetone, carbon disulfide and 2-butanone in samples RFI-55-11 (01-03), RFI-55-11 (03-05), RFI-55-12 (01-03), RFI-55-12 (03-05) and RFI-55-12 (05-07) and acetone, methylene chloride and 2-butanone in sample RFI-55-11 (05-07) based on the %D.

Several compounds were detected in the rinse blank and in the method blanks. Since associated samples were either non-detect for compounds found in the blanks or at a concentration greater than the blank action level, no data have been qualified based on the blank content.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Semivolatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)		X	
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)		X	
	Matrix spike (%Recovery)	X		
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	Internal standard (Response, RT)		X	
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)		X	
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples		X	

Notes

The initial calibration %RSD was above control limits for several compounds. Data have been qualified as estimated for indeno(1,2,3-cd)pyrene and benzo(g,h,i)perylene in associated samples RFI-55-11 (01-03)RE and RFI-55-12 (01-03)RE based on the deviations.

The continuing calibration %D were above the acceptable limit due to a decrease in response by 3&4-methylphenol, indeno(1,2,3-cd)pyrene, dibenzo(a,h)anthracene and benzo(g,h,i)perylene. Data have been qualified as estimated for 3&4-Methylphenol in all samples and indeno(1,2,3-cd)pyrene, dibenzo(a,h)anthracene and benzo(g,h,i)perylene in samples RFI-55-11 (01-03)RE, RFI-55-12 (01-03)RE and RFI-55-12 (03-05)RE based on the deviations.

The recovery for one base surrogate was above control limits in several samples. Since the recoveries for the remaining surrogates were within control limits, no data have been qualified based on the deviations.

The LCS/LCSD RPD were above control limits for several compounds. Since associated samples

were non-detect for the non-compliant compounds, no data have been qualified based on the deviations.

The response for one or more internal standards were below control limits in samples RFI-55-11 (01-03), RFI-55-11 (03-05), RFI-55-11 (05-07), RFI-55-12 (01-03), RFI-55-12 (03-05), RFI-55-11 (01-03)RE, RFI-55-11 (03-05)RE, RFI-55-11 (05-07)RE, RFI-55-12 (01-03) RE and RFI-55-12 (03-05)RE. Data have been qualified as estimated or rejected, depending on the severity of the deviation, for all compounds quantitated under the non-compliant internal standards.

Several compounds were detected in the method and rinse blanks. Since associated samples were either non-detect or at a concentration greater than that in the blank for the compounds, no data have been qualified based on the blank content.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: PCBs

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)	X		
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)	X		
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)	X		
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

All data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Metals

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times		X	
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%R, R2)	X		
	Continuing calibration (%D)	X		
	Matrix spike (%Recovery)		X	
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	CRDL standard (%R)			X
	Serial dilution (%D)		X	
	Internal standard (Response)			X
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)		X	
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples		X	

Notes

Cyanide was analyzed past the holding time in sample RFI-55-RB-227. Data for cyanide have been qualified as estimated in the listed sample based on the deviations.

Several analytes were detected the blanks. Based on the blank content, data have been qualified as non-detect for silver in samplesRFI-55-11 (01-03), RFI-55-11 (03-05), RFI-55-11 (05-07), RFI-55-12 (01-03), RFI-55-12 (03-05) and RFI-55-12 (05-07).

The MS/MSD %R were below the acceptable limit for antimony, silver and zinc and above the acceptable limit for barium, lead and cyanide. The MS/MSD RPD was above control limits for antimony, silver and cyanide. Data have been qualified as estimated for silver and zinc in sample RFI-55-RB-227 based on the deviations. Positive data for barium, lead and cyanide and all data for antimony and silver have been qualified as estimated in all soil samples based on the deviations.

The serial dilution results were above control limits for manganese, selenium, antimony, cadmium and beryllium. Based on the results, data have been qualified as estimated for the listed analytes in all soil samples.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Analyses performed by:	CT&E, Inc. Luddington, Michigan
Date of Report:	October 16, 2003
Validation performed by:	(Melissa Cash)
Date of Validation:	October 23, 2003

GENERAL MOTORS CORPORATION
NORTH AMERICAN OPERATIONS
FLINT OPERATIONS SITE

FLINT, MICHIGAN

TIER II
DATA VALIDATION REPORT

SDG# 3033961

PCB ANALYSES

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Summary

The following is an assessment of data package 3033961 for sampling in support of the RCRA Facility Investigation at the GM-NAO Flint Operations Site in Flint, Michigan. Included in this assessment are checklists used in the review of the samples and a summary of non-conformances and their impact on the reported data. Analyses were performed on the following samples:

Sample ID	Laboratory ID	Matrix	Sample Date	Analyses				
				VOC	SVOC	PCB	TAL	MISC
32/66 Tunnel-0(091203)NL	3033961003	NL	9/12/2003			X		
32/66 Tunnel-50(091203)NL	3033961004	NL	9/12/2003			X		
32/66 Tunnel-100(091203)NL	3033961005	NL	9/12/2003			X		

Sample Analysis: PCBs

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)	X		
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)	X		
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)	X		
	Field duplicate (RPD)	X		
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

All data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Analyses performed by:	CT&E, Inc. Luddington, Michigan
Date of Report:	October 2, 2003
Validation performed by:	(Melissa Cash)
Date of Validation:	October 08, 2003

GENERAL MOTORS CORPORATION
NORTH AMERICAN OPERATIONS
FLINT OPERATIONS SITE

FLINT, MICHIGAN

TIER II
DATA VALIDATION REPORT

SDG# 3034026

VOLATILE, SEMIVOLATILE,
PCB AND INORGANIC ANALYSES

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Summary

The following is an assessment of data package 3034026 for sampling in support of the RCRA Facility Investigation at the GM-NAO Flint Operations Site in Flint, Michigan. Included in this assessment are checklists used in the review of the samples and a summary of non-conformances and their impact on the reported data. Analyses were performed on the following samples:

Sample ID	Laboratory ID	Matrix	Sample Date	Analyses				
				VOC	SVOC	PCB	TAL	MISC
84-6R2 (091503)	3034026001	Water	9/15/03				X	
84-6R2 (091503)	3034026002	Water	9/15/03				X[1]	
RFI-07-01R (091503)	3034026003	Water	9/15/03	X				
RFI-09-52 (091503)	3034026004	Water	9/15/03	X				
RFI-86-02 (091503) NL	3034026005	NL	9/15/03	X	X	X	X	
RFI-12-22 (091503) NL	3034026006	NL	9/15/03	X	X	X	X	
TB-1 (091503)	3034026007	Water	9/15/03	X				

1 Metals analysis is for dissolved metals.

Sample Analysis: Volatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)		X	
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)		X	
	Matrix spike (%Recovery)	X		
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	Internal standard (Response, RT)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The initial calibration RSD was above control limits for methylene chloride. Data for methylene chloride have been qualified as estimated in samples RFI-86-02 (091503) NL and RFI-12-22 (091503) NL based on the deviation.

The continuing calibration %D were above control limits due to a decrease in response by several compounds. Based on the %D, data have been qualified as estimated for chloromethane, bromomethane, acetone, carbon disulfide, methyl acetate and 2-butanone.

Recovery for one surrogate was above control limits in sample RFI-12-22 (091503) NL. Positive data have been qualified as estimated in the listed sample based on the deviation.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Semivolatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)		X	
	Matrix spike (%Recovery)			X
	Blank spike (%Recovery)			X
	Control sample (%Recovery)			X
	Internal standard (Response, RT)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)			X
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The continuing calibration %D were above the acceptable limit due to a decrease in response by 3&4-methylphenol, dibenzo(a,h)anthracene and benzo (g,h,i)perylene. Data have been qualified as estimated for the listed compounds in samples RFI-86-02 (091503) NL and RFI-12-22 (091503) NL based on the deviations.

Recovery for two surrogates were above control limits in sample RFI-12-22 (091503) NL. Positive data for all base compounds have been qualified as estimated in the listed sample based on the deviations.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: PCBs

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)	X		
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)	X		
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)	X		
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

All data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Metals

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%R, R2)	X		
	Continuing calibration (%D)	X		
	Matrix spike (%Recovery)		X	
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	CRDL standard (%R)			X
	Serial dilution (%D)	X		
	Internal standard (Response)			X
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)		X	
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples		X	

Notes

Several analytes were detected the blanks. Since all samples were at a concentration greater than that in the blank, no data have been qualified based on the blank content.

The MS/MSD %R were outside the acceptable limit for silver, zinc, nickel, mercury and cyanide. Data have been qualified as estimated for total silver and total zinc in sample 84-6R2 (091503), dissolved nickel, dissolved silver and dissolved zinc in sample 84-6R2 (091503) and zinc, mercury and cyanide in samples RFI-86-02 (091503)NL and RFI-12-2 (091503) NL based on the deviations.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Analyses performed by:	CT&E, Inc. Luddington, Michigan
Date of Report:	October 17, 2003
Validation performed by:	(Melissa Cash)
Date of Validation:	October 27, 2003

GENERAL MOTORS CORPORATION
NORTH AMERICAN OPERATIONS
FLINT OPERATIONS SITE

FLINT, MICHIGAN

TIER II
DATA VALIDATION REPORT

SDG# 3034049

VOLATILE, PCB AND
INORGANIC ANALYSES

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Summary

The following is an assessment of data package 3034049 for sampling in support of the RCRA Facility Investigation at the GM-NAO Flint Operations Site in Flint, Michigan. Included in this assessment are checklists used in the review of the samples and a summary of non-conformances and their impact on the reported data. Analyses were performed on the following samples:

Sample ID	Laboratory ID	Matrix	Sample Date	Analyses				
				VOC	SVOC	PCB	TAL	MISC
RFI-40-13 (091603)	3034049001	Water	9/16/03	x		x	x	
DUP-1 (091603)[1]	3034049003	Water	9/16/03	x		x	x	
RFI-86-16R (091603)	3034049005	Water	9/16/03	x				
TB-2 (091603)	3034049006	Water	9/16/03	x				

1 Duplicate analysis of sample RFI-40-13 (091603)

Sample Analysis: Volatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)	X		
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	Internal standard (Response, RT)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)	X		
8.	Target analyte concentrations below detection limit in all blank samples		X	

Notes

The continuing calibration %D were above control limits due to a decrease in response by several compounds. Since all samples were non-detect for the deviant compounds, no data have been qualified based on the %D.

Methylene chloride was detected in the method blank. Since associated samples were non-detect for methylene chloride, no data have been qualified based on the blank content.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: PCBs

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)	X		
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)	X		
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)	X		
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

All data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Metals

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%R, R2)	X		
	Continuing calibration (%D)	X		
	Matrix spike (%Recovery)		X	
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	CRDL standard (%R)			X
	Serial dilution (%D)	X		
	Internal standard (Response)			X
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)	X		
8.	Target analyte concentrations below detection limit in all blank samples		X	

Notes

Several analytes were detected the blanks. Based on the blank content, data have been qualified as non-detect for zinc in samples RFI-40-13 (091603) and DUP-1 (091603).

The MS/MSD %R were below the acceptable limit for silver and zinc. Data have been qualified as estimated for silver and zinc in samples RFI-40-13 (091603) and DUP-1 (091603) based on the deviations.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Analyses performed by:	CT&E, Inc. Luddington, Michigan
Date of Report:	October 16, 2003
Validation performed by:	(Melissa Cash)
Date of Validation:	October 23, 2003

GENERAL MOTORS CORPORATION
NORTH AMERICAN OPERATIONS
FLINT OPERATIONS SITE

FLINT, MICHIGAN

TIER II
DATA VALIDATION REPORT

SDG# 3034070

VOLATILE, SEMIVOLATILE,
PCB AND INORGANIC ANALYSES

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Summary

The following is an assessment of data package 3034070 for sampling in support of the RCRA Facility Investigation at the GM-NAO Flint Operations Site in Flint, Michigan. Included in this assessment are checklists used in the review of the samples and a summary of non-conformances and their impact on the reported data. Analyses were performed on the following samples:

Sample ID	Laboratory ID	Matrix	Sample Date	Analyses				
				VOC	SVOC	PCB	TAL	MISC
RFI-12-35 (091703)	3034070001	Water	9/17/03	X		X	X	
RFI-12-35d (091703)	3034070002	Water	9/17/03				X[1]	
RFI-81-39R (091703)	3034070003	Water	9/17/03	X		X	X	
TB-3 (091703)	3034070004	Water	9/17/03	X				
83/84-07 (091703)NL	3034070005	NL	9/18/03	X	X	X	X	
RFI-94/02R (091803)	3034070006	Water	9/18/03	X				

1 Metals analysis is for dissolved metals.

Sample Analysis: Volatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)		X	
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)	X		
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	Internal standard (Response, RT)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The initial calibration RSD was above control limits for acetone. Data for acetone have been qualified as estimated in associated samples RFI-12-35 (091703) and 83/84-07 (091803)NL based on the deviation.

The continuing calibration %D were above control limits due to a decrease in response by several compounds. Based on the %D, data have been qualified as estimated for chloromethane, acetone, carbon disulfide, methyl acetate, methylene chloride, methyl-tert butyl-ether, 2-butanone, tetrachloroethene and bromoform in sample RFI-12-35 (091703), and bromomethane, acetone, 2-butanone, 1,1,2,2-tetrachloroethane, 1,4-dichlorobenzene, 1,2-dichlorobenzene, 1,2-dibromo-3-chloropropane and 1,2,4-trichlorobenzene in sample 83/84-07 (091803)NL.

Sample RFI-94/02 (091803) contained trichloroethene above the linear range. Data for trichloroethene have been replaced with data from the dilution analysis.

Other than for the deviations noted in this review, all data quality parameters were within method-

specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Semivolatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)			X
	Blank spike (%Recovery)			X
	Control sample (%Recovery)			X
	Internal standard (Response, RT)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)			X
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The continuing calibration %D were above the acceptable limit due to a decrease in response by 3&4-methylphenol and dibenzo(a,h)anthracene. Data have been qualified as estimated for 3&4-Methylphenol and dibenzo(a,h)anthracene in sample 83/84-07 (09/18/03)NL based on the deviations.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: PCBs

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)	X		
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)	X		
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)	X		
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

All data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Metals

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%R, R2)	X		
	Continuing calibration (%D)	X		
	Matrix spike (%Recovery)		X	
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	CRDL standard (%R)			X
	Serial dilution (%D)		X	
	Internal standard (Response)			X
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)		X	
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples		X	

Notes

Several analytes were detected the blanks. Since all samples were at a concentration greater than that in the blank, no data have been qualified based on the blank content.

The MS/MSD %R were below the acceptable limit for silver, zinc, nickel, mercury and cyanide. The MS/MSD RPD was above control limits for mercury. Data have been qualified as estimated for silver and zinc in samples RFI-12-35 (091703) and RFI-12-35d (091703), nickel in sample RFI-12-35d (091703) and zinc, mercury and cyanide in sample 83/84-07 (091803)NL based on the deviations.

The serial dilution recoveries were above control limits for several analytes. Based on the deviations, data have been qualified as estimated for cadmium, thallium, vanadium and beryllium in sample RFI-12-35d (091703) and zinc, selenium, barium, beryllium, cadmium, chromium and nickel in sample 83/84-07 (091803)NL.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Analyses performed by:	CT&E, Inc. Luddington, Michigan
Date of Report:	October 20, 2003
Validation performed by:	(Melissa Cash)
Date of Validation:	October 24, 2003

GENERAL MOTORS CORPORATION
NORTH AMERICAN OPERATIONS
FLINT OPERATIONS SITE

FLINT, MICHIGAN

TIER II
DATA VALIDATION REPORT

SDG# 3034086

VOLATILE, PCB
AND INORGANIC ANALYSES

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Summary

The following is an assessment of data package 3034086 for sampling in support of the RCRA Facility Investigation at the GM-NAO Flint Operations Site in Flint, Michigan. Included in this assessment are checklists used in the review of the samples and a summary of non-conformances and their impact on the reported data. Analyses were performed on the following samples:

Sample ID	Laboratory ID	Matrix	Sample Date	Analyses				
				VOC	SVOC	PCB	TAL	MISC
RFI-83/84-51 (091903)	3034086001	Water	9/19/03	X		X	X	
RFI-83/84-51d (091903)[1]	3034086002	Water	9/19/03			X	X	
TB-4 (091903)	3034086003	Water	9/19/03	X				

1 Analyses includes dissolved PCB and dissolved metals.

Sample Analysis: Volatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)		X	
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	Internal standard (Response, RT)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The continuing calibration %D were above control limits due to an increase in response by several compounds. Since all samples were non-detect for the deviant compounds and since the responses were increasing, no data have been qualified based on the %D.

The MSD recovery for vinyl chloride was above control limits. Since the associated sample was non-detect for vinyl chloride, no data have been qualified based on the deviation.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: PCBs

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)	X		
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)	X		
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)	X		
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

All data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Metals

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%R, R2)	X		
	Continuing calibration (%D)	X		
	Matrix spike (%Recovery)		X	
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	CRDL standard (%R)			X
	Serial dilution (%D)		X	
	Internal standard (Response)			X
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples		X	

Notes

Several analytes were detected the blanks. Since all samples were at a concentration greater than the blank action level, no data have been qualified based on the blank contamination.

The MS/MSD %R were below the acceptable limit for silver, zinc and nickel. Data have been qualified as estimated for total silver and total zinc in sample RFI-83/84-51 (091903) and dissolved nickel, dissolved silver and dissolved zinc in sample RFI-83/84-51d (091903) based on the deviations.

The serial dilution recoveries were above control limits for several analytes. Based on the deviations, data have been qualified as estimated for arsenic, cadmium, cobalt, copper, manganese, nickel, thallium, vanadium and beryllium in samples RFI-83/84-51 (091903) and RFI-83/84-51d (091903).

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Analyses performed by:	CT&E, Inc. Luddington, Michigan
Date of Report:	October 21, 2003
Validation performed by:	(Melissa Cash)
Date of Validation:	October 28, 2003

GENERAL MOTORS CORPORATION
NORTH AMERICAN OPERATIONS
FLINT OPERATIONS SITE

FLINT, MICHIGAN

TIER II
DATA VALIDATION REPORT

SDG# 3034201

VOLATILE, SEMIVOLATILE,
PCB AND INORGANIC ANALYSES

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Summary

The following is an assessment of data package 3034201 for sampling in support of the RCRA Facility Investigation at the GM-NAO Flint Operations Site in Flint, Michigan. Included in this assessment are checklists used in the review of the samples and a summary of non-conformances and their impact on the reported data. Analyses were performed on the following samples:

Sample ID	Laboratory ID	Matrix	Sample Date	Analyses				
				VOC	SVOC	PCB	TAL	MISC
RFI-55-11 (092603)	3034201001	Water	9/26/03	X	X	X	X	
RFI-55-11d (092603)[1]	3034201002	Water	9/26/03			X	X	
RFI-55-12 (092603)	3034201003	Water	9/26/03	X	X	X	X	
TB	3034201004	Water	9/26/03	X				

1 Sample analyses are for dissolved metals and dissolved PCB.

Sample Analysis: Volatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)	X		
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	Internal standard (Response, RT)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The continuing calibration %D were above control limits due to a decrease in response by methyl acetate. Based on the %D, data have been qualified as estimated for methyl acetate in samples RFI-55-11 (092603), RFI-55-12 (092603) and TB.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Semivolatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)			X
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	Internal standard (Response, RT)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)			X
	Laboratory duplicate (RPD)	X		
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The continuing calibration %D were above the acceptable limit due to a decrease in response by 3&4-methylphenol and an increase in response by bis(2-chloroisopropyl)ether. Data have been qualified as estimated for the 3&4-methylphenol in samples RFI-55-11 (092603) and RFI-55-12 (092603) and bis(2-chloroisopropyl)ether in sample RFI-55-11 (092603) based on the deviations.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: PCBs

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)	X		
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)	X		
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)		X	
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The LCS/LCSD RPD were above control limits for Aroclors 1248 and 1260. Since all samples were non-detect for these Aroclors, no data have been qualified based on the deviations.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Metals

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%R, R2)	X		
	Continuing calibration (%D)	X		
	Matrix spike (%Recovery)		X	
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	CRDL standard (%R)			X
	Serial dilution (%D)		X	
	Internal standard (Response)			X
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples		X	

Notes

Several analytes were detected the blanks. Based on the blank content data have been qualified as non-detect for zinc in sample RFI-55-12 (092603).

The MS/MSD %R were outside the acceptable limit for antimony, beryllium, copper, manganese, silver, zinc, vanadium and nickel. Data have been qualified as estimated for total antimony, copper, beryllium, manganese, nickel, silver and zinc in samples RFI-55-11 (092603) and RFI-55-12 (092603) based on the deviations. Data have been qualified as estimated for dissolved vanadium in sample RFI-55-11d (092603) based on the deviations.

The serial dilution results were above control limits for several analytes. Based on the deviations, data have been qualified as estimated for antimony, arsenic, cadmium, cobalt, copper, lead, nickel, silver, thallium, zinc and beryllium in sample RFI-55-12 (092603).

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Analyses performed by:	CT&E, Inc. Luddington, Michigan
Date of Report:	October 27, 2003
Validation performed by:	(Melissa Cash)
Date of Validation:	October 30, 2003

GENERAL MOTORS CORPORATION
NORTH AMERICAN OPERATIONS
FLINT OPERATIONS SITE

FLINT, MICHIGAN

TIER II
DATA VALIDATION REPORT

SDG# 3034507

SEMIVOLATILE ANALYSES

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Summary

The following is an assessment of data package 3034507 for sampling in support of the RCRA Facility Investigation at the GM-NAO Flint Operations Site in Flint, Michigan. Included in this assessment are checklists used in the review of the samples and a summary of non-conformances and their impact on the reported data. Analyses were performed on the following samples:

Sample ID	Laboratory ID	Matrix	Sample Date	Analyses				
				VOC	SVOC	PCB	TAL	MISC
RFI-40-13 (101303)	3034507001	Water	10/13/03		X			
RFI-12-35 (101403)	3034507002	Water	10/14/03		X			
RFI-83/84-51 (101403)	3034507003	Water	10/14/03		X			
RFI-DUP01 (101403)[1]	3034507004	Water	10/14/03		X			

1 Filed duplicate sample of RFI-83/84-51 (101403).

Sample Analysis: Semivolatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)		X	
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	Internal standard (Response, RT)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)		X	
	Laboratory duplicate (RPD)	X		
	Field duplicate (RPD)	X		
8.	Target analyte concentrations below detection limit in all blank samples		X	

Notes

The continuing calibration %D were above the acceptable limit due to a decrease in response by 3&4-methylphenol. Data have been qualified as estimated for 3&4-Methylphenol in all samples based on the deviations.

Di-n-butylphthalate was detected in the method blank. Based on the blank content, data have been qualified as non-detect for di-n-butylphthalate in sample RFI-DUP-01 (101403).

The MSD recoveries for atrazine and hexachlorocyclopentadiene were below control limits. Data for the listed compounds have been qualified as estimated in sample RFI-83/84-51 (101403) based on the deviations.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Analyses performed by:	CT&E, Inc. Luddington, Michigan
Date of Report:	October 23, 2003
Validation performed by:	(Melissa Cash)
Date of Validation:	October 27, 2003

GENERAL MOTORS CORPORATION
NORTH AMERICAN OPERATIONS
FLINT OPERATIONS SITE

FLINT, MICHIGAN

TIER II
DATA VALIDATION REPORT

SDG# 3035292

VOLATILE, SEMIVOLATILE,
PCB AND INORGANIC ANALYSES

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Summary

The following is an assessment of data package 3035292 for sampling in support of the RCRA Facility Investigation at the GM-NAO Flint Operations Site in Flint, Michigan. Included in this assessment are checklists used in the review of the samples and a summary of non-conformances and their impact on the reported data. Analyses were performed on the following samples:

Sample ID	Laboratory ID	Matrix	Sample Date	Analyses				
				VOC	SVOC	PCB	TAL	MISC
RFI-94-08 (04-06)	3035292001	Soil	12/01/2003	X	X	X	X	
RFI-94-08 (08-10)	3035292002	Soil	12/01/2003	X	X	X	X	
RFI-94-08 (21-23)	3035292003	Soil	12/01/2003	X	X	X	X	
DUP-01 (120103)[1,2]	3035292004	Soil	12/01/2003	X	X	X	X	

1 Field duplicate of sample RFI-94-08 (08-10)
2 Field duplicate of sample RFI-94-08 (21-23) (metals only)

Sample Analysis: Volatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)			X
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	Internal standard (Response, RT)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)			X
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)		X	
8.	Target analyte concentrations below detection limit in all blank samples		X	

Notes

The continuing calibrations %D were above control limits due to a decrease in response by several compounds. Data have been qualified as estimated for dichlorodifluoromethane, chloromethane, trichlorofluoromethane, carbon disulfide, methylene chloride in the associated samples based on the %D.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Semivolatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)		X	
	Continuing calibration (%D, RF)		X	
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)			X
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	Internal standard (Response, RT)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)			X
	Laboratory duplicate (RPD)	X		
	Field duplicate (RPD)	X		
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The initial calibration %RSD was above control limits for di-n-octylpthalate. Since associated samples were non-detect for this compound, no data has been qualified based on the deviations.

The continuing calibration %D were above the acceptable limit due to a decrease in response by 3&4-methylphenol and benzo(g,h,i)perylene. Data have been qualified as estimated for these compounds in the associated samples based on the deviations.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: PCBs

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)	X		
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)			X
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)			X
	Laboratory duplicate (RPD)		X	
	Field duplicate (RPD)	X		
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

The MS/MSD RPD was above control limits for Aroclor 1248 and Aroclor 1260. Since the associated sample was non-detect for PCBs none of the data have been qualified based on this deviation.

Other than for the deviations mentioned in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Sample Analysis: Metals

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%R, R2)	X		
	Continuing calibration (%D)	X		
	Matrix spike (%Recovery)			X
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	CRDL standard (%R)			X
	Serial dilution (%D)	X		
	Internal standard (Response)			X
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)			X
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)	X		
8.	Target analyte concentrations below detection limit in all blank samples		X	

Notes

Cadmium was detected the method blank. Based on the blank content, data have been qualified as non-detect for cadmium in samples RFI-94-08 (08-10) and RFI-94-08(21-23).

The RPD between original sample RFI-94-08 (21-23) and duplicate samples DUP-01 (120103) was above control limits for barium. All soil data have been qualified as estimated for the barium metals.

Other than for the deviations noted in this review, all data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Analyses performed by:	CT&E, Inc. Luddington, Michigan
Date of Report:	January 6, 2004
Validation performed by:	(Douglas Fischi)
Date of Validation:	January 14, 2004

GENERAL MOTORS CORPORATION
NORTH AMERICAN OPERATIONS
FLINT OPERATIONS SITE

FLINT, MICHIGAN

TIER II
DATA VALIDATION REPORT

SDG# 3035565

VOLATILE ANALYSES

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Summary

The following is an assessment of data package 3035565 for sampling in support of the RCRA Facility Investigation at the GM-NAO Flint Operations Site in Flint, Michigan. Included in this assessment are checklists used in the review of the samples and a summary of non-conformances and their impact on the reported data. Analyses were performed on the following samples:

Sample ID	Laboratory ID	Matrix	Sample Date	Analyses				
				VOC	SVOC	PCB	TAL	MISC
RFI-94-09 (121503)	3035565001	Water	12/15/03	X				
RFI-94-10 (121503)	3035565002	Water	12/15/03	X				
RFI-94-08 (121603)	3035565003	Water	12/15/03	X				
Trip Blank (121603)	3035565004	Water	12/17/03	X				

Sample Analysis: Volatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)	X		
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)	X		
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	Internal standard (Response, RT)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

All data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

Analyses performed by:	CT&E, Inc. Luddington, Michigan
Date of Report:	January 8, 2004
Validation performed by:	(Douglas Fischi)
Date of Validation:	January 14, 2004

GENERAL MOTORS CORPORATION
NORTH AMERICAN OPERATIONS
FLINT OPERATIONS SITE

FLINT, MICHIGAN

TIER II
DATA VALIDATION REPORT

SDG# 3035565

VOLATILE ANALYSES

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

Summary

The following is an assessment of data package 3035565 for sampling in support of the RCRA Facility Investigation at the GM-NAO Flint Operations Site in Flint, Michigan. Included in this assessment are checklists used in the review of the samples and a summary of non-conformances and their impact on the reported data. Analyses were performed on the following samples:

Sample ID	Laboratory ID	Matrix	Sample Date	Analyses				
				VOC	SVOC	PCB	TAL	MISC
RFI-94-09 (121503)	3035565001	Water	12/15/03	X				
RFI-94-10 (121503)	3035565002	Water	12/15/03	X				
RFI-94-08 (121603)	3035565003	Water	12/15/03	X				
Trip Blank (121603)	3035565004	Water	12/17/03	X				

Sample Analysis: Volatiles

Quality Control Checks

		YES	NO	NA
1.	Field Chain-of-Custody complete	X		
2.	Proper methods for analysis used	X		
3.	All documentation supplied	X		
4.	Samples analyzed within specified holding times	X		
5.	The minimum number of field and laboratory QC samples analyzed	X		
6.	Accuracy maintained within established ranges for the following:			
	Initial calibration (%RSD, R2, RF)	X		
	Continuing calibration (%D, RF)	X		
	Surrogate (%Recovery)	X		
	Matrix spike (%Recovery)	X		
	Blank spike (%Recovery)			X
	Control sample (%Recovery)	X		
	Internal standard (Response, RT)	X		
7.	Precision maintained within established ranges for the following:			
	Matrix spike (RPD)	X		
	Laboratory duplicate (RPD)			X
	Field duplicate (RPD)			X
8.	Target analyte concentrations below detection limit in all blank samples	X		

Notes

All data quality parameters were within method-specified limits and the data is acceptable for use as reported by the laboratory.

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