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DRAFT RESOURCE CONSERVATION AND RECOVERY ACT FACILITY INVESTIGATION REPORT FOR ZONE E VOLUME XII OF XV APPENDIX I
11/1/1997
ENSAFE

DRAFT ZONE E
RCRA FACILITY INVESTIGATION REPORT
NAVBASE CHARLESTON

VOLUME XII OF XV
APPENDIX I (Part 1)

CTO-029
CONTRACT NO: N62467-89-D-0318

Prepared for:

Department of the Navy
Southern Division
Naval Facilities Engineering Command
North Charleston, South Carolina

Prepared by:

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November 1997

Appendix I

Analytical Data Validation Reports

DATA ASSESSMENT NARRATIVE
Metals

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, calibration standards, blank analysis results and MS/MSD results. A minimum of ten percent of all laboratory calculations are recalculated by the reviewer. The data validation was performed by the " Laboratory Data Validation Functional Guideline for Evaluating Inorganic Analysis" July, 1988. All comments made within this report should be considered when examining the analytical results (Form Is).

This data package consisted of results from Ensafe, SDG# 23360B, the analysis of two (2) field soil samples and no Matrix Spike, Matrix Spike Duplicate and Duplicate pair for TAL Metals and Cyanide. Overall, the inorganic data quality was fair. All protocol requirements were followed with the exception of the following problems.

Specific QA/QC deficiency Findings are listed numerically in the following categories:

Holding Times

The holding times were met as specified in the "Laboratory Data Validation Functional Guideline for Evaluating Inorganic Analysis", July, 1988.

Calibration

No deficiencies in this section.

Preparation and Field Blank

1. The preparation blank exhibited contamination for the following elements.

Iron	3.28	mg/kg	no impact
Potassium	123.0	mg/kg	no impact
Sodium	18.9	mg/kg	no impact

The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as estimated, "U".

Interferences

No significant interferences were observed.

Spike Recovery

No deficiencies in this section.

Duplicate

No deficiencies in this section.

LCS

No deficiencies in this section.

Serial Dilution

No deficiencies in this section.

MSA

No deficiencies in this section.

2. Ensafe requires that all data points with the "B" qualifier be changed to "J".

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL	SPECIFIC FINDING
No impact.	Fe, K and Na.	+	U	1
All soil samples	all analytes	B	J	2

DL - denotes laboratory qualifier/reported value
+ denotes positive values
U denotes non-detect values

QL - denotes data validation qualifier

DATA ASSESSMENT NARRATIVE
Metals

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, calibration standards, blank analysis results and MS/MSD results. A minimum of ten percent of all laboratory calculations are recalculated by the reviewer. The data validation was performed by the " Laboratory Data Validation Functional Guideline for Evaluating Inorganic Analysis" July, 1988. All comments made within this report should be considered when examining the analytical results (Form Is).

This data package consisted of results from Ensafe, SDG# 23360B, the analysis of two (2) field soil samples and no Matrix Spike, Matrix Spike Duplicate and Duplicate pair for TAL Metals and Cyanide. Overall, the inorganic data quality was fair. All protocol requirements were followed with the exception of the following problems.

Specific QA/QC deficiency Findings are listed numerically in the following categories:

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Serial Dilution

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MSA

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SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL	SPECIFIC FINDING
No impact.	Fe, K and Na.	+	U	1
All soil samples	all analytes	B	J	2

DL - denotes laboratory qualifier/reported value
+ denotes positive values
U denotes non-detect values

QL - denotes data validation qualifier

DATA ASSESSMENT NARRATIVE

ORGANOCHLORINE PESTICIDES AND PCBS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, GC instrument performance, initial and continuing calibration summaries, analytical sequence, blank analysis results, surrogate recoveries, MS/MSD and Blank Spike results where applicable. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW846 Method 8080; and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results (Form Is). Please refer the specific findings found in each category to the Summary of Data Qualification table.

LABORATORY SDG NUMBERS: 23360

Contractual Non-Compliance

The method requires that all target compounds, including the multi-component compounds, be analyzed with a five (5) point calibration curve. The laboratory analyzed a single point curve for the aroclors 1221, 1232, 1242, 1248, and 1254. The data did not require qualification because there were no aroclors detected in the samples. However, the laboratory should follow the methodology.

Holding Times

All extraction and analysis hold times were met. No qualifications were required.

GC Instrument Performance

This GC analytical fraction was analyzed utilizing external standards. All percent breakdowns reported were within the required QC limits. It appears that all surrogate retention times were within the required limits. Retention times windows were present in the data package. However, there were no summary forms for the continuing calibration standards. No qualifications of the reported non-detect results were required based on instrument performance.

Initial Calibration

The single-component pesticides and all multi-component compounds were analyzed using an initial five-point calibration. Calibration factors and %RSDs were calculated. No qualification of the reported results were required based on the initial calibration.

DATA ASSESSMENT NARRATIVE

ORGANOCHLORINE PESTICIDES AND PCBs

Continuing Calibrations

All %Ds for all continuing calibrations associated with reported samples were not within QC limit. The %Ds were slightly high. There were no positive results reported in the associated samples for the non-compliant compounds so no qualification of the reported results was required.

Method Blanks

The method blanks did not contain any significant confirmed peaks. No qualifications were required.

Field QC Blanks

The associated rinseate blank and field blank were analyzed in a different SDG. The blanks did not exhibit contamination for target compounds. No qualifications were required.

Surrogate Recoveries

The field sample surrogate recoveries were within the reported QC limits. No qualification of the reported results was required.

Matrix Spike/Matrix Spike Duplicate

There was no MS/MSD in this SDG. The reported blank spikes exhibited acceptable recoveries for all compounds. No qualifications were required.

Analyte Identification/Quantitation

No positive results were reported or identified by the reviewer for the samples. The quantitation calculations were verified. No qualifications were required.

Overall Assessment

All reported results for these samples are accepted without qualification.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

NJ = Presumptive evidence for the presence of the material at an estimated value

K = Result is biased high

L = Result is biased low

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF PESTICIDE/AROCLOR DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL	SPECIFIC FINDINGS

NO QUALIFICATIONS WERE REQUIRED.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier(s) used by the data validation firm
+ in the DL column denotes a positive result
_ in the DL column denotes a non-detect result

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846, Method 8270 Appendix IX , National Functional Guidelines for Organic Data Review, and DQO Level IV. All comments made within this report should be considered when examining the analytical results (Form I's).

SDG # 23360

Holding Times

The holding times for all of the samples were met per the Organic Functional Guidelines and the CLP SOW (fourteen (14) days from collection date). no qualifications are required.

Tuning

All of the BFB tunes in the initial and continuing calibrations met the percent relative abundance criteria of the SOW and the Organic Functional Guidelines. No qualifications are required.

Initial Calibrations

The initial calibrations that were analyzed by the laboratory for these samples were not acceptable for all compound %RSDs and the average RRFs for all of the compounds did not meet the initial calibration criteria.

Initial calibrations (continued)

Specific Finding:

1. The initial calibration analyzed on, 08/28/95, contained compounds with %RSD greater than 30% and RRFs less than 0.05. No qualifications are required, because no samples were analyzed following the calibration.

   pyridine

2. The initial calibration analyzed on, 09/01/95, contained compounds with %RSD greater than 30%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and reject all non detects (R).

SBLK1	1,2,4,5-tetrachlorobenzene
	1-naphthylamine
	2-naphthylamine
	3,3-dimethylbenzidine
	dimethoate
	methyl parathion

3. The initial calibration analyzed on, 09/01/95, contained compounds with RRFs less than 0.05. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and reject all non detects (R).

SBLK1	4-nitroquinoline-1-oxide
	aramite

Continuing calibrations

The continuing calibrations that were analyzed with this data package exhibited %Ds that were not within %D continuing calibration criteria. All RRFs were within calibration criteria.

Continuing calibrations (continued)

Specific Finding:

4. The continuing calibration, A8317-20-21-22, contained compounds with %Ds greater than 25%, but less than 50%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J).

538CB00802	hexachlorocyclopentadiene
SBLK2	benzo(k)fluoranthene
	ethyl methanesulfonate
	1-naphthylamine
	2,3,4,6-tetrachlorophenol
	dimethylbenz(a)anthracene
	1,4-naphthaquinone
	3,3'-dimethylbenzidine
	2-sec-butyl-4,6-dinitrophenol
	dimethoate
	famphur

5. The continuing calibration, A8317-20-21-22, contained compounds with %Ds greater than 50% but less than 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and all non detects as estimated (UJ).

538CB00802	2-naphthylamine
SBLK2	2,3,4,6-tetrachlorophenol
	pyridine

6. The continuing calibration, A8317-20-21-22, contained compounds with RRFs less than 0.05. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and reject all non detects (R).

538CB00802	methyl methanesulfonate (99.3)
SBLK2	hexachloropropene
	1,3,5-trinitrobenzene (41.7)
	4-nitroquinoline-1-oxide
	aramite
	methyl parathion
	hexachlorophene

Continuing calibrations (continued)

Specific Finding:

7. The continuing calibration, A8347-48-49-50, contained compounds with %Ds greater than 25%, but less than 50%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J).

542CB00602	hexachlorocyclopentadiene
	2,4-dinitrophenol
	4-nitrophenol
	4-nitroaniline
	4,6-dinitro-2-methylphenol
	benzyl alcohol
	benzoic acid
	ethyl methanesulfonate
	1-naphthylamine
	2,3,4,6-tetrachlorophenol
	dimethylbenz(a)anthracene
	1,4-naphthaquinone
	1,3-dinitrobenzene
	3,3'-dimethylbenzidine
	2-acetylaminofluorine
	2-sec-butyl-4,6-dinitrophenol
	dimethoate
	m-cresol

8. The continuing calibration, A8347-48-49-50, contained compounds with %Ds greater than 50%, but less than 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and all non detects as estimated (UJ).

542CB00602	2-naphthylamine
	pyridine
	methyl parathion

Continuing calibrations (continued)

Specific Finding:

9. The continuing calibration, A8347-48-49-50, contained compounds with RRFs less than 0.05. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and reject all non detects (R).

542CB00602	methyl methanesulfonate hexachloropropene 4-nitroquinoline-1-oxide (133.3) aramite (32.0)

Internal Standards

All internal standard EICP areas meet the internal standard EICP area QA/QC criteria. No qualifications are required.

Method Blanks

The method blank that was analyzed exhibited contamination for 1,2,4,5-tetrachlorobenzene. The method blank results will be compared to their associated samples. Refer to the glossary of data qualifiers for a list and definition of the method blank qualifiers: CRQL, U and No Action.

Specific findings:

10. The samples listed below have been qualified for blank contamination. Qualifications are for all blanks.

538CB00802	1,2,4,5-tetrachlorobenzene	CRQL

11. For all samples reject all "B" flagged TICs due to method blank contamination.

Rinseate Blanks

The associated rinseate blank 023EB00301, did not exhibit contamination. No qualifications are required.

Field Blanks

The associated field blank was not identified for this SDG. No qualifications are required.

DI Blanks

The associated DI blank 023DB00301, that was analyzed exhibited contamination for 4-chloro-3-methylphenol, acenaphthene and bis(2-ethylhexyl)phthalate. However, none of the associated samples exhibited similar contamination. No qualifications are required.

Surrogates

All of the surrogate recoveries for the water samples were within QA/QC limits. No qualifications are required.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

The associated MS/MSD was not identified for this SDG. No qualifications are required.

Field Duplicates

No qualifications are required.

Compound Identification/Quantitation

No qualifications are required.

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

NJ = Presumptive evidence for the presence of the material at an estimated value

K = Result is biased high

L = Result is biased low

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL	SPECIFIC FINDINGS
538CB00802	hexachlorocyclo-pentadiene	+	J	4
SBLK2	benzo(k)fluoranthene			
	ethyl methanesulfonate			
	1-naphthylamine			
	2,3,4,6-tetrachlorophenol			
	dimethylbenz(a)anthracene			
	1,4-naphthaquinone			
	3,3'-dimethylbenzidine			
	2-sec-butyl-4,6-dinitrophenol			
	dimethoate			
	famphur			
538CB00802	2-naphthylamine	+/-	J/UJ	5
SBLK2	2,3,4,6-tetrachlorophenol			
	pyridine			
538CB00802	methyl methane-sulfonate (99.3)	+/-	J/R	6
SBLK2	hexachloropropene			
	1,3,5-trinitrobenzene (41.7)			
	4-nitroquinoline-1-oxide			
	aramite			
	methyl parathion			
	hexachlorophene			

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QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL	SPECIFIC FINDINGS
542CB00602	hexachlorocyclo-pentadiene 2,4-dinitrophenol 4-nitrophenol 4-nitroaniline 4,6-dinitro-2-methylphenol benzyl alcohol benzoic acid ethyl methanesulfonate 1-naphthylamine 2,3,4,6-tetrachlorophenol dimethylbenz(a)anthracene 1,4-naphthaquinone 1,3-dinitrobenzene 3,3'-dimethylbenzidine 2-acetylaminofluorine 2-sec-butyl-4,6-dinitrophenol dimethoate m-cresol	+/-	J	7
542CB00602	2-naphthylamine pyridine methyl parathion	+/-	J/UJ	8
542CB00602	methyl methanesulfonate hexachloropropene 4-nitroquinoline-1-oxide (133.3) aramite (32.0)	+/-	J/R	9
538CB00802	1,2,4,5-tetrachloro-benzene	+	CRQL	10
All samples	"B" flagged TICs	+	R	11

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DATA ASSESSMENT AND NARRATIVE

VOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846, Method 8270 Appendix IX; the National Functional Guidelines for Organic Data Review, and DQO Level IV. All comments made within this report should be considered when examining the analytical results (Form I's).

SDG # 23360

Holding Times

The holding times for all of the samples were met per the Organic Functional Guidelines and the CLP SOW (fourteen (14) days from collection date). No qualifications are required.

Tuning

All of the BFB tunes in the initial and continuing calibrations met the percent relative abundance criteria of the SOW and the Organic Functional Guidelines. No qualifications are required.

Initial Calibrations

The initial calibrations that were analyzed by the laboratory for these samples were not acceptable for all compound %RSDs and the average RRFs for all of the compounds did not meet the initial calibration criteria.

Initial calibrations (continued)

Specific Finding:

1. The initial calibration analyzed on, 08/22/95, contained compounds with %RSD greater than 30% and RRFs less than 0.05. No qualifications are required, because no samples were analyzed following the calibration.

   chloromethane
   2-butanone
   dichlorodifluoromethane (0.032)
   2-chloroethyl vinyl ether
   1,4-dichloro-2-butene (0.044)
   isobutanol (0.012)
   1,4-dioxane (0.003)
   pentachloroethane
   acetonitrile (0.031)

2. The initial calibration analyzed on, 09/05/95, contained compounds with %RSD greater than 30% and RRFs less than 0.05. No qualifications are required, because no samples were analyzed following the calibration.

   acrolein (0.026)
   2-chloroethyl vinyl ether (0.030)
   isobutanol (0.007)
   acetonitrile (0.039)
   1,4-dioxane (0.002)

Continuing calibrations

The continuing calibrations that were analyzed with this data package exhibited %Ds that were not within %D continuing calibration criteria. All RRFs were within calibration criteria.

Continuing calibrations (continued)

Specific Finding:

3. The continuing calibration, R20176, contained compounds with %Ds greater than 25%, but less than 50%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J).

VBLK1	chloromethane
538TB00802	propionitrile

4. The continuing calibration, R20176, contained compounds with RRFs less than 0.05. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and reject all non detects (R).

VBLK1	acrolein (45.0)
538TB00802	dichlorodifluoromethane
	1,4-dichloro-2-butene
	isobutanol (33.3)
	1,4-dioxane (33.3)
	acetonitrile

5. The continuing calibration, UI344, contained compounds with RRFs less than 0.05. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and reject all non detects (R).

VBLK2	acrolein
542CB00602	2-chloroethyl vinyl ether
	isobutanol
	acetonitrile
	1,4-dioxane

Continuing calibrations (continued)

Specific Finding:

6. The continuing calibration, UI371, contained compounds with RRFs less than 0.05. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and reject all non detects (R).

VBLK3	acrolein
538CB00802	2-chloroethyl vinyl ether
	isobutanol
	acetonitrile
	1,4-dioxane

Internal Standards

All internal standard EICP areas met the internal standard EICP area QA/QC criteria. No qualifications a required.

Method Blanks

The method blanks that were analyzed exhibited contamination for methylene chloride. However, none of the associated samples exhibited similar contamination. No qualifications a required.

Trip Blanks

One of the trip blanks that were analyzed exhibited contamination for methylene chloride. However, none of the associated samples exhibited contamination for methylene chloride. The methylene chloride contamination was attributed to the associated trip blank. No qualifications are required.

Rinseate Blanks

The associated rinseate blank 023EB00301, that were analyzed exhibited contamination for methylene chloride and chloroform. The trip blank results will be compared to their associated samples. Refer to the glossary of data qualifiers for a list and definition of the method blank qualifiers: CRQL, U and No Action.

Rinseate Blanks (continued)

Specific findings:

7. The samples listed below have been qualified for blank contamination. Qualifications are for all blanks.

542CB00602	methylene chloride	U

Field Blanks

The associated field blank was not identified for this SDG. No qualifications are required.

DI Blanks

The associated DI blank 023DB00301, exhibited contamination for methylene chloride, acetone and chloroform. However, the methylene chloride found in the associated samples was attributed to the methylene chloride contamination found in the associated rinseate blank and none of the samples exhibited contamination. No qualifications a required.

Surrogates

All of the surrogate recoveries for the all blanks and samples were within QA/QC limits. No qualifications are required.

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

The associated MS/MSD was not identified for this SDG. No qualifications are required.

Field Duplicate

No qualifications are required.

Compound Identification/Quantitation

No qualifications are required.

DATA ASSESSMENT AND NARRATIVE

VOLATILE ANALYSIS

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

NJ = Presumptive evidence for the presence of the material at an estimated value

K = Result is biased high

L = Result is biased low

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL	SPECIFIC FINDINGS
VBLK1 538TB00802	chloromethane propionitrile	+	J	3
VBLK1 538TB00802	acrolein (45.0) dichlorodifluoromethane 1,4-dichloro-2-butene isobutanol (33.3) 1,4-dioxane (33.3) acetonitrile	+/-	J/R	4
VBLK2 542CB00602	acrolein 2-chloroethyl vinyl ether isobutanol acetonitrile 1,4-dioxane	+/-	J/R	5
VBLK3 538CB00802	acrolein 2-chloroethyl vinyl ether isobutanol acetonitrile 1,4-dioxane	+/-	J/R	6
542CB00602	methylene chloride	+	U	7

* DL denotes the Form I qualifier supplied by the laboratory
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\+ in the DL column denotes a positive result
\- in the DL column denotes a non detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

November 17, 1995

Prepared for

ENSAFE/ALLEN & HOSHALL
935 Houston Northcutt Blvd., Ste. 113
Mt. Pleasant, South Carolina 29464

This Data Validation Report is a review of the analytical results of sampling conducted September 6, 1995 in support of the Charleston Zone E project. There were twenty-four (24) air samples which were received and analyzed by Southwest Laboratory of Oklahoma in this analytical batch, SDG# 23423B.

Heartland ESI personnel have reviewed the data presented for the Samples listed below for the Analytical Fractions indicated. The CLP fractions have been validated utilizing: the "Laboratory Data Validation Functional Guidelines For Evaluating Inorganics Analysis", July, 1988; specific method requirements in SW-846; DQO Level III requirements and good professional judgement.

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatogram, etc., for each sample have been carefully reviewed. The end-user is urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form Is for all samples reviewed are included after the Narratives.

The release of this Data Validation Report is authorized by the following signature:

Craig H. Scarpos

Eugene M. Watson, Vice President Heartland ESI

11-17-95.

Date

6716 Mexico Road · St. Peters, MO 63376
(314) 928-9533 · (314) 278-1828 · Fax (314) 278-2709

SDG# 23423B

SAMPLES AND FRACTIONS REVIEWED

Sample Identifications			Analytical Fraction
ENSAFE ID	SWL ID	Matrix	TAL
083J0001BB	2343601	AIR	X
083JF00101	2343602	AIR	X
083JF00201	2343603	AIR	X
083JF00301	2343604	AIR	X
083JF00401	2343605	AIR	X
083JF00501	2343606	AIR	X
083JF00601	2343607	AIR	X
083JF00701	2343608	AIR	X
083JF00801	2343609	AIR	X
083JH00901	2343610	AIR	X
083JH01001	2343611	AIR	X
083JH01101	2343612	AIR	X
083JH01201	2343613	AIR	X
083JH01301	2343614	AIR	X
083JH01401	2343615	AIR	X
083JH01501	2343616	AIR	X
083JH01601	2343617	AIR	X
538JF00901	2343618	AIR	X
538JF00B01	2343619	AIR	X
538JF01001	2343620	AIR	X
538JF01101	2343621	AIR	X
538JH00901	2343622	AIR	X
538JH01001	2343623	AIR	X
538JH01101	2343624	AIR	X

Total Number of Samples (Water/Air) 0/24

Total Number of Billable Samples (Water/Air) 0/24

Individual fractions were reviewed as follows:

	Primary	Secondary
TAL - Metals (SW-846)	Paul Humburg	J. Cleveland

DATA ASSESSMENT NARRATIVE
Metals

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, calibration standards, blank analysis results and MS/MSD results. A minimum of ten percent of all laboratory calculations are recalculated by the reviewer. The data validation was performed by the " Laboratory Data Validation Functional Guideline for Evaluating Inorganic Analysis" Febuary, 1994. All comments made within this report should be considered when examining the analytical results (Form Is).

This data package consisted of results from Ensafe, SDG# 23423B, the analysis of twenty-four (24) field wipe samples and no Matrix Spike, Matrix Spike Duplicate and Duplicate pair for TAL Metals. Overall, the inorganic data quality was fair. All protocol requirements were followed with the exception of the following problems.

Specific QA/QC deficiency Findings are listed numerically in the following categories:

Holding Times

The holding times were met as specified in the "Laboratory Data Validation Functional Guideline for Evaluating Inorganic Analysis", Febuary, 1994.

Calibration

No deficiencies in this section.

Preparation and Field Blank

1. The preparation blank exhibited contamination for the following elements.

Calcium	125.0	ug/f
Chromium	0.28	ug/f
Iron	5.39	ug/f
Lead	2.42	ug/f
Nickel	0.22	ug/f
Potassium	42.7	ug/f
Tin	7.75	ug/f
Sodium	194.0	ug/f

The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as estimated, "U".

Interferences

No significant interferences were observed.

Spike Recovery

No spike for this SDG.

Duplicate

No duplicate for this SDG.

LCS

No deficiencies in this section.

Serial Dilution

2. The Serial dilutions for Aluminum, Silver and Sodium were outside the control limits. All positive results are qualified as estimated, "J".

3. Ensafe requires that all data points with the "B" qualifier be changed to "J".

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL	SPECIFIC FINDING
All wipe samples	Ca, Cr, Fe, Pb, Ni, K, Na and Sn.	+	U	1
All wipe samples	Al, Ag and Na.	+	J	2
All wipe samples	all analytes	B	J	3

DL - denotes laboratory qualifier/reported value
+ denotes positive values
U denotes non-detect values

QL - denotes data validation qualifier

DATA ASSESSMENT NARRATIVE
Metals and Hexavalent Chromium

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, calibration standards, blank analysis results and MS/MSD results. A minimum of ten percent of all laboratory calculations are recalculated by the reviewer. The data validation was performed by the " Laboratory Data Validation Functional Guideline for Evaluating Inorganic Analysis" Febuary, 1994. All comments made within this report should be considered when examining the analytical results (Form Is).

This data package consisted of results from Ensafe, SDG# 23424B, the analysis of one (1) field soil sample and no Matrix Spike, Matrix Spike Duplicate and Duplicate pair for TAL Metals and two (2) field soil samples and no Matrix Spike, Matrix Spike Duplicate and Duplicate pair for Hexavalent Chrmomium and Mercury only. Overall, the inorganic data quality was fair. All protocol requirements were followed with the exception of the following problems.

Specific QA/QC deficiency Findings are listed numerically in the following categories:

Holding Times

The holding times were met as specified in the "Laboratory Data Validation Functional Guideline for Evaluating Inorganic Analysis", Febuary, 1994.

Calibration

No deficiencies in this section.

Preparation and Field Blank

No deficiencies in this section..

The field or DI water blanks exhibited no contamination.

Interferences

No significant interferences were observed.

Spike Recovery

No spike for this section.

Duplicate

No duplicate for this section.

LCS

No deficiencies in this section.

Serial Dilution

No deficiencies in this section.

1. Ensafe requires that all data points with the "B" qualifier be changed to "J".

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL	SPECIFIC FINDING
All soil samples	all analytes	B	J	1

DL - denotes laboratory qualifier/reported value
+ denotes positive values
U denotes non-detect values

QL - denotes data validation qualifier

DATA ASSESSMENT NARRATIVE
Metals

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, calibration standards, blank analysis results and MS/MSD results. A minimum of ten percent of all laboratory calculations are recalculated by the reviewer. The data validation was performed by the " Laboratory Data Validation Functional Guideline for Evaluating Inorganic Analysis" Febuary, 1994. All comments made within this report should be considered when examining the analytical results (Form Is).

This data package consisted of results from Ensafe, SDG# 23424C, the analysis of six (6) field soil samples and no Matrix Spike, Matrix Spike Duplicate and Duplicate pair for TAL Metals and ten (10) field soil samples and no Matrix Spike, Matrix Spike Duplicate and Duplicate pair for Mercury only. Overall, the inorganic data quality was fair. All protocol requirements were followed with the exception of the following problems.

Specific QA/QC deficiency Findings are listed numerically in the following categories:

Holding Times

The holding times were met as specified in the "Laboratory Data Validation Functional Guideline for Evaluating Inorganic Analysis", Febuary, 1994.

Calibration

No deficiencies in this section.

Preparation and Field Blank

No deficiencies in this section.

The field or DI water blanks exhibited no contamination.

Interferences

No significant interferences were observed.

Spike Recovery

No spike for this section.

Duplicate

No duplicate for this section.

LCS

No deficiencies in this section.

Serial Dilution

No deficiencies in this section.

1. Ensafe requires that all data points with the "B" qualifier be changed to "J".

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL	SPECIFIC FINDING
All soil samples	all analytes	B	J	1

DL - denotes laboratory qualifier/reported value
+ denotes positive values
U denotes non-detect values

QL - denotes data validation qualifier

DATA ASSESSMENT NARRATIVE
Metals

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, calibration standards, blank analysis results and MS/MSD results. A minimum of ten percent of all laboratory calculations are recalculated by the reviewer. The data validation was performed by the " Laboratory Data Validation Functional Guideline for Evaluating Inorganic Analysis" Febuary, 1994. All comments made within this report should be considered when examining the analytical results (Form Is).

This data package consisted of results from Ensafe, SDG# 23424A, the analysis of nine (9) field soil samples and no Matrix Spike, Matrix Spike Duplicate and Duplicate pair for TAL Metals and Cyanide. Overall, the inorganic data quality was fair. All protocol requirements were followed with the exception of the following problems.

Specific QA/QC deficiency Findings are listed numerically in the following categories:

Holding Times

The holding times were met as specified in the "Laboratory Data Validation Functional Guideline for Evaluating Inorganic Analysis", Febuary, 1994.

Calibration

No deficiencies in this section.

Preparation and Field Blank

1. The preparation blank exhibited contamination for the following elements.

Potassium	63.1	mg/kg

The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as estimated, "U". The field or DI water blanks exhibited no contamination.

Interferences

No significant interferences were observed.

Spike Recovery

No spike for this section.

Duplicate

No duplicate for this section.

LCS

No deficiencies in this section.

Serial Dilution

No deficiencies in this section.

2. Ensafe requires that all data points with the "B" qualifier be changed to "J".

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL	SPECIFIC FINDING
All soil samples	K.	+	U	1
All soil samples	all analytes	B	J	2

DL - denotes laboratory qualifier/reported value
+ denotes positive values
U denotes non-detect values

QL - denotes data validation qualifier

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	23471B
Date:	February 9, 1996
Client Name:	Ensafe/Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	September 11, 1995
Number of Samples:	3 Aqueous Sample(s) with 0 MS/MSD(s) 8 Non-aqueous Sample(s) with 3 MS/MSD(s)
Laboratory:	Southwest laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Volatiles, Semivolatiles, Pesticides/PCB's, pH, Metals, Cyanide

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Sergas
Eugene M. Watson, Vice President

3-14-96
Date

6716 Mexico Road · St. Peters, MO 63376
(314) 928-9533 · (314) 278-1828 · Fax (314) 278-2709

SDG# 23471B

Samples and Fractions Reviewed

Sample Identifications — Analytical Fractions

ENSAFE ID	MATRIX	VOA		SV		P/P		pH		TAL		CN	
572SB00101	SOIL		X		X						X		
572SB00102	SOIL		X		X						X		
573SB00201	SOIL		X		X				X		X		
573TB00201	WATER	X											
573DB00201	WATER	X		X		X				X		X	
573SB00202	SOIL		X		X				X		X		
573SB00301	SOIL		X		X				X		X		
573SB00302	SOIL		X		X				X		X		
573SB00501	SOIL		X		X				X		X		
573SB00502	SOIL		X		X				X		X		
573EB00201	WATER	X		X		X				X		X	
Total Billable Samples (Water/Soil)		3	8	2	8	2	0	0	6	2	8	2	0

VOA = SW846 Volatiles
SV = SW846 Semivolatiles
P/P = SW846 Pesticides/PCB's
pH = SW846 pH
TAL = SW846 Metals
CN = SW846 Cyanide

DATA ASSESSMENT NARRATIVE

CHLORINATED PESTICIDES/PCBs

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8080; the National Functional Guidelines for Organic Data Validation, June 1991, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23471

A validation was performed on the Chlorinated Pesticide/PCB Data from SDG 23471. The data was evaluated based on the following parameters:

* Data Completeness
* Holding Times
* Calibration
* Blanks
* Surrogate Recoveries
* Compound Identification
* Compound Quantitation

* - All criteria were met for this parameter.

System Performance and Overall Assessment

Overall performance was acceptable. The data did not require qualifications/rejections.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated Value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for the analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non-detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL

No Qualifications assigned

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non-detect result.

DATA ASSESSMENT NARRATIVE
Metals

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, calibration standards, blank analysis results and MS/MSD results. A minimum of ten percent of all laboratory calculations are recalculated by the reviewer. The data validation was performed by the " Laboratory Data Validation Functional Guideline for Evaluating Inorganic Analysis" Febuary, 1994. All comments made within this report should be considered when examining the analytical results (Form Is).

This data package consisted of results from Ensafe, SDG# 23471A, the analysis of three (3) field soil samples and no Matrix Spike, Matrix Spike Duplicate and Duplicate pair for TAL Metals and Cyanide. Overall, the inorganic data quality was fair. All protocol requirements were followed with the exception of the following problems.

Specific QA/QC deficiency Findings are listed numerically in the following categories:

Holding Times

The holding times were met as specified in the "Laboratory Data Validation Functional Guideline for Evaluating Inorganic Analysis", Febuary, 1994.

Calibration

No deficiencies in this section.

Preparation and Field Blank

1. The preparation blank exhibited contamination for the following elements.

Chromium	0.17	mg/kg
Copper	0.44	mg/kg
Iron	3.61	mg/kg
Nickel	0.11	mg/kg
Sodium	27.6	mg/kg

The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as estimated, "U". The field or DI water blanks exhibited no contamination.

Interferences

No significant interferences were observed.

Spike Recovery

No spike for this section.

Duplicate

No duplicate for this section.

LCS

No deficiencies in this section.

Serial Dilution

No deficiencies in this section.

2. Ensafe requires that all data points with the "B" qualifier be changed to "J".

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL	SPECIFIC FINDING
All soil samples	Cr, Cu, Fe, Ni and Na.	+	U	1
All soil samples	all analytes	B	J	2

DL - denotes laboratory qualifier/reported value
+ denotes positive values
U denotes non-detect values

QL - denotes data validation qualifier

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

December 6, 1995

Prepared for
ENSAFE/ALLEN & HOSHALL

This Data Validation Report is a review of the analytical results of sampling conducted September 11, 1995 in support of the Charlston Zone E project. There were three (3) soil samples which were received and analyzed by Southwest Laboratory of Oklahoma in this analytical batch, SDG# 23471.

Heartland ESI personnel have reviewed the data presented for the Samples listed below for the Analytical Fractions indicated. The CLP fractions have been validated utilizing: the "Laboratory Data Validation Functional Guidelines For Evaluating Organics Analysis", June, 1991; the "Laboratory Data Validation Functional Guidelines For Evaluating Inorganics Analysis", July, 1988; specific method requirements in SW-846; DQO Level IV requirements and good professional judgement.

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatogram, etc., for each sample have been carefully reviewed. The end-user is urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form Is for all samples reviewed are included after the Narratives.

The release of this Data Validation Report is authorized by the following signature:

Craig H. Seaman
for Eugene M. Watson, Vice President Heartland ESI

12-8-95.
Date

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(314) 928-9533 · (314) 278-1828 · Fax (314) 278-2709

SDG# 23471

SAMPLES AND FRACTIONS REVIEWED

Sample Identifications			Analytical Fractions							
ENSAFE ID	SWL ID	Matrix	VOA	SV	P/P	OPP	HB	TAL	CN	D/F
573CB00201	23471.01	SOIL	X	X	X	X	X	X	X	X
573CB00302	23471.02	SOIL	X	X	X	X	X	X	X	X
573CB00502	23471.03	SOIL	X	X	X	X	X	X	X	X
Total Number of Samples (Water/Soil)			0/3	0/3	0/3	0/3	0/3	0/3	0/3	0/3
Total Number of Billable Samples (Water/Soil)			0/3	0/3	0/3	0/3	0/3	0/3	0/3	0/3

Individual fractions were reviewed as follows:

	Primary	Secondary
VOA - Volatiles (SW-846, 8240)	Dan Heil	Gene Watson
SV - Semivolatiles (SW-846, 8270)	Dan Heil	Gene Watson
P/P - Pesticides/PCB's (SW-846, 8080A)	Jackie Cleveland	Gene Watson
OPP - Organophosphorus Pesticides (SW-846, 8140)	Jackie Cleveland	Gene Watson
HB - Herbicides (SW-846, 8150)	Jackie Cleveland	Gene Watson
TAL - Metals (EPA SW-846 6000 & 7000 Series)	Paul Humburg	Jackie Cleveland
CN - Cyanide (SW-846, 9010)	Paul Humburg	Jackie Cleveland
D/F - Dioxin/Furans (SW-846, 8290)	Gene Watson	

DATA ASSESSMENT NARRATIVE
Metals

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, calibration standards, blank analysis results and MS/MSD results. A minimum of ten percent of all laboratory calculations are recalculated by the reviewer. The data validation was performed by the " Laboratory Data Validation Functional Guideline for Evaluating Inorganic Analysis" Febuary, 1994. All comments made within this report should be considered when examining the analytical results (Form Is).

This data package consisted of results from **Ensafe, SDG# 23471C,** the analysis of eight (8) field soil samples and two Matrix Spike, Matrix Spike Duplicate and Duplicate pair for TAL Metals. Overall, the inorganic data quality was fair. All protocol requirements were followed with the exception of the following problems.

Specific QA/QC deficiency Findings are listed numerically in the following categories:

Holding Times

The holding times were met as specified in the "Laboratory Data Validation Functional Guideline for Evaluating Inorganic Analysis", Febuary, 1994.

Calibration

No deficiencies in this section.

Preparation and Field Blank

1. The preparation blank exhibited contamination for the following elements.

Iron	3.61	mg/kg
Nickel	0.11	mg/kg
Sodium	27.5	mg/kg

The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as estimated, "U". The field or DI water blanks exhibited contamination but had no impact on the data.

Interferences

No significant interferences were observed.

Spike Recovery

2. The Matrix Spike recovery for Lead was below 30%. All non-detect results are rejected and all positive results are qualified as estimated, "J".

3. The Matrix Spike recoveries for Antimony, Chromium, Cobalt, Copper, Vanadium and Zinc were below the lower control limits. All positive and non-detect results are qualified as estimated, "J" or "UJ".

   The Matrix Spike recovery for Calcium was outside the control limits but are not required for soil samples.

Duplicate

4. The Duplicate analyses for Calcium, Lead and Zinc were outside the control limits. All positive results are qualified as estimated, "J". The RPDs for Aluminum, Copper, Iron and Silver were not greater than 35% and will not be qualified.

LCS

   No deficiencies in this section.

Serial Dilution

5. The Serial dilution for Potassium was outside the control limits. All positive results are qualified as estimated, "J".

6. Ensafe requires that all data points with the "B" qualifier be changed to "J".

DATA ASSESSMENT AND NARRATIVE

VOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA 8240; the National Functional Guidelines for Organic Data Review, June 1991, and DQO Level III. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG # 23471B

A validation was performed on the Volatile Data from SDG 23471B. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
	•	Internal Standard Performance
	•	Blanks
*	•	Surrogate Recoveries
*	•	Laboratory Control Samples
*	•	Field Duplicates
	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Internal Standards

All internal standard EICP areas did not meet the internal standard EICP area QA/QC criteria.

Internal Standards (continued)

Specific Finding:

The Samples listed below, exhibited low internal standard areas. Qualify all associated positive results as estimated (J) and all non detects as estimated(UJ).

573SB00102 573SB00102MS 573SB00202	chlorobenzene-d_5
573SB00102MSD	1,4-difluorobenzene chlorobenzene-d_5

Method Blank

Associated blank	Compound	Concentration	Action Level
VBLK1	chloroform	2J	20
VBLK2	chloroform	4J	40

Samples	Compound	Qualification
572SB00101 572SB00102 572SB00201 572SB00202 573SB00301 573SB00302 573SB00501	chloroform	CRQL

Rinseate Blank

Associated blank	Compound	Concentration	Action Level
573EB00201	methylene chloride	8	80
	Chloroform	5J	50

Samples	Compound	Qualification
572SB00101	methylene chloride	U
572SB00102		
573SB00201		
573SB00202		
573SB00301		
573SB00302		
573SB00501		
573SB00502		

Compound Identification /Quantitation

Reject all results for 573SB00202RE, in favor of the initial analysis, due to non compliant internal standard area.

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 10% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
573SB00102 573SB00202	All associated analytes chlorobenzene-d_5	+/-	J/UJ
572SB00101 572SB00102 572SB00201 572SB00202 573SB00301 573SB00302 573SB00501	chloroform	+	CRQL
572SB00101 572SB00102 573SB00201 573SB00202 573SB00301 573SB00302 573SB00501 573SB00502	methylene chloride	+	U
573SB00202RE	all analytes	+/-	R

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA 8270; National Functional Guidelines for Organic Data Review, and DQO Level III. All comments made within this report should be considered when examining the analytical results (Form I's).

SDG # 23471B

A validation was performed on the Semivolatile Data from SDG 23471B. The data was evaluated based on the following parameters.

- * Data Completeness
- * Holding Times
- * GC/MS Tuning
- * Calibrations
- * Internal Standard Performance
- Blanks
- * Surrogate Recoveries
- * Laboratory Control Sample
- * Field Duplicates
- * Compound Identification /Quantitation

* - All criteria were met for this parameter

Rinseate Blank

Associated blank	Compound	Concentration	Action Level
573EB00201	bis(2ethylhexyl)phthalate	2J	20

Samples	Compound	Qualification
572SB00101	bis(2ethylhexyl)phthalate	CRQL
572SB00102		
572SB00201		

Rinseate Blank (continued)

Samples	Compound	Qualification
572SB00202	bis(2ethylhexyl)phthalate	CRQL
572SB00301		
572SB00302		
572SB00501		
572SB00502		

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL =	The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.
U =	The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.
No Action =	The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
572SB00101	bis(2ethylhexyl)phthalate	+	CRQL
572SB00102			
572SB00201			
572SB00202			
572SB00301			
572SB00302			
572SB00501			
572SB00502			

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE
Metals

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, calibration standards, blank analysis results and MS/MSD results. A minimum of ten percent of all laboratory calculations are recalculated by the reviewer. The data validation was performed by the " Laboratory Data Validation Functional Guideline for Evaluating Inorganic Analysis" Febuary, 1994. All comments made within this report should be considered when examining the analytical results (Form Is).

This data package consisted of results from Ensafe, SDG# 23474, the analysis of sixteen (16) field soil sample and no Matrix Spike, Matrix Spike Duplicate and Duplicate pair for TAL Metals and Cyanide. Overall, the inorganic data quality was fair. All protocol requirements were followed with the exception of the following problems.

Specific QA/QC deficiency Findings are listed numerically in the following categories:

Holding Times

The holding times were met as specified in the "Laboratory Data Validation Functional Guideline for Evaluating Inorganic Analysis", Febuary, 1994.

Calibration

No deficiencies in this section.

Preparation and Field Blank

1. The preparation blank exhibited contamination for the following elements.

Chromium	0.18	mg/kg
Potassium	122.	mg/kg

The calibration blank exhibited contamination for the following elements.

Nickel	2.5	ug/l

The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as estimated, "U". The field or DI water blanks did not exhibited contamination.

Interferences

No significant interferences were observed.

Spike Recovery

No deficiencies in this section.

Duplicate

No deficiencies in this section.

LCS

No deficiencies in this section.

Serial Dilution

2. The Serial dilution for Potassium was outside the control limits. All positive results are qualified as estimated, "J".

3. Ensafe requires that all data points with the "B" qualifier be changed to "J".

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL	SPECIFIC FINDING
All soil samples	Cr, K and Ni.	+	U	1
All soil samples	K.	+	J	2
All soil samples	all analytes	B	J	3

DL - denotes laboratory qualifier/reported value
+ denotes positive values
U denotes non-detect values

QL - denotes data validation qualifier

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	23474
Date:	March 16, 1996
Client Name:	Ensafe/ Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	September 9, 1995
Number of Samples:	2 Non-aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Organotin

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Sanjaro

Eugene M. Watson, Vice President

3-16-96

Date

4127 Plaza 94 South · St. Charles, MO 63304
(314) 936-1332 · Fax (314) 936-1335

SDG# 23474

Samples and Fractions Reviewed

Sample Identifications Analytical Fractions

ENSAFE ID	MATRIX	ORG	
172SB00201	SOIL		X
172SB00202	SOIL		X
Total Billable Samples (Water/Soil)		0	2

ORG= SW846 Organotins

DATA ASSESSMENT NARRATIVE

SEMIVOLATILES - ORGANOTINS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, calibration results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8270, modified for organotins; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level III requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 23474

A validation was performed on the volatile organics data from SDGs 23474. The data was evaluated based on the following parameters.

*	•	Data Completeness
	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
*	•	Internal Standard Performance
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Identification/Quantitation

* - All criteria were met for this parameter.

Holding Times

All samples were extracted thriteen (13) days outside of extraction holding times. Qualify all positive and non detect results as estimated (J/UJ).

Overall Performance

The overall performance was acceptable except where noted.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
All samples	all compounds	+/-	J/UJ

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	23484
Date:	February 9, 1996
Client Name:	Ensafe/Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	September 12 - 13, 1995
Number of Samples:	3 Non-aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level IV
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Volatiles, Semivolatiles, Pesticides/PCB's, Organophosphorus Pesticides, Herbicides, Hexavalent Chromium, Dioxin/Furans, Metals

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig H. Simpson

Eugene M. Watson, Vice President

3-5-96

Date

6716 Mexico Road · St. Peters, MO 63376
(314) 928-9533 · (314) 278-1828 · Fax (314) 278-2709

SDG# 23484

Samples and Fractions Reviewed

Sample Identifications | Analytical Fractions

ENSAFE ID	MATRIX	VOA		SV		P/P		OPP		HERB		HCR		D/'F		TAL	
579CB00401	SOIL		X		X				X		X		X		X		X
GDECB00901	SOIL		X		X		X		X		X		X		X		X
GDECB01002	SOIL		X		X		X		X		X		X		X		X
Total Billable Samples (Water/Soil)		0	3	0	3	0	2	0	3	0	3	0	3	0	3	0	3

VOA = SW846 Volatiles
SV = SW846 Semivolatiles
P/P = SW846 Pesticides/PCB's
OPP = SW846 Organophosphorus Pesticides
HERB = SW846 Herbicides
HCR = SW846 Hexavalent Chromium
D/F = SW846 Dioxin and Furans
TAL = SW846 Metals

DATA ASSESSMENT NARRATIVE

DIOXIN/FURANS - 8290

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, internal standard recoveries, clean-up standard recoveries, matrix spike recoveries, GC/MS high resolution performance, tuning results, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8290; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level IV requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 23484

A validation was performed on the Dioxin/Furan Data from SDG 23484. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Mass Resolution Checks
*	•	Column Performance
*	•	Calibrations
*	•	Internal Standard Recovery
	•	Blanks
*	•	Laboratory Control Samples
N/A	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Congener Identification/Quantitation

* - All criteria were met for this parameter.

Blanks

The method blanks exhibited positive results for one (1)congener (**Table 1**). In addition, the three (3) congeners were reported as EMPCs. It is the professional opinion of the data validator that the EMPC values for the method blank should be reported as non detect (U).

Data Assessment Narrative

Page - 2

Table 1

Congener ID	MB Conc. (ng/Kg)	579CB00401
1,2,3,4,6,7,8-HpCDF	0.532 (EMPC)	0.511 U
OCDF	1.964	0.511 U

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	CONGENER ID	DL	QL
579CB00401	See Table 1	+XB	U

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE
METALS, HEXAVALENT CHROMIUM AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM03.0 Method; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23484

A validation was performed on the Metals Data from SDG 23484. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Calibrations
	•	Blanks
*	•	Interferences
*	•	Matrix Spike Recovery
*	•	Matrix Duplicates
*	•	Field Duplicates
*	•	Laboratory Control Samples
*	•	Serial Dilutions
*	•	MSAs

* - All criteria were met for this parameter.

Preparation and Field Blanks

Specific Finding

The preparation blank exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Potassium	14.2 mg/kg	no impact

The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as non-detect, "U". The field or DI water blanks exhibited contamination but had no impact on the data.

Specific Finding

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafe's request.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
All "B" results	all analytes	B	J

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	23484B
Date:	February 9, 1996
Client Name:	Ensafe/Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	September 12 - 13, 1995
Number of Samples:	1 Aqueous Sample(s) with 0 MS/MSD(s) 16 Non-aqueous Sample(s) with 1 MS/MSD(s)
Laboratory:	Southwest laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Volatiles, Semivolatiles, Pesticides/PCB's, Metals, Cyanide

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Serfass — 3-13-96

Eugene M. Watson, Vice President — Date

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SDG# 23484B

Samples and Fractions Reviewed

Sample Identifications — Analytical Fractions

ENSAFE ID	MATRIX	VOA		SV		P/P		TAL		CN	
579SB00101	SOIL		X		X				X		
579SB00102	SOIL		X		X				X		
579SB00202	SOIL		X		X				X		
579SB00201	SOIL		X		X				X		
579SB00301	SOIL		X		X				X		
579SB00302	SOIL		X		X				X		
579SB00401	SOIL		X		X				X		
579SB00402	SOIL		X		X				X		
579TB00402	WATER	X									
GDESB00901	SOIL		X		X		X		X		X
GDESB00902	SOIL		X		X		X		X		X
GDESB01001	SOIL		X		X		X		X		X
GDESB01002	SOIL		X		X		X		X		X
GDESB01201	SOIL		X		X		X		X		X
GDESB01202	SOIL		X		X		X		X		X
GDESB01301	SOIL		X		X		X		X		X
GDESB01302	SOIL		X		X		X		X		X
Total Billable Samples (Water/Soil)		1	16	0	16	0	8	0	16	0	8

VOA = SW846 Volatiles
SV = SW846 Semivolatiles
P/P = SW846 Pesticides/PCB's
TAL = SW846 Metals
CN = SW846 Cyanide

DATA ASSESSMENT NARRATIVE
METALS AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM03.0 Method; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23484

A validation was performed on the Metals Data from SDG 23484. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Calibrations
	•	Blanks
*	•	Interferences
*	•	Matrix Spike Recovery
*	•	Matrix Duplicates
	•	Field Duplicates
*	•	Laboratory Control Samples
	•	Serial Dilutions
*	•	MSAs

* - All criteria were met for this parameter.

Preparation and Field Blanks

Specific Finding

The preparation blank exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Potassium	14.2 mg/kg	no impact

The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as non-detect, "U". The field or DI water blanks exhibited contamination but had no impact on the data.

Field Duplicate Analysis

Specific Finding

The Field Duplicate analyses for soils for Chromium and Copper were outside the control limits of 50%. All positive results are qualified as estimated, "J".

Serial Dilution

Specific Finding

The Serial dilution for Potassium was outside the control limits. All positive results are qualified as estimated, "J".

Specific Finding

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafe's request.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all soil samples	Cr and Cu.	+	J
all soil samples	K.	+	J
All "B" results	all analytes	B	J

DATA ASSESSMENT NARRATIVE

CHLORINATED PESTICIDES/PCBs

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8080; the National Functional Guidelines for Organic Data Validation, June 1991, and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23484

A validation was performed on the Chlorinated Pesticide/PCB Data from SDG 23484. The data was evaluated based on the following parameters:

* Data Completeness
* Holding Times
* Calibration
* Blanks
* Surrogate Recoveries
* Matrix Spike/Matrix Spike Duplicates
* Field Duplicates
* Compound Identification
* Compound Quantitation

* - All criteria were met for this parameter.

System Performance and Overall Assessment

Overall performance was acceptable. The data did not require qualifications/rejections.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated Value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for the analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non-detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL

NO QUALIFICATIONS WERE REQUIRED

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non-detect result.

DATA ASSESSMENT AND NARRATIVE

VOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA 8240 Appendix IX; the National Functional Guidelines for Organic Data Review, June 1991, and DQO Level IV. All comments made within this report should be considered when examining the analytical results.

SDG # 23484A

A validation was performed on the Volatile Data from SDG 23484A. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibrations
	•	Internal Standard Performance
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Laboratory Control Samples
*	•	Field Duplicates
	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Continuing calibrations

The continuing calibrations that were analyzed with this data package exhibited %Ds and RRFs that were not within continuing calibration criteria. Qualifications are required.

Continuing calibrations (continued)

Specific Finding:

The continuing calibration, U1627.D, contained compounds with %Ds greater than 25%, and RRFs less than 0.050 . For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and non detects as rejected (R).

579CB00401	2-chloroethyl vinyl ether (0.025) Acetonitrile(0.037) Methylacrylonitrile (0.005 and 28.6%) 1,4-dioxane (0.002)

The continuing calibration, I17775.D, contained compounds %D greater than 50% and less than 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and non detects as estimated (UJ).

579CB00401	dichlorodifluoromethane (71.1%)

Internal Standards

All internal standard EICP areas did not meet the internal standard EICP area QA/QC criteria.

Specific Finding:

The Samples listed below, exhibited low internal standard areas. Qualify all associated positive results as estimated (J) and all non detects as estimated(UJ).

GDECB01002	chlorobenzene-d_5

Compound Identification /Quantitation

Reject sample GDECB01002RE, in favor of initial analysis, due to non compliant internal standard area and surrogate recoveries.

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
579CB00401	2-chloroethyl vinyl ether Acetonitrile Methylacrylonitrile 1,4-dioxane	+/-	J/R
579CB00401	dichlorodifluoromethane	+/-	J/UJ
GDECB01002	All associated analytes chlorobenzene-d_5	+/-	J/UJ
GDECB01002RE	all analytes	+/-	R

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA 8270 Appendix IX; National Functional Guidelines for Organic Data Review, and DQO Level IV. All comments made within this report should be considered when examining the analytical results (Form I's).

SDG # 23484A

A validation was performed on the Semivolatile Data from SDG 23484A. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibrations
*	•	Internal Standard Performance
	•	Blanks
*	•	Surrogate Recoveries
*	•	Laboratory Control Sample
*	•	Field Duplicates
*	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Continuing calibrations

The continuing calibrations that were analyzed with this data package exhibited %Ds that were not within %D and RRF continuing calibration criteria. Qualifications are required.

Continuing calibrations (continued)

Specific Finding:

The continuing calibration, A8774, contained compounds with RRFs an d%D greater than 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and all non detects as rejected (R).

GDECB00901	4-nitroquinoline-1-oxide (0.037)
	2-naphthylamine (98.08%)
	Aramite (193.4%)
	Hexachloropropene (0.046)

The continuing calibration, A8774, contained compounds with %Ds greater than 50%, but less than 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and all non detects as estimated (UJ).

GDECB00901	n-nitrosopyrolidine (76.8%)
	o,o,o-triethylphosphorothic (73.3%)
	a,a-dimethylphenethylamine (80.4%)
	thionazine (69.5%)
	Phorate (53.1%)
	Chlorobenzilate (76.8%)

The continuing calibration, A8743 and A8741, contained compounds with %Ds greater than 50%, but less than 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and all non detects as estimated (UJ).

579CB00401	2,4-dinitrophenol (56.8%)
GDECB01002	kepone (54.7%)
	Methyl methansulfonate (55.5%)
	o,o,o-triethyl phosphorothic (54.9%)
	Chlorobenzilate (71.6%)

Continuing calibrations (continued)

Specific Finding:

The continuing calibration, A8743 and A8741, contained compounds with %Ds greater 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and all non detects as rejected (R).

579CB00401	4-nitroquinoline-1-oxide (225.2%)
GDECB01002	aramite (187.5%)

Rinseate Blank

Associated blank	Compound	Concentration	Action Level
573EB00201	bis(2ethylhexyl)phthalate	2J	20

Samples	Compound	Qualification
579CB00401	bis(2ethylhexyl)phthalate	CRQL
GDECB00901		
GDECB01002		

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL =	The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.
U =	The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.
No Action =	The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
GDECB00901	4-nitroquinoline-1-oxide (0.037) 2-naphthylamine (98.08%) Aramite (193.4%) Hexachloropropene (0.046)	+/-	J/R
GDECB00901	n-nitrosopyrolidine (76.8%) o,o,o-triethylphosphorothic (73.3%) a,a-dimethylphenethylamine (80.4%) thionazine (69.5%) Phorate (53.1%) Chlorobenzilate (76.8%)	+/-	J/UJ
579CB00401 GDECB01002	2,4-dinitrophenol (56.8%) kepone (54.7%) Methyl methansulfonate (55.5%) o,o,o-triethyl phosphorothic (54.9%) Chlorobenzilate (71.6%)	+/-	J/UJ
579CB00401 GDECB01002	4-nitroquinoline-1-oxide (225.2%) aramite (187.5%)	+/-	J/R
579CB00401 GDECB00901 GDECB01002	bis(2ethylhexyl)phthalate	+	CRQL

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT AND NARRATIVE

VOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA 8240; the National Functional Guidelines for Organic Data Review, June 1991, and DQO Level III. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG # 23484B

A validation was performed on the Volatile Data from SDG 23484B. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibrations
	•	Internal Standard Performance
*	•	Blanks
	•	Surrogate Recoveries
*	•	Laboratory Control Samples
*	•	Field Duplicates
	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Continuing calibrations

The continuing calibrations that were analyzed with this data package exhibited %Ds and RRFs that were not within continuing calibration criteria. Qualifications are required.

Continuing calibrations (continued)

Specific Finding:

The continuing calibration, UI600, contained compounds with RRFs less than 0.050 . For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and non detects as rejected (R).

GDESB01201	2-chloroethyl vinyl ether (0.024)
GDESB01202	
GDESB01301	
579SB00101	
579SB00102	
579SB00201	
579SB00202	
579SB00301	
579SB00401	
579SB00402	
GDESB01001	
GDESB01002	

The continuing calibration, UI627, contained compounds with RRFs less than 0.050 . For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and non detects as rejected (R).

GDESB01302	2-chloroethyl vinyl ether (0.024)
579SB00302	
GDESB00901	
GDESB00902RE	

Internal Standards

All internal standard EICP areas did not meet the internal standard EICP area QA/QC criteria.

Internal Standards (continued)

Specific Finding:

The Samples listed below, exhibited low internal standard areas. Qualify all associated positive results as estimated (J) and all non detects as estimated(UJ).

579SB00301	1,4-difluorobenzene
GDESB01001	chlorobenzene-d_5
GDESB00902RE	chlorobenzene-d_5

Surrogates

Specific Finding:

Sample listed below exhibited recoveries that were not within QA/QC limits for surrogates listed. Qualify all positive results as estimated (J).

GDESB01001	toluene-d_8
	Bromofluorobenzene

Compound Identification /Quantitation

Reject all results for 579SB00301RE and GDESB01001RE, in favor of the initial analysis, due to non compliant internal standard area and surrogate recoveries. Reject GDESB00902, in favor of reanalysis, due to non compliant internal standard area recoveries.

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 10% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
GDESB01201	2-chloroethyl vinyl ether	+/-	J/R
GDESB01202			
GDESB01301			
579SB00101			
579SB00102			
579SB00201			
579SB00202			
579SB00301			
579SB00401			
579SB00402			
GDESB01001			
GDESB01002			
GDESB01302	2-chloroethyl vinyl ether	+/-	J/R
579SB00302			
GDESB00901			
GDESB00902RE			
	All associated analytes	+/-	J/UJ
579SB00301	1,4-difluorobenzene		
GDESB01001	chlorobenzene-d_5		
GDESB00902RE	chlorobenzene-d_5		
GDESB01001	all analytes	+	J
579SB00301RE	all analytes	+/-	R
GDESB01001RE			
GDESB00902			

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non detect result

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA 8270; National Functional Guidelines for Organic Data Review, and DQO Level III. All comments made within this report should be considered when examining the analytical results (Form I's).

SDG # 23484B

A validation was performed on the Semivolatile Data from SDG 23484B. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
*	•	Internal Standard Performance
	•	Blanks
*	•	Surrogate Recoveries
*	•	Laboratory Control Sample
*	•	Field Duplicates
*	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Rinseate Blank

Associated blank	Compound	Concentration	Action Level
573EB00201	bis(2ethylhexyl)phthalate	2J	20

Samples	Compound	Qualification
579SB00101	bis(2ethylhexyl)phthalate	CRQL
579SB00102		
579SB00201		

Rinseate Blank (continued)

Samples	Compound	Qualification
579SB00202	bis(2ethylhexyl)phthalate	CRQL
579SB00402		
GDESB0901		
GDESB01001		
GDESB01002		
GDESB01201		
GDESB01202		
GDEBS01301		
GDEBES01302		

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL =	The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.
U =	The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.
No Action =	The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
579SB00101	bis(2ethylhexyl)phthalate	+	CRQL
579SB00102			
579SB00201			
579SB00202			
579SB00402			
GDESB0901			
GDESB01001			
GDESB01002			
GDESB01201			
GDESB01202			
GDEBS01301			
GDEBES01302			

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

CHLORINATED HERBICIDES

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW846 Method 8150; the National Functional Guidelines for Organic Data Validation, June 1991; and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23484A

A validation was performed on the Herbicide Data from SDG 23484A. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC Performance
*	•	Calibration
*	•	Blanks
	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

Surrogate Recoveries

One (1) sample exhibited a non-compliant DCAA recovery.

Surrogate Recoveries, Continued

Specific Finding

One (1) sample exhibited a low DCAA recovery. For the following sample, the positive results are qualified as estimated, J, and the non-detect results are qualified as estimated, UJ.

Sample ID	Surrogate	% Recovery
GDECB00901	DCAA	43%

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 10% of the data required qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
GDECB00901	ALL	+/-	J/UJ

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non-detect result

DATA ASSESSMENT NARRATIVE

ORGANOPHOSPHORUS PESTICIDES

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW846 Method 8140; the National Functional Guidelines for Organic Data Validation, June 1991; and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23484A

A validation was performed on the Organophosphorus Pesticide Data from SDG 23484A. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC Performance
*	•	Calibration
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 10% of the data required qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL

NO QUALIFICATIONS ARE REQUIRED.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non-detect result

DATA ASSESSMENT NARRATIVE

CHLORINATED PESTICIDES/PCBs

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8080; the National Functional Guidelines for Organic Data Validation, June 1991, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23484

A validation was performed on the Chlorinated Pesticide/PCB Data from SDG 23484. The data was evaluated based on the following parameters:

*	Data Completeness
*	Holding Times
	Calibration
*	Blanks
*	Matrix spike/Matrix spike duplicate
	Surrogate Recoveries
*	Compound Identification
	Compound Quantitation

* - All criteria were met for this parameter.

Calibration

The calibration verification contains percent differences greater than 15%.

Analyte	%RSD
4,4'-DDT	28
Aroclor 1260	98, 86

Qualify all positive results as estimated (J).

Surrogates

Two samples exhibited percent recoveries greater than the upper limit.

Sample	Surrogate	%Rec
GDESB01001	DCB-1	409
GDESB01001	DCB-2	467

Qualify all positive results as estimated (J).

Compound Quantitation
The QC samples (23485SLCS, 23485SLCSD, GDESB01301MS, GDESB01301MSD) exhibited results greater than the calibration range . A dilution was not run. Qualify extrapolated results as estimated (J).

System Performance and Overall Assessment

Overall performance was acceptable. The data did require qualifications/rejections as stated above.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated Value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for the analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non-detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL
GDESB01001	4,4'-DDT	E	J
GDESB01001	Aroclor-1260	+	J

SAMPLE ID	SURROGATE	%REC
GDESB01001	DCB-1	409
GDESB01001	DCB-2	467

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non-detect result.

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	23484B
Date:	February 9, 1996
Client Name:	Ensafe/Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	September 12 - 13, 1995
Number of Samples:	1 Aqueous Sample(s) with 0 MS/MSD(s) 16 Non-aqueous Sample(s) with 1 MS/MSD(s)
Laboratory:	Southwest laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Volatiles, Semivolatiles, Pesticides/PCB's, Metals, Cyanide

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig B. Sergeson
Eugene M. Watson, Vice President

3-13-96
Date

6716 Mexico Road · St. Peters, MO 63376
(314) 928-9533 · (314) 278-1828 · Fax (314) 278-2709

SDG# 23484B

Samples and Fractions Reviewed

Sample Identifications | Analytical Fractions

ENSAFE ID	MATRIX	VOA		SV		P/P		TAL		CN	
579SB00101	SOIL		X		X				X		
579SB00102	SOIL		X		X				X		
579SB00202	SOIL		X		X				X		
579SB00201	SOIL		X		X				X		
579SB00301	SOIL		X		X				X		
579SB00302	SOIL		X		X				X		
579SB00401	SOIL		X		X				X		
579SB00402	SOIL		X		X				X		
579TB00402	WATER	X									
GDESB00901	SOIL		X		X		X		X		X
GDESB00902	SOIL		X		X		X		X		X
GDESB01001	SOIL		X		X		X		X		X
GDESB01002	SOIL		X		X		X		X		X
GDESB01201	SOIL		X		X		X		X		X
GDESB01202	SOIL		X		X		X		X		X
GDESB01301	SOIL		X		X		X		X		X
GDESB01302	SOIL		X		X		X		X		X
Total Billable Samples	(Water/Soil)	1	16	0	16	0	8	0	16	0	8

VOA = SW846 Volatiles
SV = SW846 Semivolatiles
P/P = SW846 Pesticides/PCB's
TAL = SW846 Metals
CN = SW846 Cyanide

DATA ASSESSMENT NARRATIVE
METALS AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM03.0 Method; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23484

A validation was performed on the Metals Data from SDG 23484. The data was evaluated based on the following parameters.

*	●	Data Completeness
*	●	Holding Times
*	●	Calibrations
	●	Blanks
*	●	Interferences
*	●	Matrix Spike Recovery
*	●	Matrix Duplicates
	●	Field Duplicates
*	●	Laboratory Control Samples
	●	Serial Dilutions
*	●	MSAs

* - All criteria were met for this parameter.

Preparation and Field Blanks

Specific Finding

The preparation blank exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Potassium	14.2 mg/kg	no impact

The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as non-detect, "U". The field or DI water blanks exhibited contamination but had no impact on the data.

Field Duplicate Analysis

Specific Finding

The Field Duplicate analyses for soils for Chromium and Copper were outside the control limits of 50%. All positive results are qualified as estimated, "J".

Serial Dilution

Specific Finding

The Serial dilution for Potassium was outside the control limits. All positive results are qualified as estimated, "J".

Specific Finding

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafe's request.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all soil samples	Cr and Cu.	+	J
all soil samples	K.	+	J
All "B" results	all analytes	B	J

DATA ASSESSMENT NARRATIVE
METALS, HEXAVALENT CHROMIUM AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM03.0 Method; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23484

A validation was performed on the Metals Data from SDG 23484. The data was evaluated based on the following parameters.

*	●	Data Completeness
*	●	Holding Times
*	●	Calibrations
	●	Blanks
*	●	Interferences
*	●	Matrix Spike Recovery
*	●	Matrix Duplicates
*	●	Field Duplicates
*	●	Laboratory Control Samples
*	●	Serial Dilutions
*	●	MSAs

* - All criteria were met for this parameter.

Preparation and Field Blanks

Specific Finding

The preparation blank exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Potassium	14.2 mg/kg	no impact

The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as non-detect, "U". The field or DI water blanks exhibited contamination but had no impact on the data.

Specific Finding

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafe's request.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
All "B" results	all analytes	B	J

DATA ASSESSMENT AND NARRATIVE

VOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA 8240 Appendix IX; the National Functional Guidelines for Organic Data Review, June 1991, and DQO Level IV. All comments made within this report should be considered when examining the analytical results.

SDG # 23502A

A validation was performed on the Volatile Data from SDG 23502A. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibrations
*	•	Internal Standard Performance
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Laboratory Control Samples
*	•	Field Duplicates
*	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Initial calibrations

The initial calibrations that were analyzed with this data package exhibited %Ds and RRFs that were not within continuing calibration criteria. Qualifications are required.

Initial calibrations (continued)

Specific Finding:

The initial calibration analyzed on 09/21/95, contained compounds with %Ds greater than 30%, and RRFs less than 0.050 . For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and non detects as rejected (R).

GDECB00101	Acetonitrile (0.037)
GDECB00202	Isobutyl alcohol (0.010))
580CB00201	1,4-dioxane (0.002 and 34.7%)
	Dichlorodifluoromethane (0.035 and 40.1%)

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL =	The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.
U =	The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.
No Action =	The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
GDECB00101	Acetonitrile	+/-	J/R
GDECB00202	Isobutyl alcohol		
580CB00201	1,4-dioxane		
	Dichlorodifluoromethane		

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA 8270 Appendix IX; National Functional Guidelines for Organic Data Review, and DQO Level IV. All comments made within this report should be considered when examining the analytical results (Form I's).

SDG # 23502A

A validation was performed on the Semivolatile Data from SDG 23502A. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibrations
*	•	Internal Standard Performance
	•	Blanks
*	•	Surrogate Recoveries
*	•	Laboratory Control Sample
*	•	Field Duplicates
*	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Continuing calibrations

The continuing calibrations that were analyzed with this data package exhibited %Ds that were not within %D and RRF continuing calibration criteria. Qualifications are required.

Continuing calibrations (continued)

Specific Finding:

The continuing calibration, A8774, contained compounds with RRFs less than 0.05 and %D greater than 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and all non detects as rejected (R).

580CB00201	hexachlorophene (0.046) 4-nitroquinoline-1-oxide (0.037 and 208.5%) Aramite (193.4%)

The continuing calibration, A8774, contained compounds with %Ds greater than 50%, but less than 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and all non detects as estimated (UJ).

580CB00201	n-nitrosopyrrolidine (76.8%) o,o,o-triethyl phosphorothio (73.3%) a,a-dimethylphenethylamine (80.4%) Thionazine (69.5%) Phorate (72.3%) Chlorobenzilate (76.8%)

Method Blank

Associated blank	Compound	Concentration	Action Level
SBLK2	bis(2ethylhexyl)phthalate	35J	350

Samples	Compound	Qualification
580CB00201	bis(2ethylhexyl)phthalate	CRQL

Rinseate Blank

Associated blank	Compound	Concentration	Action Level
573EB00201	bis(2ethylhexyl)phthalate	2J	20

Samples	Compound	Qualification
GDECB00101 GDECB00201	bis(2ethylhexyl)phthalate	CRQL

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL =	The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.
U =	The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.
No Action =	The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
580CB00201	hexachlorophene 4-nitroquinoline-1-oxide Aramite	+/-	J/R
580CB00201	n-nitrosopyrrolidine o,o,o-triethyl phosphorothio a,a-dimethylphenethylamine Thionazine Phorate Chlorobenzilate	+/-	J/UJ
580CB00201	bis(2ethylhexyl)phthalate	+	CRQL
GDECB00101 GDECB00201	bis(2ethylhexyl)phthalate	+	CRQL

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT AND NARRATIVE

VOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA 8240; the National Functional Guidelines for Organic Data Review, June 1991, and DQO Level III. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG # 23502B

A validation was performed on the Volatile Data from SDG 23502B. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibrations
	•	Internal Standard Performance
	•	Blanks
*	•	Surrogate Recoveries
*	•	Laboratory Control Samples
*	•	Field Duplicates
	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Continuing calibrations

The continuing calibrations that were analyzed with this data package exhibited %Ds and RRFs that were not within continuing calibration criteria. Qualifications are required.

Continuing calibrations (continued)

Specific Finding:

The continuing calibration, UI652.D, contained compounds with RRFs less than 0.050. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and non detects as rejected (R).

GDESB00101	2-chloroethyl vinyl ether (0.024)
GDESB00102	
GDESB00201	
GDESB00202	

The continuing calibration, UI652.D, contained compounds with %Ds greater than 50%, but less than 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and non detects as estimated (UJ).

GDESB00101	vinyl acetate (61.0)
GDESB00102	
GDESB00201	
GDESB00202	

Internal Standards

All internal standard EICP areas did not meet the internal standard EICP area QA/QC criteria.

Specific Finding:

The Samples listed below, exhibited low internal standard areas. Qualify all associated positive results as estimated (J) and all non detects as estimated(UJ).

GDESB00802	1,4-difluorobenzene chlorobenzene-d_5
GDESB00801	chlorobenzene-d_5
GDESB00801MSD	
GDESB00801MS	1,4-difluorobenzene chlorobenzene-d_5

Method Blank

Associated blank	Compound	Concentration	Action Level
VBLK5	chloroform	1J	10
VBLK7	methylene chloride	8	80
	Acetone	12	120
VBLK6	methylene chloride	4J	40
	Chloroform	4J	40

Samples	Compound	Qualification
580SB00302 580SB00601	chloroform	CRQL
GDESB00101 GDESB00102 GDESB00201 GDESB00202 580SB00601	methylene chloride	U
GDESB00101 GDESB00202	acetone	U

Surrogates

All of the surrogate recoveries for these samples were not within QA/QC limits.

Specific Finding:

Sample listed below exhibited high recoveries for toluene-d_8 . Qualify all positive results as estimated (J).

GDESB00802 (123%)

Compound Identification /Quantitation

Reject all results for GDESB00802RE, in favor of the initial analysis, due to non compliant internal standard areas and surrogate recoveries.

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL =	The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.
U =	The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.
No Action =	The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
GDESB00101 GDESB00102 GDESB00201 GDESB00202	2-chloroethyl vinyl ether	+/-	J/R
GDESB00101 GDESB00102 GDESB00201 GDESB00202	vinyl acetate	+/-	J/UJ
GDESB00802	All associated samples 1,4-difluorobenzene chlorobenzene-d_5	+/-	J/UJ
GDESB00801 GDESB00801MSD	chlorobenzene-d_5		
GDESB00801MS	1,4-difluorobenzene chlorobenzene-d_5		
580SB00302 580SB00601	chloroform	+	CRQL
GDESB00101 GDESB00102 GDESB00201 GDESB00202 580SB00601	methylene chloride	+	U
GDESB00101 GDESB00202	acetone	+	U
GDESB00802	All analytes	+	J
GDESB00802RE	All analytes	+/-	R

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non detect result

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA 8270; National Functional Guidelines for Organic Data Review, and DQO Level III. All comments made within this report should be considered when examining the analytical results (Form I's).

SDG # 23502B

A validation was performed on the Semivolatile Data from SDG 23502B. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
	•	Internal Standard Performance
	•	Blanks
*	•	Surrogate Recoveries
*	•	Laboratory Control Sample
*	•	Field Duplicates
	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Internal Standards

All internal standard EICP areas did not meet the internal standard EICP area QA/QC criteria.

Specific Finding:

The Samples listed below, exhibited low internal standard areas. Qualify all associated positive results as estimated (J) and all non detects as estimated(UJ).

GDESB00201RE	phenanthrene-d_{10}
	Chrysene-d_{12}

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ANALYSIS

PAGE - 2

Method Blank

Associated blank	Compound	Concentration	Action Level
SBLK1	bis(2ethylhexyl)phthalate	50J	500

Samples	Compound	Qualification
GDESB00501	bis(2ethylhexyl)phthalate	CRQL
GDESB00502		
GDESB00802		
GDESB00801		
GDESB00101		
GDESB00201RE		
573SB00401		
GDESB00302	bis(2ethylhexyl)phthalate	U
GDESB00202		
GDESB00101		
573SB00402		

Rinseate Blank

Associated blank	Compound	Concentration	Action Level
573EB00201	bis(2ethylhexyl)phthalate	2J	20

Samples	Compound	Qualification
580SB00101	bis(2ethylhexyl)phthalate	CRQL
580SB00102		
580SB00202		
580SB00301		
580SB00302		
580SB00501		
580SB00502		
580SB00601		
580SB00602		

Compound Identification /Quantitation

Reject sample GDESB00201, in favor of GDESB00201RE, due to non compliant internal standard areas.

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL =	The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.
U =	The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.
No Action =	The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
GDESB00201RE	All associated analytes phenanthrene-d_{10} Chrysene-d_{12}	+/-	J/UJ
GDESB00501 GDESB00502 GDESB00802 GDESB00801 GDESB00101 GDESB00201RE 573SB00401	bis(2ethylhexyl)phthalate	+	CRQL
GDESB00302 GDESB00202 GDESB00101 573SB00402	bis(2ethylhexyl)phthalate	+	U
580SB00101 580SB00102 580SB00202 580SB00301 580SB00302 580SB00501 580SB00502 580SB00601 580SB00602	bis(2ethylhexyl)phthalate	+	CRQL
GDESB00201	all analytes	+/-	R

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+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

CHLORINATED PESTICIDES/PCBs

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8080; the National Functional Guidelines for Organic Data Validation, June 1991, and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23502

A validation was performed on the Chlorinated Pesticide/PCB Data from SDG 23502. The data was evaluated based on the following parameters:

*	Data Completeness
*	Holding Times
	Calibration
*	Blanks
*	Surrogate Recoveries
*	Matrix Spike/Matrix Spike Duplicates
*	Field Duplicates
*	Compound Identification
*	Compound Quantitation

* - All criteria were met for this parameter.

Calibration

The calibration verification exhibits a percent recovery greater than 15%. For the following samples and non-compliant compound, all positive results are qualified as estimated (J).

Sample ID	Analyte	%RSD
GDECB00101	Endrin Aldehyde	15.7%

System Performance and Overall Assessment

Overall performance was acceptable. The data did require qualifications/rejections as stated above.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

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J = Estimated Value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for the analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non-detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL
GDECB00101	Endrin Aldehyde	+	J

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QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non-detect result.

DATA ASSESSMENT NARRATIVE

CHLORINATED PESTICIDES/PCBs

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8080; the National Functional Guidelines for Organic Data Validation, June 1991, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23502

A validation was performed on the Chlorinated Pesticide/PCB Data from SDG 23502. The data was evaluated based on the following parameters:

*	Data Completeness
*	Holding Times
	Calibration
*	Blanks
*	Matrix spikes/Matrix spike duplicates
	Surrogate Recoveries
*	Compound Identification
	Compound Quantitation

* - All criteria were met for this parameter.

Calibration

The initial calibration exhibits non-linearity for some compounds. Qualify all positive results for the non-linear compounds as estimated (J).

Analyte	%RSD
alpha-BHC	28.59
delta-BHC	26.72
gamma-BHC	22

The calibration verification shows percent differences greater than 15% for some compounds. Qualify positive results for specific compounds as estimated (J).

Analyte	%RSD
4,4'-DDT	36.7

Surrogate Recoveries

One sample and two QC samples exhibit surrogate recoveries greater than the upper limit. Qualify all positive results as estimated (J). One sample exhibits a surrogate recovery greater than 10% and less than the lower limit. Qualify all positive results as estimated (J) and all non-detect results as estimated (UJ).

SAMPLE ID	SURROGATE	%REC
BL0915SIS	TCX-1	154
GDESB00502	DCB-1	166
GDESB00502	DCB-2	166
SB00301MSD	TCX-1	147
GDESB00201	DCB-2	34

Compound Quantitation

One sample (GDESB00502) exhibited results greater than the calibration range for 4,4'-DDE, 4,4'-DDT, alpha-Chlordane and gamma-Chlordane. A dilution was run for this sample. Qualify extrapolated results in original sample as rejected (R). Qualify all results other than extrapolated in dilution as rejected (UR). Qualify extrapolated result in dilution as diluted (D).

System Performance and Overall Assessment

Overall performance was acceptable. The data did require qualifications/rejections as stated above.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated Value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for the analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non-detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL
GDESB00502	4,4'-DDE	E	R
GDESB00502	4,4'-DDT	E	R
GDESB00502	alpha-Chlordane	E	R
GDESB00502	gamma-Chlordane	E	R
GDESB00502DL	4,4'-DDE	D	D
GDESB00502DL	4,4'-DDT	D	D
GDESB00502DL	alpha-Chlordane	D	D
GDESB00502DL	gamma-Chlordane	D	D
GDESB00502	Heptachlor	+	J
GDESB00502	Dieldrin	+	J
GDESB00502	Endrin	+	J
GDESB00502	4,4'-DDD	+	J
GDESB00301	4,4'-DDT	+	J
GDESB00301MS	alpha-BHC	E	J
GDESB00301MS	delta-BHC	E	J
GDESB00301MS	gamma-BHC	+	J

SAMPLE ID	SURROGATE	%REC
BL0915SIS	TCX-1	154
GDESB00502	DCB-1	166
GDESB00502	DCB-2	166
SB00301MSD	TCX-1	147
GDESB00201	DCB-2	34

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non-detect result.

DATA ASSESSMENT NARRATIVE

CHLORINATED HERBICIDES

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW846 Method 8150; the National Functional Guidelines for Organic Data Validation, June 1991; and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23502A

A validation was performed on the Herbicide Data from SDG 23502A. The data was evaluated based on the following parameters:

* • Data Completeness
* • Holding Times
* • GC Performance
* • Calibration
* • Blanks
* • Surrogate Recoveries
* • Matrix Spike/Matrix Spike Duplicates
* • Field Duplicates
* • Compound Identification
* • Compound Quantitation

* - All criteria were met for this parameter.

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 10% of the data required qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL

NO QUALIFICATIONS ARE REQUIRED.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non-detect result

DATA ASSESSMENT NARRATIVE

ORGANOPHOSPHORUS PESTICIDES

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW846 Method 8140; the National Functional Guidelines for Organic Data Validation, June 1991; and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23502A

A validation was performed on the Organophosphorus Pesticide Data from SDG 23502A. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC Performance
*	•	Calibration
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 10% of the data required qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL

NO QUALIFICATIONS ARE REQUIRED.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non-detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	23502B
Date:	February 9, 1996
Client Name:	Ensafe/Allen & Hoshall]
Project/Site Name:	Charleston; Zone E
Date Sampled:	September 13 - 14, 1995
Number of Samples:	2 Aqueous Sample(s) with 0 MS/MSD(s) 22 Non-aqueous Sample(s) with 5 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Volatiles, Semivolatiles, Pesticides/PCB's, Metals, Cyanide

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Searfoss
for Eugene M. Watson, Vice President

3-6-96
Date

6716 Mexico Road · St. Peters, MO 63376
(314) 928-9533 · (314) 278-1828 · Fax (314) 278-2709

SDG# 23502B

Samples and Fractions Reviewed

Sample Identifications — Analytical Fractions

ENSAFE ID	MATRIX	VOA		SV		P/P		pH		TAL		CN	
573SB00401	SOIL		X		X				X		X		
573SB00402	SOIL		X		X				X		X		
580SB00101	SOIL		X		X						X		
580SB00102	SOIL		X		X						X		
580SB00201	SOIL		X		X						X		
580TB00201	WATER	X											
580SB00202	SOIL		X		X						X		
580SB00301	SOIL		X		X						X		
580SB00302	SOIL		X		X						X		
580SB00501	SOIL		X		X						X		
580SB00502	SOIL		X		X						X		
580SB00601	SOIL		X		X						X		
580SB00602	SOIL		X		X						X		
GDESB00101	SOIL		X		X		X				X		X
GDESB00102	SOIL		X		X		X				X		X
GDESB00201	SOIL		X		X		X				X		X
GDESB00202	SOIL		X		X		X				X		X
GDESB00301	SOIL		X		X		X				X		X
GDESB00302	SOIL		X		X		X				X		X
GDESB00501	SOIL		X		X		X				X		X
GDESB00502	SOIL		X		X		X				X		X
GDESB00801	SOIL		X		X		X				X		X
GDETB00801	WATER	X											
GDESB00802	SOIL		X		X		X				X		X
Total Billable Samples (Water/Soil)		2	22	0	22	0	10	0	2	0	22	0	10

VOA = SW846 Volatiles
SV = SW846 Semivolatiles
P/P = SW846 Pesticides/PCB's
OPP = SW846 Organophosphorus Pesticides
HERB = SW846 Herbicides
pH = SW846 pH
HCR = SW846 Hexavalent Chromium
D/F = SW846 Dioxin and Furans
TAL = SW846 Metals
CN = SW846 Cyanide

DATA ASSESSMENT NARRATIVE
METALS AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM03.0 Method; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23502

A validation was performed on the Metals Data from SDG 23502. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Calibrations
	•	Blanks
*	•	Interferences
	•	Matrix Spike Recovery
	•	Matrix Duplicates
	•	Field Duplicates
*	•	Laboratory Control Samples
*	•	Serial Dilutions
*	•	MSAs

* - All criteria were met for this parameter.

Preparation and Field Blanks

Specific Finding

The preparation blank exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Tin	0.61 mg/kg	all soil samples below 3.05 mg/kg

The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as non-detect, "U". The field or DI water blanks exhibited contamination but had no impact on the data.

Matrix Spike Recovery

Specific Finding

The Matrix Spike recoveries for Antimony(36), Lead(70) and Mercury(55) were below the lower control limits. All positive and non-detect results are qualified as estimated, "J" or "UJ".

The Matrix Spike recovery for Calcium was outside the control limits but are not required for soil samples.

Duplicate Analysis

Specific Finding

The Laboratory Duplicate analyses for soils for Calcium was outside the control limits. All positive results are qualified as estimated, "J". The RPDs for Iron and Manganese were less than 35% and will not be qualified. The field duplicate analysis for Aluminum, Calcium, Iron, Magnesium, Manganese, Potassium and Zinc were greater than 50%. All positive results are qualified as estimated, "J".

Specific Finding

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafe's request.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all soil samples	Sn.	+	U
All soil samples	Sb, Pb and Hg.	+/U	J/UJ
All soil samples	Al, Ca, Fe, Mg, Mn, K and Zn.	+	J
All "B" results	all analytes	B	J

DATA ASSESSMENT NARRATIVE
METALS AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM03.0 Method; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23502

A validation was performed on the Metals Data from SDG 23502. The data was evaluated based on the following parameters.

*	●	Data Completeness
*	●	Holding Times
*	●	Calibrations
	●	Blanks
*	●	Interferences
*	●	Matrix Spike Recovery
*	●	Matrix Duplicates
*	●	Field Duplicates
*	●	Laboratory Control Samples
*	●	Serial Dilutions
*	●	MSAs

* - All criteria were met for this parameter.

Preparation and Field Blanks

Specific Finding

The preparation blank exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Tin	0.61 mg/kg	all soil samples below 3.05 mg/kg

The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as non-detect, "U". The field or DI water blanks exhibited contamination but had no impact on the data.

Specific Finding

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafe's request.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all soil samples	Sn.	+	U
All "B" results	all analytes	B	J

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	23502
Date:	February 9, 1996
Client Name:	Ensafe/Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	September 12, 1995
Number of Samples:	3 Non-aqueous Sample(s) with 1 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level IV
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Volatiles, Semivolatiles, Pesticides/PCB's, Organophosphorus Pesticides, Herbicides, pH, Hexavalent Chromium, Dioxin/Furans, Metals, Cyanide

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Seafoon — 3-5-96

Eugene M. Watson, Vice President — Date

6716 Mexico Road · St. Peters, MO 63376
(314) 928-9533 · (314) 278-1828 · Fax (314) 278-2709

SDG# 23502

Samples and Fractions Reviewed

Sample Identifications — Analytical Fractions

ENSAFE ID	MATRIX	VOA		SV		P/P		OPP		HERB		pH		HCR		D/'F		TAL		CN	
580CB00201	SOIL		X		X				X		X				X		X		X		
GDECB00101	SOIL		X		X		X		X		X		X		X		X		X		X
GDECB00202	SOIL		X		X		X		X		X				X		X		X		X
Total Billable Samples (Water/Soil)		0	3	0	3	0	2	0	3	0	3	0	1	0	3	0	3	0	3	0	2

VOA = SW846 Volatiles
SV = SW846 Semivolatiles
P/P = SW846 Pesticides/PCB's
OPP = SW846 Organophosphorus Pesticides
HERB = SW846 Herbicides
pH = SW846 pH
HCR = SW846 Hexavalent Chromium
D/F = SW846 Dioxin and Furans
TAL = SW846 Metals
CN = SW846 Cyanide

DATA ASSESSMENT NARRATIVE

DIOXIN/FURANS - 8290

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, internal standard recoveries, clean-up standard recoveries, matrix spike recoveries, GC/MS high resolution performance, tuning results, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8290; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level IV requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 23502

A validation was performed on the Dioxin/Furan Data from SDG 23502. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Mass Resolution Checks
*	•	Column Performance
*	•	Calibrations
*	•	Internal Standard Recovery
	•	Blanks
N/A	•	Laboratory Control Samples
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Congener Identification/Quantitation

* - All criteria were met for this parameter.

Blanks

One (1) of the two (2) method blanks (DFBLK2) exhibited positive results for four (4) congeners. The associated samples exhibited positive results for these congeners at concentrations greater than the method blank values, so qualifications were not warranted. However, the 1,2,3,4,6,7,8-HpCDF and OCDF blank concentrations were high (6 ng/Kg and 16 ng/Kg respectively) when compared to other method blanks. All results for these two (2) congeners should be used with caution and considered to be biased high and possibly due to laboratory contamination. In addition, the two (2) method blank reported several congeners as EMPCs. It is the professional opinion of the data validator that the EMPC values for the method blank should be reported as non detect (U).

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	CONGENER ID	DL	QL

No qualifications are required.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE
Metals

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, calibration standards, blank analysis results and MS/MSD results. A minimum of ten percent of all laboratory calculations are recalculated by the reviewer. The data validation was performed by the " Laboratory Data Validation Functional Guideline for Evaluating Inorganic Analysis" Febuary, 1994. All comments made within this report should be considered when examining the analytical results (Form Is).

This data package consisted of results from Ensafe, SDG# 23535B, the analysis of twenty-two (22) field soil samples and one Matrix Spike, Matrix Spike Duplicate and Duplicate pair for TAL Metals and Cyanide. Overall, the inorganic data quality was fair. All protocol requirements were followed with the exception of the following problems.

Specific QA/QC deficiency Findings are listed numerically in the following categories:

Holding Times

The holding times were met as specified in the "Laboratory Data Validation Functional Guideline for Evaluating Inorganic Analysis", Febuary, 1994.

Calibration

No deficiencies in this section.

Preparation and Field Blank

1. The preparation blank exhibited contamination for the following elements.

Aluminum	5.98	mg/kg
Barium	0.17	mg/kg
Calcium	74.1	mg/kg
Chromium	0.18	mg/kg
Iron	3.94	mg/kg
Sodium	49.7	mg/kg

The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as estimated, "U". The field or DI water blanks did not exhibited contamination.

Interferences

No significant interferences were observed.

Spike Recovery

2. The Matrix Spike recovery for Copper was below 30%. All non-detect results are rejected and all positive results are qualified as estimated, "J".

3. The Matrix Spike recoveries for Chromium, Lead, Manganese, Vanadium and Zinc were below the lower control limits. All positive and non-detect results are qualified as estimated, "J" or "UJ".

Duplicate

No deficiencies in this section.

LCS

No deficiencies in this section.

Serial Dilution

No deficiencies in this section.

4. Ensafe requires that all data points with the "B" qualifier be changed to "J".

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL	SPECIFIC FINDING
All soil samples	Al, Ca, Ba, Cr, Fe and Na.	+	U	1
All soil samples	Cu.	+ U	J R	2
All soil samples	Cr, Pb, Mn, V and Zn.	+/U	J/UJ	3
All soil samples	all analytes	B	J	4

DL - denotes laboratory qualifier/reported value
+ denotes positive values
U denotes non-detect values

QL - denotes data validation qualifier

DATA ASSESSMENT NARRATIVE
Metals

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, calibration standards, blank analysis results and MS/MSD results. A minimum of ten percent of all laboratory calculations are recalculated by the reviewer. The data validation was performed by the " Laboratory Data Validation Functional Guideline for Evaluating Inorganic Analysis" Febuary, 1994. All comments made within this report should be considered when examining the analytical results (Form Is).

This data package consisted of results from Ensafe, SDG# 23535C, the analysis of two (2) field water QC samples and no Matrix Spike, Matrix Spike Duplicate and Duplicate pair for TAL Metals and Cyanide. Overall, the inorganic data quality was fair. All protocol requirements were followed with the exception of the following problems.

Specific QA/QC deficiency Findings are listed numerically in the following categories:

Holding Times

The holding times were met as specified in the "Laboratory Data Validation Functional Guideline for Evaluating Inorganic Analysis", Febuary, 1994.

Calibration

No deficiencies in this section.

Preparation and Field Blank

No deficiencies in this section.

The field or DI water blanks exhibited no contamination.

Interferences

No significant interferences were observed.

Spike Recovery

No spike for this section.

Duplicate

No duplicate for this section.

LCS

No deficiencies in this section.

Serial Dilution

No deficiencies in this section.

1. Ensafe requires that all data points with the "B" qualifier be changed to "J".

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL	SPECIFIC FINDING
All water samples	all analytes	B	J	1

DL - denotes laboratory qualifier/reported value
+ denotes positive values
U denotes non-detect values

QL - denotes data validation qualifier

DATA ASSESSMENT NARRATIVE
Metals

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, calibration standards, blank analysis results and MS/MSD results. A minimum of ten percent of all laboratory calculations are recalculated by the reviewer. The data validation was performed by the " Laboratory Data Validation Functional Guideline for Evaluating Inorganic Analysis" Febuary, 1994. All comments made within this report should be considered when examining the analytical results (Form Is).

This data package consisted of results from Ensafe, SDG# 23535A, the analysis of two (2) field soil samples and no Matrix Spike, Matrix Spike Duplicate and Duplicate pair for TAL Metals and Cyanide. Overall, the inorganic data quality was fair. All protocol requirements were followed with the exception of the following problems.

Specific QA/QC deficiency Findings are listed numerically in the following categories:

Holding Times

The holding times were met as specified in the "Laboratory Data Validation Functional Guideline for Evaluating Inorganic Analysis", Febuary, 1994.

Calibration

No deficiencies in this section.

Preparation and Field Blank

1. The preparation blank exhibited contamination for the following elements.

Barium	0.17	mg/kg
Calcium	74.1	mg/kg
Chromium	0.18	mg/kg
Iron	3.94	mg/kg
Sodium	49.7	mg/kg

The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as estimated, "U". The field or DI water blanks did not exhibited contamination.

Interferences

No significant interferences were observed.

Spike Recovery

No deficiencies in thiss ection.

Duplicate

No deficiencies in this section.

LCS

No deficiencies in this section.

Serial Dilution

No deficiencies in this section.

2. Ensafe requires that all data points with the "B" qualifier be changed to "J".

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL	SPECIFIC FINDING
All soil samples	Cr, Ca, Ba, Cu, Fe and Na.	+	U	1
All soil samples	all analytes	B	J	2

DL - denotes laboratory qualifier/reported value
+ denotes positive values
U denotes non-detect values

QL - denotes data validation qualifier

DATA ASSESSMENT NARRATIVE
Metals

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, calibration standards, blank analysis results and MS/MSD results. The data validation was performed by the " Laboratory Data Validation Functional Guideline for Evaluating Inorganic Analysis" Febuary, 1994. This data validation was performed as a DQO Level IV. All comments made within this report should be considered when examining the analytical results (Form Is).

This data package consisted of results from **Ensafe, SDG# 23560A**, the analysis of two (2) field duplicate soil samples and no Matrix Spike, Matrix Spike Duplicate and Duplicate pair for TAL Metals and Cyanide. Overall, the inorganic data quality was fair. All protocol requirements were followed with the exception of the following problems.

Specific QA/QC deficiency Findings are listed numerically in the following categories:

Holding Times

The holding times were met as specified in the "Laboratory Data Validation Functional Guideline for Evaluating Inorganic Analysis", Febuary, 1994.

Calibration

No deficiencies in this section.

Preparation and Field Blank

1. The preparation blank exhibited contamination for the following elements.

   Potassium 131.0 mg/kg 56103 and 07 and 57517 and 21.

   The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as estimated, "U".

Interferences

No significant interferences were observed.

Spike Recovery

2. The Matrix Spike recoveries for Antimony and Manganese were below the lower control limits. All positive and non-detect results are qualified as estimated, "J' or "UJ".

3. The Matrix Spike recoveries for Barium, Copper and Zinc were above the upper control limits. All positive results are qualified as estimated, "J".

Duplicate and Field Duplicate

4. The Duplicate analyses for Calcium and Iron were outside the control limits. All positive results are qualified as estimated, "J". The RPDs for Aluminum, Antimony and Zinc were not greater than 35% and will not be qualified. The field duplicate pairs(598-S-B002-02 and 598-C-B002-02, 599-S-B005-02 and 599-C-B005-02) were less than 50% for all sample values greater than 10 times the CRDL except for the following elements.

   Barium, Chromium, Lead and Vanadium.

LCS

   No deficiencies in this section.

Serial Dilution

5. The Serial Dilutions for Barium, Chromium, Lead and Vanadium were outside the control limits. All positive results are qualified as estimated, "J".

6. Ensafe requires that all data points with the "B" qualifier be changed to "J".

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL	SPECIFIC FINDING
56103 and 07, 57517 and 21.	K.	+	U	1
All soil samples	Sb and Mn.	+/U	J/UJ	2
All soil samples	Ba, Cu and Zn.	+	J	3
All soil samples	Ba, Ca, Cr, Pb, Fe and V.	+	J	4
All soil samples	Pb, Ni, K and Na.	+	J	5
All soil samples	all analytes	B	J	6

DL - denotes laboratory qualifier/reported value
+ denotes positive values
U denotes non-detect values

QL - denotes data validation qualifier

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846, Method 8270; National Functional Guidelines for Organic Data Review, and DQO Level IV. All comments made within this report should be considered when examining the analytical results (Form I's).

SDG # 23560A

A validation was performed on the Volatile Data from SDG 1536. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibrations
*	•	Internal Standard Performance
	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Initial Calibrations

The initial calibrations that were analyzed by the laboratory for these samples were not acceptable for all compound %RSDs and average RRFs.

Specific Finding:

1. The initial calibration analyzed on, 09/26/95, contained compounds with RRFs less than 0.05. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and reject all non detects (R).

   599CB00502 aramite

Initial Calibrations (continued)

Specific Finding:

The initial calibration analyzed on, 09/26/95, contained compounds with %RSDs greater than 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and reject all non detects (R).

599CB00502	2-naphthylamine

Continuing calibrations

The continuing calibrations that were analyzed with this data package exhibited %Ds that were not within %D continuing calibration criteria. All RRFs were within calibration criteria.

Specific Finding:

The continuing calibration, A8801,-02,-03, contained compounds with %Ds greater than 50%, but less than 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and all non detect as estimated (UJ).

598CB00202	dimethylbenz(a)anthracene
	0,0,0-triethylphosphorothio
	a,a-dimethylphenethyl amine
	thiozine
	diallate
	chlorobenzilate

The continuing calibration, A8801,-02,-03, contained compounds with %Ds greater than 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and reject all non detects (R).

598CB00202	aramite

The continuing calibration, A8801,-02,-03, contained compounds with RRFs less than 0.05. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and reject all non detects (R).

598CB00202	4-nitroquinoline-1-oxide

Continuing calibrations (continued)

Specific Finding:

The continuing calibration, A8827,-28, contained compounds with %Ds greater than 50%, but less than 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and all non detect as estimated (UJ).

599CB00502	n-nitrosopyrrolidine
	1,3,5-trinitrobenzene

The continuing calibration, A8827,-28, contained compounds with %Ds greater than 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and reject all non detects (R).

599CB00502	4-nitroquinoline-1-oxide

The continuing calibration, A8827,-28, contained compounds with RRFs less than 0.05. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and reject all non detects (R).

599CB00202	aramite

Method Blanks

Associated blank	Compound	Concentration
SBLK1	bis(2-ethylhexyl)phthalate	79J

Samples	Compound	Qualification
598CB00202	bis(2-ethylhexyl)phthalate	CRQL

Rinseate Blanks

Associated blank	Compound	Concentration
097EB00301	bis(2-ethylhexyl)phthalate	2J
	butylbenzylphthalate	1J

Rinseate Blanks (continued)

Samples	Compound	Qualification
599CB00502	bis(2-ethylhexyl)phthalate	CRQL

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

NJ = Presumptive evidence for the presence of the material at an estimated value

K = Result is biased high

L = Result is biased low

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
599CB00502	aramite	+/-	J/R
599CB00502	2-naphthylamine	+/-	J/R
598CB00202	dimethylbenz(a)anthracene 0,0,0-triethylphosphorothio a,a-dimethylphenethyl amine thiozine diallate chlorobenzilate	+/-	J/UJ
598CB00202	aramite	+/-	J/R
598CB00202	4-nitroquinoline-1-oxide	+/-	J/R
599CB00502	n-nitrosopyrrolidine 1,3,5-trinitrobenzene	+/-	J/UJ
599CB00502	4-nitroquinoline-1-oxide	+/-	J/R
599CB00202	aramite	+/-	J/R

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	23560S
Date:	February 1, 1996
Client Name:	Ensafe/Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	October 28, 1995
Number of Samples:	4 Non-aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma - Tulsa
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Semivolatiles

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig H. Simpson — 3-15-96

Eugene M. Watson, Vice President — Date

6716 Mexico Road · St. Peters, MO 63376
(314) 928-9533 · (314) 278-1828 · Fax (314) 278-2709

SDG# 23560S

Samples and Fractions Reviewed

Sample Identifications Analytical Fractions

ENSAFE ID	MATRIX	SV	
603SB00101	SOIL		X
603SB00102	SOIL		X
603SB00201	SOIL		X
603SB00202	SOIL		X
Total Billable Samples	(Water/Soil)	0	4

SV = SW846 Semivolatiles

DATA ASSESSMENT NARRATIVE

SEMIVOLATILES - ORGANOTINS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, calibration results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8270, modified for organotins; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level III requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 23560

A validation was performed on the volatile organics data from SDGs 23560. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
*	•	Internal Standard Performance
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
	•	Identification/Quantitation

* - All criteria were met for this parameter.

Identification/Quantitation

Reject (R) all RE analyses in favor of the original analyses due to similar internal standard area results.

Overall Performance

The overall performance was acceptable except where noted.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
All RE samples	all compounds	+/-	R

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	23593F
Date:	February 1, 1996
Client Name:	Ensafe/Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	October 28, 1995
Number of Samples:	2 Non-aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma - Tulsa
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level IV
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Semivolatiles

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig B. Sempson — 3-15-96

Eugene M. Watson, Vice President — Date

6716 Mexico Road · St. Peters, MO 63376
(314) 928-9533 · (314) 278-1828 · Fax (314) 278-2709

SDG# 23593F

Samples and Fractions Reviewed

Sample Identifications Analytical Fractions

ENSAFE ID	MATRIX	SV	
605CB01102	SOIL		X
605CB01001	SOIL		X
Total Billable Samples (Water/Soil)		0	2

SV = SW846 Semivolatiles

DATA ASSESSMENT NARRATIVE

SEMIVOLATILES - ORGANOTINS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, calibration results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8270, modified for organotins; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level IV requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 23593

A validation was performed on the volatile organics data from SDGs 23593. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
*	•	Internal Standard Performance
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
	•	Identification/Quantitation

* - All criteria were met for this parameter.

Identification/Quantitation

Reject (R) all reanalysis results and report the original analysis due to similar internal standard area results.

Overall Performance

The overall performance was acceptable.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
All RE samples	All compounds	+/-	R

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8270; the National Functional Guidelines for Organic Data Validation, June 1991, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23593B

A validation was performed on the Semivolatile Data from SDG 23593B. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibration
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
*	•	Internal Standard Performance
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

Continuing Calibrations

The continuing calibrations standards that were analyzed exhibited non-compliant %Ds for which qualification of the data was required.

Continuing Calibrations, continued

Specific Findings

The continuing calibration standard, A9151.D contained compounds with %Ds greater than 25% but less than 50%. For the samples and non-compliant compounds listed below, the positive results are qualified as estimated, J.

6SB00302	chrysene (27.3%)
6SB00201	
106SB00202	
3SB00301	
605SB01102	
605SB01002	
605SB00301	

Method Blanks

One (1) method blank exhibited contamination which resulted in the qualification of field samples.

	SBLK1
ACENAPHTHENE	68 µg/Kg

Specific Findings

Sample	Contaminant	Action Level	Qualification
6SB00301	acenaphthene	680 µg/Kg	CRQL
106SB00202			
605SB01102			
605SB01002			
605SB00401			

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 5% of data required qualifications

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
6SB00302	chrysene	+	J
6SB00201			
106SB00202			
3SB00301			
605SB01102			
605SB01002			
605SB00301			
6SB00301	acenaphthene	+B	CRQL
106SB00202			
605SB01102			
605SB01002			
605SB00401			

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8270; the National Functional Guidelines for Organic Data Validation, June 1991, and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23593A

A validation was performed on the Semivolatile Data from SDG 23593A. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibration
	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
*	•	Internal Standard Performance
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

Continuing Calibrations

The continuing calibrations standards that were analyzed exhibited non-compliant %Ds and RRFs for which qualification of the data was required.

Continuing Calibrations, continued

Specific Findings

The continuing calibration A9211.D, contained compounds with RRFs less than 0.05. For the samples and non-compliant compounds listed below, the positive results are qualified as estimated, J, and the non-detect results are rejected, R.

605CB01102	aramite (0.036)
605CB01001	hexachlorophene (0.044)

The continuing calibration A9211.D, contained compounds with %Ds greater than 90%. For the samples and non-compliant compounds listed below, the positive results are qualified as estimated, J, and the non-detect results are rejected, R.

605CB01102	1,2-dibromo-3-chloropropane (136.6%)
605CB01001	aramite (91.2%)

The continuing calibration A9211.D, contained compounds with %D greater than 50% but less than 90%. For the samples and non-compliant compounds listed below, the positive results are qualified as estimated, J, and the non-detect results are qualified as estimated, J/UJ.

605CB01102	n-nitrosopyrrolidine (60.4%)
605CB01001	

Method Blanks

The method blank exhibited contamination which resulted in the qualification of field samples.

	SBLK1
BIS(2-ETHYLHEXYL)PHTHALATE	38 μg/Kg

Specific Findings

Sample	Contaminant	Action Level	Qualification
605CB01001	bis(2-ethylhexyl)phthalate	380 μg/Kg	CRQL
605DB01102			NA

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 5% of data required qualifications

.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
605CB01102 605CB01001	aramite hexachlorophene	+/-	J/R
605CB01102 605CB01001	1,2-dibromo-3-chloropro. aramite	+/-	J/R
605CB01102 605CB01001	n-nitrosopyrrolidine	+/-	J/UJ
605CB01001 605DB01102	bis(2-ethylhexyl)phthalate	+B	CRQL NA

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	23593
Date:	February 11, 1996
Client Name:	Ensafe/Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	September 21 - 22, 1995
Number of Samples:	2 Non-aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level IV
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Volatiles, Semivolatiles, Pesticides w/PCB's, Herbicides, Organophosphorus Pesticides, Organotins, Dioxin/Furans Hexavalent Chromium, Metals w/Cyanide

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig B. Sexton
Eugene M. Watson, Vice President

2-22-96
Date

6716 Mexico Road · St. Peters, MO 63376
(314) 928-9533 · (314) 278-1828 · Fax (314) 278-2709

SDG# 23593

Samples and Fractions Reviewed

Sample Identifications — Analytical Fractions

ENSAFE ID	MATRIX	VOA		SV		P/P		HERB		OPP		ORG		D/F		HCR		TAL/CN	
065CB01102	SOIL		X		X		X		X		X		X		X		X		X
065CB01001	SOIL		X		X		X		X		X		X		X		X		X
Total Billable Samples (Water/Soil)		0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2

VOA = SW846 Volatiles
SV = SW846 Semivolatiles
P/P = SW846 Pesticides/PCB's
HERB = SW846 Herbicides
OPP = SW846 Organophosphorus Pesticides
ORG = SW846 Organotins
D/F = SW846 Dioxin/Furans
HCR = SW846 Hexavalent Chromium
TAL/CN = SW846 Metals w/Cyanide

DATA ASSESSMENT NARRATIVE

PESTICIDE/AROCLORS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW846 Method 8080; the National Functional Guidelines for Organic Data Validation, June 1991; and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23593A

A validation was performed on the Pesticide/Aroclor Data from SDG 23593A. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC Performance
*	•	Calibration
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
*	•	Compound Identification
	•	Compound Quantitation

* - All criteria were met for this parameter.

Analyte Identification/Quantitation

Interferences were noted in some of the samples. It is the professional opinion of the data reviewer that the interferences are of such magnitude that they would interfere with determining the presence or absence of target compounds. Therefore, all positive results are qualified as estimated, J, and all non-detect results are qualified as unusable, R, for those compounds that fall within the interferences on both columns.

Analyte Identification/Quantitation, Continued

Specific Findings

For samples and compounds listed below, the positive results are qualified as estimated, J, and the non-detect results are qualified as unusable, R.

605CB01102	Aroclor 1016
	Aroclor 1242
605CB01001	Aldrin
	Aroclor 1016
	Aroclor 1242
	Aroclor 1248

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 10% of the data required qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
605CB01102	Aroclor 1016 Aroclor 1242	+/-	J/R
605CB01001	Aldrin Aroclor 1016 Aroclor 1242 Aroclor 1248	+/-	J/R

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non-detect result

DATA ASSESSMENT NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8270; the National Functional Guidelines for Organic Data Validation, June 1991, and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23593A

A validation was performed on the Semivolatile Data from SDG 23593A. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibration
	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
*	•	Internal Standard Performance
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

Continuing Calibrations

The continuing calibrations standards that were analyzed exhibited non-compliant %Ds and RRFs for which qualification of the data was required.

Continuing Calibrations, continued

Specific Findings

The continuing calibration A9211.D, contained compounds with RRFs less than 0.05. For the samples and non-compliant compounds listed below, the positive results are qualified as estimated, J, and the non-detect results are rejected, R.

605CB01102	aramite (0.036)
605CB01001	hexachlorophene (0.044)

The continuing calibration A9211.D, contained compounds with %Ds greater than 90%. For the samples and non-compliant compounds listed below, the positive results are qualified as estimated, J, and the non-detect results are rejected, R.

605CB01102	1,2-dibromo-3-chloropropane (136.6%)
605CB01001	aramite (91.2%)

The continuing calibration A9211.D, contained compounds with %D greater than 50% but less than 90%. For the samples and non-compliant compounds listed below, the positive results are qualified as estimated, J, and the non-detect results are qualified as estimated, J/UJ.

605CB01102	n-nitrosopyrrolidine (60.4%)
605CB01001	

Method Blanks

The method blank exhibited contamination which resulted in the qualification of field samples.

	SBLK1
BIS(2-ETHYLHEXYL)PHTHALATE	38 µg/Kg

Specific Findings

Sample	Contaminant	Action Level	Qualification
605CB01001	bis(2-ethylhexyl)phthalate	380 µg/Kg	CRQL
605DB01102			NA

DATA ASSESSMENT NARRATIVE
SEMIVOLATILE ANALYSIS

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 5% of data required qualifications

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL =	The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.
U =	The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.
No Action =	The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
605CB01102 605CB01001	aramite hexachlorophene	+/-	J/R
605CB01102 605CB01001	1,2-dibromo-3-chloropro. aramite	+/-	J/R
605CB01102 605CB01001	n-nitrosopyrrolidine	+/-	J/UJ
605CB01001 605DB01102	bis(2-ethylhexyl)phthalate	+B	CRQL NA

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

SEMIVOLATILES - ORGANOTINS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, calibration results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8270, modified for organotins; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level III requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 23593

A validation was performed on the volatile organics data from SDGs 23593. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
	•	Internal Standard Performance
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
	•	Identification/Quantitation

* - All criteria were met for this parameter.

Internal Standards

Sample 605SB00602 exhibited a low internal standard. Qualify all positive and non detect results as estimated (J/UJ).

Identification/Quantitation

Reject (R) 605SB00602RE in favor of the original analyses due to similar internal standard area results.

Overall Performance

The overall performance was acceptable except where noted.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
605SB00602	all compounds	+/-	J/UJ
605SB00602RE	all compounds	+/-	R

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

DIOXIN/FURANS - 8290

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, internal standard recoveries, clean-up standard recoveries, matrix spike recoveries, GC/MS high resolution performance, tuning results, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8290; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level IV requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 23593

A validation was performed on the Dioxin/Furan Data from SDG 23593. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Mass Resolution Checks
*	•	Column Performance
*	•	Calibrations
*	•	Internal Standard Recovery
	•	Blanks
*	•	Laboratory Control Samples
N/A	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Congener Identification/Quantitation

* - All criteria were met for this parameter.

Blanks

The method blank exhibited positive results for three (3) congeners. The associated samples exhibited positive results for these congeners at concenrations greater than the method blank values, so qualifications were not warrented. In addition, four (4) congeners were reported as EMPCs. It is the professional opinion of the data validator that the EMPC values for the method blank should be reported as non detect (U).

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	CONGENER ID	DL	QL

No qualifications are required.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE
METALS, HEXAVALENT CHROMIUM AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM03.0 Method; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23593

A validation was performed on the Metals Data from SDG 23593. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Calibrations
*	•	Blanks
*	•	Interferences
*	•	Matrix Spike Recovery
*	•	Matrix Duplicates
*	•	Field Duplicates
*	•	Laboratory Control Samples
*	•	Serial Dilutions
*	•	MSAs

* - All criteria were met for this parameter.

Specific Finding

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafe's request.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
All "B" results	all analytes	B	J

DATA ASSESSMENT NARRATIVE
METALS AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM03.0 Method; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23593

A validation was performed on the Metals Data from SDG 23593. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Calibrations
	•	Blanks
*	•	Interferences
	•	Matrix Spike Recovery
	•	Matrix Duplicates
	•	Field Duplicates
*	•	Laboratory Control Samples
*	•	Serial Dilutions
*	•	MSAs

* - All criteria were met for this parameter.

Preparation and Field Blanks

Specific Finding

The preparation blank exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Chromium	0.19 mg/kg	no impact
Nickel	0.11 mg/kg	no impact

The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as non-detect, "U". The field or DI water blanks exhibited contamination but had no impact on the data.

The preparation blank exhibited negative bias for the following elements.

Elements	Conc.	Samples affected
Potassium	-103 mg/kg	all soil samples below 1030 mg/kg

This reviewer qualifies all samples results below ten times the negative bias as estimated, "J" or "UJ".

Matrix Spike Recovery

Specific Finding

The Matrix Spike recovery for Cyanide (19%) was below 30%. All non-detect results are rejected and all positive results are qualified as estimated, "J".

The Matrix Spik recoveries for Barium (202%), Chromium (176%), Lead (155%) and Manganese (148%) were above the upper control limits. All positive results are qualified as estimated, "J".

Duplicate Analysis

Specific Finding

The Duplicate analyses for Chromium, Cyanide, Lead and Zinc were outside the control limits of 35%. All positive results are qualified as estimated, "J".

The Field Duplicate analyses for Aluminum, Calcium, Copper and Zinc were outside the control limits of 50%. All positive results are qualified as estimated, "J">

Specific Finding

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafe's request.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all soil samples below 1030 mg/kg	K.	+/U	J/UJ
all soil samples	Cn.	+	J
		U	R
all soil samples	Ba, Cr, Pb and Mn.	+	J
all soil samples	Cr, Cn, Pb and Zn.	+	J
all soil samples	Al, Ca, Cu and Zn.	+	J
All "B" results	all analytes	B	J

DATA ASSESSMENT AND NARRATIVE

VOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846, Method 8240; the National Functional Guidelines for Organic Data Review, June 1991, and DQO Level III. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG # 23593B

A validation was performed on the Volatile Data from SDG 23593B, The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
	•	Internal Standard Performance
	•	Blanks
	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Internal Standards

All internal standard EICP areas did not meet the internal standard EICP area QA/QC criteria.

Internal Standards (continued)

Specific Finding:

The Samples listed below, exhibited low internal standard areas. Qualify all associated positive results as estimated (J) and all non detects as estimated (UJ).

005SB00302	bromochloromethane
605SB00801RE	1,4-difluorobenzene
605SB00602RE	chlorobenzene-d_5
605SB00801	chlorobenzene-d_5
605SB00602	
005SB00302RE	1,4-difluorobenzene
	chlorobenzene-d_5

Method Blanks

Associated blank	Compound	Conc.	Action Level
VBLK1	chloroform	5J	25
VBLK2	chloroform	4J	20
VBLK3	chloroform	4J	20

Samples	Compound	Qualification
106SB00301	chloroform	CRQL
603SB00301		
603SB00302		
603SB00401		
603SB00402		
106SB00202		
106SB00201		
605SB01001		
605SB01002		
605SB00301		
605SB00902		
605SB00802		
605SB00801		

Method Blanks (continued)

Associated blank	Compound	Conc.	Action Level
VBLK1	chloroform	5J	25
VBLK2	chloroform	4J	20
VBLK3	chloroform	4J	20

Samples	Compound	Qualification
605SB00701	chloroform	CRQL
603SB00602		
005SB00302		
605SB01102		
605SB00401		
605SB00901		
605SB00801RE		
605SB00601		
605SB00602RE		
005SB00301		
005SB00302RE		

Trip blanks

Associated blank	Compound	Conc.	Action Level
605TB00301	methylene chloride	12	120
605TB00601	methylene chloride	11	110

Samples	Compound	Qualification
106SB00202	methylene chloride	U
106SB00301		
603SB00301		
603SB00302		
603SB00401		
603SB00402		
605SB00301		
605SB00401		
605SB00301		
603SB01001		

Trip blanks

Associated blank	Compound	Conc.	Action Level
605TB00301	methylene chloride	12	120
605TB00601	methylene chloride	11	110

Samples	Compound	Qualification
605SB01101	methylene chloride	U
106SB00201		
605SB00601		
605SB00602		
605SB00701		
605SB00801		
605SB00801RE		
605SB00802		
605SB00901		
605SB00902		
605SB01101		
605SB01102	methylene chloride	CRQL
605SB00602RE		

Surrogates

All of the surrogate recoveries for the all blanks and samples were not within QA/QC limits.

Specific Finding:

The samples listed below, exhibited surrogate recoveries that exceeded the QA/QC limit. Qualify all positive results as estimated (J)

605SB00801	toluene-d_8	120

Compound Identification/Quantitation

Specific Finding:

Reject (R) all results for the re-analyzed samples listed below, due to non compliant internal standard areas and/or non compliant surrogate recoveries.

005SB00302
605SB00801RE
605SB00602RE

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on the dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
	All associated analytes	+/-	J/UJ
005SB00302	bromochloromethane		
605SB00801RE	1,4-difluorobenzene		
605SB00602RE	chlorobenzene-d_5		
605SB00801	chlorobenzene-d_5		
605SB00602			
005SB00302RE	1,4-difluorobenzene		
	chlorobenzene-d_5		
106SB00301	chloroform	+	CRQL
603SB00301			
603SB00302			
603SB00401			
603SB00402			
106SB00202			
106SB00201			
605SB01001			
605SB01002			
605SB00301			
605SB00902			
605SB00802			
605SB00801			
605SB00701			
603SB00602			
005SB00302			
605SB01102			
605SB00401			
605SB00901			
605SB00801RE			
605SB00601			
605SB00602RE			
005SB00301			
005SB00302RE			

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
106SB00202	methylene chloride	+	U
106SB00301			
603SB00301			
603SB00302			
603SB00401			
603SB00402			
605SB00301			
605SB00401			
605SB00301			
603SB01001			
605SB01101			
106SB00201			
605SB00601			
605SB00602			
605SB00701			
605SB00801			
605SB00801RE			
605SB00802			
605SB00901			
605SB00902			
605SB01101			
605SB01102	methylene chloride	+	CRQL
605SB00602RE			
605SB00801	All analytes	+	J
005SB00302	All analytes	+/-	R
605SB00801RE			
605SB00602RE			

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT AND NARRATIVE

VOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846, Method 8240 Appendix IX; the National Functional Guidelines for Organic Data Review, June 1991, and DQO Level IV. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG # 23593A

A validation was performed on the Volatile Data from SDG # 23593A. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibrations
*	•	Internal Standard Performance
	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Continuing calibrations

The continuing calibrations that were analyzed with this data package exhibited %Ds that were not within %D continuing calibration criteria. All RRFs were within calibration criteria.

Continuing Calibrations (continued)

Specific Finding:

The continuing calibration, C18416, contained compounds with %Ds greater than 50%, but less than 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and all non detects as estimated (UJ).

605CB01001	dichlorodifluoromethane (56.6)
605CB01102	

The continuing calibration, C18416, contained compounds with RRFs less than 0.05. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and reject all non detects (R).

605CB01001	acrolein
605CB01102	acetonitrile
	isobutanol
	1,4-dioxane

Method Blanks

Associated blank	Compound	Conc.	Action Level
VBLK1	chloroform	5J	25

Samples	Compound	Qualification
605CB01001	chloroform	CRQL
605CB01102		

Trip Blanks

Associated blank	Compound	Conc.	Action Level
605TB00301	methylene chloride	5J	25

Samples	Compound	Qualification
605CB01001	methylene chloride	U
605CB01102		

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

NJ = Presumptive evidence for the presence of the material at an estimated value

K = Result is biased high

L = Result is biased low

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
605CB01001 605CB01102	dichlorodifluoro-methane (56.6)	+/-	J/UJ
605CB01001 605CB01102	acrolein acetonitrile isobutanol 1,4-dioxane	+/-	J/R
605CB01001 605CB01102	chloroform	+	CRQL
605CB01001 605CB01102	methylene chloride	+	U

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	23607F
Date:	February 11, 1996
Client Name:	Ensafe/Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	October 29, 1995
Number of Samples:	1 Non-aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	Southwest laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level IV
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Organotins

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Swyfoss
Eugene M. Watson, Vice President

3-15-96
Date

6716 Mexico Road · St. Peters, MO 63376
(314) 928-9533 · (314) 278-1828 · Fax (314) 278-2709

SDG# 23607F

Samples and Fractions Reviewed

Sample Identifications Analytical Fractions

ENSAFE ID	MATRIX	SV	
542CB00602	SOIL		X
Total Billable Samples (Water/Soil)		0	1

SV = SW846 Semivolatiles; Organotins

DATA ASSESSMENT NARRATIVE

SEMIVOLATILES - ORGANOTINS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, calibration results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8270, modified for organotins; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level IV requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 23607

A validation was performed on the volatile organics data from SDGs 23607. The data was evaluated based on the following parameters.

*	•	Data Completeness
	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
*	•	Internal Standard Performance
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Identification/Quantitation

* - All criteria were met for this parameter.

Holding Times

All samples were extracted twenty-seven (27) days outside of holding times. Qualify all positive results as estimated (J) and reject (R) all non detect results.

Overall Performance

Overall performance was acceptable.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
All samples	All compounds	+/-	J/R

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	23607S
Date:	February 11, 1996
Client Name:	Ensafe/Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	October 29 - 30, 1995
Number of Samples:	13 Non-aqueous Sample(s) with 1 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Organotins

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Serfoss
Eugene M. Watson, Vice President

3-15-96
Date

4127 Plaza 94 South · St. Charles, MO 63304
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SDG# 23607S

Samples and Fractions Reviewed

Sample Identifications Analytical Fractions

ENSAFE ID	MATRIX	SV	
542SB00602	SOIL		X
063SB00302	SOIL		X
540SB00101	SOIL		X
540SB00102	SOIL		X
541SB00101	SOIL		X
542SB00101	SOIL		X
542SB00102	SOIL		X
542SB00301	SOIL		X
542SB00302	SOIL		X
542SB00401	SOIL		X
542SB00501	SOIL		X
542SB00502	SOIL		X
542SB00601	SOIL		X
Total Billable Samples	(Water/Soil)	0	13

SV= SW846 Semivolatiles; Organotins

DATA ASSESSMENT NARRATIVE

SEMIVOLATILES - ORGANOTINS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, calibration results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8270, modified for organotins; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level III requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 23607S

A validation was performed on the volatile organics data from SDGs 23607S. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
*	•	Internal Standard Performance
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Identification/Quantitation

* - All criteria were met for this parameter.

Overall Performance

Overall performance was acceptable.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL

No qualifications are required.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	23608F
Date:	February 11, 1996
Client Name:	Ensafe/Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	October 31, 1995
Number of Samples:	3 Non-aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	Southwest laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level IV
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Organotins

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig H. Seaton

Eugene H. Watson, Vice President

3-15-96

Date

6716 Mexico Road · St. Peters, MO 63376
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SDG# 23608F

Samples and Fractions Reviewed

Sample Identifications Analytical Fractions

ENSAFE ID	MATRIX	ORG	
070CB00101	SOIL		X
540CB00102	SOIL		X
543CB00402	SOIL		X
Total Billable Samples (Water/Soil)		0	3

ORG = SW846 Organotins

DATA ASSESSMENT NARRATIVE

SEMIVOLATILES - ORGANOTINS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, calibration results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8270, modified for organotins; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level IV requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 23608

A validation was performed on the volatile organics data from SDGs 23608. The data was evaluated based on the following parameters.

*	•	Data Completeness
	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
*	•	Internal Standard Performance
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Identification/Quantitation

* - All criteria were met for this parameter.

Holding Times

All samples were extracted twenty-six to twenty-seven (26-27) days outside of extraction holding times. Qualify all positive results as estimated (J) and reject (R) all non detect results.

Overall Performance

The overall performance was acceptable except where noted.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
All samples	all compounds	+/-	J/R

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	23608F
Date:	February 11, 1996
Client Name:	Ensafe/Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	October 31 - November 1, 1995
Number of Samples:	17 Non-aqueous Sample(s) with 1 MS/MSD(s)
Laboratory:	Southwest laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Organotins

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig H. Sempson — 3-15-96

Eugene M. Watson, Vice President — Date

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(314) 928-9533 · (314) 278-1828 · Fax (314) 278-2709

SDG# 23608S

Samples and Fractions Reviewed

Sample Identifications Analytical Fractions

ENSAFE ID	MATRIX	ORG	
070SB00101	SOIL		X
070SB00102	SOIL		X
070SB00201	SOIL		X
070SB00202	SOIL		X
070SB00301	SOIL		X
070SB00302	SOIL		X
070SB00401	SOIL		X
070SB00402	SOIL		X
542SB00701	SOIL		X
543SB00401	SOIL		X
543SB00402	SOIL		X
549SB00201	SOIL		X
549SB00202	SOIL		X
549SB00301	SOIL		X
549SB00302	SOIL		X
549SB00601	SOIL		X
549SB00602	SOIL		X
Total Billable Samples (Water/Soil)		0	17

ORG= SW846 Organotins

DATA ASSESSMENT NARRATIVE

SEMIVOLATILES - ORGANOTINS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, calibration results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8270, modified for organotins; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level III requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 23608

A validation was performed on the volatile organics data from SDGs 23608. The data was evaluated based on the following parameters.

*	•	Data Completeness
	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
*	•	Internal Standard Performance
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Identification/Quantitation

* - All criteria were met for this parameter.

Holding Times

All samples were extracted twenty-six (26) days outside of holding times. Qualify all positive results as estimated (J) and reject (R) all non detect results.

Overall Performance

Overall performance was acceptable.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
All samples	All compounds	+/-	J/R

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	23609S
Date:	February 11, 1996
Client Name:	Ensafe/Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	November 3 - 4, 1995
Number of Samples:	20 Non-aqueous Sample(s) with 1 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Organotins

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Swanson
for Eugene M. Watson, Vice President

3-15-96
Date

6716 Mexico Road · St. Peters, MO 63376
(314) 928-9533 · (314) 278-1828 · Fax (314) 278-2709

SDG# 23609S

Samples and Fractions Reviewed

Sample Identifications Analytical Fractions

ENSAFE ID	MATRIX	ORG	
548SB00101	SOIL		X
548SB00102	SOIL		X
548SB00201	SOIL		X
548SB00202	SOIL		X
548SB00301	SOIL		X
548SB00302	SOIL		X
548SB00401	SOIL		X
548SB00402	SOIL		X
549SB00101	SOIL		X
549SB00102	SOIL		X
549SB00401	SOIL		X
549SB00501	SOIL		X
549SB00701	SOIL		X
549SB00702	SOIL		X
549SB00801	SOIL		X
549SB00802	SOIL		X
549SB00901	SOIL		X
549SB00902	SOIL		X
549SB01001	SOIL		X
549SB01002	SOIL		X
Total Billable Samples	(Water/Soil)	0	20

ORG= SW846 Organotins

DATA ASSESSMENT NARRATIVE

SEMIVOLATILES - ORGANOTINS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, calibration results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8270, modified for organotins; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level III requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 23609

A validation was performed on the volatile organics data from SDGs 23609. The data was evaluated based on the following parameters.

*	•	Data Completeness
	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
*	•	Internal Standard Performance
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Identification/Quantitation

* - All criteria were met for this parameter.

Holding Times

All samples were extracted twenty-three to twenty-eight (23-28) days outside of extraction holding times. Qualify all positive results as estimated (J) and reject (R) all non detect results.

Overall Performance

The overall performance was acceptable except where noted.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
All samples	all compounds	+/-	J/R

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	23610F
Date:	February 11, 1996
Client Name:	Ensafe/Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	November 2 - 3, 1995
Number of Samples:	3 Non-aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level IV
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Organotins

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Surfoos
for Eugene M. Watson, Vice President

3-15-96
Date

6716 Mexico Road · St. Peters, MO 63376
(314) 928-9533 · (314) 278-1828 · Fax (314) 278-2709

SDG# 23610F

Samples and Fractions Reviewed

Sample Identifications Analytical Fractions

ENSAFE ID	MATRIX	ORG	
022CB00101	SOIL		X
172CB00301	SOIL		X
087CB00101	SOIL		X
Total Billable Samples	(Water/Soil)	0	3

ORG= SW846 Organotins

DATA ASSESSMENT NARRATIVE

SEMIVOLATILES - ORGANOTINS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, calibration results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8270, modified for organotins; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level IV requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 23610

A validation was performed on the volatile organics data from SDGs 23610. The data was evaluated based on the following parameters.

*	•	Data Completeness
	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
*	•	Internal Standard Performance
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Identification/Quantitation

* - All criteria were met for this parameter.

Holding Times

All samples were extracted twenty-two (22) days outside of extraction holding times. Qualify all positive results as estimated (J) and reject (R) all non detect results.

Overall Performance

The overall performance was acceptable except where noted.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
All samples	all compounds	+/-	J/R

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

December 6, 1995

Prepared for
ENSAFE/ALLEN & HOSHALL

This Data Validation Report is a review of the analytical results of sampling conducted September 9, 1995 in support of the Charlston Zone E project. There were four (4) soil samples which were received and analyzed by Southwest Laboratory of Oklahoma in this analytical batch, SDG# 23628.

Heartland ESI personnel have reviewed the data presented for the Samples listed below for the Analytical Fractions indicated. The CLP fractions have been validated utilizing: the "Laboratory Data Validation Functional Guidelines For Evaluating Organics Analysis", June, 1991; the "Laboratory Data Validation Functional Guidelines For Evaluating Inorganics Analysis", July, 1988; specific method requirements in SW-846; DQO Level III requirements and good professional judgement.

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatogram, etc., for each sample have been carefully reviewed. The end-user is urged to review the **Specific Findings** and associated **Data Qualifications** presented in this report. Annotated Form Is for all samples reviewed are included after the **Narratives**.

The release of this Data Validation Report is authorized by the following signature:

Craig H. Swafford

for Eugene M. Watson, Vice President Heartland ESI

12-7-95.
Date

6718 Mexico Road St. Peters MO 63376
(314) 928-9533 (314) 278-1828 Fax (314) 278-2709

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	23610S
Date:	February 11, 1996
Client Name:	Ensafe/Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	November 2- 3, 1995
Number of Samples:	17 Non-aqueous Sample(s) with 1 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Organotins

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig M. Seafoss
Eugene M. Watson, Vice President

3-15-96
Date

6716 Mexico Road · St. Peters, MO 63376
(314) 928-9533 · (314) 278-1828 · Fax (314) 278-2709

SDG# 23610S

Samples and Fractions Reviewed

Sample Identifications Analytical Fractions

ENSAFE ID	MATRIX	ORG	
022SB00101	SOIL		X
022SB00102	SOIL		X
022SB00201	SOIL		X
022SB00202	SOIL		X
172SB00601	SOIL		X
172SB00602	SOIL		X
549SB00402	SOIL		X
554SB00101	SOIL		X
554SB00102	SOIL		X
554SB00201	SOIL		X
554SB00202	SOIL		X
564SB00101	SOIL		X
564SB00102	SOIL		X
564SB00201	SOIL		X
564SB00202	SOIL		X
564SB00301	SOIL		X
564SB00302	SOIL		X
Total Billable Samples	(Water/Soil)	0	17

ORG = SW846 Organotins

DATA ASSESSMENT NARRATIVE

SEMIVOLATILES - ORGANOTINS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, calibration results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8270, modified for organotins; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level III requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 23610

A validation was performed on the volatile organics data from SDGs 23610. The data was evaluated based on the following parameters.

*	•	Data Completeness
	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
*	•	Internal Standard Performance
*	•	Blanks
	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Identification/Quantitation

* - All criteria were met for this parameter.

Holding Times

All samples were extracted twenty-six (26) days outside of holding times. Qualify all positive results as estimated (J) and reject (R) all non detect results.

Surrogates

Samples 549SB00402, 022SB00202, and 544SB00102 all exhibited the surrogate tripropyltin with percent recoveries less than 10% (5%, 7%, and 6% respectively). For these samples, qualify all positive results as estimated (J) and reject (R) all non detect results.

Overall Performance

The overall performance was acceptable for the instrumentation.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
All samples	All compounds	+/-	J/R

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	23611S
Date:	February 11, 1996
Client Name:	Ensafe/Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	November 3 - 8, 1995
Number of Samples:	16 Non-aqueous Sample(s) with 1 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Organotins

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig H. Langbo

Eugene M. Watson, Vice President

3-15-96

Date

6716 Mexico Road · St. Peters, MO 63376
(314) 928-9533 · (314) 278-1828 · Fax (314) 278-2709

SDG# 23611S

Samples and Fractions Reviewed

Sample Identifications Analytical Fractions

ENSAFE ID	MATRIX	SV	
087SB00101	SOIL		X
087SB00102	SOIL		X
097SB00101	SOIL		X
097SB00102	SOIL		X
097SB00201	SOIL		X
097SB00202	SOIL		X
097SB00301	SOIL		X
097SB00302	SOIL		X
172SB00101	SOIL		X
172SB00102	SOIL		X
172SB00301	SOIL		X
172SB00302	SOIL		X
172SB00401	SOIL		X
172SB00402	SOIL		X
172SB00501	SOIL		X
172SB00502	SOIL		X
Total Billable Samples	(Water/Soil)	0	16

SV = SW846 Semivolatiles; Organotins

DATA ASSESSMENT NARRATIVE

SEMIVOLATILES - ORGANOTINS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, calibration results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8270, modified for organotins; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level III requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 23611

A validation was performed on the volatile organics data from SDGs 23611. The data was evaluated based on the following parameters.

*	•	Data Completeness
	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
*	•	Internal Standard Performance
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
	•	Identification/Quantitation

* - All criteria were met for this parameter.

Identification/Quantitation

Reject (R) 097SB00102RE, 097SB00202RE, and 097SB00302RE in favor of the original analyses due to similar internal standard area results.

Holding Times

The samples listed below were extracted fourteen (14, J/UJ) to twenty-four (24, J/R) days outside of holding times. Qualifications are required.

Sample Ids	Qual.
097SB000101	J/UJ
097SB000102	J/UJ
097SB000102RE	J/UJ
097SB000201	J/UJ
097SB000202	J/UJ
097SB000202RE	J/UJ
097SB000301	J/UJ
097SB000302	J/UJ
097SB000302RE	J/UJ
087SB00101	J/R
087SB00102	J/R
172SB00101	J/R
172SB00102	J/R
172SB00301	J/R
172SB00302	J/R
172SB00401	J/R
172SB00402	J/R
172SB00501	J/R
172SB00502	J/R

Overall Performance

The overall performance was acceptable except where noted.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
097SB00102RE	all compounds	+/-	R
097SB00202RE			
097SB00302RE			
097SB000101	all compounds	+/-	J/UJ
097SB000102			J/UJ
097SB000102RE			J/UJ
097SB000201			J/UJ
097SB000202			J/UJ
097SB000202RE			J/UJ
097SB000301			J/UJ
097SB000302			J/UJ
097SB000302RE			J/UJ
087SB00101			J/R
087SB00102			J/R
172SB00101			J/R
172SB00102			J/R
172SB00301			J/R
172SB00302			J/R
172SB00401			J/R
172SB00402			J/R
172SB00501			J/R
172SB00502			J/R

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	23611F
Date:	February 11, 1996
Client Name:	Ensafe/Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	November 4, 1995
Number of Samples:	1 Non-aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level IV
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Organotins

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Serpas
for Eugene M. Watson, Vice President

3-15-96
Date

6716 Mexico Road · St. Peters, MO 63376
(314) 928-9533 · (314) 278-1828 · Fax (314) 278-2709

SDG# 23611F

Samples and Fractions Reviewed

Sample Identifications Analytical Fractions

ENSAFE ID	MATRIX	SV	
097CB00301	SOIL		X
Total Billable Samples (Water/Soil)		0	1

SV = SW846 Semivolatiles; Organotins

DATA ASSESSMENT NARRATIVE

SEMIVOLATILES - ORGANOTINS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, calibration results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8270, modified for organotins; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level IV requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 23611

A validation was performed on the volatile organics data from SDGs 23611. The data was evaluated based on the following parameters.

*	•	Data Completeness
	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
*	•	Internal Standard Performance
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Identification/Quantitation

* - All criteria were met for this parameter.

Holding Times

All samples were extracted six (6) days outside of holding times. Qualify all positive and non detect results as estimated (J/UJ).

Overall Performance

Overall performance was acceptable.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
All samples	All compounds	+/-	J/UJ

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846, Method 8270; National Functional Guidelines for Organic Data Review, and DQO Level IV. All comments made within this report should be considered when examining the analytical results (Form I's).

SDG # 23626A

A validation was performed on the Semivolatile Data from SDG 23626A. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibrations
*	•	Internal Standard Performance
	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Continuing calibrations

The continuing calibrations that were analyzed with this data package exhibited %Ds that were not within %D continuing calibration criteria. All RRFs were within calibration criteria.

Continuing calibrations (continued)

Specific Finding:

The continuing calibration, A9211,-12, contained compounds with %Ds greater than 50%, but less than 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and all non detect as estimated (UJ).

018CB00502	n-nitrosopyrrolidine (60.4)

The continuing calibration, A9211,-12, contained compounds with %Ds greater than 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and reject all non detect (R).

018CB00502	1,2-dibromo-3-chloropropane (136.6)

The continuing calibration, A9211,-12, contained compounds with RRFs less than 0.05. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and reject all non detects (R).

018CB00502	hexachloropropene aramite (91.2)

The continuing calibration, A9286,-93,-94, contained compounds with %Ds greater than 50%, but less than 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and all non detect as estimated (UJ).

018CB00501	1-naphthylamine (68.1) 2-naphthylamine (59.2) m-cresol (52.4) 3,3'-dimethylbenzidine (50.6) 7,12-dimethylbenz(a)anthracene (86.4) n-nitrosomethylethylamine (59.8)

Continuing calibrations (continued)

Specific Finding:

The continuing calibration, A9286,-93,-94, contained compounds with %Ds greater than 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and reject all non detect (R).

018CB00501	1,3,5-trinitrobenzene (90.5)

The continuing calibration, A9286,-93,-94, contained compounds with RRFs less than 0.05. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and reject all non detects (R).

018CB00501	hexachloropropene (30.7) 4-nitroquinoline-1-oxide (30.5) pentachloronitrophenol (38.7) aramite (34.1)

Method Blanks

Associated blank	Compound	Conc.	Action Level
SBLK1	bis(2-ethylhexyl)phthalate	90J	900

Samples	Compound	Qualification
018CB00502	bis(2-ethylhexyl)phthalate	CRQL
018CB00501		

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

NJ = Presumptive evidence for the presence of the material at an estimated value

K = Result is biased high

L = Result is biased low

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
018CB00502	n-nitrosopyrrolidine (60.4)	+/-	J/UJ
018CB00502	1,2-dibromo-3-chloropropane (136.6)	+/-	J/R
018CB00502	hexachloropropene aramite (91.2)	+/-	J/R
018CB00501	1-naphthylamine (68.1) 2-naphthylamine (59.2) m-cresol (52.4) 3,3'-dimethylbenzidine (50.6) 7,12-dimethylbenz(a)anthracene (86.4) n-nitrosomethylethylamine (59.8)	+/-	J/UJ
018CB00501	1,3,5-trinitrobenzene (90.5)	+/-	J/R
018CB00501	hexachloropropene (30.7) 4-nitroquinoline-1-oxide (30.5) pentachloronitrophenol (38.7) aramite (34.1)	+/-	J/R
018CB00502 018CB00501	bis(2-ethylhexyl)phthalate	+	CRQL

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8270; the National Functional Guidelines for Organic Data Validation, June 1991, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23626B

A validation was performed on the Semivolatile Data from SDG 23626B. The data was evaluated based on the following parameters:

* • Data Completeness
* • Holding Times
* • GC/MS Tuning
* • Calibration
* • Blanks
* • Surrogate Recoveries
* • Matrix Spike/Matrix Spike Duplicates
* • Field Duplicates
* • Internal Standard Performance
* • Compound Identification
* • Compound Quantitation

* - All criteria were met for this parameter.

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 5% of data required qualifications

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL

NO QUALIFICATIONS WERE REQUIRED

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	23626F
Date:	March 15, 1996
Client Name:	Ensafe/ Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	September 25, 1995
Number of Samples:	2 Non-aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level IV
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Organotin

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Eugene M. Watson, Vice President

3-15-96
Date

4127 Plaza 94 South · St. Charles, MO 63304
(314) 936-1332 · Fax (314) 936-1335

SDG# 23626F

Samples and Fractions Reviewed

Sample Identifications Analytical Fractions

ENSAFE ID	MATRIX	ORG	
018CB00501	SOIL		X
018CB00502	SOIL		X
Total Billable Samples (Water/Soil)		0	2

ORG= SW846 Organotins

DATA ASSESSMENT NARRATIVE

SEMIVOLATILES - ORGANOTINS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, calibration results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8270, modified for organotins; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level IV requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 23626

A validation was performed on the volatile organics data from SDGs 23626. The data was evaluated based on the following parameters.

*	•	Data Completeness
	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
*	•	Internal Standard Performance
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Identification/Quantitation

* - All criteria were met for this parameter.

Holding Times

All samples were extracted seven (7) days outside of holding times. Qualify all positive and non detect results as estimated (J/UJ).

Overall Performance

Overall performance was acceptable.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
All samples	All compounds	+/-	J/UJ

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	23626S
Date:	March 15, 1996
Client Name:	Ensafe/ Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	September 25-26, 1995
Number of Samples:	16 Non-aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Organotin

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig H. Watson

Eugene M. Watson, Vice President

3-15-96

Date

4127 Plaza 94 South · St. Charles, MO 63304
(314) 936-1332 · Fax (314) 936-1335

SDG# 23626S

Samples and Fractions Reviewed

Sample Identifications Analytical Fractions

ENSAFE ID	MATRIX	ORG	
005SB00101	SOIL		X
005SB00201	SOIL		X
005SB00201	SOIL		X
005SB00202	SOIL		X
018SB00101	SOIL		X
018SB00201	SOIL		X
018SB00202	SOIL		X
018SB00401	SOIL		X
018SB00501	SOIL		X
018SB00502	SOIL		X
172MX00201	SOIL		X
605SB00101	SOIL		X
605SB00201	SOIL		X
605SB00202	SOIL		X
605SB00501	SOIL		X
605SB00502	SOIL		X
Total Billable Samples	(Water/Soil)	0	16

ORG= SW846 Organotins

DATA ASSESSMENT NARRATIVE

SEMIVOLATILES - ORGANOTINS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, calibration results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8270, modified for organotins; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level III requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 23626

A validation was performed on the volatile organics data from SDGs 23626. The data was evaluated based on the following parameters.

*	•	Data Completeness
	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
	•	Internal Standard Performance
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
	•	Identification/Quantitation

* - All criteria were met for this parameter.

Holding Times

All of the samples exceeded the extraction holding time seven (7) to nine (9) days. Qualify all positive and non detect results as estimated (J/UJ).

Internal Standards

Samples 605SB00201, 605SB00202, 605SB00501, and 605SB00502 exhibited a low internal standard. Qualify all positive and non detect results as estimated (J/UJ).

Identification/Quantitation

Reject (R) 605SB00201RE, 605SB00202RE, 605SB00501RE, and 605SB00502RE in favor of the original analyses due to similar internal standard area results.

Overall Performance

The overall performance was acceptable except where noted.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
All samples	all compounds	+/-	J/UJ
605SB00201 605SB00202 605SB00501 605SB00502	all compounds	+/-	J/UJ
605SB00201RE 605SB00202RE 605SB00501RE 605SB00502RE	all compounds	+/-	R

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

DIOXIN/FURANS - 8290

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, internal standard recoveries, clean-up standard recoveries, matrix spike recoveries, GC/MS high resolution performance, tuning results, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8290; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level IV requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 23626

A validation was performed on the Dioxin/Furan Data from SDG 23626. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Mass Resolution Checks
*	•	Column Performance
*	•	Calibrations
*	•	Internal Standard Recovery
	•	Blanks
*	•	Laboratory Control Samples
N/A	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Congener Identification/Quantitation

* - All criteria were met for this parameter.

Method Blanks

Congener ID	MB Conc. (pg/L)	018CB00501	Q	018CB00502	Q
1,2,3,4,6,7,8-HpCDD	0.263	60.977	NA	1.289	NA
OCDD	0.846	376.164	NA	7.493	NA

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	CONGENER ID	DL	QL
All samples	OCDD and 1,2,3,4,6,7,8-HpCDD	+B	NA

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE
Lead

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, calibration standards, blank analysis results and MS/MSD results. A minimum of ten percent of all laboratory calculations are recalculated by the reviewer. The data validation was performed by the " Laboratory Data Validation Functional Guideline for Evaluating Inorganic Analysis" Febuary, 1994. All comments made within this report should be considered when examining the analytical results (Form Is).

This data package consisted of results from Ensafe, SDG# 23628, the analysis of four (4) field soil samples and no Matrix Spike, Matrix Spike Duplicate and Duplicate pair for Lead only. Overall, the inorganic data quality was fair. All protocol requirements were followed with the exception of the following problems.

Specific QA/QC deficiency Findings are listed numerically in the following categories:

Holding Times

The holding times were met as specified in the "Laboratory Data Validation Functional Guideline for Evaluating Inorganic Analysis", Febuary, 1994.

Calibration

No deficiencies in this section.

Preparation and Field Blank

No deficiencies in this section.

Spike Recovery

No spike for this SDG.

Duplicate

No duplicate for this SDG.

LCS

No deficiencies in this section.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL	SPECIFIC FINDING

Data stands as reported without qualification.

DL - denotes laboratory qualifier/reported value
+ denotes positive values
U denotes non-detect values

QL - denotes data validation qualifier

SDG# 23628

SAMPLES AND FRACTIONS REVIEWED

Sample Identifications			Analytical Fraction
ENSAFE ID	SWL ID	Matrix	PB
065JF00101	23628.01	SOIL	X
065JF00201	23628.02	SOIL	X
065JF00301	23628.03	SOIL	X
065JB00401	23628.04	SOIL	X

Total Number of Samples (Water/Soil)	0/4
Total Number of Billable Samples (Water/Soil)	0/4

Individual fractions were reviewed as follows:

	Primary	Secondary
PB - Lead (SW-846, 7000 Series)	Paul Humburg	Jackie Cleveland

DATA ASSESSMENT NARRATIVE
HEXAVALENT CHROMIUM

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM03.0 Method; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23663

A validation was performed on the Hexavalent Chromium Data from SDG 23663. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Calibrations
*	•	Blanks
*	•	Laboratory Control Samples

* - All criteria were met for this parameter.

Specific Finding

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafe's request.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
All "B" results	all analytes	B	J

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	23663S
Date:	February 11, 1996
Client Name:	Ensafe/Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	September 27 - 28, 1995
Number of Samples:	19 Non-aqueous Sample(s) with 1 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Semivolatiles

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig H. Lewson

Eugene M. Watson, Vice President

3-15-96

Date

6716 Mexico Road · St. Peters, MO 63376
(314) 928-9533 · (314) 278-1828 · Fax (314) 278-2709

SDG# 23663S

Samples and Fractions Reviewed

Sample Identifications Analytical Fractions

ENSAFE ID	MATRIX	SV	
065SB00601	SOIL		X
065SB00602	SOIL		X
544SB00201	SOIL		X
544SB00202	SOIL		X
544SB00101	SOIL		X
544SB00102	SOIL		X
100SB00101	SOIL		X
100SB00102	SOIL		X
100SB00201	SOIL		X
100SB00202	SOIL		X
100SB00301	SOIL		X
100SB00302	SOIL		X
065SB00301	SOIL		X
544SB00401	SOIL		X
544SB00402	SOIL		X
065SB00302	SOIL		X
065SB00401	SOIL		X
065SB00501	SOIL		X
065SB00502	SOIL		X
Total Billable Samples (Water/Soil)		0	19

SV = SW846 Semivolatiles, Organitins

DATA ASSESSMENT NARRATIVE

SEMIVOLATILES - ORGANOTINS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, calibration results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8270, modified for organotins; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level III requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 23663

A validation was performed on the volatile organics data from SDGs 23663. The data was evaluated based on the following parameters.

*	•	Data Completeness
	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
*	•	Internal Standard Performance
*	•	Blanks
	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
	•	Identification/Quantitation

* - All criteria were met for this parameter.

Surrogates

Sample 605SB00301exhibited a surrogate recovery for tripropyltin (1%). Qualify all positive results as estimated (J/UJ).

Holding Times

Thirteen samples exceeded the extraction holding time six days. Qualify all positive and non detect results as estimated (J/UJ).

Sample ID

065SB00301
065SB00302
065SB00401
065SB00501
065SB00502
100SB00101
100SB00102
100SB00201
100SB00202
100SB00301
100SB00302
544SB00401
544SB00402

Identification/Quantitation

Reject (R) 544SB00101RE, 544SB00102RE, 544SB00201RE, 544SB00202RE, 065SB00601RE, and 065SB00602RE in favor of the original analysis due to similar internal standard area results.

Overall Performance

The overall performance was acceptable except where noted.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
605SB00301	all compounds	+/-	J/UJ
065SB00301	all compounds	+/-	J/UJ
065SB00302			
065SB00401			
065SB00501			
065SB00502			
100SB00101			
100SB00102			
100SB00201			
100SB00202			
100SB00301			
100SB00302			
544SB00401			
544SB00402			
544SB00101RE	all compounds	+/-	R
544SB00102RE			
544SB00201RE			
544SB00202RE			
065SB00601RE			
065SB00602RE			

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	23663F
Date:	February 11, 1996
Client Name:	Ensafe/Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	September 27 - 28, 1995
Number of Samples:	2 Non-aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level IV
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Semivolatiles

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig H. Watson

Eugene M. Watson, Vice President

3-15-96

Date

6716 Mexico Road · St. Peters, MO 63376
(314) 928-9533 · (314) 278-1828 · Fax (314) 278-2709

SDG# 23663F

Samples and Fractions Reviewed

Sample Identifications Analytical Fractions

ENSAFE ID	MATRIX	SV	
065CB00501	SOIL		X
065CB00502	SOIL		X
Total Billable Samples (Water/Soil)		0	2

SV = SW846 Semivolatiles; Organotins

DATA ASSESSMENT NARRATIVE

SEMIVOLATILES - ORGANOTINS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, calibration results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8270, modified for organotins; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level IV requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 23663

A validation was performed on the volatile organics data from SDGs 23663. The data was evaluated based on the following parameters.

*	•	Data Completeness
	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
*	•	Internal Standard Performance
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Identification/Quantitation

* - All criteria were met for this parameter.

Holding Times

All samples were extracted six (6) days outside of holding times. Qualify all positive and non detect results as estimated (J/UJ).

Overall Performance

Overall performance was acceptable.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
All samples	All compounds	+/-	J/UJ

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

DIOXIN/FURANS - 8290

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, internal standard recoveries, clean-up standard recoveries, matrix spike recoveries, GC/MS high resolution performance, tuning results, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8290; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level IV requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 23663

A validation was performed on the Dioxin/Furan Data from SDG 23663. The data was evaluated based on the following parameters.

- * Data Completeness
- * Holding Times
- * Mass Resolution Checks
- * Column Performance
- * Calibrations
- * Internal Standard Recovery
- Blanks
- * Laboratory Control Samples
- * Matrix Spike/Matrix Spike Duplicate
- * Field Duplicates
- Congener Identification/Quantitation

* - All criteria were met for this parameter.

Blanks

Congener ID	MB Conc. (pg/L)	065CB00501	Q	065CB00502	Q
OCDD	0.846	236.857	NA	17.150	NA
1,2,3,4,6,7,8-HpCDD	0.263	36.052	NA	2.513	NA

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	CONGENER ID	DL	QL
All samples	1,2,3,4,6,7,8-HpCDD OCDD	+B	NA

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE
METALS AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM03.0 Method; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23663B

A validation was performed on the Metals Data from SDG 23663B. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Calibrations
	•	Blanks
*	•	Interferences
	•	Matrix Spike Recovery
*	•	Matrix Duplicates
	•	Field Duplicates
*	•	Laboratory Control Samples
	•	Serial Dilutions
*	•	MSAs

* - All criteria were met for this parameter.

Preparation and Field Blanks

Specific Finding

The preparation blank exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Iron	3.08 mg/kg	no impact
Potassium	84.3 mg/kg	all soil samples below 421.5 mg/kg

The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as non-detect, "U". The field or DI water blanks exhibited contamination but had no impact on the data.

Matrix Spike Recovery

Specific Finding

The Matrix Spike recovery for soils for Chromium was below 30%. All non-detect results are rejected and all positive results are qualfied as estimated, "J".

The Matrix Spike recoveries for Antimony and Copper were below the lower control limits. All positive and non-detect results are qualified as estimated, "J" or "UJ".

Duplicate Analysis

Specific Finding

The RPD for Aluminum was less than 35% and will not be qualified. The field duplicate analyses for Zinc and Calcium were greater than 50%. All positive results are qualified as estimated, "J".

Serial Dilution Analysis

Specific Finding

The Serial dilution for soils for Potassium was outside the control limits. All positive results are qualified as estimated, "J".

Specific Finding

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafe's request.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all soil samples below 421.5	K.	+	U
all soil samples	Cr.	+	J
		U	R
all soil samples	Sb and Cu.	+/U	J/UJ
all soil samples	Zn and Ca.	+	J
all soil samples	K.	+	J
All "B" results	all analytes	B	J

DATA ASSESSMENT NARRATIVE
METALS AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM03.0 Method; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23663C

A validation was performed on the Metals Data from SDG 23663C. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Calibrations
*	•	Blanks
*	•	Interferences
*	•	Matrix Spike Recovery
*	•	Matrix Duplicates
*	•	Field Duplicates
*	•	Laboratory Control Samples
*	•	Serial Dilutions
*	•	MSAs

* - All criteria were met for this parameter.

Specific Finding

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafe's request.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
All "B" results	all analytes	B	J

DATA ASSESSMENT AND NARRATIVE

VOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846, Method 8240 Appendix IX; the National Functional Guidelines for Organic Data Review, June 1991, and DQO Level IV. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG # 23663A

A validation was performed on the Volatile Data from SDG # 23663A. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibrations
*	•	Internal Standard Performance
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Continuing calibrations

The continuing calibrations that were analyzed with this data package exhibited %Ds that were not within %D continuing calibration criteria. All RRFs were within calibration criteria.

Continuing Calibrations (continued)

Specific Finding:

The continuing calibration, C18541, contained compounds with %Ds greater than 50%, but less than 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and all non detects as estimated (UJ).

065CB00501	dichlorodifluoromethane (86.2) 1,2-dibromo-3-chloropropane (-56.7)

The continuing calibration, C18541, contained compounds with RRFs less than 0.05. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and reject all non detects (R).

065CB00501	acrolein acetonitrile propionitrile isobutanol 1,4-dioxane

The continuing calibration, C18518, contained compounds with %Ds greater than 50%, but less than 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and all non detects as estimated (UJ).

065CB00502	dichlorodifluoromethane (-70.4) 1,2-dibromo-3-chloropropane (-90.8)

The continuing calibration, C18518, contained compounds with RRFs less than 0.05. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and reject all non detects (R).

065CB00502	acrolein acetonitrile isobutyl alcohol propionitrile 1,4-dioxane

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

NJ = Presumptive evidence for the presence of the material at an estimated value

K = Result is biased high

L = Result is biased low

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
065CB00501	dichlorodifluoro-methane (86.2) 1,2-dibromo-3-chloropropane (-56.7)	+/-	J/UJ
065CB00501	acrolein acetonitrile propionitrile isobutanol 1,4-dioxane	+/-	J/R
065CB00502	dichlorodifluoro-methane (-70.4) 1,2-dibromo-3-chloropropane (-90.8)	+/-	J/UJ
065CB00502	acrolein acetonitrile isobutyl alcohol propionitrile 1,4-dioxane	+/-	J/R

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE
METALS AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM03.0 Method; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23663A

A validation was performed on the Metals Data from SDG 23663A. The data was evaluated based on the following parameters.

*	●	Data Completeness
*	●	Holding Times
*	●	Calibrations
	●	Blanks
*	●	Interferences
*	●	Matrix Spike Recovery
*	●	Matrix Duplicates
	●	Field Duplicates
*	●	Laboratory Control Samples
	●	Serial Dilutions
*	●	MSAs

* - All criteria were met for this parameter.

Preparation and Field Blanks

Specific Finding

The preparation blank exhibited negative bias for the following elements.

Elements	Conc.	Samples affected
Potassium	-20.0 mg/kg	no impact.

Duplicate Analysis

Specific Finding

The field duplicate analyses for Calcium and Zinc were greater than 50%. All positive results are qualified as estimated, "J".

Serial dilution Analysis

Specific Finding

The Serial dilution for soils for Iron, Magnesium, Nickel and Potassium were outside the control limits. All positive results are qualified as estimated, "J".

Specific Finding

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafe's request.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
All soil samples	Fe, Mg, Ni and K.	+	J
All "B" results	all analytes	B	J

DATA ASSESSMENT AND NARRATIVE

VOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846, Method 8240; the National Functional Guidelines for Organic Data Review, June 1991, and DQO Level III. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG # 23663B

A validation was performed on the Volatile Data from SDG 23663B, The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibrations
*	•	Internal Standard Performance
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Continuing calibrations

The continuing calibrations that were analyzed with this data package exhibited %Ds that were not within %D continuing calibration criteria. All RRFs were within calibration criteria.

Continuing calibrations (continued)

Specific Finding:

The continuing calibration, C18518, contained compounds with %Ds greater than 25% but less than 50%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J).

100SB00101	methylene chloride
100SB00201	
100SB00202	
100SB00302	
065SB00301	
065SB00401	
065SB00501	

The continuing calibration, C18541, contained compounds with %Ds greater than 25% but less than 50%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J).

100SB00301	methylene chloride
544SB00401	
544SB00402	
552SB00202	

The continuing calibration, C18571, contained compounds with %Ds greater than 25% but less than 50%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J).

552SB00102	methylene chloride
065SB00601	
065SB00602	
544SB00202	
544SB00102	

Continuing calibrations (continued)

Specific Finding:

The continuing calibration, C18590, contained compounds with %Ds greater than 25% but less than 50%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J).

544SB00101	methylene chloride

Compound Identification/Quantitation

Specific Finding:

For sample 544SB00201, reject the E-flagged result in favor of the D-flagged result in the diluted sample.

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on the dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
100SB00101	methylene chloride	+	J
100SB00201			
100SB00202			
100SB00302			
065SB00301			
065SB00401			
065SB00501			
100SB00301	methylene chloride	+	J
544SB00401			
544SB00402			
552SB00202			
552SB00102	methylene chloride	+	J
065SB00601			
065SB00602			
544SB00202			
544SB00102			
544SB00101	methylene chloride	+	J
544SB00201	E-flagged results	+	R

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	23663B
Date:	February 11, 1996
Client Name:	Ensafe/Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	September 27 -28, 1995
Number of Samples:	4 Aqueous Sample(s) with 0 MS/MSD(s) 23 Non-aqueous Sample(s) with 4 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Volatiles, Semivolatiles, Pesticides w/PCB's, Metals w/Cyanide

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Senfan
Eugene M. Watson, Vice President

3-1-96
Date

6716 Mexico Road · St. Peters, MO 63376
(314) 928-9533 · (314) 278-1828 · Fax (314) 278-2709

SDG# 23663B

Samples and Fractions Reviewed

Sample Identifications — Analytical Fractions

ENSAFE ID	MATRIX	VOA		SV		P/P		CN		TAL	
065SB00301	SOIL		X		X		X		X		X
065SB00302	SOIL		X		X		X		X		X
065SB00401	SOIL		X		X		X		X		X
065SB00501	SOIL		X		X		X		X		X
065TB00501	WATER	X									
065SB00502	SOIL		X		X		X		X		X
065SB00601	SOIL		X		X		X		X		X
065SB00602	SOIL		X		X		X		X		X
100SB00101	SOIL		X		X		X		X		X
100EB00101	WATER	X		X		X					
100DB00101	WATER	X		X		X					
100SB00102	SOIL		X		X		X		X		X
100SB00201	SOIL		X		X		X		X		X
100SB00202	SOIL		X		X		X		X		X
100SB00301	SOIL		X		X		X		X		X
100SB00302	SOIL		X		X		X		X		X
544SB00101	SOIL		X		X		X		X		X
544SB00102	SOIL		X		X		X		X		X
544TB00102	WATER	X									
544SB00201	SOIL		X		X		X		X		X
544SB00202	SOIL		X		X		X		X		X
544SB00401	SOIL		X		X		X		X		X
544SB00402	SOIL		X		X		X		X		X
552SB00101	SOIL		X		X				X		X
552SB00102	SOIL		X		X				X		X
552SB00201	SOIL		X		X				X		X
552SB00202	SOIL		X		X				X		X
Total Billable Samples (Water/Soil)		4	23	2	23	2	19	0	23	0	23

VOA = SW846 Volatiles
SV = SW846 Semivolatiles
P/P = SW846 Pesticides/PCB's
CN = SW846 Cyanide
TAL = SW846 Metals

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846, Method 8270; National Functional Guidelines for Organic Data Review, and DQO Level III. All comments made within this report should be considered when examining the analytical results (Form I's).

SDG # 23663B

A validation was performed on the Semivolatile Data from SDG 23663B. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibrations
*	•	Internal Standard Performance
	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Continuing calibrations

The continuing calibrations that were analyzed with this data package exhibited %Ds that were not within %D continuing calibration criteria. All RRFs were within calibration criteria.

Continuing calibrations (continued)

Specific Finding:

The continuing calibration, A9445, contained compounds with %Ds greater than 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and reject all non detects (R).

100DB00101	4-nitrophenol
100EB00101	

The continuing calibration, A9502, contained compounds with %Ds greater than 50% but less than 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and all non detects as estimated (UJ).

552SB00101	4-nitrophenol
544SB00101	benzo(b)fluoranthene
	indeno(1,2,3-cd)pyrene

Method Blanks

Associated blank	Compound	Concentration
SBLK4	bis(2-ethylhexyl)phthalate	87J
SBLK3	bis(2-ethylhexyl)phthalate	57J

Samples	Compound	Qualification
552SB00101	bis(2-ethylhexyl)phthalate	CRQL
544SB00101		
065SB00501		
065SB00502		

Rinseate Blanks

Associated blank	Compound	Concentration
100EB00101	bis(2-ethylhexyl)phthalate	42B

Rinseate Blanks (continued)

Samples	Compound	Qualification
065SB00601	bis(2-ethylhexyl)phthalate	CRQL
065SB00602		
544SB00102		
544SB00201		
544SB00202		
552SB00102		
552SB00201		
552SB00202		

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

NJ = Presumptive evidence for the presence of the material at an estimated value

K = Result is biased high

L = Result is biased low

METHOD BLANK QUALIFICATION CODES

CRQL =	The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.
U =	The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.
No Action =	The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
100DB00101 100EB00101	4-nitrophenol	+/-	J/R
552SB00101 544SB00101	4-nitrophenol benzo(b)fluoranthene indeno(1,2,3-cd)pyrene	+/-	J/UJ
552SB00101 544SB00101 065SB00501 065SB00502	bis(2-ethylhexyl)phthalate	+	CRQL
065SB00601 065SB00602 544SB00102 544SB00201 544SB00202 552SB00102 552SB00201 552SB00202	bis(2-ethylhexyl)phthalate	+	CRQL

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

PESTICIDE/AROCLORS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW846 Method 8080; the National Functional Guidelines for Organic Data Validation, June 1991; and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23663B

A validation was performed on the Pesticide/Aroclor Data from SDG 23663B. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC Performance
	•	Calibration
*	•	Blanks
	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
*	•	Compound Identification
	•	Compound Quantitation

* - All criteria were met for this parameter.

Initial Calibrations

One (1) initial calibration standard associated with the reported samples exhibited %RSDs above the QC limits.

Initial Calibrations, Continued

Specific Findings

The initial calibration of 10/2-3/95 contained compounds with %RSDs greater than 20% but less than 50%. For the samples and the non-compliant compound listed below, the positive results are qualified as estimated, J.

544SB00101	Delta-BHC
544SB00102	
544SB00201	
544SB00202	

Continuing Calibrations

One (1) continuing calibration standards associated with the reported samples exhibited %Ds above the QC limits.

Specific Findings

The continuing calibration of 10/11/95 contained compounds with %Ds greater than 15% but less than 50%. For the sample and the non-compliant compound listed below, the positive results are qualified as estimated, J.

544SB00101	Gamma-BHC

Surrogate Recoveries

Many samples exhibited non-compliant TCX and DCB recoveries.

Surrogate Recoveries, Continued

Specific Findings

One (1) sample exhibited low TCX and DCB recoveries. For the following samples, all positive results are qualified as estimated, J, and all non-detect results are qualified as estimated, UJ.

544SB00101

Several samples exhibited high TCX and/or DCB recoveries. For the following samples, all positive results are qualified as estimated, J.

065SB00501
544SB00102

Analyte Identification/Quantitation

Several samples required dilution to accurately quantitate target compounds.

Specific Findings

For the following samples, the results for the E flagged compounds are replaced with the corresponding results from the dilution analysis. All other results from the dilution are rejected, UR, in favor of the results reported from the undiluted analysis.

544SB00101
544SB00201

For the following sample, the results for the dilution analysis are rejected, UR, in favor of the results reported from the undiluted analysis.

544SB00102

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 10% of the data required qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
544SB00101 544SB00102 544SB00201 544SB00202	Delta-BHC	+	J
544SB00101	Gamma-BHC	+	J
544SB00101	ALL	+/-	J/UJ
065SB00501 544SB00102	ALL	+	J
544SB00101 544SB00201	ALL E FLAGGED	+	D
544SB00101DL 544SB00201DL	ALL OTHERS	+/-	UR
544SB00102DL	ALL	+/-	UR

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non-detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	23663A
Date:	February 11, 1996
Client Name:	Ensafe/Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	September 27 - 28, 1995
Number of Samples:	2 Non-aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level IV
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Volatiles, Semivolatiles, Pesticides w/PCB's, Organophosphorus Pesticides, Herbicides, Hexavalent Chromium, Dioxin/Furans, Metals w/Cyanide

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig H. Sewson
for Eugene M. Watson, Vice President

3-1-96
Date

6716 Mexico Road · St. Peters, MO 63376
(314) 928-9533 · (314) 278-1828 · Fax (314) 278-2709

SDG# 23663A

Samples and Fractions Reviewed

Sample Identifications | Analytical Fractions

ENSAFE ID	MATRIX	VOA		SV		P/P		OPP		HERB		HCR		D/F		TAL/C	
065CB00502	SOIL		X		X		X		X		X		X		X		X
065CB00501	SOIL		X		X		X		X		X		X		X		X
Total Billable Samples (Water/Soil)		0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2

VOA = SW846 Volatiles
SV = SW846 Semivolatiles
P/P = SW846 Pesticides/PCB's
OPP = SW846 Organophosphorus Pesticides
HERB = SW846 Herbicides
HCR = SW846 Hexavalent Chromium
D/F = SW846 Dioxin and Furans
TAL/CN = SW846 Metals

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846, Method 8270; National Functional Guidelines for Organic Data Review, and DQO Level IV. All comments made within this report should be considered when examining the analytical results (Form I's).

SDG # 23663A

A validation was performed on the Semivolatile Data from SDG 23663A. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibrations
*	•	Internal Standard Performance
	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Continuing calibrations

The continuing calibrations that were analyzed with this data package exhibited %Ds that were not within %D continuing calibration criteria. All RRFs were within calibration criteria.

Continuing calibrations (continued)

Specific Finding:

The continuing calibration, A9341,-43,-44, contained compounds with %Ds greater than 50%, but less than 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and all non detect as estimated (UJ).

065CB00501	pyridine
065CB00502	p-phenylenediamine
	1,3,5-trinitrobenzene
	3,3'-dimethylbenzidine
	n-nitrosomethylethylamine
	1,2,4,5-tetrachlorobenzene

The continuing calibration, A9341,-43,-44, contained compounds with RRFs less than 0.05. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and reject all non detects (R).

065CB00501	hexachloropropene (47.9)
065CB00502	pentachloronitrobenzene (44.5)
	aramite (148.0)
	7,12-dimethylbenz(a)anthracene (93.6)

Rinseate Blanks

Associated blank	Compound	Concentration
100EB00101	bis(2-ethylhexyl)phthalate	42B

Samples	Compound	Qualification
065CB00501	bis(2-ethylhexyl)phthalate	CRQL

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

NJ = Presumptive evidence for the presence of the material at an estimated value

K = Result is biased high

L = Result is biased low

METHOD BLANK QUALIFICATION CODES

CRQL =	The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.
U =	The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.
No Action =	The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
065CB00501 065CB00502	pyridine p-phenylenediamine 1,3,5-trinitrobenzene 3,3'-dimethylbenzidine n-nitrosomethylethylamine 1,2,4,5-tetrachlorobenzene	+/-	J/UJ
065CB00501 065CB00502	hexachloropropene (47.9) pentachloronitrobenzene (44.5) aramite (148.0) 7,12-dimethylbenz(a)anthracene (93.6)	+/-	J/R
065CB00501	bis(2-ethylhexyl)phthalate	+	CRQL

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

PESTICIDE/AROCLORS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW846 Method 8080; the National Functional Guidelines for Organic Data Validation, June 1991; and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23663A

A validation was performed on the Pesticide/Aroclor Data from SDG 23663A. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC Performance
*	•	Calibration
*	•	Blanks
	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
*	•	Compound Identification
	•	Compound Quantitation

* - All criteria were met for this parameter.

Surrogate Recoveries

Several samples exhibited non-compliant TCX and DCB recoveries.

Specific Findings

Two (2) samples exhibited high TCX and DCB recoveries. For the following sample, all positive results are qualified as estimated, J. Sample 065CB00502 did not exhibit positive results.

065CB00501

Analyte Identification/Quantitation

Several samples exhibited column quantitation %Ds greater than 25%.

Specific Findings

The positive results reported in all samples which exhibited column quantitation differences greater than 25% are qualified as estimated, J.

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 10% of the data required qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
065CB00501	ALL	+	J
ALL	ALL P >25%	+	J

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non-detect result

DATA ASSESSMENT NARRATIVE

ORGANOPHOSPHORUS PESTICIDES

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW846 Method 8140; the National Functional Guidelines for Organic Data Validation, June 1991; and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23663A

A validation was performed on the Organophosphorus Pesticide Data from SDG 23663A. The data was evaluated based on the following parameters:

* • Data Completeness
* • Holding Times
* • GC Performance
* • Calibration
* • Blanks
* • Surrogate Recoveries
* • Matrix Spike/Matrix Spike Duplicates
* • Field Duplicates
* • Compound Identification
* • Compound Quantitation

* - All criteria were met for this parameter.

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 10% of the data required qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL

NO QUALIFICATIONS ARE REQUIRED.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non-detect result

DATA ASSESSMENT NARRATIVE

CHLORINATED HERBICIDES

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW846 Method 8150; the National Functional Guidelines for Organic Data Validation, June 1991; and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23663A

A validation was performed on the Herbicide Data from SDG 23663A. The data was evaluated based on the following parameters:

* • Data Completeness
* • Holding Times
* • GC Performance
* • Calibration
* • Blanks
* • Surrogate Recoveries
* • Matrix Spike/Matrix Spike Duplicates
* • Field Duplicates
* • Compound Identification
* • Compound Quantitation

* - All criteria were met for this parameter.

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 10% of the data required qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL

NO QUALIFICATIONS ARE REQUIRED.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non-detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	23922B
Date:	February 25, 1996
Client Name:	Ensafe/ Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	October 30-November 2, 1995
Number of Samples:	5 Aqueous Sample(s) with 0 MS/MSD(s) 20 Non-aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Volatiles, Semivolatiles, Pesticides/PCB's, Organotins, pH, Metals, Cyanide

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Swifson
Eugene M. Watson, Vice President

3-1-96
Date

4127 Plaza 94 South · St. Charles, MO 63304
(314) 936-1332 · Fax (314) 936-1335

SDG# 23922B

Samples and Fractions Reviewed

Sample Identifications — Analytical Fractions

ENSAFE ID	MATRIX	VOA		SV		P/P		ORG		TAL		CN		pH	
054M000101	SOIL				X				X		X				
054M000201	SOIL				X				X		X				
054M000301	SOIL				X				X		X				
054M000401	SOIL				X				X		X				
0655000301	SOIL		X		X		X				X		X		
0656000301	SOIL		X		X		X				X		X		
065SB00201	SOIL		X		X		X		X		X		X		X
065SBFP602	SOIL				X										
531EB00101	WATER	X		X		X				X		X			
531DB00101	WATER	X		X		X				X		X			
546GM00101	SOIL		X		X		X		X		X		X		X
556M000101	SOIL		X		X		X				X		X		
556M000901	SOIL		X		X		X				X		X		
556TB00101	WATER	X													
572GM00101	SOIL		X		X						X				
573SB00101	SOIL		X		X						X				X
573TB00101	WATER	X													
573SB00102	SOIL		X		X						X				X
596SB00901	SOIL		X		X						X				
596TB00901	WATER	X													
596SB00902	SOIL		X		X						X				
596SB01001	SOIL		X		X						X				
596SB01002	SOIL		X		X						X				
596SB01201	SOIL		X		X						X				
596SB01202	SOIL		X		X						X				
Total Billable Samples	(Water/Soil)	5	15	2	20	2	6	0	6	2	19	2	6	0	4

VOA = SW846 Volatiles
SV = SW846 Semivolatiles
P/P = SW846 Pesticides/PCB's
CN = SW846 Cyanide
TAL = SW846 Metals
pH = SW846 pH
ORG = SW846 Organotins

DATA ASSESSMENT NARRATIVE
METALS, HEX CR AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM03.0 Method; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23922

A validation was performed on the Metals Data from SDG 23922. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Calibrations
	•	Blanks
*	•	Interferences
*	•	Matrix Spike Recovery
*	•	Matrix Duplicates
	•	Field Duplicates
*	•	Laboratory Control Samples
*	•	Serial Dilutions
*	•	MSAs

* - All criteria were met for this parameter.

Preparation and Field Blanks

Specific Finding

The preparation blank exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Chromium	0.21 mg/kg	0656000301
Iron	3.89 mg/kg	no impact
Nickel	0.17 mg/kg	0656000301
Sodium	17.9 mg/kg	0656000301
Tin	2.42 mg/kg	all soil samples below 12.1 mg/kg

Potassium	175. mg/kg	all soil samples below 675 mg/kg

The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as non-detect, "U". The field or DI water blanks exhibited contamination but had no impact on the data.

Duplicate Analysis

Specific Finding

The field duplicate results for Lead and Zinc were greater than 50% and all positive results will be qualified as estimated, "J" for all soil samples.

Specific Finding

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafe's request.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all soil samples below 12.1 mg/kg	Sn.	+	U
0656000301	Cr, Ni and Na.		
all soil samples below 675 mg/kg	K.		
all soil samples	Pb and Zn.	+	J
All "B" results	all analytes	B	J

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	23704A
Date:	February 11, 1996
Client Name:	Ensafe/Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	September 29, 1995 - October 2, 1995
Number of Samples:	2 Non-aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level IV
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	volatiles, Semivolatiles, Herbicides, Organophosphorus Pesticides, Hexavalent Chromium, Dioxin/Furans, Metals

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Sevfan
Eugene M. Watson, Vice President

2-28-96
Date

6716 Mexico Road · St. Peters, MO 63376
(314) 928-9533 · (314) 278-1828 · Fax (314) 278-2709

SDG# 23704A

Samples and Fractions Reviewed

Sample Identifications — Analytical Fractions

ENSAFE ID	MATRIX	VOA		SV		HERB		OPP		HCR		D/F		TAL	
551CB00601	SOIL		X		X		X		X		X		X		X
551CB00201	SOIL		X		X		X		X		X		X		X
Total Billable Samples	(Water/Soil)	0	2	0	2	0	2	0	2	0	2	0	2	0	2

VOA = SW846 Volatiles
SV = SW846 Semivolatiles
HERB = SW846 Herbicides
OPP = SW846 Organophosphorus Pesticides
HCR = SW846 Hexavalent Chromium
D/F SW846 Dioxin/Furans
TAL/CN = SW846 Metals

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846, Method 8270; National Functional Guidelines for Organic Data Review, and DQO Level IV. All comments made within this report should be considered when examining the analytical results (Form I's).

SDG # 23704A

A validation was performed on the Semivolatile Data from SDG 23704A. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibrations
*	•	Internal Standard Performance
	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Continuing calibrations

The continuing calibrations that were analyzed with this data package exhibited %Ds that were not within %D continuing calibration criteria. All RRFs were within calibration criteria.

Continuing calibrations (continued)

Specific Finding:

The continuing calibration, A9317,-18,-19, contained compounds with %Ds greater than 50%, but less than 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and all non detect as estimated (UJ).

551CB00201	2-naphthylamine
551CB00601	3,3'-dimethylbenzidine
	n-nitrosomethylethylamine
	1,2,4,5-tetrachlorobenzene
	famphur
	kepone

The continuing calibration, A9317,-18,-19, contained compounds with %Ds greater than 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and reject all non detect (R).

551CB00201	aramite
551CB00601	1,3,5-trinitrobenzene

The continuing calibration, A9317,-18,-19, contained compounds with RRFs less than 0.05. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and reject all non detects (R).

551CB00201	hexachloropropene (45.8)
551CB00601	1-naphthylamine (77.5)
	pentachloronitrobenzene (34.2)
	7,12-dimethylbenz(a)anthrace (92.7)

Rinseate Blanks

Associated blank	Compound	Concentration
100EB00101	bis(2-ethylhexyl)phthalate	42B

Samples	Compound	Qualification
551CB00201 551CB00601	bis(2-ethylhexyl)phthalate	CRQL

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

NJ = Presumptive evidence for the presence of the material at an estimated value

K = Result is biased high

L = Result is biased low

METHOD BLANK QUALIFICATION CODES

CRQL =	The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.
U =	The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.
No Action =	The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
551CB00201 551CB00601	2-naphthylamine 3,3'-dimethylbenzidine n-nitrosomethylethylamine 1,2,4,5-tetrachlorobenzene famphur kepone	+/-	J/UJ
551CB00201 551CB00601	aramite 1,3,5-trinitrobenzene	+/-	J/R
551CB00201 551CB00601	hexachloropropene (45.8) 1-naphthylamine (77.5) pentachloronitrobenzene (34.2) 7,12-dimethylbenz(a)anthrace (92.7)	+/-	J/R
551CB00201 551CB00601	bis(2-ethylhexyl)phthalate	+	CRQL

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

CHLORINATED HERBICIDES

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW846 Method 8150; the National Functional Guidelines for Organic Data Validation, June 1991; and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23704A

A validation was performed on the Herbicide Data from SDG 23704A. The data was evaluated based on the following parameters:

* • Data Completeness
* • Holding Times
* • GC Performance
* • Calibration
* • Blanks
* • Surrogate Recoveries
* • Matrix Spike/Matrix Spike Duplicates
* • Field Duplicates
* • Compound Identification
* • Compound Quantitation

* - All criteria were met for this parameter.

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 10% of the data required qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL

NO QUALIFICATIONS ARE REQUIRED.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non-detect result

DATA ASSESSMENT NARRATIVE

ORGANOPHOSPHORUS PESTICIDES

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW846 Method 8140; the National Functional Guidelines for Organic Data Validation, June 1991; and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23704A

A validation was performed on the Organophosphorus Pesticide Data from SDG 23704A. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC Performance
*	•	Calibration
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 10% of the data required qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL

NO QUALIFICATIONS ARE REQUIRED.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non-detect result

DATA ASSESSMENT AND NARRATIVE

VOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846, Method 8240 Appendix IX; the National Functional Guidelines for Organic Data Review, June 1991, and DQO Level IV. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG # 23704A

A validation was performed on the Volatile Data from SDG # 23704A. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibrations
	•	Internal Standard Performance
*	•	Blanks
	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Continuing calibrations

The continuing calibrations that were analyzed with this data package exhibited %Ds that were not within %D continuing calibration criteria. All RRFs were within calibration criteria.

Continuing Calibrations (continued)

Specific Finding:

The continuing calibration, C18571, contained compounds with %Ds greater than 25%, but less than 50%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J).

551CB00601	methylene chloride (37.0)

The continuing calibration, C18571, contained compounds with %Ds greater than 50%, but less than 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and all non detects as estimated (UJ).

551CB00601	1,2-dibromo-3-chloropropane (-61.7)

The continuing calibration, C18571, contained compounds with RRFs less than 0.05. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and reject all non detects (R).

551CB00601	acrolein acetonitrile propionitrile 1,4-dioxane

The continuing calibration, C18590, contained compounds with %Ds greater than 25%, but less than 50%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J).

551CB00201 551CB00601RE	methylene chloride (32.3)

The continuing calibration, C18590, contained compounds with %Ds greater than 50%, but less than 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and all non detects as estimated (UJ).

551CB00201 551CB00601RE	dichlorodifluoromethane (-52.2)

Continuing Calibrations (continued)

Specific Finding:

The continuing calibration, C18571, contained compounds with RRFs less than 0.05. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and reject all non detects (R).

551CB00201	acrolein
551CB00601RE	acetonitrile
	isobutyl alcohol
	propionitrile
	1,4-dioxane

Internal Standards

All internal standard EICP areas did not meet the internal standard EICP area QA/QC criteria.

Specific Finding:

The Samples listed below, exhibited low internal standard areas. Qualify all associated positive results as estimated (J) and all non detects as estimated (UJ).

551CB00601	bromochloromethane
	1,4-difluorobenzene
	chlorobenzene-d_5
551CB00601RE	1,4-difluorobenzene
	chlorobenzene-d_5

Surrogates

All of the surrogate recoveries for the all blanks and samples were not within QA/QC limits.

Specific Finding:

The samples listed below, exhibited surrogate recoveries that exceeded the QA/QC limit. Qualify all positive results as estimated (J)

551CB00601	toluene-d_8	127
551CB00601RE		125

Compound Identification/Quantitation

Specific Finding:

Reject (R) all results for sample 551CB00601, due to non compliant surrogate recoveries and /or non compliant internal standard areas.

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

NJ = Presumptive evidence for the presence of the material at an estimated value

K = Result is biased high

L = Result is biased low

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
551CB00601	methylene chloride (37.0)	+	J
551CB00601	1,2-dibromo-3-chloropropane (-61.7)	+/-	J/UJ
551CB00601	acrolein acetonitrile propionitrile 1,4-dioxane	+/-	J/R
551CB00201 551CB00601RE	methylene chloride (32.3)	+	J
551CB00201 551CB00601RE	dichlorodifluoromethane (-52.2)	+/-	J/UJ
551CB00201 551CB00601RE	acrolein acetonitrile isobutyl alcohol propionitrile 1,4-dioxane	+/-	J/R
551CB00601	All associated analytes bromochloromethane 1,4-difluorobenzene chlorobenzene-d_5	+/-	J/UJ
551CB00601RE	1,4-difluorobenzene chlorobenzene-d_5		
551CB00601 551CB00601RE	All analytes	+	J
551CB00601	All analytes	+/-	R

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

PESTICIDE/AROCLORS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW846 Method 8080; the National Functional Guidelines for Organic Data Validation, June 1991; and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23704B

A validation was performed on the Pesticide/Aroclor Data from SDG 23704B. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC Performance
	•	Calibration
*	•	Blanks
	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

Contractual Non-Compliance

The method requires that all target compounds, including the multi-component compounds, be analyzed with a five (5) point calibration curve. The laboratory analyzed a single point curve for Aroclors 1221, 1232, 1242, 1248, and 1254 and Toxaphene. No positive results were reported for the compounds analyzed with a single point calibration, therefore the data did not require qualification.

Continuing Calibrations

One (1) continuing calibration standard associated with the reported samples exhibited a %D above the QC limits.

Specific Findings

The continuing calibration of 10/13/95 contained a compound with a %D greater than 15% but less than 50%. For the sample and the non-compliant compound listed below, the positive results are qualified as estimated, J.

544SB0301	4,4'-DDE

Surrogate Recoveries

Two (2) samples exhibited non-compliant DCB and/or TCX recoveries.

Specific Findings

Two (2) samples exhibited high DCB and/or TCX recoveries. For the following samples, all positive results are qualified as estimated, J.

544SB00301
544SB00302

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 10% of the data required qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
544SB0301	4,4'-DDE	+	J
544SB00301 544SB00302	ALL	+	J

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non-detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	23704B
Date:	February 11, 1996
Client Name:	Ensafe/Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	September 29 - October 2, 1995
Number of Samples:	2 Aqueous Sample(s) with 0 MS/MSD(s) 16 Non-aqueous Sample(s) with 1 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Volatiles, Semivolatiles, Pesticides w/PCB's, Metals w/Cyanide, Metals

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Watson — 3-1-96

Eugene M. Watson, Vice President — Date

6716 Mexico Road · St. Peters, MO 63376
(314) 928-9533 · (314) 278-1828 · Fax (314) 278-2709

SDG# 23704B

Samples and Fractions Reviewed

Sample Identifications — Analytical Fractions

ENSAFE ID	MATRIX	VOA		SV		P/P		TAL/CN		TAL	
551TB00301	WATER	X									
544TB00301	WATER	X									
551SB00301	SOIL		X		X		X				X
551SB00401	SOIL		X		X						X
551SB00302	SOIL		X		X		X				X
551SB00402	SOIL		X		X						X
544SB00301	SOIL		X		X				X		
544SB00302	SOIL		X		X				X		
552SB00401	SOIL		X		X						X
552SB00402	SOIL		X		X						X
551SB00201	SOIL		X		X						X
551SB00601	SOIL		X		X						X
551SB00101	SOIL		X		X						X
551SB00501	SOIL		X		X						X
551SB00502	SOIL		X		X						X
551SB00202	SOIL		X		X						X
551SB00102	SOIL		X		X						X
551SB00602	SOIL		X		X						X
Total Billable Samples (Water/Soil)		2	16	0	16	0	2	0	2	0	14

VOA = SW846 Volatiles
SV = SW846 Semivolatiles
P/P = SW846 Pesticides/PCB's
TAL/CN = SW846 Metals w/Cyanide
TAL = SW846 Metals

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846, Method 8270; National Functional Guidelines for Organic Data Review, and DQO Level III. All comments made within this report should be considered when examining the analytical results (Form I's).

SDG # 23704B

A validation was performed on the Semivolatile Data from SDG 23704B. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibrations
*	•	Internal Standard Performance
	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Continuing calibrations

The continuing calibrations that were analyzed with this data package exhibited %Ds that were not within %D continuing calibration criteria. All RRFs were within calibration criteria.

Continuing calibrations (continued)

Specific Finding:

The continuing calibration, A9445, contained compounds with %Ds greater than 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and reject all non detects (R).

551SB00301	4-nitrophenol
551SB00302	
551SB00402	

The continuing calibration, A9502, contained compounds with %Ds greater than 50% but less than 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and all non detects as estimated (UJ).

551SB00102	4-nitrophenol
551SB00601	benzo(b)fluoranthene
551SB00602	indeno(1,2,3-cd)pyrene

Method Blanks

Associated blank	Compound	Concentration
SBLK2	bis(2-ethylhexyl)phthalate	160J
SBLK3	bis(2-ethylhexyl)phthalate	93J

Samples	Compound	Qualification
551SB00301	bis(2-ethylhexyl)phthalate	CRQL
551SB00302		
551SB00401		
551SB00601		
551SB00602		

Rinseate Blanks

Associated blank	Compound	Concentration
100EB00101	bis(2-ethylhexyl)phthalate	42B

Samples	Compound	Qualification
544SB00301	bis(2-ethylhexyl)phthalate	CRQL
544SB00301MS		
544SB00301MSD		
544SB00302		
551SB00101		
551SB00102		
551SB00201		
551SB00202		
551SB00501		
551SB00502		
552SB00401		
552SB00402		

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

NJ = Presumptive evidence for the presence of the material at an estimated value

K = Result is biased high

L = Result is biased low

METHOD BLANK QUALIFICATION CODES

CRQL =	The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.
U =	The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.
No Action =	The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
551SB00301	4-nitrophenol	+/-	J/R
551SB00302			
551SB00402			
551SB00102	4-nitrophenol	+/-	J/UJ
551SB00601	benzo(b)fluoranthene		
551SB00602	indeno(1,2,3-cd)pyrene		
551SB00301	bis(2-ethylhexyl)phthalate	+	CRQL
551SB00302			
551SB00401			
551SB00601			
551SB00602			
544SB00301	bis(2-ethylhexyl)phthalate	+	CRQL
544SB00301MS			
544SB00301MSD			
544SB00302			
551SB00101			
551SB00102			
551SB00201			
551SB00202			
551SB00501			
551SB00502			
552SB00401			
552SB00402			

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

SDG# 23704B

Samples and Fractions Reviewed

Sample Identifications — Analytical Fractions

ENSAFE ID	MATRIX	VOA		SV		P/P		TAL/CN		TAL	
551TB00301	WATER	X									
544TB00301	WATER	X									
551SB00301	SOIL		X		X						X
551SB00401	SOIL		X		X						X
551SB00302	SOIL		X		X						X
551SB00402	SOIL		X		X						X
544SB00301	SOIL		X		X		X		X		
544SB00302	SOIL		X		X		X		X		
552SB00401	SOIL		X		X						X
552SB00402	SOIL		X		X						X
551SB00201	SOIL		X		X						X
551SB00601	SOIL		X		X						X
551SB00101	SOIL		X		X						X
551SB00501	SOIL		X		X						X
551SB00502	SOIL		X		X						X
551SB00202	SOIL		X		X						X
551SB00102	SOIL		X		X						X
551SB00602	SOIL		X		X						X
Total Billable Samples (Water/Soil)		2	16	0	16	0	2	0	2	0	14

VOA = SW846 Volatiles
SV = SW846 Semivolatiles
P/P = SW846 Pesticides/PCB's
TAL/CN = SW846 Metals w/Cyanide
TAL = SW846 Metals

DATA ASSESSMENT AND NARRATIVE

VOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846, Method 8240; the National Functional Guidelines for Organic Data Review, June 1991, and DQO Level III. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG # 23704B

A validation was performed on the Volatile Data from SDG 23704B, The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibrations
*	•	Internal Standard Performance
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Continuing calibrations

The continuing calibrations that were analyzed with this data package exhibited %Ds that were not within %D continuing calibration criteria. All RRFs were within calibration criteria.

Continuing calibrations (continued)

Specific Finding:

The continuing calibration, UI853, contained compounds with %Ds greater than 25% but less than 50%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J).

544SB00301	acetone
551SB00601	

Internal Standards

All internal standard EICP areas did not meet the internal standard EICP area QA/QC criteria.

Specific Finding:

The Samples listed below, exhibited low internal standard areas. Qualify all associated positive results as estimated (J) and all non detects as estimated (UJ).

551SB00601	bromochloromethane
551SB00601RE	1,4-difluorobenzene
	chlorobenzene-d_5
551SB00401	1,4-difluorobenzene
551SB00401RE	chlorobenzene-d_5
552SB00402RE	
552SB00402	chlorobenzene-d_5

Method Blanks

Associated blank	Compound	Conc.	Action Level
VBLK2	methylene chloride	6	60
VBLK4	methylene chloride	3J	30
VBLK5	methylene chloride	4J	40
	acetone	5J	50

Samples	Compound	Qualification
551SB00301	methylene chloride	CRQL
551SB00402		
544SB00301		
544SB00302		
552SB00401		
552SB00402		
551SB00201		
551SB00101		
551SB00501		
551SB00601	methylene chloride	U
552SB00401RE		
552SB00402RE		
551SB00502		
551SB00601RE		
551SB00202		
551SB00102		
551SB00602		
551SB00202	acetone	U
551SB00102		

Trip Blanks

Associated blank	Compound	Conc.	Action Level
551TB00301	acetone	3J	30

Samples	Compound	Qualification
551SB00302	acetone	U
551SB00402		
551SB00502		

Surrogates

All of the surrogate recoveries for the all blanks and samples were not within QA/QC limits.

Specific Finding:

The samples listed below, exhibited surrogate recoveries that exceeded the QA/QC limit. Qualify all positive results as estimated (J).

551SB00401
552SB00401
552SB00402
552SB00401RE
552SB00402RE

The samples listed below, exhibited surrogate recoveries that exceeded the QA/QC limits and surrogate recoveries that were less than the QA/QC limit. Qualify all positive results as estimated (J) and all non detects as estimated (UJ).

551SB00601
552SB00401RE
552SB00402RE

Compound Identification/Quantitation

Specific Finding:

Reject (R) all results for the re-analyzed samples listed below, due to non compliant surrogate recoveries and /or non compliant internal standard areas.

552SB00401RE
552SB00402RE
551SB00601RE
551SB00401RE

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on the dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
544SB00301 551SB00601	acetone	+	J
	All associated analytes	+/-	J/UJ
551SB00601 551SB00601RE	bromochloromethane 1,4-difluorobenzene chlorobenzene-d_5		
551SB00401 551SB00401RE 552SB00402RE	1,4-difluorobenzene chlorobenzene-d_5		
552SB00402	chlorobenzene-d_5		
551SB00301 551SB00402 544SB00301 544SB00302 552SB00401 552SB00402 551SB00201 551SB00101 551SB00501	methylene chloride	+	CRQL
551SB00601 552SB00401RE 552SB00402RE 551SB00502 551SB00601RE 551SB00202 551SB00102 551SB00602	methylene chloride	+	U
551SB00202 551SB00102	acetone	+	U

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
551SB00302	acetone	+	U
551SB00402			
551SB00502			
551SB00401	All analytes	+	J
552SB00401			
552SB00402			
552SB00401RE			
552SB00402RE			
551SB00601	All analytes	+/-	J/UJ
551SB00601RE			
552SB00401RE	All analytes	+/-	R
552SB00402RE			
551SB00601RE			
551SB00401RE			

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE
METALS, HEXAVALENT CHROMIUM AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM03.0 Method; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23704

A validation was performed on the Metals Data from SDG 23704. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Calibrations
	•	Blanks
*	•	Interferences
*	•	Matrix Spike Recovery
*	•	Matrix Duplicates
*	•	Field Duplicates
*	•	Laboratory Control Samples
	•	Serial Dilutions
*	•	MSAs

* - All criteria were met for this parameter.

Preparation and Field Blanks

Specific Finding

The preparation blank exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Sodium	13.2 mg/kg	all soil samples below 66.0 mg/kg

The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as non-detect, "U". The field or DI water blanks exhibited contamination but had no impact on the data.

The preparation blank exhibited negative bias for the following elements.

Elements	Conc.	Samples affected
Aluminum	-3.95 mg/kg	no impact

This reviewer qualifies all samples results below ten times the negative bias as estimated, "J" or "UJ".

Serial Dilution Analysis

Specific Finding

The Serial Dilutions for field duplicate samples for Iron, Magnesium, Nickel and Potassium were outside the control limits. All positive results are qualified as estimated, "J".

Specific Finding

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafe's request.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all soil samples below 66.0 mg/kg	Na.	+	J
all field duplicates	Fe, Mg, Ni and K.	+	J
All "B" results	all analytes	B	J

DATA ASSESSMENT NARRATIVE
METALS, HEXAVALENT CHROMIUM AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM03.0 Method; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23704

A validation was performed on the Metals Data from SDG 23704. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Calibrations
	•	Blanks
*	•	Interferences
*	•	Matrix Spike Recovery
*	•	Matrix Duplicates
	•	Field Duplicates
*	•	Laboratory Control Samples
*	•	Serial Dilutions
*	•	MSAs

* - All criteria were met for this parameter.

Preparation and Field Blanks

Specific Finding

The preparation blank exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Sodium	13.2 mg/kg	all soil samples below 66.0 mg/kg

The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as non-detect, "U". The field or DI water blanks exhibited contamination but had no impact on the data.

The preparation blank exhibited negative bias for the following elements.

Elements	Conc.	Samples affected
Aluminum	-3.95 mg/kg	no impact

This reviewer qualifies all samples results below ten times the negative bias as estimated, "J" or "UJ".

Field Duplicate Analysis

Specific Finding

The field duplicate RPDs for Calcium, Iron, Lead and Zinc were greater than 50%. All positive results are qualified as estimated, "J".

Specific Finding

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafe's request.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all soil samples below 66.0 mg/kg	Na.	+	J
all soil samples	Ca, Fe, Pb and Zn.	+	J
All "B" results	all analytes	B	J

DATA ASSESSMENT NARRATIVE

DIOXIN/FURANS - 8290

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, internal standard recoveries, clean-up standard recoveries, matrix spike recoveries, GC/MS high resolution performance, tuning results, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8290; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level IV requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 23704

A validation was performed on the Dioxin/Furan Data from SDG 23704. The data was evaluated based on the following parameters.

- * Data Completeness
- * Holding Times
- * Mass Resolution Checks
- * Column Performance
- * Calibrations
- * Internal Standard Recovery
- Blanks
- * Laboratory Control Samples
- * Matrix Spike/Matrix Spike Duplicate
- * Field Duplicates
- Congener Identification/Quantitation

* - All criteria were met for this parameter.

Congener Identification/Quantitation

Report the OCDD result from 551CB00601DL and qualify the result as estimated (J) due to the required dilution. Reject (R) all other results in favor of the lower SQLs found in the original analysis.

Blanks

Congener ID	MB Conc. (pg/L)	551CB00201	Q	551CB00601	Q
OCDD	0.827	21.538	NA	7735.720 *	NA
1,2,3,7,8,9-HxCDF	0.488	0.409	U		
1,2,3,4,6,7,8-HpCDF	3.143	3.308	U	138.68	NA
OCDF	5.938	5.182	U	804.166	NA

* Result is from dilution (551CB00601DL)

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	CONGENER ID	DL	QL
551CB00601DL	all congeners except	+/-	R
	OCDD	+	J
All samples	See MB table		

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	23704S
Date:	February 11, 1996
Client Name:	Ensafe/Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	September 29 - October 2, 1995
Number of Samples:	2 Non-aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	Southwest Laboratory of oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Semivolatiles

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Simpson
Eugene M. Watson, Vice President

3-15-96
Date

6716 Mexico Road · St. Peters, MO 63376
(314) 928-9533 · (314) 278-1828 · Fax (314) 278-2709

SDG# 23704S

Samples and Fractions Reviewed

Sample Identifications Analytical Fractions

ENSAFE ID	MATRIX	SV	
544SB00301	SOIL		X
544SB00302	SOIL		X
Total Billable Samples (Water/Soil)		0	2

SV = SW846 Semivolatiles, Organotins

DATA ASSESSMENT NARRATIVE

SEMIVOLATILES - ORGANOTINS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, calibration results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8270, modified for organotins; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level III requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 23704

A validation was performed on the volatile organics data from SDGs 23704. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
*	•	Internal Standard Performance
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Identification/Quantitation

* - All criteria were met for this parameter.

Overall Performance

The overall performance was acceptable except where noted.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL

No qualifications are required.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT AND NARRATIVE

VOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846, Method 8240 Appendix IX; the National Functional Guidelines for Organic Data Review, June 1991, and DQO Level IV. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG # 23720A

A validation was performed on the Volatile Data from SDG # 23720A. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibrations
*	•	Internal Standard Performance
	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Continuing calibrations

The continuing calibrations that were analyzed with this data package exhibited %Ds that were not within %D continuing calibration criteria. All RRFs were within calibration criteria.

Continuing Calibrations (continued)

Specific Finding:

The continuing calibration, C18668, contained compounds with %Ds greater than 50%, but less than 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and all non detects as estimated (UJ).

543CB00302	dichlorodifluoromethane (86.2)
528CB00302	
543CB00202	

The continuing calibration, C18668, contained compounds with RRFs less than 0.05. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and reject all non detects (R).

543CB00302	acrolein
528CB00302	acetonitrile
543CB00202	propionitrile
	isobutanol
	1,4-dioxane

Trip Blanks

Associated blank	Compound	Conc.	Action Level
543TB00102	methylene chloride	10	100
	acetone	16	160
528TB00202	methylene chloride	9	90
	acetone	20	200

Samples	Compound	Qualification
543CB00202	methylene chloride	U
543CB00302		
528CB00302		
543CB00202	acetone	U
543CB00302		
528CB00302		

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

NJ = Presumptive evidence for the presence of the material at an estimated value

K = Result is biased high

L = Result is biased low

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
543CB00302 528CB00302 543CB00202	dichlorodifluoro-methane (86.2)	+/-	J/UJ
543CB00302 528CB00302 543CB00202	acrolein acetonitrile propionitrile isobutanol 1,4-dioxane	+/-	J/R
543CB00202 543CB00302 528CB00302	methylene chloride	+	U
543CB00202 543CB00302 528CB00302	acetone	+	U

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT AND NARRATIVE

VOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846, Method 8240; the National Functional Guidelines for Organic Data Review, June 1991, and DQO Level III. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG # 23720B

A validation was performed on the Volatile Data from SDG 23720B, The data was evaluated based on the following parameters.

- * Data Completeness
- * Holding Times
- * GC/MS Tuning
- Calibrations
- Internal Standard Performance
- Blanks
- Surrogate Recoveries
- * Matrix Spike/Matrix Spike Duplicate
- * Field Duplicates
- Compound Identification /Quantitation

* - All criteria were met for this parameter

Continuing calibrations

The continuing calibrations that were analyzed with this data package exhibited %Ds that were not within %D continuing calibration criteria. All RRFs were within calibration criteria.

Continuing calibrations (continued)

Specific Finding:

The continuing calibration, UI853, contained compounds with %Ds greater than 50% but less than 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and all non detects as estimated (UJ).

543SB00301	2-chloroethyl vinyl ether (53.2)

Internal Standards

All internal standard EICP areas did not meet the internal standard EICP area QA/QC criteria.

Specific Finding:

The Samples listed below, exhibited low internal standard areas. Qualify all associated positive results as estimated (J) and all non detects as estimated (UJ).

543SB00101	bromochloromethane 1,4-difluorobenzene chlorobenzene-d_5
543SB00101RE 173MO00101	chlorobenzene-d_5
173MO00101RE 173MO00301 173MO00301RE	1,4-difluorobenzene chlorobenzene-d_5

Method Blanks

Associated blank	Compound	Conc.	Action Level
VBLK8	carbon tetrachloride	2J	20

Samples	Compound	Qualification
528SB00202	carbon tetrachloride	CRQL

Trip Blanks

Associated blank	Compound	Conc.	Action Level
018TB00301	methylene chloride	5	50
	acetone	3J	30
528TB00202	methylene chloride	9	90
	acetone	20	200
543TB00102	methylene chloride	10	100
	acetone	16	160

Samples	Compound	Qualification
018SB00301	methylene chloride	CRQL
018SB00302		
106SB00101		
106SB00102		
173MO00201		
173SB00101	methylene chloride	U
173SB00102		
173SB00201		
173SB00202		
173MO0101		
173MO0101RE		
173MO0201		
173MO0301		
173MO0301RE		
528SB00101		
528SB00102		
528SB00301		
528SB00302		
528SB00401		
528SB00402		
543SB00101		
543SB00101RE		
543SB00102		
543SB00301		
543SB00302		

Trip Blanks

Associated blank	Compound	Conc.	Action Level
018TB00301	methylene chloride	5	50
	acetone	3J	30
528TB00202	methylene chloride	9	90
	acetone	20	200
543TB00102	methylene chloride	10	100
	acetone	16	160

Samples	Compound	Qualification
173SB00101	acetone	CRQL
173MO0301		
173MO0301RE		
018SB00301	acetone	U
106SB00101		
106SB00102		
173SB00102		
173SB00201		
173SB00202		
173MO0101		
173MO0101RE		
528SB00101		
528SB00102		
528SB00201		
528SB00202		
528SB00301		
528SB00302		
528SB00401		
528SB00402		
543SB00101		
543SB00101RE		
543SB00102		
543SB00301		
543SB00302		

Surrogates

All of the surrogate recoveries for the all blanks and samples were not within QA/QC limits.

Specific Finding:

The samples listed below, exhibited surrogate recoveries that exceeded the QA/QC limit. Qualify all positive results as estimated (J).

543SB00101	toluene-d_8	123
	1,2-dichloroethane-d_4	126
543SB00102	toluene-d_8	119
	1,2-dichloroethane-d_4	122

The samples listed below, exhibited surrogate recoveries that exceeded the QA/QC limits and surrogate recoveries that were less than the QA/QC limit. Qualify all positive results as estimated (J) and all non detects as estimated (UJ).

173MO00301	toluene-d_8	122
	bromofluorobenzene	73
173MO00301RE	toluene-d_8	132
	bromofluorobenzene	65

Compound Identification/Quantitation

Specific Finding:

Reject (R) all results for the samples listed below, due to non compliant surrogate recoveries and /or non compliant internal standard areas.

173MO00101RE
173MO00301RE
543SB00101

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on the dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
543SB00301	2-chloroethyl vinylether (53.2)	+/-	J/UJ
543SB00101	All associated analytes bromochloromethane 1,4-difluorobenzene chlorobenzene-d_5	+/-	J/UJ
543SB00101RE 173MO00101	chlorobenzene-d_5		
173MO00101RE 173MO00301 173MO00301RE	1,4-difluorobenzene chlorobenzene-d_5		
528SB00202	carbon tetrachloride	+	CRQL
018SB00301 018SB00302 106SB00101 106SB00102 173MO00201	methylene chloride	+	CRQL

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
173SB00101	methylene chloride	+	U
173SB00102			
173SB00201			
173SB00202			
173MO0101			
173MO0101RE			
173MO0201			
173MO0301			
173MO0301RE			
528SB00101			
528SB00102			
528SB00301			
528SB00302			
528SB00401			
528SB00402			
543SB00101			
543SB00101RE			
543SB00102			
543SB00301			
543SB00302			
173SB00101	acetone	+	CRQL
173MO0301			
173MO0301RE			

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
018SB00301	acetone	+	U
106SB00101			
106SB00102			
173SB00102			
173SB00201			
173SB00202			
173MO0101			
173MO0101RE			
528SB00101			
528SB00102			
528SB00201			
528SB00202			
528SB00301			
528SB00302			
528SB00401			
528SB00402			
543SB00101			
543SB00101RE			
543SB00102			
543SB00301			
543SB00302			
543SB00101	All analytes	+	J
543SB00102			
173MO00301	All analytes	+/-	J/UJ
173MO00301RE			
173MO00101RE	All analytes	+/-	R
173MO00301RE			
543SB00101			

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	23720
Date:	February 2, 1996
Client Name:	Ensafe/Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	October 3 - 12, 1995
Number of Samples:	3 Non-aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level IV
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Volatiles, Semivolatiles, Pesticides/PCB's, Organophosphorus, Herbicides, Dioxin/Furans, Hexavalent Chromium, pH, Metals, Cyanide

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig H. Ferguson — 2-28-96

Eugene M. Watson, Vice President — Date

6716 Mexico Road · St. Peters, MO 63376
(314) 928-9533 · (314) 278-1828 · Fax (314) 278-2709

SDG# 23720

Samples and Fractions Reviewed

Sample Identifications | Analytical Fractions

ENSAFE ID	MATRIX	VOA		SV		P/P		OPP		HERB		D/F		HCR		pH		TAL		CN	
528CB00302	SOIL		X		X						X		X		X		X				
543CB00202	SOIL		X		X		X		X		X		X		X		X		X		X
543CB00302	SOIL		X		X		X		X		X		X		X		X		X		X
Total Billable Samples (Water/Soil)		0	3	0	3	0	2	0	2	0	3	0	3	0	3	0	3	0	2	0	2

VOA = SW846 Volatiles
SV = SW846 Semivolatiles
P/P = SW846 Pesticides/PCB's
OPP = SW846 Organophosphorus Pesticides
HERB = SW846 Herbicides
D/F = SW846 Dioxin/Furans
HCR = SW846 Hexavalent Chromium
pH = SW846 pH
TAL = SW846 Metals
CN = SW846 Cyanide

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846, Method 8270; National Functional Guidelines for Organic Data Review, and DQO Level IV. All comments made within this report should be considered when examining the analytical results (Form I's).

SDG # 23720A

A validation was performed on the Semivolatile Data from SDG 23720A. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibrations
*	•	Internal Standard Performance
	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Continuing calibrations

The continuing calibrations that were analyzed with this data package exhibited %Ds that were not within %D continuing calibration criteria. All RRFs were within calibration criteria.

Continuing calibrations (continued)

Specific Finding:

The continuing calibration, A9642,-43, contained compounds with %Ds greater than 50%, but less than 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and all non detect as estimated (UJ).

543CB00202	methyl methanesulfonate
543CB00302	2-naphthylamine
528CB00302	methapyrilene

The continuing calibration, A9642,-43, contained compounds with %Ds greater than 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and reject all non detect (R).

543CB00202	1,2-dibromo-3-chloropropane
543CB00302	
528CB00302	

The continuing calibration, A9642,-43, contained compounds with RRFs less than 0.05. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and reject all non detects (R).

543CB00202	aramite
543CB00302	
528CB00302	

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

NJ = Presumptive evidence for the presence of the material at an estimated value

K = Result is biased high

L = Result is biased low

METHOD BLANK QUALIFICATION CODES

CRQL =	The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.
U =	The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.
No Action =	The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
543CB00202 543CB00302 528CB00302	methyl methanesulfonate 2-naphthylamine methapyrilene	+/-	J/UJ
543CB00202 543CB00302 528CB00302	1,2-dibromo-3-chloropropane	+/-	J/R
543CB00202 543CB00302 528CB00302	aramite	+/-	J/R

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

PESTICIDE/AROCLORS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW846 Method 8080; the National Functional Guidelines for Organic Data Validation, June 1991; and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23720A

A validation was performed on the Pesticide/Aroclor Data from SDG 23720A. The data was evaluated based on the following parameters:

* • Data Completeness
* • Holding Times
* • GC Performance
* • Calibration
* • Blanks
* • Surrogate Recoveries
* • Matrix Spike/Matrix Spike Duplicates
* • Field Duplicates
* • Compound Identification
* • Compound Quantitation

* - All criteria were met for this parameter.

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 10% of the data required qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL

NO QUALIFICATIONS ARE REQUIRED.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non-detect result

DATA ASSESSMENT NARRATIVE

CHLORINATED HERBICIDES

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW846 Method 8150; the National Functional Guidelines for Organic Data Validation, June 1991; and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23720A

A validation was performed on the Herbicide Data from SDG 23720A. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC Performance
*	•	Calibration
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 10% of the data required qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL

NO QUALIFICATIONS ARE REQUIRED.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non-detect result

DATA ASSESSMENT NARRATIVE

ORGANOPHOSPHORUS PESTICIDES

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW846 Method 8140; the National Functional Guidelines for Organic Data Validation, June 1991; and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23720A

A validation was performed on the Organophosphorus Pesticide Data from SDG 23720A. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC Performance
*	•	Calibration
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 10% of the data required qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL

NO QUALIFICATIONS ARE REQUIRED.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non-detect result

DATA ASSESSMENT NARRATIVE
METALS AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM03.0 Method; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23720C

A validation was performed on the Metals Data from SDG 23720C. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Calibrations
*	•	Blanks
*	•	Interferences
*	•	Matrix Spike Recovery
*	•	Matrix Duplicates
*	•	Field Duplicates
*	•	Laboratory Control Samples
*	•	Serial Dilutions
*	•	MSAs

* - All criteria were met for this parameter.

Specific Finding

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafe's request.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
All "B" results	all analytes	B	J

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	23720B
Date:	February 2, 1996
Client Name:	Ensafe/Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	October 3 - 12, 1995
Number of Samples:	4 Aqueous Sample(s) with 0 MS/MSD(s) 22 Non-aqueous Sample(s) with 3 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Volatiles, Semivolatiles, Pesticides/PCB's, pH, Metals, Cyanide

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig H. Sen for
Eugene M. Watson, Vice President

2-28-96
Date

6716 Mexico Road · St. Peters, MO 63376
(314) 928-9533 · (314) 278-1828 · Fax (314) 278-2709

SDG# 23720B

Samples and Fractions Reviewed

Sample Identifications — Analytical Fractions

ENSAFE ID	MATRIX	VOA		SV		P/P		pH		TAL		CN	
018SB00301	SOIL		X		X		X		X		X		X
018TB00301	WATER	X											
018SB00302	SOIL		X		X		X		X		X		X
106SB00101	SOIL		X		X		X		X		X		X
106SB00102	SOIL		X		X		X		X		X		X
173SB00101	SOIL		X		X		X				X		X
173SB00102	SOIL		X		X		X				X		X
173SB00201	SOIL		X		X		X				X		X
173SB00202	SOIL		X		X		X				X		X
173M000101	SOIL		X		X		X				X		X
173M000201	SOIL		X		X		X				X		X
173M000301	SOIL		X		X		X				X		X
528SB00101	SOIL		X		X				X				
528SB00102	SOIL		X		X				X				
528SB00201	SOIL		X		X		X		X		X		X
528SB00202	SOIL		X		X		X		X		X		X
528TB00202	WATER	X											
528SB00301	SOIL		X		X				X				
528SB00302	SOIL		X		X				X				
528SB00401	SOIL		X		X				X				
528SB00402	SOIL		X		X				X				
543SB00101	SOIL		X		X		X		X		X		X
543SB00102	SOIL		X		X		X		X		X		X
543TB00102	WATER	X											
543SB00301	SOIL		X		X		X		X		X		X
543SB00302	SOIL		X		X		X		X		X		X
551EB00301	WATER	X		X		X		X		X		X	
Total Billable Samples (Water/Soil)		4	23	1	23	1	17	1	16	1	17	1	17

VOA = SW846 Volatiles
SV = SW846 Semivolatiles
P/P = SW846 Pesticides/PCB's
pH = SW846 pH
TAL = SW846 Metals
CN = SW846 Cyanide

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846, Method 8270; National Functional Guidelines for Organic Data Review, and DQO Level III. All comments made within this report should be considered when examining the analytical results (Form I's).

SDG # 23720B

A validation was performed on the Semivolatile Data from SDG 23720B. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibrations
	•	Internal Standard Performance
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Continuing calibrations

The continuing calibrations that were analyzed with this data package exhibited %Ds that were not within %D continuing calibration criteria. All RRFs were within calibration criteria.

Continuing calibrations (continued)

Specific Finding:

The continuing calibration, A9471, contained compounds with %Ds greater than 25% but less than 50%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J).

018SB00301	benzo(g,h,i)perylene
018SB00302	
106SB00101	
106SB00102	
551EB00301	

Internal Standards

All internal standard EICP areas did not meet the internal standard EICP area QA/QC criteria.

Specific Finding:

The Samples listed below, exhibited low internal standard areas. Qualify all associated positive results as estimated (J) and all non detects as estimated (UJ).

SB00201MSD	1,4-dichlorobenzene-d_4
	naphthalene-d_8
	acenaphthene-d_{10}
	phenanthrene-d_{10}
	chrysene-d_{12}
	perylene-d_{12}
SB00301	1,4-dichlorobenzene-d_4
SB00201	naphthalene-d_8
	acenaphthene-d_{10}
	phenanthrene-d_{10}
SB00301RE	1,4-dichlorobenzene-d_4
	naphthalene-d_8

Internal Standards (continued)

Specific Finding:

The Samples listed below, exhibited low internal standard areas. Qualify all associated positive results as estimated (J) and all non detects as estimated (UJ).

173MO00301	phenanthrene-d_{10} chrysene-d_{12} perylene-d_{12}
173MO00301RE	perylene-d_{12}

Compound Identification/Quantitation

Specific Finding:

Reject all results for samples 173MO00301 and SB00301, in favor of the re-analyzed due to non compliant internal standard areas and non compliant surrogate recoveries.

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

NJ = Presumptive evidence for the presence of the material at an estimated value

K = Result is biased high

L = Result is biased low

METHOD BLANK QUALIFICATION CODES

CRQL =	The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.
U =	The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.
No Action =	The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
018SB00301 018SB00302 106SB00101 106SB00102 551EB00301	benzo(g,h,i)perylene	+	J
SB00102MSD	All associated analytes 1,4-dichlorobenzene-d_4 naphthalene-d_8 acenaphthene-d_{10} phenanthrene-d_{10} chrysene-d_{12} perylene-d_{12}	+/-	J/UJ
SB00301 SB00102	1,4-dichlorobenzene-d_4 naphthalene-d_8 acenaphthene-d_{10} phenanthrene-d_{10}		
SB00301RE	1,4-dichlorobenzene-d_4 naphthalene-d_8		
173MO00201	phenanthrene-d_{10} chrysene-d_{12} perylene-d_{12}		
173MO00201RE	perylene-d_{12}		
SB00301 173MO00201	All analytes	+/-	R

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

PESTICIDE/AROCLORS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW846 Method 8080; the National Functional Guidelines for Organic Data Validation, June 1991; and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23720B

A validation was performed on the Pesticide/Aroclor Data from SDG 23720B. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC Performance
*	•	Calibration
*	•	Blanks
	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

Surrogate Recoveries

Several samples exhibited non-compliant TCX or DCB recoveries.

Specific Findings

One (1) sample exhibited a high TCX recovery. For the following sample, all positive results are qualified as estimated, J.

018SB00302

One (1) sample exhibited a DCB recovery below 10%. For the following samples, all positive results are qualified as estimated, J, and all non-detect results are qualified as rejected, R.

106SB00101

Four (4) samples exhibited low DCB recoveries. For the following samples, all positive results are qualified as estimated, J, and all non-detect results are qualified as estimated, UJ.

543SB00301
173M000101
173M000201
173M000301

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 10% of the data required qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
018SB00302	ALL	+	J
106SB00101	ALL	+/-	J/R
543SB00301 173M000101 173M000201 173M000301	ALL	+/-	J/UJ

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non-detect result

DATA ASSESSMENT NARRATIVE
METALS AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM03.0 Method; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23720A

A validation was performed on the Metals Data from SDG 23720A. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Calibrations
	•	Blanks
*	•	Interferences
	•	Matrix Spike Recovery
	•	Matrix Duplicates
	•	Field Duplicates
*	•	Laboratory Control Samples
*	•	Serial Dilutions
*	•	MSAs

* - All criteria were met for this parameter.

Preparation and Field Blanks

Specific Finding

The preparation blank exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Chromium	0.42 mg/kg	173SB00101.
Iron	2.35 mg/kg	no impact

The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as non-detect, "U". The field or DI water blanks exhibited contamination but had no impact on the data.

Matrix Spike Recovery

Specific Finding

The Matrix Spike recovery for soils for Nickel was below 30%. All non-detect results are rejected and all positive results are qualfied as estimated, "J".

The Matrix Spike recoveries for Mercury, Cobalt and Manganese were below the lower control limits. All positive and non-detect results are qualified as estimated, "J" or "UJ".

The Matrix Spike recoveries for Chromium and Lead were above the upper control limits. All positive results are qualified as estimated, "J".

Duplicate Analysis

Specific Finding

The Duplicate analyses for soils for Calcium, Cobalt, Copper, Iron and Nickel were outside the control limits. All positive results are qualified as estimated, "J". The RPDs for Chromium, Manganese and Zinc were less than 35% and will not be qualified. The fild duplicate analysis for Iron was greater than 50%. All positive results are qualified as estimated, "J".

Specific Finding

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafe's request.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
173SB00101.	Fe.	+	U
All soil samples	Ni.	+	J
		U	R
All soil samples	Hg, Co and Mn.	+/U	J/UJ
All soil samples	Pb and Cr.	+	J
All soil samples	Ca, Co, Cu, Fe and Ni.	+	J
All "B" results	all analytes	B	J

DATA ASSESSMENT NARRATIVE
METALS AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM03.0 Method; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23720B

A validation was performed on the Metals Data from SDG 23720B. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Calibrations
*	•	Blanks
*	•	Interferences
*	•	Matrix Spike Recovery
*	•	Matrix Duplicates
*	•	Field Duplicates
*	•	Laboratory Control Samples
*	•	Serial Dilutions
*	•	MSAs

* - All criteria were met for this parameter.

Specific Finding

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafe's request.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
All "B" results	all analytes	B	J

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	23720F
Date:	March 15, 1996
Client Name:	Ensafe/ Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	October 11-12, 1995
Number of Samples:	2 Non-aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level IV
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Organotin

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Eugene M. Watson, Vice President

3-15-96
Date

4127 Plaza 94 South · St. Charles, MO 63304
(314) 936-1332 · Fax (314) 936-1335

SDG# 23720F

Samples and Fractions Reviewed

Sample Identifications Analytical Fractions

ENSAFE ID	MATRIX	ORG	
543CB00202	SOIL		X
543CB00302	SOIL		X
Total Billable Samples (Water/Soil)		0	2

ORG= SW846 Organotins

DATA ASSESSMENT NARRATIVE

SEMIVOLATILES - ORGANOTINS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, calibration results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8270, modified for organotins; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level IV requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 23720

A validation was performed on the volatile organics data from SDGs 23720. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
*	•	Internal Standard Performance
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Identification/Quantitation

* - All criteria were met for this parameter.

Overall Performance

Overall performance was acceptable.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL

No qualifications are required.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	23720S
Date:	March 15, 1996
Client Name:	Ensafe/ Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	October 3-12, 1995
Number of Samples:	17 Non-aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Organotin

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig H. Taylor
Eugene M. Watson, Vice President

3-15-96
Date

4127 Plaza 94 South · St. Charles, MO 63304
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SDG# 23720S

Samples and Fractions Reviewed

Sample Identifications Analytical Fractions

ENSAFE ID	MATRIX	ORG	
018SB00301	SOIL		X
018SB00302	SOIL		X
106SB00101	SOIL		X
106SB00102	SOIL		X
173SB00101	SOIL		X
173SB00102	SOIL		X
173SB00201	SOIL		X
173SB00202	SOIL		X
173M000101	SOIL		X
173M000201	SOIL		X
173M000301	SOIL		X
528SB00201	SOIL		X
528SB00202	SOIL		X
543SB00101	SOIL		X
543SB00102	SOIL		X
543SB00301	SOIL		X
243SB00302	SOIL		X
Total Billable Samples	(Water/Soil)	0	17

ORG= SW846 Organotins

DATA ASSESSMENT NARRATIVE

SEMIVOLATILES - ORGANOTINS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, calibration results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8270, modified for organotins; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level III requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 23720

A validation was performed on the volatile organics data from SDGs 23720. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
*	•	Internal Standard Performance
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
	•	Identification/Quantitation

* - All criteria were met for this parameter.

Identification/Quantitation

Reject (R) 528SB00202RE in favor of the original analysis due to similar internal standard area results.

Overall Performance

The overall performance was acceptable.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
528SB00202RE	All compounds	+/-	R

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

DIOXIN/FURANS - 8290

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, internal standard recoveries, clean-up standard recoveries, matrix spike recoveries, GC/MS high resolution performance, tuning results, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8290; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level IV requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 23720

A validation was performed on the Dioxin/Furan Data from SDG 23720. The data was evaluated based on the following parameters.

- * Data Completeness
- * Holding Times
- * Mass Resolution Checks
- * Column Performance
- * Calibrations
- * Internal Standard Recovery
- Blanks
- * Laboratory Control Samples
- * Matrix Spike/Matrix Spike Duplicate
- * Field Duplicates
- * Congener Identification/Quantitation

* - All criteria were met for this parameter.

Blanks

Congener ID	MB Conc. (pg/L)	543CB00202	Q	543CB00302	Q
1,2,3,4,6,7,8-HpCDF	0.53	35.435	NA	9.697	U
OCDF	0.668	271.273	NA	32.885	NA

Blanks - continued

Congener ID	MB Conc. (pg/L)	528CB00302	Q
1,2,3,4,6,7,8-HpCDD	0.317	0.428	U *
OCDF	1.273	0.812	U

* This result is qualified as non detect (U) based on professional opinion since the result is an EMPC.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	CONGENER ID	DL	QL
543CB00202	OCDF	+B	NA
543CB00302	1,2,3,4,6,7,8-HpCDF		
528CB00302	1,2,3,4,6,7,8-HpCDD	+B	U
	OCDF		

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT AND NARRATIVE

VOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846, Method 8240; the National Functional Guidelines for Organic Data Review, June 1991, and DQO Level III. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG # 23801B

A validation was performed on the Volatile Data from SDG 23801B, The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
	•	Internal Standard Performance
	•	Blanks
	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Internal Standards

All internal standard EICP areas did not meet the internal standard EICP area QA/QC criteria.

Specific Finding:

The Samples listed below, exhibited low internal standard areas. Qualify all associated positive results as estimated (J) and all non detects as estimated (UJ).

569SB00402	bromochloromethane
539SB00101	1,4-difluorobenzene chlorobenzene-d_5
569SB00301	chlorobenzene-d_5
569SB00301RE	1,4-difluorobenzene chlorobenzene-d_5

Method Blanks

Associated blank	Compound	Conc.	Action Level
VBLK2	carbon tetrachloride	2J	20
VBLK3	methylene chloride	860	8600
	acetone	510	5100
VBLK5	methylene chloride	1	10
	acetone	3	30

Samples	Compound	Qualification
528SB00201	carbon tetrachloride	CRQL
569SB00502 569SB00302 569SB00102	methylene chloride	U
569SB00302 569SB00102	acetone	U

Trip Blanks

Associated blank	Compound	Conc.	Action Level
023TB00202	acetone	5J	50

Samples	Compound	Qualification
569SB00201	acetone	CRQL
023SB00202	acetone	U
539SB00101RE		
569SB00202		
569SB00301		
569SB00301RE		
569SB00401		
569SB00402		
569SB00402RE		
569SB00501		

Rinseate Blanks

Associated blank	Compound	Conc.	Action Level
023EB00202	methylene chloride	9	90

Samples	Compound	Qualification
023SB00201	methylene chloride	CRQL
528SB00201		
569SB00101		
569SB00201		
569SB00202		
569SB00301		
569SB00301RE		
569SB00401		

Surrogates

All of the surrogate recoveries for the all blanks and samples were not within QA/QC limits.

Specific Finding:

The samples listed below, exhibited surrogate recoveries that exceeded the QA/QC limit. Qualify all positive results as estimated (J).

569SB00402	bromofluorobenzene	133
569SB00301	toluene-d_8	120
	bromofluorobenzene	123
	1,2-dichloroethane-d_4	126
539SB00101RE	bromofluorobenzene	129
539SB00101	bromofluorobenzene	126
569SB00402RE	toluene-d_8	119
	bromofluorobenzene	126
	1,2-dichloroethane-d_4	122

Compound Identification/Quantitation

Specific Finding:

Reject (R) all results for the samples listed below, due to non compliant surrogate recoveries and /or non compliant internal standard areas.

539SB00101
569SB00402
569SB00301RE

For sample 569SB00502, reject the E-flagged result in favor of the D-flagged result in the diluted sample.

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on the dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
	All associated analytes	+/-	J/UJ
569SB00402	bromochloromethane		
539SB00101	1,4-difluorobenzene chlorobenzene-d_5		
569SB00301	chlorobenzene-d_5		
569SB00301RE	1,4-difluorobenzene chlorobenzene-d_5		
528SB00201	carbon tetrachloride	+	CRQL
569SB00502 569SB00302 569SB00102	methylene chloride	+	U
569SB00302 569SB00102	acetone	+	U
569SB00201	acetone	+	CRQL
023SB00202 539SB00101RE 569SB00202 569SB00301 569SB00301RE 569SB00401 569SB00402 569SB00402RE 569SB00501	acetone	+	U

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
023SB00201 528SB00201 569SB00101 569SB00201 569SB00202 569SB00301 569SB00301RE 569SB00401	methylene chloride	+	CRQL
569SB00402	All analytes	+	J
569SB00301 539SB00101RE 539SB00101 569SB00402RE			
539SB00101 569SB00402 569SB00301RE	All analytes	+	R
569SB00502	E-flagged results	+	R

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846, Method 8270; National Functional Guidelines for Organic Data Review, and DQO Level IV. All comments made within this report should be considered when examining the analytical results (Form I's).

SDG # 23801A

A validation was performed on the Semivolatile Data from SDG 23801A. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibrations
*	•	Internal Standard Performance
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Initial Calibrations

The initial calibrations that were analyzed by the laboratory for these samples were not acceptable for all compound %RSDs and average RRFs.

Initial calibrations (continued)

Specific Finding:

The initial calibration analyzed on, 11/01/95, contained compounds with RRFs less than 0.05. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and reject all non detects (R).

023CB00102	4-nitroquinoline-1-oxide hexachlorophene

Continuing calibrations

The continuing calibrations that were analyzed with this data package exhibited %Ds that were not within %D continuing calibration criteria. All RRFs were within calibration criteria.

Specific Finding:

The continuing calibration, A9784,-92,-93,-94,-95, contained compounds with %Ds greater than 50%, but less than 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and all non detect as estimated (UJ).

023CB00102	disulfoton (56.3) isodrin (82.0) kepone (65.6) ethyl methanesulfonate (71.9) o,o,o-triethyl phosphorothio (66.4) 1-nitroso-piperidine (87.0) 2,3,4,6-tetrachlorophenol (59.3)

Continuing calibrations (continued)

Specific Finding:

The continuing calibration, A9784,-92,-93,-94,-95, contained compounds with %Ds greater than 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and reject all non detect (R).

023CB000102	n-nitrosodiethylamine (92.5)
	dimethoate (100.9)
	methyl parathion (98.0)
	2-picoline (338.4)
	phenacetin (179.6)
	methylpyriline (630.4)
	chlorobenzilate (146.4)
	3,3'-dimethylbenzidine (224.9)
	n-nitrosomethylethylamine (329.0)
	4-aminobiphenyl (189.0)
	methyl yellow (318.3)
	2-acetylaminofluorene (276.1)

The continuing calibration, A9784,-92,-93,-94,-95, contained compounds with RRFs less than 0.05. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and reject all non detects (R).

023CB00102	aramite (49.3)

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

NJ = Presumptive evidence for the presence of the material at an estimated value

K = Result is biased high

L = Result is biased low

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
023CB00102	4-nitroquinoline-1-oxide hexachlorophene	+/-	J/R
023CB00102	disulfoton (56.3) isodrin (82.0) kepone (65.6) ethyl methanesulfonate (71.9) o,o,o-triethyl phosphorothio (66.4) 1-nitroso-piperidine (87.0) 2,3,4,6-tetrachlorophenol (59.3)	+/-	J/UJ
023CB000102	n-nitrosodiethylamine (92.5) dimethoate (100.9) methyl parathion (98.0) 2-picoline (338.4) phenacetin (179.6) methylpyriline (630.4) chlorobenzilate (146.4) 3,3'-dimethylbenzidine (224.9) n-nitrosomethylethylamine (329.0) 4-aminobiphenyl (189.0) methyl yellow (318.3) 2-acetylaminofluorene (276.1)	+/-	J/R
023CB00102	aramite (49.3)	+/-	J/R

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT AND NARRATIVE

VOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846, Method 8240 Appendix IX; the National Functional Guidelines for Organic Data Review, June 1991, and DQO Level IV. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG # 23801A

A validation was performed on the Volatile Data from SDG # 23801A. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibrations
*	•	Internal Standard Performance
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Continuing calibrations

The continuing calibrations that were analyzed with this data package exhibited %Ds that were not within %D continuing calibration criteria. All RRFs were within calibration criteria.

Continuing Calibrations (continued)

Specific Finding:

The continuing calibration, UI974, contained compounds with RRFs less than 0.05. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and reject all non detects (R).

023CB00102	2-chloroethylvinyl ether
	acrolein
	acetonitrile
	isobutanol
	1,4-dioxane

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

NJ = Presumptive evidence for the presence of the material at an estimated value

K = Result is biased high

L = Result is biased low

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
023CB00102	2-chloroethylvinyl ether	+/-	J/UJ
	acrolein		
	acetonitrile		
	isobutanol		
	1,4-dioxane		

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

SEMIVOLATILES - ORGANOTINS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, calibration results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8270, modified for organotins; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level III requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 23801

A validation was performed on the volatile organics data from SDGs 23801. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
*	•	Internal Standard Performance
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Identification/Quantitation

* - All criteria were met for this parameter.

Overall Performance

Overall performance was acceptable.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL

No qualifications are required.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

SEMIVOLATILES - ORGANOTINS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, calibration results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8270, modified for organotins; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level IV requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 23801

A validation was performed on the volatile organics data from SDGs 23801. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
*	•	Internal Standard Performance
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Identification/Quantitation

* - All criteria were met for this parameter.

Overall Performance

Overall performance was acceptable.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL

No qualifications are required.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

DIOXIN/FURANS - 8290

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, internal standard recoveries, clean-up standard recoveries, matrix spike recoveries, GC/MS high resolution performance, tuning results, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8290; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level IV requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 23801

A validation was performed on the Dioxin/Furan Data from SDG 23801. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Mass Resolution Checks
*	•	Column Performance
*	•	Calibrations
*	•	Internal Standard Recovery
	•	Blanks
*	•	Laboratory Control Samples
N/A	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Congener Identification/Quantitation

* - All criteria were met for this parameter.

Method Blanks

Congener ID	MB Conc. (pg/L)	023CB00102	Q	067CB00202	Q
1,2,3,4,6,7,8-HpCDF	0.53	0.773	NA	0.547 (EMPC)	U
OCDF	0.668	1.906	NA	1.167	NA

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	CONGENER ID	DL	QL
All samples	OCDF	+B	NA
023CB00102	1,2,3,4,6,7,8-HpCDF	+B	NA
067CB00202	1,2,3,4,6,7,8-HpCDF	+B	U

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QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
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DATA ASSESSMENT AND NARRATIVE

VOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846, Method 8240 Appendix IX; the National Functional Guidelines for Organic Data Review, June 1991, and DQO Level IV. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG # 23801A

A validation was performed on the Volatile Data from SDG # 23801A. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibrations
*	•	Internal Standard Performance
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Continuing calibrations

The continuing calibrations that were analyzed with this data package exhibited %Ds that were not within %D continuing calibration criteria. All RRFs were within calibration criteria.

Continuing Calibrations (continued)

Specific Finding:

The continuing calibration, UI974, contained compounds with RRFs less than 0.05. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and reject all non detects (R).

023CB00102	2-chloroethylvinyl ether
	acrolein
	acetonitrile
	isobutanol
	1,4-dioxane

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

NJ = Presumptive evidence for the presence of the material at an estimated value

K = Result is biased high

L = Result is biased low

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
023CB00102	2-chloroethylvinyl ether	+/-	J/UJ
	acrolein		
	acetonitrile		
	isobutanol		
	1,4-dioxane		

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	23801A
Date:	February 19, 1996
Client Name:	Ensafe/ Allen & Hoshall
Project/Site Name:	Charleston Zone E
Date Sampled:	October 13, 1995
Number of Samples:	2 Non-aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level IV
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Volatiles, Semivolatiles, Pesticide/PCB's, Organophosphorus Pesticides, Herbicides, Metals, Cyanide, pH, Organotins, Hexavalent Chromium, Dioxin/Furans

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Simpson
Eugene M. Watson, Vice President

2-28-96
Date

6716 Mexico Road · St. Peters, MO 63376
(314) 928-9533 · (314) 278-1828 · Fax (314) 278-2709

SDG# 23801A

Samples and Fractions Reviewed

Sample Identifications | Analytical Fractions

ENSAFE ID	MATRIX	VOA		SV		P/P		HERB		OPP		ORG		D/F		HCR		TAL/CN		pH	
023CB00102	SOIL		X		X		X		X		X		X		X		X		X		X
067CB00202	SOIL								X		X				X		X				
Total Billable Samples (Water/Soil)		0	1	0	1	0	1	0	2	0	2	0	1	0	2	0	2	0	1	0	1

VOA = SW846 Volatiles
SV = SW846 Semivolatiles
P/P = SW846 Pesticides/PCB's
HERB = SW846 Herbicides
OPP = SW846 Organophosphorus Pesticides
ORG = SW846 Organotins
D/F = SW846 Dioxin/Furans
HCR = SW846 Hexavalent Chromium
TAL/CN = SW846 Metals w/Cyanide
pH = SW846 pH

DATA ASSESSMENT NARRATIVE

CHLORINATED HERBICIDES

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW846 Method 8150; the National Functional Guidelines for Organic Data Validation, June 1991; and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23801A

A validation was performed on the Herbicide Data from SDG 23801A. The data was evaluated based on the following parameters:

* • Data Completeness
* • Holding Times
* • GC Performance
* • Calibration
* • Blanks
* • Surrogate Recoveries
* • Matrix Spike/Matrix Spike Duplicates
* • Field Duplicates
* • Compound Identification
* • Compound Quantitation

* - All criteria were met for this parameter.

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 10% of the data required qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL

NO QUALIFICATIONS ARE REQUIRED.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non-detect result

DATA ASSESSMENT NARRATIVE

ORGANOPHOSPHORUS PESTICIDES

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW846 Method 8140; the National Functional Guidelines for Organic Data Validation, June 1991; and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23801A

A validation was performed on the Organophosphorus Pesticide Data from SDG 23801A. The data was evaluated based on the following parameters:

* • Data Completeness
* • Holding Times
* • GC Performance
* • Calibration
* • Blanks
* • Surrogate Recoveries
* • Matrix Spike/Matrix Spike Duplicates
* • Field Duplicates
* • Compound Identification
* • Compound Quantitation

* - All criteria were met for this parameter.

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 10% of the data required qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL

NO QUALIFICATIONS ARE REQUIRED.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non-detect result

DATA ASSESSMENT NARRATIVE
METALS AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM03.0 Method; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23801A

A validation was performed on the Metals Data from SDG 23801A. The data was evaluated based on the following parameters.

*	●	Data Completeness
*	●	Holding Times
*	●	Calibrations
	●	Blanks
*	●	Interferences
*	●	Matrix Spike Recovery
*	●	Matrix Duplicates
*	●	Field Duplicates
*	●	Laboratory Control Samples
*	●	Serial Dilutions
*	●	MSAs

* - All criteria were met for this parameter.

Preparation and Field Blanks

Specific Finding

The preparation blank exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Chromium	0.18 mg/kg	No impact
Nickel	0.91 mg/kg	all soil samples below 0.95 mg/kg
Potassium	50.1 mg/kg	all soil samples below 250. mg/kg

The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as non-detect, "U". The field or DI water blanks exhibited contamination but had no impact on the data.

Specific Finding

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafe's request.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all field duplicate samples below o.95 mg/kg for Nickel and below 250 mg/kg for Potassium.	Ni and K.	+	U
All "B" results	all analytes	B	J

DATA ASSESSMENT NARRATIVE

PESTICIDE/AROCLORS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW846 Method 8080; the National Functional Guidelines for Organic Data Validation, June 1991; and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23801A

A validation was performed on the Pesticide/Aroclor Data from SDG 23801A. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC Performance
*	•	Calibration
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

Contractual Non-Compliance

The method requires that all target compounds, including the multi-component compounds, be analyzed with a five (5) point calibration curve. The laboratory analyzed a single point curve for Aroclors 1221, 1232, 1242, 1248, and 1254 and Toxaphene. No positive results were reported for the compounds analyzed with a single point calibration, therefore the data did not require qualification.

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 10% of the data required qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL

NO QUALIFICATIONS ARE REQUIRED.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non-detect result

DATA ASSESSMENT NARRATIVE

PESTICIDE/AROCLORS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW846 Method 8080; the National Functional Guidelines for Organic Data Validation, June 1991; and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23801B

A validation was performed on the Pesticide/Aroclor Data from SDG 23801B. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC Performance
*	•	Calibration
*	•	Blanks
	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

Contractual Non-Compliance

The method requires that all target compounds, including the multi-component compounds, be analyzed with a five (5) point calibration curve. The laboratory analyzed a single point curve for Aroclors 1221, 1232, 1242, 1248, and 1254 and Toxaphene. No positive results were reported for the compounds analyzed with a single point calibration, therefore the data did not require qualification.

Surrogate Recoveries

Two (2) samples exhibited non-compliant DCB recoveries.

Specific Findings

Two (2) samples exhibited low DCB recoveries. For the following samples, all positive results are qualified as estimated, J, and all non-detect results are qualified as estimated, UJ.

023SB00201
023SB00202

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 10% of the data required qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
023SB00201	ALL	+/-	J/UJ
023SB00202			

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non-detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	23801B
Date:	February 19, 1996
Client Name:	Ensafe/ Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	October 13, 1995
Number of Samples:	1 Aqueous Sample(s) with 0 MS/MSD(s) 18 Non-aqueous Sample(s) with 1 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Volatiles, Semivolatiles, Pesticide/PCB's, Metals, Cyanide, Organotins, pH

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig B. Swan

Eugene M. Watson, Vice President

3-1-96

Date

6716 Mexico Road · St. Peters, MO 63376
(314) 928-9533 · (314) 278-1828 · Fax (314) 278-2709

SDG# 23801B

Samples and Fractions Reviewed

Sample Identifications — Analytical Fractions

ENSAFE ID	MATRIX	VOA		SV		P/P		ORG		CN		TAL		pH	
023SB00101	SOIL		X		X		X		X		X		X		X
023SB00102	SOIL		X		X		X		X		X		X		X
023SB00201	SOIL		X		X		X		X		X		X		X
023SB00202	SOIL		X		X		X		X		X		X		X
023TB00202	WATER	X													
528SB00201	SOIL		X		X								X		X
528SB00202	SOIL		X		X								X		X
539SB00101	SOIL		X		X								X		
539SB00102	SOIL		X		X								X		
569SB00101	SOIL		X		X								X		X
569SB00102	SOIL		X		X								X		X
569SB00201	SOIL		X		X								X		X
569SB00202	SOIL		X		X								X		X
569SB00301	SOIL		X		X								X		X
569SB00302	SOIL		X		X								X		X
569SB00401	SOIL		X		X								X		X
569SB00402	SOIL		X		X								X		X
569SB00501	SOIL		X		X								X		X
569SB00502	SOIL		X		X								X		X
Total Billable Samples	(Water/Soil)	1	18	0	18	0	4	0	4	0	4	0	18	0	16

VOA = SW846 Volatiles
SV = SW846 Semivolatiles
P/P = SW846 Pesticides/PCB's
ORG = SW846 Organotins
CN = SW846 Cyanide
TAL = SW846 Metals
pH = SW846 pH

DATA ASSESSMENT NARRATIVE
METALS AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM03.0 Method; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23801B

A validation was performed on the Metals Data from SDG 23801B. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Calibrations
	•	Blanks
*	•	Interferences
*	•	Matrix Spike Recovery
*	•	Matrix Duplicates
	•	Field Duplicates
*	•	Laboratory Control Samples
*	•	Serial Dilutions
*	•	MSAs

* - All criteria were met for this parameter.

Preparation and Field Blanks

Specific Finding

The preparation blank exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Chromium	0.18 mg/kg	no impact
Nickel	0.19 mg/kg	all soil samples below 0.95 mg/kg
Potassium	50.1 mg/kg	all soil samples below 250 mg/kg

The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as non-detect, "U". The field or DI water blanks exhibited contamination but had no impact on the data.

Duplicate Analysis

Specific Finding

The Field duplicate results for Calcium and Lead were greater than 50%. All positive results are qualified as estimated, "J".

Specific Finding

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafe's request.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
All soil samples below 0.95 mg/kg for Nickel and for 250 mg/kg for Potassium.	Ni and K.	+	J
All soil samples	Ca and Pb.	+	J
All "B" results	all analytes	B	J

DATA ASSESSMENT AND NARRATIVE

VOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846, Method 8240; the National Functional Guidelines for Organic Data Review, June 1991, and DQO Level III. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG # 23814B

A validation was performed on the Volatile Data from SDG 23814B, The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibrations
*	•	Internal Standard Performance
	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Initial calibrations

The Initial calibrations that were analyzed with this data package exhibited %RSDs that were not within calibration criteria. All RRFs were within calibration criteria.

Initial calibrations (continued)

Specific Finding:

The initial calibration analyzed on, 10/25/95, contained compounds with %RSDs greater than 30%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J).

586SB00102	methylene chloride (42.8)
586SB00301	
586SB00302	

Continuing calibrations

The continuing calibrations that were analyzed with this data package exhibited %Ds that were not within %D continuing calibration criteria. All RRFs were within calibration criteria.

Specific Finding:

The continuing calibration, UJ065, contained compounds with %Ds greater than 25% but less than 50%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J).

586SB00401	acetone

Method Blanks

Associated blank	Compound	Conc.	Action Level
VBLK5	methylene chloride	1	10
	acetone	3	30
VBLK6	acetone	2J	20
VBLK7	methylene chloride	11	110
	acetone	9J	90

Method Blanks (continued)

Samples	Compound	Qualification
586SB00102	acetone	U
586SB00402		
586SB00301		
586SB00302		
546SB00502		
546SB00301		
596SB00602		
546SB00301	methylene chloride	U
546SB00302		
596SB00602		

Trip Blanks

Associated blank	Compound	Conc.	Action Level
586TB00302	methylene chloride	10	100
	acetone	7J	70

Samples	Compound	Qualification
586SB00101	methylene chloride	CRQL
586SB00201		
586SB00202		
586SB00401		
586SB00101	acetone	U
586SB00201		
586SB00202		

Rinseate Blanks

Associated blank	Compound	Conc.	Action Level
023EB00202	methylene chloride	9	90

Samples	Compound	Qualification
546SB00501	methylene chloride	CRQL

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on the dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
586SB00102 586SB00301 586SB00302	methylene chloride (42.8)	+	J
586SB00401	acetone	+	J
586SB00102 586SB00402 586SB00301 586SB00302 546SB00502 546SB00301 596SB00602	acetone	+	U
546SB00301 546SB00302 596SB00602	methylene chloride	+	U
586SB00101 586SB00201 586SB00202 586SB00401	methylene chloride	+	CRQL
586SB00101 586SB00201 586SB00202	acetone	+	U
546SB00501	methylene chloride	+	CRQL

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE
METALS AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM03.0 Method; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23814

A validation was performed on the Metals Data from SDG 23814. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Calibrations
	•	Blanks
*	•	Interferences
	•	Matrix Spike Recovery
*	•	Matrix Duplicates
*	•	Field Duplicates
*	•	Laboratory Control Samples
	•	Serial Dilutions
*	•	MSAs

* - All criteria were met for this parameter.

Preparation and Field Blanks

Specific Finding

The preparation blank exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Nickel	0.16 mg/kg	no impact
Potassium	24.7 mg/kg	no impact
Sodium	18.6 mg/kg	all soil samples below 93.0 mg/kg

The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as non-detect, "U". The field or DI water blanks exhibited contamination but had no impact on the data.

Matrix Spike Recovery

Specific Finding

The Matrix Spike recoveries for Antimony (58%) and Manganese (63%) were below the lower control limits. All positive and non-detect results are qualified as estimated, "J" or "UJ".

Serial Dilution

Specific Finding

The Serial dilutions for Calcium, Nickel, Potassium and Zinc were outside the control limits. All positive results are qualified as estimated, "J".

Specific Finding

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafe's request.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all soil samples below 93.0 mg/kg	Na.	+	U
All soil samples	Sb and Mn.	+/U	J/UJ
All soil samples	Ca, Ni, K and Zn.	+	J
All "B" results	all analytes	B	J

DATA ASSESSMENT NARRATIVE

PESTICIDE/AROCLORS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW846 Method 8080; the National Functional Guidelines for Organic Data Validation, June 1991; and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23814B

A validation was performed on the Pesticide/Aroclor Data from SDG 23814B. The data was evaluated based on the following parameters:

* • Data Completeness
* • Holding Times
* • GC Performance
* • Calibration
* • Blanks
* • Surrogate Recoveries
* • Matrix Spike/Matrix Spike Duplicates
* • Field Duplicates
* • Compound Identification
* • Compound Quantitation

* - All criteria were met for this parameter.

Contractual Non-Compliance

The method requires that all target compounds, including the multi-component compounds, be analyzed with a five (5) point calibration curve. The laboratory analyzed a single point curve for Aroclors 1221, 1232, 1242, 1248, and 1254 and Toxaphene. No positive results were reported for the compounds analyzed with a single point calibration, therefore the data did not require qualification.

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 10% of the data required qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL

NO QUALIFICATIONS ARE REQUIRED.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non-detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	23859A
Date:	March 27, 1996
Client Name:	Ensafe/ Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	October 23-24, 1995
Number of Samples:	2 Non-aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level IV
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Hexavalent Chromium

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Swan

Eugene M. Watson, Vice President

3-27-96

Date

4127 Plaza 94 South · St. Charles, MO 63304
(314) 936-1332 · Fax (314) 936-1335

SDG# 23859A

Samples and Fractions Reviewed

Sample Identifications Analytical Fractions

ENSAFE ID	MATRIX	HCR	
GDECB02501	SOIL		X
597CB00201	SOIL		X
Total Billable Samples (Water/Soil)		0	2

HCR = SW846 Hexavalent Chromiu

DATA ASSESSMENT NARRATIVE
HEX CHROMIUM

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM03.0 Method; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23859

A validation was performed on the Hexavalent Chromium Data from SDG 23859. The data was evaluated based on the following parameters.

* • Data Completeness
* • Holding Times
* • Calibrations
* • Blanks
* • Field Duplicates
* • Laboratory Control Samples

* - All criteria were met for this parameter.

Specific Finding

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafe's request.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
All "B" results	all analytes	B	J

DATA ASSESSMENT NARRATIVE

DIOXIN/FURANS - 8290

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, internal standard recoveries, clean-up standard recoveries, matrix spike recoveries, GC/MS high resolution performance, tuning results, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8290; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level IV requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 23859

A validation was performed on the Dioxin/Furan Data from SDG 23859. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Mass Resolution Checks
*	•	Column Performance
*	•	Calibrations
*	•	Internal Standard Recovery
	•	Blanks
*	•	Laboratory Control Samples
N/A	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Congener Identification/Quantitation

* - All criteria were met for this parameter.

Method Blanks

Congener ID	MB Conc. (pg/L)	597CB000201	Q	GDECB02501	Q
1,2,3,4,7,8,9-HpCDD	0.317	93.341	NA	11.884	NA
OCDF	1.273	117.164	NA	6.345	NA

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	CONGENER ID	DL	QL
All samples	1,2,3,4,7,8,9-HpCDD and OCDF	+B	NA

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

VOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP OLM01.8 Method; the National Functional Guidelines for Organic Data Validation, June 1991, and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23859A

A validation was performed on the Volatile Data from SDG 23859A. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibration
	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
*	•	Internal Standard Performance
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

Continuing Calibrations

The continuing calibrations that were analyzed by the laboratory for these samples were not acceptable for all compound %Ds. The continuing calibration standards that were analyzed did not meet the minimum RRF criteria.

Continuing Calibrations, continued

Specific Findings

The continuing calibration on 10/25/95, C18721.D, contained compounds with average RRFs less than 0.05. For the samples and non-compliant compounds listed below, the positive results are qualified as estimated, J and the non-detect results are rejected, R.

GDECB02501	acrolein
	Acetonitrile
	Propionitrile
	Isobutanol
	1,4-dioxane

Field Blanks

The four (4) associated field QC blanks exhibited contamination for target compounds. Some qualifications were required.

	596TB00401	065EB00401	596EB00502	596DB00502
acetone	———	5 μg/L	4 μg/L	11 μg/L
methylene chloride	4 μg/L	4 μg/L	5 μg/L	4 μg/L
chloroform	4 μg/L	5 μg/L	———	0.8 μg/L

Specific Finding

	Samples	Compound	Qualification
596EB00502	GDECB02501	methylene chloride	U
596DB00502	GDECB02501	acetone	CRQL

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates that less than 5% of the data required qualifications/rejections.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
GDECB02501	acrolein Acetonitrile Propionitrile Isobutanol 1,4-dioxane	+/-	J/R
GDECB02501	methylene chloride	+	U
GDECB02501	acetone	+	CRQL

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

DIOXIN/FURANS - 8290

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, internal standard recoveries, clean-up standard recoveries, matrix spike recoveries, GC/MS high resolution performance, tuning results, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8290; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level IV requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 23879

A validation was performed on the Dioxin/Furan Data from SDG 23879. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Mass Resolution Checks
*	•	Column Performance
*	•	Calibrations
*	•	Internal Standard Recovery
	•	Blanks
*	•	Laboratory Control Samples
N/A	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Congener Identification/Quantitation

* - All criteria were met for this parameter.

Method Blanks

Congener ID	MB Conc. (pg/L)	GDECB01801	Q
2,3,4,6,7,8-HxCDF	0.21	1.088	NA
OCDF	0.295	4.641	NA

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	CONGENER ID	DL	QL
GDECB01801	2,3,4,6,7,8-HxCDF	+B	U
	OCDF	+B	NA

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8270; the National Functional Guidelines for Organic Data Validation, June 1991, and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23890A

A validation was performed on the Semivolatile Data from SDG 23890A. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibration
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
*	•	Internal Standard Performance
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

Initial Calibrations

The initial calibration standards that were analyzed exhibited non-compliant %Ds and RRFs for which qualification of the data was required.

Initial Calibrations, continued

Specific Findings

The initial calibration, analyzed on 11/17/95 on instrument A, contained compounds with RRFs less than 0.05. For the samples and non-compliant compounds listed below, the positive results are qualified as estimated, J, and the non-detect results are rejected, R.

559CB00601	Methapyrilene (0.016)
559CB01301	Aramite (0.030)

The initial calibration, analyzed on 11/17/95 on instrument A, contained compounds with %Ds greater than 90%. For the samples and non-compliant compounds listed below, the positive results are qualified as estimated, J, and the non-detect results are rejected, R.

559CB00601	4-nitroquinoline-1-oxide (299.6%)
559CB01301	hexachlorophene (257%)

The initial calibration, analyzed on 11/17/95 on instrument A, contained compounds with %Ds greater than 50% but less than 90%. For the samples and non-compliant compounds listed below, the positive results are qualified as estimated, J, and the non-detect results are qualified as estimated, UJ.

559CB00601	1,3,5-trinitrobenzene (54.7%)
559CB01301	

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 5% of data required qualifications

.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
559CB00601 559CB01301	Methapyrilene Aramite	+/-	J/R
559CB00601 559CB01301	4-nitroquinoline-1-oxide hexachlorophene	+/-	J/R
559CB00601 559CB01301	1,3,5-trinitrobenzene	+/-	J/UJ

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

CHLORINATED HERBICIDES

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW846 Method 8150; the National Functional Guidelines for Organic Data Validation, June 1991; and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23922A

A validation was performed on the Herbicide Data from SDG 23922A. The data was evaluated based on the following parameters:

* • Data Completeness
* • Holding Times
* • GC Performance
* • Calibration
* • Blanks
* • Surrogate Recoveries
* • Matrix Spike/Matrix Spike Duplicates
* • Field Duplicates
* • Compound Identification
* • Compound Quantitation

* - All criteria were met for this parameter.

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 10% of the data required qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL

NO QUALIFICATIONS ARE REQUIRED.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non-detect result

DATA ASSESSMENT NARRATIVE

ORGANOPHOSPHORUS PESTICIDES

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW846 Method 8140; the National Functional Guidelines for Organic Data Validation, June 1991; and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23922A

A validation was performed on the Organophosphorus Pesticide Data from SDG 23922A. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC Performance
*	•	Calibration
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 10% of the data required qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL

NO QUALIFICATIONS ARE REQUIRED.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non-detect result

DATA ASSESSMENT NARRATIVE

CHLORINATED PESTICIDES/PCBs

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8080; the National Functional Guidelines for Organic Data Validation, June 1991, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23922

A validation was performed on the Chlorinated Pesticide/PCB Data from SDG 23922. The data was evaluated based on the following parameters:

*	Data Completeness
*	Holding Times
*	Calibration
*	Blanks
	Surrogate Recoveries
*	Compound Identification
*	Compound Quantitation

* - All criteria were met for this parameter.

Surrogates

One sample exhibited a percent recoveries greater than the upper limit. Qualify all positive results as estimated (J). One sample exhibited percent recoveries greater than 10% and less than the lower limit. Qualify all positive results as estimated (J) and all non-detect results as estimated (UJ).

Sample	Surrogate	%Rec
546GM00101	DCB-1	385
065SBFP602	DCB-1	25
065SBFP602	DCB-2	14

System Performance and Overall Assessment

Overall performance was acceptable. The data did require qualifications/rejections as stated above.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated Value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = CRQL	The sample result for the blank contaminant is less than the sample and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for the analyte is reported.
U =	The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non-detected at the analyte value reported.
No Action =	The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	SURROGATE	%REC
546GM00101	DCB-1	385
065SBFP602	DCB-1	25
065SBFP602	DCB-2	14

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non-detect result.

DATA ASSESSMENT AND NARRATIVE

VOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA 8240 Appendix IX; the National Functional Guidelines for Organic Data Review, June 1991, and DQO Level IV. All comments made within this report should be considered when examining the analytical results.

SDG # 23922A

A validation was performed on the Volatile Data from SDG 23922A. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibrations
*	•	Internal Standard Performance
	•	Blanks
*	•	Surrogate Recoveries
*	•	Laboratory Control Samples
*	•	Field Duplicates
*	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Continuing calibrations

The continuing calibrations that were analyzed with this data package exhibited %Ds and RRFs that were not within continuing calibration criteria. Qualifications are required.

Continuing calibrations (continued)

Specific Finding:

The continuing calibration, C18791, contained compounds with %Ds greater than 25%, and RRFs less than 0.050 . For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and non detects as rejected (R).

573CB00101	acrolein (0.019 and 58.7%) Acetonitrile (0.015) Propionitrile (0.042) Isobutyl alcohol (0.005 and 28.6%) 1,4-dioxane (0.004 and 33.3%)

Rinseate Blank

Associated blank	Compound	Concentration	Action Level
573EB00201	methylene chloride	8	80

Samples	Compound	Qualification
573CB00101	methylene chloride	U

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL =	The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.
U =	The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.
No Action =	The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
573CB00101	acrolein Acetonitrile Propionitrile Isobutyl alcohol 1,4-dioxane	+/-	R
573CB00101	methylene chloride	+	U

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT AND NARRATIVE

VOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA 8240; the National Functional Guidelines for Organic Data Review, June 1991, and DQO Level III. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG # 23922

A validation was performed on the Volatile Data from SDG 23922. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
	•	Internal Standard Performance
	•	Blanks
	•	Surrogate Recoveries
*	•	Laboratory Control Samples
*	•	Field Duplicates
	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Internal Standards

All internal standard EICP areas did not meet the internal standard EICP area QA/QC criteria.

Specific Finding:

The Samples listed below, exhibited low internal standard areas. Qualify all associated positive results as estimated (J) and all non detects as estimated(UJ).

596SB01001 chlorobenzene-d_5

Method Blank

Associated blank	Compound	Concentration	Action Level
VBLK4	methylene chloride	5J	50
	Chloroform	8J	80

Samples	Compound	Qualification
556M000101	acetone	U

Trip Blank

Associated blank	Compound	Concentration	Action Level
596TB00901	acetone	14	140
	Chloroform	3J	30
573TB00101	methylene chloride	25	250
	Acetone	20	200

Samples	Compound	Qualification
596SB00901	acetone	U
596SB00902		
596SB01001		
596SB01002		
596SB01201		
596SB01202		
573SB00101		
572SB00102		
573SB00101	methylene chloride	U
572SB00102		
573SB00901	methylene chloride	CRQL

Trip Blank

Associated blank	Compound	Concentration	Action Level
531EB00101	methylene chloride	5	50
	Acetone	10	100

Samples	Compound	Qualification
065SB00201	acetone	CRQL
546GM00101 572GM00101	methylene chloride	U
596SB01001 596SB01002 596SB01201	methylene chloride	CRQL
546GM00101	acetone	U

Surrogates

All of the surrogate recoveries for these samples were not within QA/QC limits.

Specific Finding:

Sample listed below exhibited high recoveries for toluene-d_8 . Qualify all positive results as estimated (J).

546GM00101 (73%)

Compound Identification /Quantitation

Reject all results for 546GM00101RE, in favor of the initial analysis, due to non compliant surrogate recoveries. Reject 596SB01001RE, in favor of initial analysis, due to non compliant internal standard area recoveries.

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
596SB01001	All associated analytes chlorobenzene-d_5	+/-	J/UJ
556M000101 596SB00901 596SB00902 596SB01001 596SB01002 596SB01201 596SB01202 573SB00101 572SB00102 546GM00101	acetone	+	U
573SB00101 572SB00102 546GM00101	methylene chloride	+	U
573SB00901 596SB01001 596SB01201	methylene chloride	+	CRQL
065SB00201	acetone	+	CRQL
546GM00101	all analytes	+	J
546GM00101RE 596SB01001RE	all analytes	+/-	R

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

DIOXIN/FURANS - 8290

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, internal standard recoveries, clean-up standard recoveries, matrix spike recoveries, GC/MS high resolution performance, tuning results, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8290; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level IV requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 23922

A validation was performed on the Dioxin/Furan Data from SDG 23922. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Mass Resolution Checks
*	•	Column Performance
*	•	Calibrations
*	•	Internal Standard Recovery
	•	Blanks
*	•	Laboratory Control Samples
N/A	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Congener Identification/Quantitation

* - All criteria were met for this parameter.

Method Blanks

Congener ID	MB Conc. (pg/L)	573CB00101	Q
2,3,4,6,7,8-HxCDF	0.21	0.271	U
OCDF	0.295	1.956	NA

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	CONGENER ID	DL	QL
573cb00101	2,3,4,6,7,8-HxCDF	+B	U
	OCDF	+B	NA

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846, Method 8270; National Functional Guidelines for Organic Data Review, and DQO Level III. All comments made within this report should be considered when examining the analytical results (Form I's).

SDG # 23922B

A validation was performed on the Semivolatile Data from SDG 23922B. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
	•	Internal Standard Performance
	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Internal Standards

All internal standard EICP areas did not meet the internal standard EICP area QA/QC criteria.

Specific Finding:

The samples listed below, exhibited non compliant internal standard areas. Qualify all associated positive results as estimated (J) and all non detects as estimated (UJ).

596SB01201	perylene-d_{12}
596SB01201RE	

Internal Standards (continued)

Specific Finding:

The samples listed below, exhibited non compliant internal standard areas. Qualify all associated positive results as estimated (J) and all non detects as estimated (UJ).

596SB01002RE	1,4-dichlorobenzene-d_4 naphthalene-d_8 acenaphthene-d_{10} phenanthrene-d_{10} chrysene-d_{12} perylene-d_{12}
596SB01002	1,4-dichlorobenzene-d_4

Method Blanks

Associated blank	Compound	Conc.	Action Level
SBLK1	bis(2-ethylhexyl)phthalate	180J	1800

Samples	Compound	Qualification
596SB01001	bis(2-ethylhexyl)phthalate	CRQL
596SB01002		
596SB00901		
596SB01002RE		
596SB01201		
596SB01201RE		
596SB01202		
573SB00101		
573SB00102		
065SBFP602		
556MO00101		
556MO00901		
554MO00101		
554MO00201		
554MO00301		
554MO00401		
0655000301		
0656000301		

Compound Identification/Quantitation

Specific Finding:

Reject all results for samples listed below, due to non compliant internal standard areas and non compliant surrogate recoveries.

596SB01002RE
596SB01201RE

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

NJ = Presumptive evidence for the presence of the material at an estimated value

K = Result is biased high

L = Result is biased low

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
	All associated samples	+/-	J/UJ
596SB01201	perylene-d_{12}		
596SB01201RE			
596SB01002RE	1,4-dichlorobenzene-d_4		
	naphthalene-d_8		
	acenaphthene-d_{10}		
	phenanthrene-d_{10}		
	chrysene-d_{12}		
	perylene-d_{12}		
596SB01002	1,4-dichlorobenzene-d_4		
596SB01001	bis(2-ethylhexyl)phthalate	+	CRQL
596SB01002			
596SB00901			
596SB01002RE			
596SB01201			
596SB01201RE			
596SB01202			
573SB00101			
573SB00102			
065SBFP602			
556MO00101			
556MO00901			
554MO00101			
554MO00201			
554MO00301			
554MO00401			
0655000301			
0656000301			
596SB01002RE	All analytes	+/-	R
596SB01201RE			

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

SEMIVOLATILES - ORGANOTINS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, calibration results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8270, modified for organotins; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level IV requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 23922

A validation was performed on the volatile organics data from SDGs 23922. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
*	•	Internal Standard Performance
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Identification/Quantitation

* - All criteria were met for this parameter.

Overall Performance

The overall performance was acceptable except where noted.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL

No qualifications are required.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

SEMIVOLATILES - ORGANOTINS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, calibration results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8270, modified for organotins; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level III requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 23922

A validation was performed on the volatile organics data from SDGs 23922. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
*	•	Internal Standard Performance
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
	•	Identification/Quantitation

* - All criteria were met for this parameter.

Identification/Quantitation

Reject (R) all RE analyses in favor of the original analyses due to similar internal standard area results.

Overall Performance

The overall performance was acceptable except where noted.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
All RE samples	all compounds	+/-	R

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8270; the National Functional Guidelines for Organic Data Validation, June 1991, and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23922A

A validation was performed on the Semivolatile Data from SDG 23922A. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibration
	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
*	•	Internal Standard Performance
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

Initial Calibrations

The initial calibration standards that were analyzed exhibited non-compliant %Ds and RRFs for which qualification of the data was required.

Initial Calibrations, continued

Specific Findings

The initial calibration, analyzed on 11/15/95 on instrument A, contained compounds with RRFs less than 0.05. For the samples and non-compliant compounds listed below, the positive results are qualified as estimated, J, and the non-detect results are rejected, R.

054N000201	4-nitroquinoline-1-oxide (0.04178) Methapyrilene (0.03450) Aramite (0.02987) Hexachlorophene (0.02344)

The initial calibration, analyzed on 11/09/95 on instrument A, contained compounds with RRFs less than 0.05. For the samples and non-compliant compounds listed below, the positive results are qualified as estimated, J, and the non-detect results are rejected, R.

573CB00101	hexachlorophene (0.032) Aramite (0.022) Pentachloronitrobenzene (0.049) Methapyrilene (0.017)

The initial calibration, analyzed on 11/09/95 on instrument A, contained compounds with %Ds greater than 90%. For the samples and non-compliant compounds listed below, the positive results are qualified as estimated, J, and the non-detect results are rejected, R.

573CB00101	4-nitroquinoline-1-oxide (181.6%) 1,3,5-trinitrobenzene (123.1%)

The initial calibration, analyzed on 11/09/95 on instrument A, contained compounds with %Ds greater than 50% but less than 90%. For the samples and non-compliant compounds listed below, the positive results are qualified as estimated, J, and the non-detect results are qualified as estimated, UJ.

573CB00101	p-phenylenediamine (64.3%) 3,3'-dimethylbenzidine (64.7%)

Method Blanks

One (1) method blank exhibited contamination which resulted in the qualification of field samples.

	SBLK2
BIS(2-ETHYLHEXYL)PHTHALATE	43 μg/Kg

Specific Findings

Sample	Contaminant	Action Level	Qualification
054N000201	bis(2-ethylhexyl)phthalate	430 μg/Kg	CRQL

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 5% of data required qualifications

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
054N000201	4-nitroquinoline-1-oxide Methapyrilene Aramite Hexachlorophene	+/-	J/R
573CB00101	hexachlorophene Aramite Pentachloronitrobenzene Methapyrilene	+/-	J/R
573CB00101	4-nitroquinoline-1-oxide 1,3,5-trinitrobenzene	+/-	J/R
573CB00101	p-phenylenediamine 3,3'-dimethylbenzidine	+/-	J/UJ
054N000201	bis(2-ethylhexyl)phthalate	+B	CRQL

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	23922A
Date:	February 25, 1996
Client Name:	Ensafe/ Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	October 30-November 2, 1995
Number of Samples:	2 Non-aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level IV
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Volatiles, Semivolatiles, Herbicides, Organophosphorus Pesticides, Organotins, Dioxin/Furans, Hexavalent Chromium, pH, Metals

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Sutton — 3-1-96

Eugene M. Watson, Vice President — Date

4127 Plaza 94 South · St. Charles, MO 63304
(314) 936-1332 · Fax (314) 936-1335

SDG# 23922A

Samples and Fractions Reviewed

Sample Identifications — Analytical Fractions

ENSAFE ID	MATRIX	VOA		SV		HERB		OPP		ORG		D/F		HCR		TAL		pH	
573CB00101	SOIL		X		X		X		X				X		X		X		X
054N000201	SOIL				X		X		X		X		X		X		X		
Total Billable Samples (Water/Soil)		0	1	0	2	0	2	0	2	0	1	0	2	0	2	0	2	0	1

VOA = SW846 Volatiles
SV = SW846 Semivolatiles
HERB = SW846 Herbicides
OPP = SW846 Organophosphorus Pesticides
ORG = SW846 Organotins
D/F = SW846 Dioxin/Furans
HCR = SW846 Hexavalent Chromium
TAL = SW846 Metals
pH = SW846 pH

DATA ASSESSMENT NARRATIVE
METALS, HEX CR AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM03.0 Method; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23922

A validation was performed on the Metals Data from SDG 23922. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Calibrations
	•	Blanks
*	•	Interferences
*	•	Matrix Spike Recovery
*	•	Matrix Duplicates
	•	Field Duplicates
*	•	Laboratory Control Samples
	•	Serial Dilutions
*	•	MSAs

* - All criteria were met for this parameter.

Preparation and Field Blanks

Specific Finding

The preparation blank exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Chromium	0.21 mg/kg	no impact
Iron	3.89 mg/kg	no impact
Nickel	0.17 mg/kg	no impact
Sodium	17.9 mg/kg	no impact
Tin	2.42 mg/kg	all FD samples below 12.1 mg/kg

Potassium	175. mg/kg	all FD samples below 675 mg/kg

The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as non-detect, "U". The field or DI water blanks exhibited contamination but had no impact on the data.

Duplicate Analysis

Specific Finding

The field duplicate results for Lead and Zinc were greater than 50% and all positive results will be qualified as estimated, "J" for all soil samples.

Serial Dilution

Specific Finding

The Serial Dilution for Potassium was outside the control limits. All positive results will be qualified as estimated, "J" for all FD soil samples.

Specific Finding

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafe's request.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all FD samples below 12.1 mg/kg	Sn.	+	U
all FD samples below 675 mg/kg	K.		
all FD samples	K.	+	J
All "B" results	all analytes	B	J

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	23969A
Date:	February 25, 1996
Client Name:	Ensafe/ Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	November 3, 1995
Number of Samples:	1 Non-aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level IV
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Volatiles, Semivolatiles, Pesticide/PCB's, Herbicides, Organophosphorus Pesticides, Dioxin/Furans, Hexavalent Chromium, Metals, Cyanide

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Surgan
Eugene M. Watson, Vice President

2-29-96
Date

4127 Plaza 94 South · St. Charles, MO 63304
(314) 936-1332 · Fax (314) 936-1335

SDG# 23969A

Samples and Fractions Reviewed

Sample Identifications | Analytical Fractions

ENSAFE ID	MATRIX	VOA		SV		P/P		HERB		OPP		D/F		HCR		TAL/CN	
556N000801	SOIL		X		X		X		X		X		X		X		X
Total Billable Samples	(Water/Soil)	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1

VOA = SW846 Volatiles
SV = SW846 Semivolatiles
P/P = SW846 Pesticides/PCB's
HERB = SW846 Herbicides
OPP = SW846 Organophosphorus Pesticides
D/F = SW846 Dioxin/Furans
HCR = SW846 Hexavalent Chromium
TAL/CN = SW846 Metals w/Cyanide

DATA ASSESSMENT AND NARRATIVE

VOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA 8240 Appendix IX; the National Functional Guidelines for Organic Data Review, June 1991, and DQO Level IV. All comments made within this report should be considered when examining the analytical results.

SDG # 23969

A validation was performed on the Volatile Data from SDG 23969. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibrations
*	•	Internal Standard Performance
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Laboratory Control Samples
*	•	Field Duplicates
*	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Continuing calibrations

The continuing calibrations that were analyzed with this data package exhibited %Ds and RRFs that were not within continuing calibration criteria. Qualifications are required.

Continuing calibrations (continued)

Specific Finding:

The continuing calibration, I17775.D, contained compounds with %Ds greater than 25%, and RRFs less than 0.050 . For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and non detects as rejected (R).

556N000801	acrolein

The continuing calibration, I17775.D, contained compounds with RRFs less than 0.050. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and non detects as rejected (R).

556N000801	Acetonitrile
	Isobutyl alcohol
	1,4-dioxane

The continuing calibration, I17775.D, contained compounds %D greater than 50% and less than 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and non detects as estimated (UJ).

556N000801	dichlorodifluoromethane

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
556N000801	acrolein	+/-	J/R
556N000801	Acetonitrile Isobutyl alcohol 1,4-dioxane	+/-	J/R
556N000801	dichlorodifluoromethane	+/-	J/UJ

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE
METALS, HEX CR AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM03.0 Method; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23969

A validation was performed on the Metals Data from SDG 23969. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Calibrations
	•	Blanks
*	•	Interferences
*	•	Matrix Spike Recovery
*	•	Matrix Duplicates
	•	Field Duplicates
*	•	Laboratory Control Samples
	•	Serial Dilutions
*	•	MSAs

* - All criteria were met for this parameter.

Preparation and Field Blanks

Specific Finding

The preparation blank exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Aluminum	3.03 mg/kg	no impact
Chromium	0.19 mg/kg	no impact
Iron	3.76 mg/kg	no impact
Nickel	0.13 mg/kg	no impact
Potassium	57.7 mg/kg	no impact

Silver	0.23 mg/kg	no impact
Tin	2.58 mg/kg	all soil samples below 12.9 mg/kg

The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as non-detect, "U". The field or DI water blanks exhibited contamination but had no impact on the data.

Duplicate Analysis

Specific Finding

The field duplicate results for Nickel were greater than 50% and all positive results will be qualified as estimated, "J" for all soil samples.

Serial Dilution

Specific Finding

The Serial Dilutions for Potassium and Vanadium were outside the control limits. All positive results will be qualified as estimated, "J" for all soil samples.

Specific Finding

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafe's request.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all soil samples below 12.9 mg/kg	Sn.	+	U
all soil samples	K and V.	+	J
All "B" results	all analytes	B	J

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	23969B
Date:	February 25, 1996
Client Name:	Ensafe/ Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	November 3, 1995
Number of Samples:	1 Aqueous Sample(s) with 0 MS/MSD(s) 11 Non-aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Volatiles, Semivolatiles, Pesticide/PCB's, Organotins, Cyanide, Metals

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Seufoss
Eugene M. Watson, Vice President

2-29-96
Date

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SDG# 23969B

Samples and Fractions Reviewed

Sample Identifications — Analytical Fractions

ENSAFE ID	MATRIX	VOA		SV		P/P		ORG		CN		TAL	
081M000101	SOIL		X		X		X		X		X		X
081M000201	SOIL		X		X		X		X		X		X
555M000101	SOIL												X
555M000201	SOIL												X
556M000201	SOIL		X		X		X				X		X
556M000301	SOIL		X		X		X				X		X
556M000401	SOIL		X		X		X		X		X		X
556M000501	SOIL		X		X		X				X		X
556M000601	SOIL		X		X		X		X		X		X
556M000701	SOIL		X		X		X				X		X
556M000801	SOIL		X		X		X				X		X
556TB000601	WATER	X											
Total Billable Samples	(Water/Soil)	1	9	0	9	0	9	0	4	0	9	0	11

VOA = SW846 Volatiles
SV = SW846 Semivolatiles
P/P = SW846 Pesticides/PCB's
ORG = SW846 Organotins
CN = SW846 Cyanide
TAL = SW846 Metals

DATA ASSESSMENT AND NARRATIVE

VOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA 8240; the National Functional Guidelines for Organic Data Review, June 1991, and DQO Level III. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG # 23969

A validation was performed on the Volatile Data from SDG 23969. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibrations
*	•	Internal Standard Performance
	•	Blanks
*	•	Surrogate Recoveries
*	•	Laboratory Control Samples
*	•	Field Duplicates
	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Continuing calibrations

The continuing calibrations that were analyzed with this data package exhibited %Ds that were not within continuing calibration criteria. All RRFs were within calibration criteria. Qualifications are required.

Continuing calibrations (continued)

Specific Finding:

The continuing calibration, I17798.D, contained compounds with %Ds greater than 25%, but less than 50%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J).

556M000401DL	acetone

Method Blank

Associated blank	Compound	Concentration
VBLK1	acetone	8J

Samples	Compound	Qualification
081M000101 081M000201 556M000201 556M000301	acetone	U

Compound Identification /Quantitation

Reject all E-flagged results for samples 556M000401 and 556M000501, in favor of the diluted samples. Reject all analytes except D-flagged in samples 556M000401DL and 556M000501DL.

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL =	The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.
U =	The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.
No Action =	The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
556M000401DL	acetone	+	J
081M000101 081M000201 556M000201 556M000301	acetone	+	U
556M000401 556M000501	All E-flagged analytes	+	R
556M000401DL 556M000501DL	All analytes except D-flagged analytes	+	R

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE
METALS, HEX CR AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM03.0 Method; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23969

A validation was performed on the Metals Data from SDG 23969. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Calibrations
	•	Blanks
*	•	Interferences
*	•	Matrix Spike Recovery
*	•	Matrix Duplicates
	•	Field Duplicates
*	•	Laboratory Control Samples
	•	Serial Dilutions
*	•	MSAs

* - All criteria were met for this parameter.

Preparation and Field Blanks

Specific Finding

The preparation blank exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Chromium	0.20 mg/kg	no impact
Iron	3.89 mg/kg	no impact
Nickel	0.12 mg/kg	no impact
Sodium	12.0 mg/kg	no impact
Tin	2.42 mg/kg	all soil samples below 12.0 mg/kg

The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as non-detect, "U". The field or DI water blanks exhibited contamination but had no impact on the data.

The preparation blank exhibited negative bias for the following elements.

Elements	Conc.	Samples affected
Potassium	-41.6 mg/kg	no impact

This reviewer qualifies all samples results below ten times the negative bias as estimated, "J" or "UJ".

Duplicate Analysis

Specific Finding

The field duplicate results for Nickel were greater than 50% and all positive results will be qualified as estimated, "J" for all soil samples.

Serial Dilution

Specific Finding

The Serial dilutions for Potassium and Vanadium were outside the control limits. All positive results will be qualified as estimated, "J" for all soil samples.

Specific Finding

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafe's request.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all soil samples below 12.0 mg/kg	Sn.	+	U
all soil samples	Ni.	+	J
all soil samples	K and V.	+	J
All "B" results	all analytes	B	J

DATA ASSESSMENT NARRATIVE

CHLORINATED HERBICIDES

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW846 Method 8150; the National Functional Guidelines for Organic Data Validation, June 1991; and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23969A

A validation was performed on the Herbicide Data from SDG 23969A. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC Performance
*	•	Calibration
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 10% of the data required qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL

NO QUALIFICATIONS ARE REQUIRED.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non-detect result

DATA ASSESSMENT NARRATIVE

ORGANOPHOSPHORUS PESTICIDES

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW846 Method 8140; the National Functional Guidelines for Organic Data Validation, June 1991; and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23969A

A validation was performed on the Organophosphorus Pesticide Data from SDG 23969A. The data was evaluated based on the following parameters:

* • Data Completeness
* • Holding Times
* • GC Performance
* • Calibration
* • Blanks
* • Surrogate Recoveries
* • Matrix Spike/Matrix Spike Duplicates
* • Field Duplicates
* • Compound Identification
* • Compound Quantitation

* - All criteria were met for this parameter.

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 10% of the data required qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL

NO QUALIFICATIONS ARE REQUIRED.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non-detect result

DATA ASSESSMENT NARRATIVE

CHLORINATED PESTICIDES/PCBs

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8080; the National Functional Guidelines for Organic Data Validation, June 1991, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23969

A validation was performed on the Chlorinated Pesticide/PCB Data from SDG 23969. The data was evaluated based on the following parameters:

*	Data Completeness
*	Holding Times
	Calibration
*	Blanks
	Surrogate Recoveries
*	Compound Identification
*	Compound Quantitation

* - All criteria were met for this parameter.

Calibration

The initial calibration exhibits non-linearity for some compounds.

Analyte	%RSD
Endrine ketone	28.83, 27.84

Qualify all positive results for the non-linear compounds as estimated (J).

Surrogates

Three samples exhibited percent recoveries greater than 10% and less than the lower limit.

Sample	Surrogate	%Rec
081M000201	TCX-1	27
081M000201	TCX-2	26
556M000801	TCX-1	28
556M000401	TCX-1	18

Qualify all positive results as estimated (J) and all non-detect results as estimated (UJ).

System Performance and Overall Assessment

Overall performance was acceptable. The data did require qualifications/rejections as stated above.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated Value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for the analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non-detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL
556M000401	Endrin Ketone	+	J
556M000601	Endrin Ketone	+	J
556M000801	Endrin Ketone	+	J

SAMPLE ID	SURROGATE	%REC
081M000201	TCX-1	27
081M000201	TCX-2	26
556M000801	TCX-1	28
556M000401	TCX-1	18

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non-detect result.

DATA ASSESSMENT NARRATIVE

DIOXIN/FURANS - 8290

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, internal standard recoveries, clean-up standard recoveries, matrix spike recoveries, GC/MS high resolution performance, tuning results, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8290; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level IV requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 23969

A validation was performed on the Dioxin/Furan Data from SDG 23969. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Mass Resolution Checks
*	•	Column Performance
*	•	Calibrations
*	•	Internal Standard Recovery
*	•	Blanks
*	•	Laboratory Control Samples
N/A	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Congener Identification/Quantitation

* - All criteria were met for this parameter.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	CONGENER ID	DL	QL

No qualifications are required.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

SEMIVOLATILES - ORGANOTINS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, calibration results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8270, modified for organotins; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level III requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 23969

A validation was performed on the volatile organics data from SDGs 23969. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
*	•	Internal Standard Performance
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Identification/Quantitation

* - All criteria were met for this parameter.

Overall Performance

The overall performance was acceptable except where noted.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL

No qualifications are required.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8270; the National Functional Guidelines for Organic Data Validation, June 1991, and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23969B

A validation was performed on the Semivolatile Data from SDG 23969B. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibration
	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
*	•	Internal Standard Performance
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

Initial Calibrations

The initial calibrations standards that were analyzed exhibited non-compliant %RSDs and RRFs for which qualification of the data was required.

Initial Calibrations, continued

Specific Findings

The initial calibration standards analyzed on 11/15/95 on instrument A contained compounds with %Ds greater than 25% but less than 50%. For the samples and non-compliant compounds listed below, the positive results are qualified as estimated, J.

556N000801 pyrene (35.325)

The initial calibration standards analyzed on 11/15/95 on instrument A contained compounds with RRFs less than 0.05. For the samples and non-compliant compounds listed below, the positive results are qualified as estimated, J, and the non-detect results are rejected, R.

556N000801 4-nitroquinoline-1-oxide (0.04178)
methapyrilene (0.03450)
Aramite (0.02987)
Hexachlorophene (0.02344)

Method Blanks

The method blank exhibited contamination which resulted in the qualification of field samples.

	SBLK1
bis(2-ethylhexyl)phthalate	43 µg/Kg

Specific Findings

Sample	Contaminant	Action Level	Qualification
556N000801	bis(2-ethylhexyl)phthalate	430 µg/Kg	CRQL

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 5% of data required qualifications

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
556N000801	pyrene	+	J
556N000801	4-nitroquinoline-1-oxide methapyrilene Aramite Hexachlorophene	+/-	J/R
556N000801	bis(2-ethylhexyl)phthalate	+B	CRQL

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non detect result

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846, Method 8270; National Functional Guidelines for Organic Data Review, and DQO Level III. All comments made within this report should be considered when examining the analytical results (Form I's).

SDG # 23969B

A validation was performed on the Semivolatile Data from SDG 23969B. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
	•	Internal Standard Performance
	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Internal Standards

All internal standard EICP areas did not meet the internal standard EICP area QA/QC criteria.

Internal Standards (continued)

Specific Finding:

The samples listed below, exhibited non compliant internal standard areas. Qualify all associated positive results as estimated (J) and all non detects as estimated (UJ).

556SB00601	1,4-dichlorobenzene-d_4 naphthalene-d_8 acenaphthene-d_{10} phenanthrene-d_{10} chrysene-d_{12} perylene-d_{12}
556SB00401	1,4-dichlorobenzene-d_4 acenaphthene-d_{10} phenanthrene-d_{10} chrysene-d_{12} perylene-d_{12}
556SB00401RE 556SB00601RE	1,4-dichlorobenzene-d_4 naphthalene-d_8 acenaphthene-d_{10} phenanthrene-d_{10} chrysene-d_{12}

Method Blanks

Associated blank	Compound	Conc.	Action Level
SBLK1	bis(2-ethylhexyl)phthalate	260J	2600

Samples	Compound	Qualification
081MO00101	bis(2-ethylhexyl)phthalate	CRQL
081MO00201		
556MO00201		
556MO00301		
556MO00401		
556MO00501		
556MO00601		
556MO00701		
556MO00801		

Compound Identification/Quantitation

Specific Finding:

Reject all results for samples listed below, due to non compliant internal standard areas and non compliant surrogate recoveries.

556SB00401
556SB00601

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

NJ = Presumptive evidence for the presence of the material at an estimated value

K = Result is biased high

L = Result is biased low

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
	All associated samples	+/-	J/UJ
556SB00601	1,4-dichlorobenzene-d_4 naphthalene-d_8 acenaphthene-d_{10} phenanthrene-d_{10} chrysene-d_{12} perylene-d_{12}		
556SB00401	1,4-dichlorobenzene-d_4 acenaphthene-d_{10} phenanthrene-d_{10} chrysene-d_{12} perylene-d_{12}		
556SB00401RE 556SB00601RE	1,4-dichlorobenzene-d_4 naphthalene-d_8 acenaphthene-d_{10} phenanthrene-d_{10} chrysene-d_{12}		
081MO00101 081MO00201 556MO00201 556MO00301 556MO00401 556MO00501 556MO00601 556MO00701 556MO00801	bis(2-ethylhexyl)phthalate	+	CRQL
556SB00401 556SB00601	All analytes	+/-	R

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

CHLORINATED PESTICIDES/PCBs

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8080; the National Functional Guidelines for Organic Data Validation, June 1991, and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23969

A validation was performed on the Chlorinated Pesticide/PCB Data from SDG 23969. The data was evaluated based on the following parameters:

* Data Completeness
* Holding Times
* Calibration
* Blanks
* Surrogate Recoveries
* Matrix Spike/Matrix Spike Duplicates
* Field Duplicates
* Compound Identification
* Compound Quantitation

* - All criteria were met for this parameter.

System Performance and Overall Assessment

Overall performance was acceptable. The data did not require qualifications/rejections.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated Value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for the analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non-detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL

NO QUALIFICATIONS WERE REQUIRED

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non-detect result.

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846, Method 8270; National Functional Guidelines for Organic Data Review, and DQO Level III. All comments made within this report should be considered when examining the analytical results (Form I's).

SDG # 23980B

A validation was performed on the Semivolatile Data from SDG 23980B. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
	•	Internal Standard Performance
	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Internal Standards

All internal standard EICP areas did not meet the internal standard EICP area QA/QC criteria.

Specific Finding:

The samples listed below, exhibited non compliant internal standard areas. Qualify all associated positive results as estimated (J) and all non detects as estimated (UJ).

559SB01302	1,4-dichlorobenzene-d_4 naphthalene-d_8

Internal Standards (continued)

Specific Finding:

The samples listed below, exhibited non compliant internal standard areas. Qualify all associated positive results as estimated (J) and all non detects as estimated (UJ).

570SB01301	1,4-dichlorobenzene-d_4
570SB01302	naphthalene-d_8
570SB00202	acenaphthene-d_{10}
559SB00102	phenanthrene-d_{10}
559SB00601	chrysene-d_{12}
570SB00202RE	perylene-d_{12}
570SB00201	naphthalene-d_8
	acenaphthene-d_{10}
	phenanthrene-d_{10}
	chrysene-d_{12}
	perylene-d_{12}
559SB01402	phenanthrene-d_{10}
	chrysene-d_{12}
	perylene-d_{12}
570SB01301RE	1,4-dichlorobenzene-d_4
	naphthalene-d_8
	chrysene-d_{12}
	perylene-d_{12}
570SB01302RE	1,4-dichlorobenzene-d_4
559SB00102RE	naphthalene-d_8
	acenaphthene-d_{10}
	chrysene-d_{12}
	perylene-d_{12}
570SB00201RE	perylene-d_{12}
559SB00601RE	
559SB01302RE	1,4-dichlorobenzene-d_4

Method Blanks

Associated blank	Compound	Conc.	Action Level
SBLK1	bis(2-ethylhexyl)phthalate	130J	

Samples	Compound	Qualification
559SB00802	bis(2-ethylhexyl)phthalate	U
559SB00101	bis(2-ethylhexyl)phthalate	CRQL
559SB00102		
559SB00102RE		
559SB00601		
559SB00601RE		
559SB00602		
559SB00701		
559SB00702		
559SB00801		
559SB01301		
559SB01302		
559SB01302RE		
559SB01401		
559SB01402		
559SB01402RE		
570SB00201		
570SB00201RE		
570SB00202RE		
570SB01301		
570SB01301RE		
570SB01302RE		
570SB01401		
570SB01402		

Compound Identification/Quantitation

Specific Finding:

Reject all results for samples listed below, due to non compliant internal standard areas and non compliant surrogate recoveries.

570SB00202RE
570SB01301
559SB00102
559SB00601
570SB00201
559SB01302

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

NJ = Presumptive evidence for the presence of the material at an estimated value

K = Result is biased high

L = Result is biased low

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
	All associated samples	+/-	J/UJ
559SB01302	1,4-dichlorobenzene-d_4		
	naphthalene-d_8		
570SB01301	1,4-dichlorobenzene-d_4		
570SB01302	naphthalene-d_8		
570SB00202	acenaphthene-d_{10}		
559SB00102	phenanthrene-d_{10}		
559SB00601	chrysene-d_{12}		
570SB00202RE	perylene-d_{12}		
570SB00201	naphthalene-d_8		
	acenaphthene-d_{10}		
	phenanthrene-d_{10}		
	chrysene-d_{12}		
	perylene-d_{12}		
559SB01402	phenanthrene-d_{10}		
	chrysene-d_{12}		
	perylene-d_{12}		
570SB01301RE	1,4-dichlorobenzene-d_4		
	naphthalene-d_8		
	chrysene-d_{12}		
	perylene-d_{12}		
570SB01302RE	1,4-dichlorobenzene-d_4		
559SB00102RE	naphthalene-d_8		
	acenaphthene-d_{10}		
	chrysene-d_{12}		
	perylene-d_{12}		
570SB00201RE	perylene-d_{12}		
559SB00601RE			
559SB01302RE	1,4-dichlorobenzene-d_4		

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
559SB00802	bis(2-ethylhexyl)phthalate	+	U
559SB00101	bis(2-ethylhexyl)phthalate	+	CRQL
559SB00102			
559SB00102RE			
559SB00601			
559SB00601RE			
559SB00602			
559SB00701			
559SB00702			
559SB00801			
559SB01301			
559SB01302			
559SB01302RE			
559SB01401			
559SB01402			
559SB01402RE			
570SB00201			
570SB00201RE			
570SB00202RE			
570SB01301			
570SB01301RE			
570SB01302RE			
570SB01401			
570SB01402			
570SB00202RE	All analytes	+/-	R
570SB01301			
559SB00102			
559SB00601			
570SB00201			
559SB01302			

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

DIOXIN/FURANS - 8290

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, internal standard recoveries, clean-up standard recoveries, matrix spike recoveries, GC/MS high resolution performance, tuning results, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8290; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level IV requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 23980

A validation was performed on the Dioxin/Furan Data from SDG 23980. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Mass Resolution Checks
*	•	Column Performance
*	•	Calibrations
*	•	Internal Standard Recovery
	•	Blanks
*	•	Laboratory Control Samples
N/A	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Congener Identification/Quantitation

* - All criteria were met for this parameter.

Method Blanks

Congener ID	MB Conc. (pg/L)	559CB00601	Q	559CB01301	Q
OCDD	0.77	1070	NA	165	NA
OCDF	0.449	93.7	NA	11.5	NA

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	CONGENER ID	DL	QL
All samples	OCDD and OCDF	+B	NA

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

CHLORINATED PESTICIDES/PCBs

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8080; the National Functional Guidelines for Organic Data Validation, June 1991, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23980

A validation was performed on the Chlorinated Pesticide/PCB Data from SDG 23980. The data was evaluated based on the following parameters:

*	Data Completeness
*	Holding Times
	Calibration
*	Blanks
	Surrogate Recoveries
*	Compound Identification
	Compound Quantitation

* - All criteria were met for this parameter.

Calibration

The initial calibration exhibits non-linearity for some compounds.

Analyte	%RSD
4,4'-DDD	21.71

Qualify all positive results for the non-linear compounds as estimated (J). The calibration verification contains percent differences greater than 15%.

Analyte	%RSD
4,4'-DDT	25.4

Qualify all positive results as estimated (J).

Surrogates

Three samples exhibited percent recoveries greater than the upper limit.

Sample	Surrogate	%Rec
559SB00601	DCB-1	181
559SB00601	DCB-2	163
559SB00701	DCB-1	183
559SB00701	DCB-2	222
559SB00801	DCB-2	155

Qualify all positive results as estimated (J).

Compound Quantitation

Three samples (559SB00101, 559SB00701, 559SB00801) exhibited results greater than the calibration range . A dilution was run for each sample. Qualify extrapolated results in original sample as rejected (R). Qualify all results other than extrapolated in dilution as rejected (UR). Qualify extrapolated result in dilution as diluted (D)

System Performance and Overall Assessment

Overall performance was acceptable. The data did require qualifications/rejections as stated above.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated Value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for the analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non-detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL
559SB00101	4,4'-DDD	+	J
559SB00101	alpha-chlordane	E	R
559SB00101	gamma-chlordane	E	R
559SB00601	Heptaclor	+	J
559SB00601	4,4'-DDE	+	J
559SB00701	Heptaclor	+	J
559SB00701	Heptaclor epoxide	+	J
559SB00701	4,4'-DDE	E	R
559SB00701	Dieldrin	E	R
559SB00701	4,4'-DDT	E	R
559SB00701	gamma-chlordane	+	J
559SB00701DL	4,4'-DDT	+	J
559SB00801	4,4'-DDE	+	J
559SB00801	Dieldrin	+	J
559SB00801	4,4'-DDT	E	R
559SB00801	Aroclor-1260	+	J
559SB00801DL	4,4'-DDT	+	J

SAMPLE ID	SURROGATE	%REC
559SB00601	DCB-1	181
559SB00601	DCB-2	163
559SB00701	DCB-1	183
559SB00701	DCB-2	222
559SB00801	DCB-2	155

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non-detect result.

DATA ASSESSMENT NARRATIVE

CHLORINATED HERBICIDES

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW846 Method 8150; the National Functional Guidelines for Organic Data Validation, June 1991; and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23980A

A validation was performed on the Herbicide Data from SDG 23980A. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC Performance
*	•	Calibration
*	•	Blanks
	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

Surrogate Recoveries

One (1) sample exhibited a non-compliant DCAA recovery.

Surrogate Recoveries, Continued

Specific Finding

One (1) sample exhibited a low DCAA recovery. For the following sample, the positive results are qualified as estimated, J, and the non-detect results are qualified as estimated, UJ.

Sample ID	Surrogate	% Recovery
559CB01301	DCAA	52%

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 10% of the data required qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
559CB01301	ALL	+/-	J/UJ

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non-detect result

DATA ASSESSMENT NARRATIVE

ORGANOPHOSPHORUS PESTICIDES

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW846 Method 8140; the National Functional Guidelines for Organic Data Validation, June 1991; and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23980A

A validation was performed on the Organophosphorus Pesticide Data from SDG 23980A. The data was evaluated based on the following parameters:

* • Data Completeness
* • Holding Times
* • GC Performance
* • Calibration
* • Blanks
* • Surrogate Recoveries
* • Matrix Spike/Matrix Spike Duplicates
* • Field Duplicates
* • Compound Identification
* • Compound Quantitation

* - All criteria were met for this parameter.

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 10% of the data required qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL

NO QUALIFICATIONS ARE REQUIRED.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non-detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	23980
Date:	February 8, 1996
Client Name:	Ensafe/Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	November 6, 1995
Number of Samples:	2 Non-aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level IV
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Volatiles, Semivolatiles, Herbicides, Pesticides/PCB's, Organophosphorus Pesticides, metals, Hexavalent Chromium, Dioxin, Cyanide

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Seyfan

Eugene M. Watson, Vice President

Date: 2-28-96

6716 Mexico Road · St. Peters, MO 63376
(314) 928-9533 · (314) 278-1828 · Fax (314) 278-2709

SDG# 23980

Samples and Fractions Reviewed

Sample Identifications — Analytical Fractions

ENSAFE ID	MATRIX	VOA		SV		HERB		P/P		OPP		TAL		HCR		DIO		CN	
559CB00601	SOIL		X		X		X		X		X		X		X		X		X
559CB01301	SOIL		X		X		X		X		X		X		X		X		X
Total Billable Samples	(Water/Soil)	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2

VOA = SW846 Volatiles
SV = SW846 Semivolatiles
HERB = SW846 Herbicides
P/P = SW846 Pesticides/PCB's
OPP = SW846 Organophosphorus Pesticides
TAL/CN = SW846 Metals w/Cyanide
HCR = SW846 Hexavalent Chromium
TAL = SW846 Metals
DIO = SW846 Dioxin

DATA ASSESSMENT AND NARRATIVE

VOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA 8240 Appendix IX; the National Functional Guidelines for Organic Data Review, June 1991, and DQO Level IV. All comments made within this report should be considered when examining the analytical results.

SDG # 23980A

A validation was performed on the Volatile Data from SDG 23980A. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibrations
	•	Internal Standard Performance
	•	Blanks
	•	Surrogate Recoveries
*	•	Laboratory Control Samples
*	•	Field Duplicates
	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Continuing calibrations

The continuing calibrations that were analyzed with this data package exhibited %Ds and RRFs that were not within continuing calibration criteria. Qualifications are required.

Continuing calibrations (continued)

Specific Finding:

The continuing calibration, C18874.D, contained compounds with %Ds greater than 25%, but less than 50% and RRF less than 0.050. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and non detects as rejected (R).

559CB00601RE	acrolein Acetonitrile Acrylonitrile Isobutyl alcohol 1,4-dioxane

The continuing calibration, C18860.D, contained compounds with %Ds greater than 25%, but less than 50% and RRF less than 0.050. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and non detects as rejected (R).

559CB01301	acrolein Acetonitrile Isobutyl alcohol 1,4-dioxane

Internal Standards

All internal standard EICP areas did not meet the internal standard EICP area QA/QC criteria.

Specific Finding:

The Samples listed below, exhibited low internal standard areas. Qualify all associated positive results as estimated (J) and all non detects as estimated(UJ).

559CB00601RE	chlorobenzene-d_5

Method Blank

Associated blank	Compound	Concentration
VBLK2	trichlorofluoromethane	1J

Samples	Compound	Qualification
559CB00601RE	trichlorofluoromethane	U

Rinseate Blank

Associated blank	Compound	Concentration
559EB00402	methylene chloride	9

Samples	Compound	Qualification
559CB00601RE	methylene chloride	CRQL
559CB01301		U

Surrogates

All of the surrogate recoveries for these samples were not within QA/QC limits.

Specific Finding:

Sample listed below exhibited high recoveries for 1,2-dichloroethane-d_4. Qualify all positive results as estimated (J).

559CB00601RE

Compound Identification /Quantitation

Reject sample 559CB00601, in favor of the reanalysis analysis due to non compliant internal standard area recoveries.

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
559CB00601RE	acrolein Acetonitrile Acrylonitrile Isobutyl alcohol 1,4-dioxane	+/-	J/R
559CB01301	acrolein Acetonitrile Isobutyl alcohol 1,4-dioxane	+/-	J/R
559CB00601RE	All associated analytes chlorobenzene-d_5	+	J/UJ
559CB00601RE	trichlorofluoromethane	+	U
559CB00601RE	methylene chloride	+	CRQL
559CB01301	methylene chloride	+	U
559CB00601RE	all analytes	+	J
559CB00601	all analytes	+/-	R

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE
METALS, HEX CR AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM03.0 Method; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23980

A validation was performed on the Metals Data from SDG 23980. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Calibrations
	•	Blanks
*	•	Interferences
*	•	Matrix Spike Recovery
*	•	Matrix Duplicates
*	•	Field Duplicates
*	•	Laboratory Control Samples
	•	Serial Dilutions
*	•	MSAs

* - All criteria were met for this parameter.

Preparation and Field Blanks

Specific Finding

The preparation blank exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Chromium	0.13 mg/kg	no impact
Iron	2.38 mg/kg	no impact
Potassium	85.4 mg/kg	no impact
Tin	2.63 mg/kg	all FD samples

The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as non-detect, "U". The field or DI water blanks exhibited contamination but had no impact on the data.

Serial Dilution

Specific Findings

The Serial dilutions for Calcium and Potassium for soils were outside the control limits. All positive results are qualified as estimated, "J".

Specific Finding

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafe's request.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all soil samples	Sn.	+	U
all soil samples	Ca and K.	+	J
All "B" results	all analytes	B	J

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	23980B
Date:	February 8, 1996
Client Name:	Ensafe/Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	November 6, 1995
Number of Samples:	1 Aqueous Sample(s) with MS/MSD(s) 18 Non-aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Volatiles, Semivolatiles, Pesticides/PCB's, Metals, pH, Cyanide

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig A. Sexson

Eugene M. Watson, Vice President

2-28-96

Date0

6716 Mexico Road · St. Peters, MO 63376
(314) 928-9533 · (314) 278-1828 · Fax (314) 278-2709

SDG# 23980B

Samples and Fractions Reviewed

Sample Identifications — Analytical Fractions

ENSAFE ID	MATRIX	VOA		SV		P/P		TAL		pH		CN	
559SB00101	SOIL		X		X		X		X				X
559SB00102	SOIL		X		X		X		X				X
559SB00601	SOIL		X		X		X		X				X
559SB00602	SOIL		X		X		X		X				X
559SB00701	SOIL		X		X		X		X				X
559SB00702	SOIL		X		X		X		X				X
559SB00801	SOIL		X		X		X		X				X
559SB00802	SOIL		X		X		X		X				X
559SB01301	SOIL		X		X		X		X				X
559TB01301	WATER	X											
559SB01302	SOIL		X		X		X		X				X
559SB01401	SOIL		X		X		X		X				X
559SB01402	SOIL		X		X		X		X				X
570SB00201	SOIL		X		X				X		X		
570SB00202	SOIL		X		X				X		X		
570SB01301	SOIL		X		X				X		X		
570SB01302	SOIL		X		X				X		X		
570SB01401	SOIL		X		X				X		X		
570SB01402	SOIL		X		X				X		X		
Total Billable Samples	(Water/Soil)	1	18	0	18	0	12	0	18	0	6	0	12

VOA = SW846 Volatiles
SV = SW846 Semivolatiles
P/P = SW846 Pesticides/PCB's
TAL = SW846 Metals w/Cyanide
pH = SW846 pH
CN = SW846 Cyanide

DATA ASSESSMENT AND NARRATIVE

VOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA 8240; the National Functional Guidelines for Organic Data Review, June 1991, and DQO Level III. All comments made within this report should be considered when examining the analytical results.

SDG # 23980

A validation was performed on the Volatile Data from SDG 23980. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
	•	Internal Standard Performance
	•	Blanks
	•	Surrogate Recoveries
*	•	Laboratory Control Samples
*	•	Field Duplicates
	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Internal Standards

All internal standard EICP areas did not meet the internal standard EICP area QA/QC criteria.

Specific Finding:

The Samples listed below, exhibited low internal standard areas. Qualify all associated positive results as estimated (J) and all non detects as estimated(UJ).

559SB01402	chlorobenzene-d_5
559SB00701	

Internal Standards (continued)

Specific Finding:

The Samples listed below, exhibited low internal standard areas. Qualify all associated positive results as estimated (J) and all non detects as estimated(UJ).

570SB01301RE	bromochloromethane
570SB00201RE	1,4-difluorobenzene
559SB00601	bromochloromethane
	1,4-difluorobenzene
	chlorobenzene-d_5

Method Blank

Associated blank	Compound	Concentration
VBLK2	acetone	14
	2-butanone	3J
VBLK3	methylene chloride	6
	Acetone	4J

Samples	Compound	Qualification
559SB00102	acetone	CRQL
559SB00601		
559SB01301		
559SB01401		
570SB01302		
559SB00602	acetone	U
559SB00701		
570SB01402		
559SB00702		

Method Blank (continued)

Samples	Compound	Qualification
559SB00602 559SB01301 570SB01302 570SB01402	2-butanone	CRQL
559SB00802 570SB01301 570SB01401 570SB00202DL 559SB00702	methylene chloride	U

Rinseate Blank

Associated blank	Compound	Concentration
559EB00402	methylene chloride	9

Samples	Compound	Qualification
559SB00101 559SB00102 559SB00801 559SB01302DL 559SB01401	methylene chloride	CRQL
559SB00601 559SB00701 570SB01402 570SB00201RE	methylene chloride	U

Surrogates

All of the surrogate recoveries for these samples were not within QA/QC limits.

Specific Finding:

Sample listed below exhibited high recoveries for toluene-d_8. Qualify all positive results as estimated (J).

559SB00101
559SB00601

Compound Identification /Quantitation

Reject samples 559SB01402RE, 559SB00101RE, 559SB00601RE, 559SB00701RE, 570SB01301RE, 570SB01401RE, in favor of the reanalysis analysis due to non compliant internal standard area and surrogate recoveries.

Reject 559SB01302, 570SB00201, and 599SB00202, in favor of diluted samples due to non compliant internal standard areas.

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
	All associated analytes	+/-	J/UJ
559SB01402	chlorobenzene-d_5		
559SB00701			
570SB01301RE	bromochloromethane		
570SB00201RE	1,4-difluorobenzene		
559SB00601	bromochloromethane		
	1,4-difluorobenzene		
	chlorobenzene-d_5		
559SB00102	acetone	+	CRQL
559SB00601			
559SB01301			
559SB01401			
570SB01302			
559SB00602	acetone	+	U
559SB00701			
570SB01402			
559SB00702			
559SB00602	2-butanone	+	CRQL
559SB01301			
570SB01302			
570SB01402			
559SB00802	methylene chloride	+	U
570SB01301			
570SB01401			
570SB00202DL			
559SB00702			

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
559SB00101 559SB00102 559SB00801 559SB01302DL 559SB01401	methylene chloride	+	CRQL
559SB00601 559SB00701 570SB01402 570SB00201RE	methylene chloride	+	U
559SB00101 559SB00601	all analytes	+	J
559SB01402RE 559SB00101RE 559SB00601RE 559SB00701RE 570SB01301RE 570SB01401RE	all analytes	+/-	R
559SB01302 599SB00202 570SB00201	all analytes	+/-	R

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE
METALS, HEX CR AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM03.0 Method; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23980

A validation was performed on the Metals Data from SDG 23980. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Calibrations
	•	Blanks
*	•	Interferences
*	•	Matrix Spike Recovery
*	•	Matrix Duplicates
*	•	Field Duplicates
*	•	Laboratory Control Samples
	•	Serial Dilutions
*	•	MSAs

* - All criteria were met for this parameter.

Preparation and Field Blanks

Specific Finding

The preparation blank exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Chromium	0.30 mg/kg	no impact
Nickel	0.20 mg/kg	no impact
Potassium	49.0 mg/kg	all soil samples below 245 mg/kg
Sodium	17.3 mg/kg	all soil samples below 86.5 mg/kg
Tin	2.59 mg/kg	all soil samples below 13.0 mg/kg

The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as non-detect, "U". The field or DI water blanks exhibited contamination but had no impact on the data.

Serial Dilution

Specific Findings

The Serial dilution for Potassium for soils was outside the control limits. All positive results are qualified as estimated, "J".

Specific Finding

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafe's request.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all soil samples below 245. mg/kg	K.	+	U
all soil samples below 86.5 mg/kg	Na.		
all soil samples below 13.0 mg/kg	Sn.		
all soil samples	K.	+	J
All "B" results	all analytes	B	J

DATA ASSESSMENT NARRATIVE
METALS, HEX CR AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM03.0 Method; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23980

A validation was performed on the Metals Data from SDG 23980. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Calibrations
	•	Blanks
*	•	Interferences
*	•	Matrix Spike Recovery
*	•	Matrix Duplicates
*	•	Field Duplicates
*	•	Laboratory Control Samples
	•	Serial Dilutions
*	•	MSAs

* - All criteria were met for this parameter.

Preparation and Field Blanks

Specific Finding

The preparation blank exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Chromium	0.13 mg/kg	no impact
Iron	2.38 mg/kg	no impact
Potassium	85.4 mg/kg	no impact
Tin	2.63 mg/kg	all FD samples

The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as non-detect, "U". The field or DI water blanks exhibited contamination but had no impact on the data.

Serial Dilution

Specific Findings

The Serial dilutions for Calcium and Potassium for soils were outside the control limits. All positive results are qualified as estimated, "J".

Specific Finding

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafe's request.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all soil samples	Sn.	+	U
all soil samples	Ca and K.	+	J
All "B" results	all analytes	B	J

DATA ASSESSMENT NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8270; the National Functional Guidelines for Organic Data Validation, June 1991, and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG #~~23890A~~ 23980

A validation was performed on the Semivolatile Data from SDG 23890A. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibration
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
*	•	Internal Standard Performance
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

Initial Calibrations

The initial calibration standards that were analyzed exhibited non-compliant %Ds and RRFs for which qualification of the data was required.

Initial Calibrations, continued

Specific Findings

The initial calibration, analyzed on 11/17/95 on instrument A, contained compounds with RRFs less than 0.05. For the samples and non-compliant compounds listed below, the positive results are qualified as estimated, J, and the non-detect results are rejected, R.

559CB00601	Methapyrilene (0.016)
559CB01301	Aramite (0.030)

The initial calibration, analyzed on 11/17/95 on instrument A, contained compounds with %Ds greater than 90%. For the samples and non-compliant compounds listed below, the positive results are qualified as estimated, J, and the non-detect results are rejected, R.

559CB00601	4-nitroquinoline-1-oxide (299.6%)
559CB01301	hexachlorophene (257%)

The initial calibration, analyzed on 11/17/95 on instrument A, contained compounds with %Ds greater than 50% but less than 90%. For the samples and non-compliant compounds listed below, the positive results are qualified as estimated, J, and the non-detect results are qualified as estimated, UJ.

559CB00601	1,3,5-trinitrobenzene (54.7%)
559CB01301	

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 5% of data required qualifications

.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
559CB00601 559CB01301	Methapyrilene Aramite	+/-	J/R
559CB00601 559CB01301	4-nitroquinoline-1-oxide hexachlorophene	+/-	J/R
559CB00601 559CB01301	1,3,5-trinitrobenzene	+/-	J/UJ

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	23998
Date:	February 25, 1996
Client Name:	Ensafe/ Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	November 7, 1995
Number of Samples:	3 Aqueous Sample(s) with 0 MS/MSD(s) 10 Non-aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Volatiles, Semivolatiles, Pesticide/PCB's, Metals, Cyanide

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig B. Sherman
Eugene M. Watson, Vice President

2-29-96
Date

4127 Plaza 94 South · St. Charles, MO 63304
(314) 936-1332 · Fax (314) 936-1335

SDG# 23998

Samples and Fractions Reviewed

Sample Identifications — Analytical Fractions

ENSAFE ID	MATRIX	VOA		SV		P/P		TAL		CN	
538SB00101	SOIL		X		X		X		X		
538SB00102	SOIL		X		X		X		X		
559SB01001	SOIL		X		X		X		X		X
559TB01001	WATER	X									
559EB01001	WATER	X		X		X		X		X	
559DB01001	WATER	X		X		X		X		X	
559SB01002	SOIL		X		X		X		X		X
559SB01201	SOIL		X		X		X		X		X
559SB01202	SOIL		X		X		X		X		X
559SB01501	SOIL		X		X		X		X		X
559SB01502	SOIL		X		X		X		X		X
559SB01701	SOIL		X		X		X		X		X
559SB01702	SOIL		X		X		X		X		X
Total Billable Samples (Water/Soil)		3	10	2	10	2	10	2	10	2	8

VOA = SW846 Volatiles
SV = SW846 Semivolatiles
P/P = SW846 Pesticides/PCB's
CN = SW846 Cyanide
TAL = SW846 Metals

DATA ASSESSMENT AND NARRATIVE

VOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA 8240; the National Functional Guidelines for Organic Data Review, June 1991, and DQO Level III. All comments made within this report should be considered when examining the analytical results.

SDG # 23998

A validation was performed on the Volatile Data from SDG 23998. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
	•	Internal Standard Performance
	•	Blanks
	•	Surrogate Recoveries
*	•	Laboratory Control Samples
*	•	Field Duplicates
	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Internal Standards

All internal standard EICP areas did not meet the internal standard EICP area QA/QC criteria.

Specific Finding:

The Samples listed below, exhibited low internal standard areas. Qualify all associated positive results as estimated (J) and all non detects as estimated(UJ).

559SB01502RE	chlorobenzene-d_5
559SB01702RE	
559SB01001RE	

Internal Standards (continued)

Specific Finding:

The Samples listed below, exhibited low internal standard areas. Qualify all associated positive results as estimated (J) and all non detects as estimated(UJ).

559SB01201	chlorobenzene-d_5
559SB01501RE	bromochloromethane
559SB01701	1,4-difluorobenzene
	chlorobenzene-d_5

Method Blank

Associated blank	Compound	Concentration
VBLK3	methylene chloride	6
	Acetone	4J
VBLK5	methylene chloride	9

Samples	Compound	Qualification
538SB00101	methylene chloride	U
538SB00102		
559SB01701		
559SB01002		
559SB01202		
538SB00101	acetone	U
538SB00102		
559SB01701		
559SB01002	acetone	CRQL

Surrogates

All of the surrogate recoveries for these samples were not within QA/QC limits.

Specific Finding:

Sample listed below exhibited high recoveries for toluene-d_8. Qualify all positive results as estimated (J).

559SB01501RE
559SB01001RE

Sample listed below exhibited high recoveries for toluene-d_8 and bromofluorobenzene. Qualify all positive results as estimated (J) and non detects as estimated (UJ).

559SB01701

Compound Identification /Quantitation

Reject samples 559SB01501, 559SB01502, 559SB01701RE, 559SB01702, 559SB01001, and 559SB01201RE, in favor of initial or reanalysis due to non compliant surrogate and internal standard area recoveries.

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL =	The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.
U =	The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.
No Action =	The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
559SB01502RE 559SB01702RE 559SB01001RE 559SB01201	All associated analytes chlorobenzene-d_5	+/-	J/UJ
559SB01501RE 559SB01701	bromochloromethane 1,4-difluorobenzene chlorobenzene-d_5		
538SB00101 538SB00102 559SB01701 559SB01002 559SB01202	methylene chloride	+	U
538SB00101 538SB00102 559SB01701	acetone	+	U
559SB01002	acetone	+	CRQL
559SB01501RE 559SB01001RE	all analytes	+	J
559SB01701	All analytes	+/-	J/UJ
559SB01501 559SB01502 559SB01701RE 559SB01702 559SB01001 559SB01201RE	all analytes	+/-	R

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE
METALS, HEX CR AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM03.0 Method; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23998

A validation was performed on the Metals Data from SDG 23998. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Calibrations
	•	Blanks
*	•	Interferences
*	•	Matrix Spike Recovery
*	•	Matrix Duplicates
*	•	Field Duplicates
*	•	Laboratory Control Samples
*	•	Serial Dilutions
*	•	MSAs

* - All criteria were met for this parameter.

Preparation and Field Blanks

Specific Finding

The preparation blank exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Calcium	34.7 mg/kg	no impact
Chromium	0.19 mg/kg	no impact
Tin	2.33 mg/kg	all soil samples below 11.7 mg/kg

The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as non-detect, "U". The field or DI water blanks exhibited contamination but had no impact on the data.

The preparation blank exhibited negative bias for the following elements.

Elements	Conc.	Samples affected
Potassium	-29.8 mg/kg	all soil samples below 298 mg/kg

This reviewer qualifies all samples results below ten times the negative bias as estimated, "J" or "UJ".

Specific Finding

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafe's request.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all soil samples below 149 mg/kg	Sn.	+	U
all soil samples below 298 mg/kg	K.	+/U	J/UJ
All "B" results	all analytes	B	J

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846, Method 8270; National Functional Guidelines for Organic Data Review, and DQO Level III. All comments made within this report should be considered when examining the analytical results (Form I's).

SDG # 23801B

A validation was performed on the Semivolatile Data from SDG 23801B. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
*	•	Internal Standard Performance
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

NJ = Presumptive evidence for the presence of the material at an estimated value

K = Result is biased high

L = Result is biased low

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL

No qualifications are required.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

SDG# 23998

Samples and Fractions Reviewed

Sample Identifications — Analytical Fractions

ENSAFE ID	MATRIX	VOA		SV		P/P		TAL		CN	
538SB00101	SOIL		X		X				X		
538SB00102	SOIL		X		X				X		
559SB01001	SOIL		X		X		X		X		X
559TB01001	WATER	X									
559EB01001	WATER	X		X		X		X		X	
559DB01001	WATER	X		X		X		X		X	
559SB01002	SOIL		X		X		X		X		X
559SB01201	SOIL		X		X		X		X		X
559SB01202	SOIL		X		X		X		X		X
559SB01501	SOIL		X		X		X		X		X
559SB01502	SOIL		X		X		X		X		X
559SB01701	SOIL		X		X		X		X		X
559SB01702	SOIL		X		X		X		X		X
Total Billable Samples	(Water/Soil)	3	10	2	10	2	8	2	10	2	8

VOA = SW846 Volatiles
SV = SW846 Semivolatiles
P/P = SW846 Pesticides/PCB's
CN = SW846 Cyanide
TAL = SW846 Metals

SDG# 24105B

Samples and Fractions Reviewed

Sample Identifications — Analytical Fractions

ENSAFE ID	MATRIX	VOA		SV		P/P		ORG		CN		TAL		pH	
054SB00402	SOIL				X				X				X		
054SB00501	SOIL				X				X				X		
054SB00502	SOIL				X				X				X		
054SB00601	SOIL				X				X				X		
054TB00601	WATER	X													
054EB00601	WATER	X		X		X				X		X			
054DB00601	WATER	X		X		X				X		X			
054SB00602	SOIL				X				X				X		
054SB00701	SOIL				X				X		X		X		
054SB00702	SOIL				X				X		X		X		
054SB00801	SOIL				X				X		X		X		
054SB00802	SOIL				X				X		X		X		
526SB00401	SOIL				X				X				X		
526TB00402	WATER	X													
526SB00701	SOIL		X		X		X		X				X		
526SB00702	SOIL		X		X		X		X				X		
526SB00801	SOIL		X		X		X		X				X		
526SB00802	SOIL		X		X		X		X				X		
570SB01101	SOIL		X		X								X		X
570SB01102	SOIL		X		X								X		X
Total Billable Samples (Water/Soil)		4	6	2	16	2	4	0	14	2	4	2	16	0	2

VOA = SW846 Volatiles
SV = SW846 Semivolatiles
P/P = SW846 Pesticides/PCB's
ORG = SW846 Organotins
CN = SW846 Cyanide
TAL = SW846 Metals
pH = SW846 pH

SDG# 23663B

Samples and Fractions Reviewed

Sample Identifications — Analytical Fractions

ENSAFE ID	MATRIX	VOA		SV		P/P		CN		TAL	
065SB00301	SOIL		X		X		X		X		X
065SB00302	SOIL		X		X		X		X		X
065SB00401	SOIL		X		X		X		X		X
065SB00501	SOIL		X		X		X		X		X
065TB00501	WATER	X									
065SB00502	SOIL		X		X		X		X		X
065SB00601	SOIL		X		X		X		X		X
065SB00602	SOIL		X		X		X		X		X
100SB00101	SOIL		X		X		X		X		X
100EB00101	WATER	X		X		X		X		X	
100DB00101	WATER	X		X		X		X		X	
100SB00102	SOIL		X		X		X		X		X
100SB00201	SOIL		X		X		X		X		X
100SB00202	SOIL		X		X		X		X		X
100SB00301	SOIL		X		X		X		X		X
100SB00302	SOIL		X		X		X		X		X
544SB00101	SOIL		X		X		X		X		X
544SB00102	SOIL		X		X		X		X		X
544TB00102	WATER	X									
544SB00201	SOIL		X		X		X		X		X
544SB00202	SOIL		X		X		X		X		X
544SB00401	SOIL		X		X		X		X		X
544SB00402	SOIL		X		X		X		X		X
552SB00101	SOIL		X		X				X		X
552SB00102	SOIL		X		X				X		X
552SB00201	SOIL		X		X				X		X
552SB00202	SOIL		X		X				X		X
Total Billable Samples	(Water/Soil)	4	23	2	23	2	19	2	23	2	23

VOA = SW846 Volatiles
SV = SW846 Semivolatiles
P/P = SW846 Pesticides/PCB's
CN = SW846 Cyanide
TAL = SW846 Metals

SDG# 23922B

Samples and Fractions Reviewed

Sample Identifications — Analytical Fractions

ENSAFE ID	MATRIX	VOA		SV		P/P		ORG		TAL		CN		pH	
054M000101	SOIL				X				X		X				
054M000201	SOIL				X				X		X				
054M000301	SOIL				X				X		X				
054M000401	SOIL				X				X		X				
0655000301	SOIL		X		X		X				X		X		
0656000301	SOIL		X		X		X				X		X		
065SB00201	SOIL		X		X		X		X		X		X		X
065SBFP602	SOIL				X		X								
531EB00101	WATER	X		X		X				X		X			
531DB00101	WATER	X		X		X				X		X			
546GM00101	SOIL		X		X		X		X		X		X		X
556M000101	SOIL		X		X		X				X		X		
556M000901	SOIL		X		X		X				X		X		
556TB00101	WATER	X													
572GM00101	SOIL		X		X						X				
573SB00101	SOIL		X		X						X				X
573TB00101	WATER	X													
573SB00102	SOIL		X		X						X				X
596SB00901	SOIL		X		X						X				
596TB00901	WATER	X													
596SB00902	SOIL		X		X						X				
596SB01001	SOIL		X		X						X				
596SB01002	SOIL		X		X						X				
596SB01201	SOIL		X		X						X				
596SB01202	SOIL		X		X						X				
Total Billable Samples	(Water/Soil)	5	15	2	20	2	7	0	6	2	19	2	6	0	4

VOA = SW846 Volatiles
SV = SW846 Semivolatiles
P/P = SW846 Pesticides/PCB's
CN = SW846 Cyanide
TAL = SW846 Metals
pH = SW846 pH
ORG = SW846 Organotins

DATA ASSESSMENT NARRATIVE

CHLORINATED PESTICIDES/PCBs

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8080; the National Functional Guidelines for Organic Data Validation, June 1991, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23998

A validation was performed on the Chlorinated Pesticide/PCB Data from SDG 23998. The data was evaluated based on the following parameters:

* Data Completeness
* Holding Times
* Calibration
* Blanks
* Matrix spikes/Matrix spike duplicates
  Surrogate Recoveries
* Compound Identification
* Compound Quantitation

* - All criteria were met for this parameter.

Surrogate Recoveries

Three samples exhibit surrogate recoveries greater than the upper limit. Qualify all positive results as estimated (J).

SAMPLE ID	SURROGATE	%REC
559SB01501	DCB-1	162
559SB01001	DCB-1	264
559SB01001	DCB-2	204
559SB01201	DCB-1	308
559SB01201	DCB-2	307

System Performance and Overall Assessment

Overall performance was acceptable. The data did require qualifications/rejections as stated above.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated Value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for the analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non-detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	SURROGATE	%REC
559SB01501	DCB-1	162
559SB01001	DCB-1	264
559SB01001	DCB-2	204
559SB01201	DCB-1	308
559SB01201	DCB-2	307

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non-detect result.

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846, Method 8270; National Functional Guidelines for Organic Data Review, and DQO Level III. All comments made within this report should be considered when examining the analytical results (Form I's).

SDG # 23998B

A validation was performed on the Semivolatile Data from SDG 23998B. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
	•	Internal Standard Performance
	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Continuing calibrations

The continuing calibrations that were analyzed with this data package exhibited %Ds that were not within %D continuing calibration criteria. All RRFs were within calibration criteria.

Continuing calibrations (continued)

Specific Finding:

The continuing calibration, S0428, contained compounds with %Ds greater than 25% but less than 50%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J).

559SB01001	benzo(b)fluoranthene (26.2)
559SB01201	
559SB01202	
559SB01701	

Method Blanks

Associated blank	Compound	Conc.	Action Level
SBLK1	bis(2-ethylhexyl)phthalate	240J	2400

Samples	Compound	Qualification
538SB00101	bis(2-ethylhexyl)phthalate	CRQL
538SB00201		
559SB01501		
559SB01501		
559SB01502		
559SB01701		
559SB01702		
559SB01201		
559SB01202		
559SB01001		
559SB01002		

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

NJ = Presumptive evidence for the presence of the material at an estimated value

K = Result is biased high

L = Result is biased low

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
559SB01001	benzo(b)fluoranthene (26.2)	+	J
559SB01201			
559SB01202			
559SB01701			
538SB00101	bis(2-ethylhexyl)phthalate	+	CRQL
538SB00201			
559SB01501			
559SB01501			
559SB01502			
559SB01701			
559SB01702			
559SB01201			
559SB01202			
559SB01001			
559SB01002			

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

CHLORINATED PESTICIDES/PCBs

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8080; the National Functional Guidelines for Organic Data Validation, June 1991, and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 23980

A validation was performed on the Chlorinated Pesticide/PCB Data from SDG 23980. The data was evaluated based on the following parameters:

*	Data Completeness
*	Holding Times
*	Calibration
*	Blanks
	Surrogate Recoveries
*	Matrix Spike/Matrix Spike Duplicates
*	Field Duplicates
*	Compound Identification
*	Compound Quantitation

* - All criteria were met for this parameter.

Surrogate Recoveries

One samples exhibited percent recoveries greater than the upper limit. Qualify all positive results as estimated (J).

Sample ID	Surrogate	%Rec
559CB00601	DCB-1	308
559CB00601	DCB-2	192

System Performance and Overall Assessment

Overall performance was acceptable. The data did require qualifications/rejections as stated above.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated Value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for the analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non-detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL
559CB00601	ALL	+/-	J/UJ

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non-detect result.

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	24010A
Date:	February 25, 1996
Client Name:	Ensafe/ Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	November 7-8, 1995
Number of Samples:	2 Aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level IV
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Volatiles, Semivolatiles, Pesticides/PCB's, Herbicides, Organophosphorus Pesticides, Dioxin/Furans, Hexavalent Chromium, Metals, Cyanide

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig H. Searson — 2-29-96.

Eugene M. Watson, Vice President — Date

4127 Plaza 94 South · St. Charles, MO 63304
(314) 936-1332 · Fax (314) 936-1335

SDG# 24010A

Samples and Fractions Reviewed

Sample Identifications — Analytical Fractions

ENSAFE ID	MATRIX	VOA		SV		P/P		HERB		OPP		D/F		HCR		TAL/CN	
556R000501	WATER	X		X		X		X		X		X		X		X	
556R000903	WATER	X		X		X		X		X		X		X		X	
Total Billable Samples (Water/Soil)		2	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0

VOA = SW846 Volatiles
SV = SW846 Semivolatiles
P/P = SW846 Pesticides/PCB's
HERB = SW846 Herbicides
OPP = SW846 Organophosphorus Pesticides
D/F = SW846 Dioxin/Furans
HCR = SW846 Hexavalent Chromium
TAL/CN = SW846 Metals w/Cyanide

DATA ASSESSMENT AND NARRATIVE

VOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA 8240 Appendix IX; the National Functional Guidelines for Organic Data Review, June 1991, and DQO Level IV. All comments made within this report should be considered when examining the analytical results.

SDG # 24010

A validation was performed on the Volatile Data from SDG 24010. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibrations
*	•	Internal Standard Performance
	•	Blanks
*	•	Surrogate Recoveries
*	•	Laboratory Control Samples
*	•	Field Duplicates
*	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Continuing calibrations

The continuing calibrations that were analyzed with this data package exhibited %Ds and RRFs that were not within continuing calibration criteria. Qualifications are required.

Continuing calibrations (continued)

Specific Finding:

The continuing calibration, R20772.D and C18899.D, contained compounds with %Ds greater than 25%, and RRFs less than 0.050 . For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and non detects as rejected (R).

556R000903 556R000501	isobutyl alcohol

The continuing calibration, R20772.D and C18899.D, contained compounds with RRFs less than 0.050 . For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and non detects as rejected (R).

556R000903 556R000501	acetonitrile

The continuing calibration, R20772.D, contained compounds with %Ds greater than 50%, and less than 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and non detects as rejected (R).

556R000903 556R000501	dichlorodifluoromethane

Trip Blank

Associated blank	Compound	Concentration
556TB00601	methylene chloride	27
	Acetone	14

Samples	Compound	Qualification
556R000501 556R000903	methylene chloride	U
556R000501	acetone	CRQL

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL =	The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.
U =	The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.
No Action =	The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
556R000903 556R000501	isobutyl alcohol	+/-	J/R
556R000903 556R000501	acetonitrile	+/-	J/R
556R000903 556R000501	dichlorodifluoromethane	+/-	J/R
556R000501 556R000903	methylene chloride	+	U
556R000501	acetone	+	CRQL

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE
METALS, HEX CR AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM03.0 Method; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24010

A validation was performed on the Metals Data from SDG 24029. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Calibrations
	•	Blanks
*	•	Interferences
*	•	Matrix Spike Recovery
*	•	Matrix Duplicates
*	•	Field Duplicates
*	•	Laboratory Control Samples
	•	Serial Dilutions
*	•	MSAs

* - All criteria were met for this parameter.

Preparation and Field Blanks

Specific Finding

The preparation blank exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Chromium	2.41 ug/l	all water samples

The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as non-detect, "U". The field or DI water blanks exhibited contamination but had no impact on the data.

The preparation blank exhibited negative bias for the following elements.

Elements	Conc.	Samples affected
Potassium	-87.2 mg/kg	all soil samples below 872 mg/kg
Potassium	-9.69 ug/l	no impact

This reviewer qualifies all samples results below ten times the negative bias as estimated, "J" or "UJ".

Serial Dilution

Specific Findings

The Serial dilutions for Calcium, Iron and Potassium for waters were outside the control limits. All positive results are qualified as estimated, "J".

Specific Finding

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafe's request.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all water samples	Cr.	+	U
all soil samples below 872 mg/kg	K.	+/U	J/UJ
all water samples	Ca, Fe and K.	+	J
All "B" results	all analytes	B	J

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	24010B
Date:	February 25, 1996
Client Name:	Ensafe/ Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	November 7-8, 1995
Number of Samples:	25 Aqueous Sample(s) with 0 MS/MSD(s) 3 Non-aqueous Sample(s) with 1 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Volatiles, Semivolatiles, Pesticide/PCB's, Metals, Cyanide

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig H. Sewson
Eugene M. Watson, Vice President

2-29-96
Date

4127 Plaza 94 South · St. Charles, MO 63304
(314) 936-1332 · Fax (314) 936-1335

SDG# 24010B

Samples and Fractions Reviewed

Sample Identifications — Analytical Fractions

ENSAFE ID	MATRIX	VOA		SV		P/P		CN		TAL	
065SB00603	SOIL						X				X
531JF00101	WATER					X					
531JF00201	WATER					X					
531JF00301	WATER					X					
531JF00401	WATER					X					
556W000101	WATER	X		X		X		X		X	
556W000102	WATER	X		X		X		X		X	
556W000103	WATER	X		X		X		X		X	
556W000401	WATER	X		X		X		X		X	
556W000501	WATER	X		X		X		X		X	
556W000601	WATER	X		X		X		X		X	
556W000602	WATER	X		X		X		X		X	
556W000603	WATER	X		X		X		X		X	
556W000701	WATER	X		X		X		X		X	
556W000702	WATER	X		X				X		X	
556W000702	WATER	X		X				X		X	
556W000801	WATER	X		X		X		X		X	
556W000802	WATER	X		X		X		X		X	
556W000803	WATER	X		X		X		X		X	
556W000901	WATER	X		X		X		X		X	
556W000902	WATER	X		X		X		X		X	
556W000903	WATER	X		X		X		X		X	
602JF00101	WATER					X					
602JF00201	WATER					X					
602JF00301	WATER					X					
602JF00401	WATER					X					
054SB00301	SOIL		X		X				X		X
054SB00302	SOIL		X		X				X		X
Total Billable Samples	(Water/Soil)	17	2	17	2	23	1	17	2	17	3

VOA = SW846 Volatiles
SV = SW846 Semivolatiles
P/P = SW846 Pesticides/PCB's
CN = SW846 Cyanide
TAL = SW846 Metals

DATA ASSESSMENT NARRATIVE
METALS, HEX CR AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM03.0 Method; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24010

A validation was performed on the Metals Data from SDG 24029. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Calibrations
	•	Blanks
*	•	Interferences
*	•	Matrix Spike Recovery
*	•	Matrix Duplicates
*	•	Field Duplicates
*	•	Laboratory Control Samples
	•	Serial Dilutions
*	•	MSAs

* - All criteria were met for this parameter.

Preparation and Field Blanks

Specific Finding

The preparation blank exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Chromium	2.41 ug/l	all water samples

The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as non-detect, "U". The field or DI water blanks exhibited contamination but had no impact on the data.

The preparation blank exhibited negative bias for the following elements.

Elements	Conc.	Samples affected
Potassium	-87.2 mg/kg	all soil samples below 872 mg/kg
Potassium	-9.69 ug/l	no impact

This reviewer qualifies all samples results below ten times the negative bias as estimated, "J" or "UJ".

Serial Dilution

Specific Findings

The Serial dilutions for Calcium, Iron and Potassium for waters were outside the control limits. All positive results are qualified as estimated, "J".

Specific Finding

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafe's request.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all water samples	Cr.	+	U
all soil samples below 872 mg/kg	K.	+/U	J/UJ
all water samples	Ca, Fe and K.	+	J
All "B" results	all analytes	B	J

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	24010
Date:	April 12, 1996
Client Name:	Ensafe/Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	November 7, 1995
Number of Samples:	1 Non-aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively with Region IV Modifications
QA/QC Level:	EPA DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Gasoline Range Organics, Diesel Range Organics

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Seerfoss
Eugene M. Watson, Vice President

4-12-96
Date

4127 Plaza 94 South · St. Charles, MO 63304
(314) 936-1332 · Fax (314) 936-1335

SDG# 24010

Samples and Fractions Reviewed

Sample Identifications Analytical Fractions

ENSAFE ID	MATRIX	GRO		DRO	
065SB00603	SOIL		X		X
Total Billable Samples (Water/Soil)		0	1	0	1

GRO= SW846 Gasoline range Organics
DRO= SW846 Diesel Range Organics

DATA ASSESSMENT NARRATIVE

TPH - EXTRACTABLES AND PURGEABLES

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, calibration results, surrogate and matrix spike recoveries, and GC performance. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8015, modified for extractable and purgeable TPH; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level III requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 24010

A validation was performed on the TPH by GC data from SDG 24010. The data was evaluated based on the following parameters.

* • Data Completeness
* • Holding Times
* • GC/MS Tuning
* • Calibrations
* • Internal Standard Performance
* • Blanks
* • Surrogate Recoveries
* • Matrix Spike/Matrix Spike Duplicate
* • Field Duplicates
* • Identification/Quantitation

* - All criteria were met for this parameter.

Overall Performance

Overall performance was acceptable.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL

NO QUALIFICATIONS WERE REQUIRED.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

CHLORINATED PESTICIDES/PCBs

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8080; the National Functional Guidelines for Organic Data Validation, June 1991, and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24010

A validation was performed on the Chlorinated Pesticide/PCB Data from SDG 24010. The data was evaluated based on the following parameters:

* Data Completeness
* Holding Times
* Calibration
* Blanks
* Surrogate Recoveries
* Matrix Spike/Matrix Spike Duplicates
* Field Duplicates
* Compound Identification
* Compound Quantitation

* - All criteria were met for this parameter.

System Performance and Overall Assessment

Overall performance was acceptable. The data did not require qualifications/rejections.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated Value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for the analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non-detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL

NO QUALIFICATIONS WERE REQUIRED

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non-detect result.

DATA ASSESSMENT NARRATIVE

CHLORINATED PESTICIDES/PCBs

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8080; the National Functional Guidelines for Organic Data Validation, June 1991, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24010

A validation was performed on the Chlorinated Pesticide/PCB Data from SDG 24010. The data was evaluated based on the following parameters:

*	Data Completeness
*	Holding Times
	Calibration
*	Blanks
*	Matrix spikes/Matrix spike duplicates
	Surrogate Recoveries
*	Compound Identification
*	Compound Quantitation

* - All criteria were met for this parameter.

Calibration

The initial calibration exhibits non-linearity for some compounds. Qualify all positive results for the non-linear compounds as estimated (J).

Analyte	%RSD
delta-BHC	21.79
gamma-BHC	21.13
Endrin	27.07
4,4'-DDT	21.38
4,4'-DDD	24.71

The calibration verification shows percent differences greater than 15% for some compounds. Qualify positive results for specific compounds as estimated (J).

Analyte	%D
alpha-BHC	18.2
4,4'-DDT	30.8
Methoxychlor	17.3
Tetrachloro-m-xylene	20.3

Surrogate Recoveries

One sample exhibits surrogate recoveries greater than 10% and less than the lower limit. Qualify all positive results as estimated (J) and all non-detect results as estimated (UJ).

SAMPLE ID	SURROGATE	%REC
065SB00603	DCB-1	36
065SB00603	DCB-2	34

System Performance and Overall Assessment

Overall performance was acceptable. The data did require qualifications/rejections as stated above.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated Value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL =	The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for the analyte is reported.
U =	The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non-detected at the analyte value reported.
No Action =	The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL
556W000701MS	alpha-BHC	+	J
556W000701MS	delta-BHC	+	J
556W000701MS	gamma-BHC	+	J
556W000701MS	Endrin	+	J
556W000701MS	4,4'-DDD	+	J
556W000701MSD	alpha-BHC	+	J
556W000701MSD	gamma-BHC	+	J
556W000701MSD	Endrin	+	J
556W000701MSD	4,4'-DDD	+	J
556W000701MSD	4,4'-DDT	+	J
556W000701MSD	Methoxychlor	+	J

SAMPLE ID	SURROGATE	%REC
065SB00603	DCB-1	36
065SB00603	DCB-2	34

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non-detect result.

DATA ASSESSMENT NARRATIVE

CHLORINATED PESTICIDES/PCBs

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8080; the National Functional Guidelines for Organic Data Validation, June 1991, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24010

A validation was performed on the Chlorinated Pesticide/PCB Data from SDG 24010. The data was evaluated based on the following parameters:

*	Data Completeness
*	Holding Times
	Calibration
*	Blanks
*	Matrix spikes/Matrix spike duplicates
	Surrogate Recoveries
*	Compound Identification
*	Compound Quantitation

* - All criteria were met for this parameter.

Calibration

The initial calibration exhibits non-linearity for some compounds. Qualify all positive results for the non-linear compounds as estimated (J).

Analyte	%RSD
delta-BHC	21.79
gamma-BHC	21.13
Endrin	27.07
4,4'-DDT	21.38
4,4'-DDD	24.71

The calibration verification shows percent differences greater than 15% for some compounds. Qualify positive results for specific compounds as estimated (J).

Analyte	%D
alpha-BHC	18.2
4,4'-DDT	30.8
Methoxychlor	17.3
Tetrachloro-m-xylene	20.3

Surrogate Recoveries

One sample exhibits surrogate recoveries greater than 10% and less than the lower limit. Qualify all positive results as estimated (J) and all non-detect results as estimated (UJ).

SAMPLE ID	SURROGATE	%REC
065SB00603	DCB-1	36
065SB00603	DCB-2	34

System Performance and Overall Assessment

Overall performance was acceptable. The data did require qualifications/rejections as stated above.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated Value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for the analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non-detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL
556W000701MS	alpha-BHC	+	J
556W000701MS	delta-BHC	+	J
556W000701MS	gamma-BHC	+	J
556W000701MS	Endrin	+	J
556W000701MS	4,4'-DDD	+	J
556W000701MSD	alpha-BHC	+	J
556W000701MSD	gamma-BHC	+	J
556W000701MSD	Endrin	+	J
556W000701MSD	4,4'-DDD	+	J
556W000701MSD	4,4'-DDT	+	J
556W000701MSD	Methoxychlor	+	J

SAMPLE ID	SURROGATE	%REC
065SB00603	DCB-1	36
065SB00603	DCB-2	34

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non-detect result.

DATA ASSESSMENT NARRATIVE

ORGANOPHOSPHORUS PESTICIDES

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW846 Method 8140; the National Functional Guidelines for Organic Data Validation, June 1991; and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24010A

A validation was performed on the Organophosphorus Pesticide Data from SDG 24010A. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC Performance
*	•	Calibration
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 10% of the data required qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL

NO QUALIFICATIONS ARE REQUIRED.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non-detect result

DATA ASSESSMENT NARRATIVE

CHLORINATED HERBICIDES

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW846 Method 8150; the National Functional Guidelines for Organic Data Validation, June 1991; and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24010A

A validation was performed on the Herbicide Data from SDG 24010A. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC Performance
*	•	Calibration
*	•	Blanks
	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

Surrogate Recoveries

One (1) sample exhibited a non-compliant DCAA recovery.

Surrogate Recoveries, Continued

Specific Finding

One (1) sample exhibited a low DCAA recovery. For the following sample, the positive results are qualified as estimated, J, and the non-detect results are qualified as estimated, UJ.

Sample ID	Surrogate	% Recovery
556R000501	DCAA	53%

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates greater than 40% of the data required qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
556R000501	ALL	+/-	J/UJ

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non-detect result

DATA ASSESSMENT NARRATIVE

DIOXIN/FURANS - 8290

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, internal standard recoveries, clean-up standard recoveries, matrix spike recoveries, GC/MS high resolution performance, tuning results, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8290; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level IV requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 24010

A validation was performed on the Dioxin/Furan Data from SDG 24010. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Mass Resolution Checks
*	•	Column Performance
*	•	Calibrations
*	•	Internal Standard Recovery
	•	Blanks
*	•	Laboratory Control Samples
N/A	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Congener Identification/Quantitation

* - All criteria were met for this parameter.

Method Blanks

Congener ID	MB Conc. (pg/L)	556R000501	Q	556R000903	Q
OCDD	8.6	57.1	NA	46.4	NA
OCDF	7.03	9.52	NA	10.3	NA

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	CONGENER ID	DL	QL
All samples	OCDD and OCDF	+B	NA

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	CONGENER ID	DL	QL
All samples	OCDD and OCDF	+B	NA

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8270; the National Functional Guidelines for Organic Data Validation, June 1991, and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24010A

A validation was performed on the Semivolatile Data from SDG 24010A. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibration
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
*	•	Internal Standard Performance
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

Calibrations

The initial and continuing calibrations standards that were analyzed exhibited non-compliant %RSDs, %Ds and RRFs for which qualification of the data was required.

Calibrations, continued

Specific Findings

The continuing calibration standards analyzed on 11/17/95 on instrument A contained compounds with %Ds greater than 90%. For the samples and non-compliant compounds listed below, the positive results are qualified as estimated, J, and the non-detect results are rejected, R.

556R000903	4-nitroquinoline-1-oxide (299.6%)
556R000501	hexachlorophene (257%)

The continuing calibration standards analyzed on 11/17/95 on instrument A contained compounds with RRFs less than 0.05. For the samples and non-compliant compounds listed below, the positive results are qualified as estimated, J, and the non-detect results are rejected, R.

556R000903	methapyrilene (0.016)
556R000501	aramite (0.030)

The continuing calibration standards analyzed on 11/17/95 on instrument A contained compounds with %Ds greater than 50% but less than 90%. For the samples and non-compliant compounds listed below, the positive results are qualified as estimated, J, and the non-detect results are qualified as estimated, UJ.

556R000903	1,3,5-trinitrobenzene (54.7)
556R000501	

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 5% of data required qualifications

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
556R000903 556R000501	4-nitroquinoline-1-oxide hexachlorophene	+/-	J/R
556R000903 556R000501	methapyrilene aramite	+/-	J/R
556R000903 556R000501	1,3,5-trinitrobenzene	+/-	J/UJ

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non detect result

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846, Method 8270; National Functional Guidelines for Organic Data Review, and DQO Level III. All comments made within this report should be considered when examining the analytical results (Form I's).

SDG # 24010B

A validation was performed on the Semivolatile Data from SDG 24010B. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
*	•	Internal Standard Performance
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

NJ = Presumptive evidence for the presence of the material at an estimated value

K = Result is biased high

L = Result is biased low

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL

No qualifications are required.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	24010S
Date:	March 15, 1996
Client Name:	Ensafe/ Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	November 8, 1995
Number of Samples:	6 Non-aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Organotin

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Simpson

Eugene M. Watson, Vice President

3-15-96

Date

4127 Plaza 94 South St Charles, MO 63304
(314) 936-1332 Fax (314) 936-1335

SDG# 24010S

Samples and Fractions Reviewed

Sample Identifications Analytical Fractions

ENSAFE ID	MATRIX	ORG	
054SB00301	SOIL		X
054SB00302	SOIL		X
556W000401	SOIL		X
556W000601	SOIL		X
556W000602	SOIL		X
556W000603	SOIL		X
Total Billable Samples (Water/Soil)		0	6

ORG = SW846 Organotins

DATA ASSESSMENT NARRATIVE

SEMIVOLATILES - ORGANOTINS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, calibration results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8270, modified for organotins; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level III requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 24010

A validation was performed on the volatile organics data from SDGs 24010. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
*	•	Internal Standard Performance
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Identification/Quantitation

* - All criteria were met for this parameter.

Overall Performance

The overall performance was acceptable except where noted.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL

No qualifications are required.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

SEMIVOLATILES - ORGANOTINS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, calibration results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8270, modified for organotins; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level III requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 24024

A validation was performed on the volatile organics data from SDGs 24024. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
*	•	Internal Standard Performance
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Identification/Quantitation

* - All criteria were met for this parameter.

Overall Performance

The overall performance was acceptable except where noted.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL

No qualifications are required.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846, Method 8270; National Functional Guidelines for Organic Data Review, and DQO Level III. All comments made within this report should be considered when examining the analytical results (Form I's).

SDG # 24024B

A validation was performed on the Semivolatile Data from SDG 24024B. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibrations
	•	Internal Standard Performance
	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Continuing calibrations

The continuing calibrations that were analyzed with this data package exhibited %Ds that were not within %D continuing calibration criteria. All RRFs were within calibration criteria.

Continuing calibrations (continued)

Specific Finding:

The continuing calibration, S0529, contained compounds with %Ds greater than 25% but less than 50%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J).

GDESB01501RE	benzo(b)fluoranthene (26.2)

Internal Standards

All internal standard EICP areas did not meet the internal standard EICP area QA/QC criteria.

Specific Finding:

The samples listed below, exhibited non compliant internal standard areas. Qualify all associated positive results as estimated (J) and all non detects as estimated (UJ).

GDESB01501	1,4-dichlorobenzene-d_4 naphthalene-d_8 acenaphthene-d_{10} phenanthrene-d_{10} chrysene-d_{12} perylene-d_{12}
559SB00201 GDESB01501RE	perylene-d_{12}
559SB00201RE	chrysene-d_{12} perylene-d_{12}

Compound Identification/Quantitation

Specific Finding:

Reject all results for samples listed below, due to non compliant internal standard areas.

559SB00201RE
GDESB01501

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

NJ = Presumptive evidence for the presence of the material at an estimated value

K = Result is biased high

L = Result is biased low

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
GDESB01501RE	benzo(b)fluoranthene (26.2)	+	J
GDESB01501	All associated 1,4-dichlorobenzene-d_4 naphthalene-d_8 acenaphthene-d_{10} phenanthrene-d_{10} chrysene-d_{12} perylene-d_{12}	+/-	J/UJ
559SB00201 GDESB01501RE	perylene-d_{12}		
559SB00201RE	chrysene-d_{12} perylene-d_{12}		
559SB00201RE GDESB01501	All analytes	+/-	R

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

CHLORINATED PESTICIDES/PCBs

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8080; the National Functional Guidelines for Organic Data Validation, June 1991, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24024

A validation was performed on the Chlorinated Pesticide/PCB Data from SDG 24024. The data was evaluated based on the following parameters:

*	Data Completeness
*	Holding Times
	Calibration
*	Blanks
*	Matrix spikes/Matrix spike duplicates
*	Surrogate Recoveries
*	Compound Identification
*	Compound Quantitation

* - All criteria were met for this parameter.

Calibration

The initial calibration exhibits non-linearity for some compounds.

Analyte	%RSD
4,4'-DDT	38

Qualify all positive results for the non-linear compounds as estimated (J).

System Performance and Overall Assessment

Overall performance was acceptable. The data did require qualifications/rejections as stated above.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated Value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL =	The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for the analyte is reported.
U =	The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non-detected at the analyte value reported.
No Action =	The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL
559SB00301	4,4'-DDT	+	J

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non-detect result.

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	24024
Date:	February 25, 1996
Client Name:	Ensafe/ Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	November 9, 1995
Number of Samples:	1 Aqueous Sample(s) with 0 MS/MSD(s) 11 Non-aqueous Sample(s) with 2 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Volatiles, Semivolatiles, Pesticides/PCB's, PCB's, Organotins, Cyanide, Metals

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig M. Simpson
Eugene M. Watson, Vice President

2-29-96
Date

4127 Plaza 94 South · St. Charles, MO 63304
(314) 936-1332 · Fax (314) 936-1335

SDG# 24024

Samples and Fractions Reviewed

Sample Identifications — Analytical Fractions

ENSAFE ID	MATRIX	VOA		SV		P/P		PCB		ORG		TAL		CN	
054SB00101	SOIL				X						X		X		
054SB00102	SOIL				X						X		X		
054SB00201	SOIL				X						X		X		
054SB00202	SOIL				X						X		X		
559SB00201	SOIL		X		X		X						X		X
559SB00202	SOIL		X		X		X						X		X
559SB00301	SOIL		X		X		X						X		X
559SB00302	SOIL		X		X		X						X		X
559SB00501	SOIL		X		X		X						X		X
559TB00501	WATER	X													
GDESB01501	SOIL		X		X		X						X		X
GDESB01502	SOIL		X		X		X						X		X
559JF00101	WIPE								X						
559JF00201	WIPE								X						
559JF00301	WIPE								X						
559JF00401	WIPE								X						
559JF00501	WIPE								X						
559JF00601	WIPE								X						
559JF00701	WIPE								X						
559JF00801	WIPE								X						
559JF00901	WIPE								X						
559JF01101	WIPE								X						
559EJ01001	WIPE								X						
Total Billable Samples (Water/Soil)		1	7	0	11	0	7	0	11	0	4	0	11	0	7

VOA = SW846 Volatiles
SV = SW846 Semivolatiles
P/P = SW846 Pesticides/PCB's
PCB = SW846 PCB's only
ORG = SW846 Organotins
CN = SW846 Cyanide
TAL = SW846 Metals

DATA ASSESSMENT AND NARRATIVE

VOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA 8240; the National Functional Guidelines for Organic Data Review, June 1991, and DQO Level III. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG # 24024

A validation was performed on the Volatile Data from SDG 24024. The data was evaluated based on the following parameters.

- * Data Completeness
- * Holding Times
- * GC/MS Tuning
- Calibrations
- Internal Standard Performance
- Blanks
- Surrogate Recoveries
- * Laboratory Control Samples
- * Field Duplicates
- Compound Identification /Quantitation

* - All criteria were met for this parameter

Initial Calibrations

The initial calibrations that were analyzed with this data package exhibited %Ds that were not within continuing calibration criteria. All RRFs were within initial calibration criteria.. Samples were analyzed after the calibrations, therefore qualifications are required.

Initial Calibrations (continued)

Specific Finding:

The initial calibration analyzed on 11/13/95, contained compounds with %Ds greater than 30%, but less than 50%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J).

559SB00302	acetone

Internal Standards

All internal standard EICP areas did not meet the internal standard EICP area QA/QC criteria.

Specific Finding:

The Samples listed below, exhibited low internal standard areas. Qualify all associated positive results as estimated (J) and all non detects as estimated(UJ).

559SB00302	chlorobenzene-d_5
559SB00301RE	
559SB00501RE	

Rinseate Blank

Associated blank	Compound	Concentration
559EB00402	methylene chloride	9

Samples	Compound	Qualification
559SB00201	methylene chloride	U
559SB00202		
559SB00301RE		
559SB00302		
559SB00501RE		
GDESB01502		
GDESB01501	methylene chloride	CRQL

Surrogates

All of the surrogate recoveries for these samples were not within QA/QC limits.

Specific Finding:

Sample listed below exhibited high recoveries for toluene-d8. Qualify all positive results as estimated (J).

559SB00302
559SB00501RE

Compound Identification /Quantitation

Reject sample 559SB00302RE, in favor of the initial analysis due to non compliant internal standard area recoveries.

Reject 559SB00301 and 559SB00501, in favor of the reanalysis, due to non compliant internal standard area and surrogate recoveries.

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL =	The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.
U =	The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.
No Action =	The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
559SB00302	acetone	+	J
559SB00302 559SB00301RE 559SB00501RE	All associated analytes chlorobenzene-d_5	+/-	J/UJ
559SB00201 559SB00202 559SB00301RE 559SB00302 559SB00501RE GDESB01502	methylene chloride	+	U
GDESB01501	methylene chloride	+	CRQL
559SB00302 559SB00501RE	All anlytes	+	J
559SB00302RE	All analytes	+/-	R
559SB00301 559SB00501	All analytes	+/-	R

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE
METALS, HEX CR AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM03.0 Method; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24024

A validation was performed on the Metals Data from SDG 24024. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Calibrations
	•	Blanks
*	•	Interferences
	•	Matrix Spike Recovery
	•	Matrix Duplicates
*	•	Field Duplicates
*	•	Laboratory Control Samples
	•	Serial Dilutions
*	•	MSAs

* - All criteria were met for this parameter.

Preparation and Field Blanks

Specific Finding

The preparation blank exhibited negative bias for the following elements.

Elements	Conc.	Samples affected
Potassium	-29.8 mg/kg	all soil samples below 298 mg/kg

This reviewer qualifies all samples results below ten times the negative bias as estimated, "J" or "UJ".

Matrix Spike Analysis

Specific Finding

The Matrix Spike recoveries for soils for Antimony, Copper, Iron, Nickel, Manganese, Tin and Zinc were below the lower control limits. All positive and non-detect results are qualified as estimated, "J" or "UJ".

The Matrix Spike recovery for Mercury was above the upper control limits. All positive results are qualified as estimated, "J".

Duplicate Analysis

Specific Finding

The duplicate analyses for Lead, Copper and Zinc outside the control limits. All positive results are qualified as estimated, "J". The RPDs for Iron, Manganese and Mercury were below 35% and will not be qualified.

Serial Dilution

Specific Finding

The Serial dilution for Zinc for soils was outside the control limits. All positive results will be qualified as estimated, "J".

Specific Finding

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafe's request.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
All soil samples below 872 mg/kg	K.	+/U	J/UJ
all soil samples	Sb, Cu, Fe, Ni, Mn, Sn and Zn.	+/U	J/UJ
all soil samples	Hg.	+	J
all soil samples	Pb, Cu and Zn.	+	J
all soil samples	Zn.	+	J
All "B" results	all analytes	B	J

DATA ASSESSMENT NARRATIVE

CHLORINATED PESTICIDES/PCBs

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8080; the National Functional Guidelines for Organic Data Validation, June 1991, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24024

A validation was performed on the Chlorinated Pesticide/PCB Data from SDG 24024. The data was evaluated based on the following parameters:

*	Data Completeness
*	Holding Times
	Calibration
*	Blanks
*	Matrix spikes/Matrix spike duplicates
*	Surrogate Recoveries
*	Compound Identification
*	Compound Quantitation

* - All criteria were met for this parameter.

Calibration

The initial calibration exhibits non-linearity for some compounds.

Analyte	%RSD
4,4'-DDT	38

Qualify all positive results for the non-linear compounds as estimated (J).

System Performance and Overall Assessment

Overall performance was acceptable. The data did require qualifications/rejections as stated above.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated Value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for the analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non-detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL
559SB00301	4,4'-DDT	+	J

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non-detect result.

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	24029A
Date:	February 25, 1996
Client Name:	Ensafe/ Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	November 10-13, 1995
Number of Samples:	3 Aqueous Sample(s) with 0 MS/MSD(s) 1 Non-aqueous Sample(s) with 1 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level IV
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Volatiles, Semivolatiles, Pesticides/PCB's, Herbicides, Organophosphorus Pesticides, Dioxin/Furans, Hexavalent Chromium Metals, Cyanide

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Simpson
Eugene M. Watson, Vice President

2-29-96.
Date

4127 Plaza 94 South · St. Charles, MO 63304
(314) 936-1332 · Fax (314) 936-1335

SDG# 24029A

Samples and Fractions Reviewed

Sample Identifications — Analytical Fractions

ENSAFE ID	MATRIX	VOA		SV		P/P		HERB		OPP		D/F		HCR		TAL/CN	
054EB00201	WATER	X		X		X		X		X		X		X		X	
054DB00201	WATER	X		X		X		X		X		X		X		X	
559CB00401	SOIL		X		X		X		X		X		X		X		X
559EB00402	WATER	X		X		X		X		X		X		X		X	
Total Billable Samples	(Water/Soil)	3	1	3	1	3	1	3	1	3	1	3	1	3	1	3	1

VOA = SW846 Volatiles
SV = SW846 Semivolatiles
P/P = SW846 Pesticides/PCB's
HERB = SW846 Herbicides
OPP = SW846 Organophosphorus Pesticides
D/F = SW846 Dioxin/Furans
HCR = SW846 Hexavalent Chromium
TAL/CN = SW846 Metals w/Cyanide

DATA ASSESSMENT AND NARRATIVE

VOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA 8240 Appendix IX; the National Functional Guidelines for Organic Data Review, June 1991, and DQO Level IV. All comments made within this report should be considered when examining the analytical results.

SDG # 24029A

A validation was performed on the Volatile Data from SDG 24029A. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibrations
*	•	Internal Standard Performance
	•	Blanks
*	•	Surrogate Recoveries
*	•	Laboratory Control Samples
*	•	Field Duplicates
*	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Continuing calibrations

The continuing calibrations that were analyzed with this data package exhibited %Ds and RRFs that were not within continuing calibration criteria. Qualifications are required.

Continuing calibrations (continued)

Specific Finding:

The continuing calibration, R20772.D and C18899.D, contained compounds with %Ds greater than 25%, and RRFs less than 0.050 . For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and non detects as rejected (R).

054EB00201	acrolein
054DB00201	acetonitrile
559EB00402	isobutyl alcohol
559CB00401	1,4-dioxane

The continuing calibration, R20772.D, contained compounds with %Ds greater than 25%, and less than 50%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and non detects as estimated (UJ).

054EB00201	methyl iodide
054DB00201	
559EB00402	

Rinseate Blank

Associated blank	Compound	Concentration
559EB00402	methylene chloride	9

Samples	Compound	Qualification
559CB00401	methylene chloride	U

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL =	The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.
U =	The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.
No Action =	The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
054EB00201	acrolein	+/-	J/R
054DB00201	acetonitrile		
559EB00402	isobutyl alcohol		
559CB00401	1,4-dioxane		
054EB00201	methyl iodide	+/-	J/UJ
054DB00201			
559EB00402			
559CB00401	methylene chloride	+	U

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE
METALS, HEX CR AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM03.0 Method; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24029

A validation was performed on the Metals Data from SDG 24029. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Calibrations
	•	Blanks
*	•	Interferences
*	•	Matrix Spike Recovery
*	•	Matrix Duplicates
	•	Field Duplicates
*	•	Laboratory Control Samples
*	•	Serial Dilutions
*	•	MSAs

* - All criteria were met for this parameter.

Preparation and Field Blanks

Specific Finding

The preparation blank exhibited negative bias for the following elements.

Elements	Conc.	Samples affected
Potassium	-87.2 mg/kg	559CB00401

This reviewer qualifies all samples results below ten times the negative bias as estimated, "J" or "UJ".

Specific Finding

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafe's request.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
559CB00401	K.	+/U	J/UJ
All "B" results	all analytes	B	J

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	24029B
Date:	February 25, 1996
Client Name:	Ensafe/ Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	November 10-13, 1995
Number of Samples:	8 Aqueous Sample(s) with 0 MS/MSD(s) 14 Non-aqueous Sample(s) with 1 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Volatiles, Semivolatiles, Pesticide/PCB's, Cyanide, Metals

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Sengson
Eugene M. Watson, Vice President

2-29-96
Date

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SDG# 24029B

Samples and Fractions Reviewed

Sample Identifications — Analytical Fractions

ENSAFE ID	MATRIX	VOA		SV		P/P		CN		TAL	
054TB00201	WATER	X									
556W000201	WATER	X		X		X		X		X	
556W000202	WATER	X		X		X		X		X	
556W000203	WATER	X		X		X		X		X	
556W000301	WATER	X		X		X		X		X	
556W000302	WATER	X		X		X		X		X	
556W000303	WATER	X		X		X		X		X	
559SB00401	SOIL		X		X		X		X		X
559SB00402	SOIL		X		X		X		X		X
559TB00402	WATER	X									
559SB00901	SOIL		X		X		X		X		X
559SB00902	SOIL		X		X		X		X		X
559SB01801	SOIL		X		X		X		X		X
559SB01802	SOIL		X		X		X		X		X
559SB01901	SOIL		X		X		X		X		X
559SB01902	SOIL		X		X		X		X		X
559SB02001	SOIL		X		X		X		X		X
559SB02002	SOIL		X		X		X		X		X
559SB02201	SOIL		X		X		X		X		X
559SB002202	SOIL		X		X		X		X		X
GDESB01401	SOIL		X		X		X		X		X
GDESB01402	SOIL		X		X		X		X		X
Total Billable Samples (Water/Soil)		8	14	6	14	6	14	6	14	6	14

VOA = SW846 Volatiles
SV = SW846 Semivolatiles
P/P = SW846 Pesticides/PCB's
CN = SW846 Cyanide
TAL = SW846 Metals

DATA ASSESSMENT AND NARRATIVE

VOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA 8240; the National Functional Guidelines for Organic Data Review, June 1991, and DQO Level III. All comments made within this report should be considered when examining the analytical results.

SDG # 24029

A validation was performed on the Volatile Data from SDG 24029. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibrations
*	•	Internal Standard Performance
	•	Blanks
*	•	Surrogate Recoveries
*	•	Laboratory Control Samples
*	•	Field Duplicates
	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Continuing calibrations

The continuing calibrations that were analyzed with this data package exhibited %Ds that were not within continuing calibration criteria. All RRFs were within calibration criteria. Qualifications are required.

Continuing calibrations (continued)

Specific Finding:

The continuing calibration, I17878.D, contained compounds with %Ds greater than 25%, and less than 50%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J).

559SB00902	2-butanone
559SB01802	
559SB01902	

The continuing calibration, I17897.D, contained compounds with %Ds greater than 25%, and less than 50%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J).

559SB01801	2-butanone

The continuing calibration,R20746.D, contained compounds with %Ds greater than 25%, and less than 50%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J).

556W000301	acetone

Internal Standards

All internal standard EICP areas did not meet the internal standard EICP area QA/QC criteria.

Specific Finding:

The Samples listed below, exhibited low internal standard areas. Qualify all associated positive results as estimated (J) and all non detects as estimated(UJ).

559SB02001	bromochloromethane
	1,4-difluorobenzene
	chlorobenzene-d_5

Internal Standards

Specific Finding:

The Samples listed below, exhibited low internal standard areas. Qualify all associated positive results as estimated (J) and all non detects as estimated(UJ).

GDESB01402RE	1,4-difluorobenzene
559SB01902	chlorobenzene-d_5
559SB00901	
559SB00902	

Method Blanks

Associated blank	Compound	Concentration
VBLK3	methylene chloride	9
VBLK5	methylene chloride	6

Samples	Compound	Qualification
559SB01802	methylene chloride	U
550SB01902		
559SB02001		
559SB02201		
559SB00901		
559SB00902		
559SB01801		
559SB01901		
559SB02002	methylene chloride	CRQL
559SB02202		

Rinseate Blanks

Associated blank	Compound	Concentration
559EB00402	methylene chloride	9

Samples	Compound	Qualification
559SB00401 GDESB01401 GDESB01402RE	methylene chloride	U
559SB00401	methylene chloride	CRQL

Surrogates

All of the surrogate recoveries for these samples were not within QA/QC limits.

Specific Finding:

Sample listed below exhibited high recoveries for toluene-d_8. Qualify all positive results as estimated (J).

GDESB01401
559SB01902
559SB02001
559SB02201
559SB00902

Sample listed below exhibited high recoveries for toluene-d_8 and bromofluorobenzene. Qualify all positive results as estimated (J) and non detects as estimated (UJ).

559SB00901

Compound Identification /Quantitation

Reject samples 559SB01902RE, 559SB02001RE, 559SB00402RE, 559SB02201RE, 559SB00901RE, and 559SB00902RE, in favor of the initial analysis due to internal standard area and surrogate recoveries.

Reject sample GDESB01402, in favor of the reanalysis due to internal standard and surrogate recoveries.

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
559SB00902 559SB01802 559SB01902	2-butanone	+	J
559SB01801	2-butanone	+	J
556W000301	acetone	+	J
GDESB01401 559SB02001	All associated analytes bromochloromethane 1,4-difluorobenzene chlorobenzene-d_5	+/-	J/UJ
559SB00902 559SB01902 559SB00901	1,4-difluorobenzene chlorobenzene-d_5		
559SB01802 550SB01902 559SB02001 559SB02201 559SB00901 559SB00902 559SB01801 559SB01901	methylene chloride	+	U
GDESB01401 559SB01902 559SB02001 559SB02201 559SB00902	all analytes	+	J

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

SUMMARY OF DATA QUALIFICATIONS

Page 2

SAMPLE ID	ANALYTE ID	DL	QL
559SB02002 559SB02202	methylene chloride	+	CRQL
559SB00901	all analytes	+	J
559SB01902RE 559SB02001RE 559SB00402RE 559SB02201RE 559SB00901RE 559SB00902RE GDESB01402	all analytes	+/-	R
559SB00401 GDESB01401 GDESB01402RE	methylene chloride	+	U
559SB00401	methylene chloride	+	CRQL

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE
METALS, HEX CR AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM03.0 Method; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24029

A validation was performed on the Metals Data from SDG 24029. The data was evaluated based on the following parameters.

*	●	Data Completeness
*	●	Holding Times
*	●	Calibrations
	●	Blanks
*	●	Interferences
*	●	Matrix Spike Recovery
*	●	Matrix Duplicates
	●	Field Duplicates
*	●	Laboratory Control Samples
	●	Serial Dilutions
*	●	MSAs

* - All criteria were met for this parameter.

Preparation and Field Blanks

Specific Finding

The preparation blank exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Chromium	0.13 mg/kg	no impact
Potassium	54.3 mg/kg	no impact
Sodium	21.0 mg/kg	all soil samples below 105. mg/kg
Tin	2.45 mg/kg	no impact

The equipment and DI blanks exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Calcium	277. ug/l	no impact
Iron	72.8 ug/l	all water samples
Manganese	4.30 ug/l	all water samples below 21.5 ug/l
Sodium	4150 ug/l	no impact
Potassium	1720 ug/l	no impact
Zinc	5.50 ug/l	no impact

The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as non-detect, "U". The field or DI water blanks exhibited contamination but had no impact on the data.

Duplicate Analysis

Specific Finding

The field duplicate results for Zinc for soils were greater than 50% and all positive results will be qualified as estimated, "J" for all soil samples.

Serial Dilution

Specific Finding

The Serial dilutions for Potassium and Calcium for waters were outside the control limits. All positive results will be qualified as estimated, "J" for all soil samples.

Specific Finding

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafe's request.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all soil samples below 105. mg/kg	Na.	+	U
all water samples	Fe.		
all water samples below 21.5 ug/l	Mn.		
all soil samples	Zn.	+	J
all water samples	K and Ca.	+	J
All "B" results	all analytes	B	J

DATA ASSESSMENT NARRATIVE

CHLORINATED PESTICIDES/PCBs

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8080; the National Functional Guidelines for Organic Data Validation, June 1991, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24029

A validation was performed on the Chlorinated Pesticide/PCB Data from SDG 24029. The data was evaluated based on the following parameters:

*	Data Completeness
*	Holding Times
	Calibration
*	Blanks
*	Matrix spikes/Matrix spike duplicates
	Surrogate Recoveries
*	Compound Identification
	Compound Quantitation

* - All criteria were met for this parameter.

Calibration

The initial calibration exhibits non-linearity for some compounds. Qualify all positive results for the non-linear compounds as estimated (J).

Analyte	%RSD
gamma-BHC	22.94
Endrin ketone	39.32
aroclor-1260	30.12

The calibration verification shows percent differences greater than 15% for some compounds. Qualify positive results for specific compounds as estimated (J).

Analyte	%D
Aroclor-1054	16.14
Aroclor-1260	17.94

Surrogate Recoveries

Two samples exhibit surrogate recoveries greater than the upper limit. Qualify all positive results as estimated (J).

SAMPLE ID	SURROGATE	%REC
555SB01901	DCB-2	221
555SB01902	DCB-2	228

Compound Quantitation

Three samples (GDESB01401, 559SB01901, 559SB02001) exhibited results greater than the calibration range for some compounds. A dilution was run for each sample. Qualify extrapolated results in original sample as rejected (R). Qualify all results other than extrapolated in dilution as rejected (UR). Qualify extrapolated result in dilution as diluted (D). Sample 559SB02001DL does not reproduce result for Aroclor-1254. This cannot be verified as this is a Level III package.

System Performance and Overall Assessment

Overall performance was acceptable. The data did require qualifications/rejections as stated above.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated Value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for the analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non-detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL
GDESB01401	4,4'-DDE	E	R
GDESB01401	4,4'-DDT	+	J
GDESB01401DL	4,4'-DDE	D	D
559SB01901	4,4'-DDE	E	R
559SB01901	4,4'-DDD	E	R
559SB01901	Heptachlor	+	J
559SB01901	gamma-Chlordane	+	J
559SB01901	Endrin Ketone	+	J
559SB01901DL	4,4'-DDE	D	D
559SB01901DL	4,4'-DDD	D	D
559SB02001	4,4'-DDE	E	R
559SB02001DL	4,4'-DDE	D	D
GDESB01401MS	delta-BHC	+	J
GDESB01401MS	Endrin Ketone	+	J
GDESB01401MSD	delta-BHC	+	J
GDESB01401MSD	Endrin Ketone	+	J
559SB01902	4,4'-DDE	+	J
559SB01902	4,4'-DDD	+	J
559SB02201	Aroclor-1260	+	J
559SB02202	Aroclor-1260	+	J
559SB02202	Aroclor-1254	+	J

SAMPLE ID	SURROGATE	%REC
555SB01901	DCB-2	221
555SB01902	DCB-2	228

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non-detect result.

DATA ASSESSMENT NARRATIVE

CHLORINATED HERBICIDES

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW846 Method 8150; the National Functional Guidelines for Organic Data Validation, June 1991; and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24029A

A validation was performed on the Herbicide Data from SDG 24029A. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC Performance
*	•	Calibration
*	•	Blanks
	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

Surrogate Recoveries

One (1) sample exhibited a non-compliant DCAA recovery.

Surrogate Recoveries, Continued

Specific Finding

One (1) sample exhibited a low DCAA recovery. For the following sample, the positive results are qualified as estimated, J, and the non-detect results are qualified as estimated, UJ.

Sample ID	Surrogate	% Recovery
559CB00401	DCAA	52%

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 10% of the data required qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
559CB00401	ALL	+/-	J/UJ

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non-detect result

DATA ASSESSMENT NARRATIVE

ORGANOPHOSPHORUS PESTICIDES

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW846 Method 8140; the National Functional Guidelines for Organic Data Validation, June 1991; and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24029A

A validation was performed on the Organophosphorus Pesticide Data from SDG 24029A. The data was evaluated based on the following parameters:

* • Data Completeness
* • Holding Times
* • GC Performance
* • Calibration
* • Blanks
* • Surrogate Recoveries
* • Matrix Spike/Matrix Spike Duplicates
* • Field Duplicates
* • Compound Identification
* • Compound Quantitation

* - All criteria were met for this parameter.

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 10% of the data required qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL

NO QUALIFICATIONS ARE REQUIRED.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non-detect result

DATA ASSESSMENT NARRATIVE
METALS, HEX CR AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM03.0 Method; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24029

A validation was performed on the Metals Data from SDG 24029. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Calibrations
	•	Blanks
*	•	Interferences
*	•	Matrix Spike Recovery
*	•	Matrix Duplicates
	•	Field Duplicates
*	•	Laboratory Control Samples
	•	Serial Dilutions
*	•	MSAs

* - All criteria were met for this parameter.

Preparation and Field Blanks

Specific Finding

The preparation blank exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Chromium	0.13 mg/kg	no impact
Potassium	54.3 mg/kg	no impact
Sodium	21.0 mg/kg	all soil samples below 105. mg/kg
Tin	2.45 mg/kg	no impact

The equipment and DI blanks exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Calcium	277. ug/l	no impact
Iron	72.8 ug/l	all water samples
Manganese	4.30 ug/l	all water samples below 21.5 ug/l
Sodium	4150 ug/l	no impact
Potassium	1720 ug/l	no impact
Zinc	5.50 ug/l	no impact

The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as non-detect, "U". The field or DI water blanks exhibited contamination but had no impact on the data.

Duplicate Analysis

Specific Finding

The field duplicate results for Zinc for soils were greater than 50% and all positive results will be qualified as estimated, "J" for all soil samples.

Serial Dilution

Specific Finding

The Serial dilutions for Potassium and Calcium for waters were outside the control limits. All positive results will be qualified as estimated, "J" for all soil samples.

Specific Finding

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafe's request.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all soil samples below 105. mg/kg	Na.	+	U
all water samples	Fe.		
all water samples below 21.5 ug/l	Mn.		
all soil samples	Zn.	+	J
all water samples	K and Ca.	+	J
All "B" results	all analytes	B	J

DATA ASSESSMENT NARRATIVE

DIOXIN/FURANS - 8290

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, internal standard recoveries, clean-up standard recoveries, matrix spike recoveries, GC/MS high resolution performance, tuning results, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8290; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level IV requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 24029

A validation was performed on the Dioxin/Furan Data from SDG 24029. The data was evaluated based on the following parameters.

- * Data Completeness
- * Holding Times
- * Mass Resolution Checks
- * Column Performance
- * Calibrations
- * Internal Standard Recovery
- Blanks
- * Laboratory Control Samples
- * Matrix Spike/Matrix Spike Duplicate
- * Field Duplicates
- * Congener Identification/Quantitation

* - All criteria were met for this parameter.

Method Blanks

Congener ID	MB1 Conc. (pg/L)	MB2 Conc. (pg/L)	054DB00201 (MB1)	Q	559CB00401 (MB2)	Q
OCDD	6.061	1.642	29.198	NA	109.52	NA
OCDF	5.572	0.750	17.544	NA	2.552	NA

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	CONGENER ID	DL	QL
All samples	OCDD, OCDF	+B	NA

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

CHLORINATED PESTICIDES/PCBs

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8080; the National Functional Guidelines for Organic Data Validation, June 1991, and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24029

A validation was performed on the Chlorinated Pesticide/PCB Data from SDG 24029. The data was evaluated based on the following parameters:

* Data Completeness
* Holding Times
* Calibration
* Blanks
* Surrogate Recoveries
* Matrix Spike/Matrix Spike Duplicates
* Field Duplicates
* Compound Identification
* Compound Quantitation

* - All criteria were met for this parameter.

System Performance and Overall Assessment

Overall performance was acceptable. The data did not require qualifications/rejections.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated Value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = CRQL	The sample result for the blank contaminant is less than the sample and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for the analyte is reported.
U =	The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non-detected at the analyte value reported.
No Action =	The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL

NO QUALIFICATIONS WERE REQUIRED

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non-detect result.

DATA ASSESSMENT NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8270; the National Functional Guidelines for Organic Data Validation, June 1991, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24029B

A validation was performed on the Semivolatile Data from SDG 24029B. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibration
	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
	•	Internal Standard Performance
*	•	Compound Identification
	•	Compound Quantitation

* - All criteria were met for this parameter.

Continuing Calibrations

The continuing calibrations standards that were analyzed exhibited non-compliant %Ds for which qualification of the data was required.

Continuing Calibrations, continued

Specific Findings

The continuing calibration standard, P4964.D contained compounds with %Ds greater than 25% but less than 50%. For the samples and non-compliant compounds listed below, the positive results are qualified as estimated, J.

559SB01902 benzo(b)fluoranthene (33.1%)

Internal Standards

Several samples required qualification due to non-compliant internal standard area recoveries.

Specific Findings

The following samples exhibited non-compliant internal standard area recoveries. All positive and non-detect results are qualified as estimated, J/UJ, for the compounds quantitated with the noted internal standard.

559SB01901 phenanthrene-d10
Chrysene-d12
Perylene-d12

559SB2201 chrysene-d12

559SB01902RE
559SB01901DL All internal standards

Method Blanks

One (1) method blank exhibited contamination which resulted in the qualification of field samples.

	SBLK4
BIS(2-ETHYLHEXYL)PHTHALATE	1 μg/L

Method Blanks, continued

Specific Findings

Sample	Contaminant	Action Level	Qualification
556W000201 556W000301 556W000302 556W000303	bis(2-ethylhexyl)phthalate	10 μg/L	CRQL

Compound Quantitation

Specific Findings

For the following sample, the E flagged compounds are rejected and replaced with the D flagged compounds from the dilution analysis. All other compounds reported from the dilution analysis are rejected, UR, in favor of the results from the undiluted analysis.

559SB01901

For the following sample, the reported compounds are rejected, UR, in favor of the results from the initial analysis of the sample. The original analysis exhibited better internal standard recoveries.

559SB01902RE

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 5% of data required qualifications

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

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UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
559SB01902	benzo(b)fluoranthene	+	J
559SB01901	All associated with phenanthrene-d10 Chrysene-d12 Perylene-d12	+/-	J/UJ
559SB2201	All associated with chrysene-d12	+/-	J/UJ
559SB01902RE 559SB01901DL	All associated with All internal standards	+/-	J/UJ
556W000201 556W000301 556W000302 556W000303	bis(2-ethylhexyl)phthalate	+B	CRQL
559SB01901	All E flagged compounds	+	R
559SB01901DL	All except corresponding D flagged compounds	+/-	UR
559SB01902RE	All	+/-	UR

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QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8270; the National Functional Guidelines for Organic Data Validation, June 1991, and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24029A

A validation was performed on the Semivolatile Data from SDG 24029A. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibration
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
*	•	Internal Standard Performance
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

Continuing Calibrations

The continuing calibrations standards that were analyzed exhibited non-compliant %Ds and RRFs for which qualification of the data was required.

Continuing Calibrations, continued

Specific Findings

The continuing calibration standard, A0130.D contained compounds with RRFs less than 0.05. For the samples and non-compliant compounds listed below, the positive results are qualified as estimated, J, and the non-detect results are rejected, R.

559CB00401	methapyrilene (0.016) Aramite (0.030)

The continuing calibration standard, A0130.D contained compounds with %Ds greater than 90%. For the samples and non-compliant compounds listed below, the positive results are qualified as estimated, J, and the non-detect results are rejected, R.

559CB00401	4-nitroquinoline-1-oxide (299.6%) Hexachlorophene (257 %)

The continuing calibration standard, A0130.D contained compounds with %Ds greater than 50% but less than 90%. For the samples and non-compliant compounds listed below, the positive results are qualified as estimated, J, and the non-detect results are qualified as estimated, UJ.

559CB00401	1,3,5-trinitrobenzene (54.7%)

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 5% of data required qualifications

.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
559CB00401	methapyrilene Aramite	+/-	J/R
559CB00401	4-nitroquinoline-1-oxide Hexachlorophene	+/-	J/R
559CB00401	1,3,5-trinitrobenzene	+/-	J/UJ

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	24056A
Date:	March 13, 1996
Client Name:	Ensafe/Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	November 14, 1995
Number of Samples:	1 Non-aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level IV
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Volatiles, Semivolatiles, Herbicides, Organophosphorus Pesticides, pH, Hexavalent Chromium, Dioxin, Metals

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig B. Simpson — 3-13-96

Eugene M. Watson, Vice President — Date

4127 Plaza 94 South · St. Charles, MO 63304
(314) 936-1332 · Fax (314) 936-1335

SDG# 24056A

Samples and Fractions Reviewed

Sample Identifications | Analytical Fractions

ENSAFE ID	MATRIX	VOA		SV		HB		OPP		pH		HCR		DIO		TAL	
570CB01502	SOIL		X		X		X		X		X		X		X		X
Total Billable Samples	(Water/Soil)	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1

VOA = SW846 Volatiles
SV = SW846 Semivolatiles
HB = SW846 Herbicides
OPP = SW846 Organophosphorus Pesticides
pH = SW846 pH
HCR = SW846 Hexavalent Chromium
DIO = SW846 Dioxin
TAL = SW846 Metals

DATA ASSESSMENT NARRATIVE
METALS, HEXAVALENT CHROMIUM AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM03.0 Method; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24056

A validation was performed on the Metals Data from SDG 24056. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Calibrations
	•	Blanks
*	•	Interferences
*	•	Matrix Spike Recovery
*	•	Matrix Duplicates
*	•	Field Duplicates
*	•	Laboratory Control Samples
*	•	Serial Dilutions
*	•	MSAs

* - All criteria were met for this parameter.

Preparation and Field Blanks

Specific Finding

The preparation blank exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Chromium	0.12 mg/kg	no impact
Potassium	116 mg/kg	all soil samples below 580 mg/kg
Sodium	20.6 mg/kg	all soil samples below 103 mg/kg
Tin	2.27 mg/kg	all soil samples below 11.4 mg/kg

The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as non-detect, "U". The field or DI water blanks exhibited contamination but had no impact on the data.

Specific Finding

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafe's request.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all soil samples below 580 mg/kg	K.	+	U
all soil samples below 103 mg/kg	Na.		
all soil samples below 11.4 mg/kg	Sn.		
All "B" results	all analytes	B	J

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	24056B
Date:	March 13, 1996
Client Name:	Ensafe/Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	November 14, 1995
Number of Samples:	1 Aqueous Sample(s) with 0 MS/MSD(s) 8 Non-aqueous Sample(s) with 2 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Volatiles, Semivolatiles, pesticides w/PCb's, pH, Metals, Cyanide

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig H. Scafan
Eugene M. Watson, Vice President

3-13-96
Date

4127 Plaza 94 South · St. Charles, MO 63304
(314) 936-1332 · Fax (314) 936-1335

SDG# 24056B

Samples and Fractions Reviewed

Sample Identifications | Analytical Fractions

ENSAFE ID	MATRIX	VOA		SV		P/P		pH		TAL		CN	
559SB01101	SOIL		X		X		X				X		X
559SB01102	SOIL		X		X		X				X		X
559TB01102	WATER	X											
559SB01601	SOIL		X		X		X				X		X
559SB01602	SOIL		X		X		X				X		X
570SB00301	SOIL		X		X				X		X		
570SB00302	SOIL		X		X				X		X		
570SB01501	SOIL		X		X				X		X		
570SB01502	SOIL		X		X				X		X		
Total Billable Samples	(Water/Soil)	1	8	0	8	0	4	0	4	0	8	0	4

VOA = SW846 Volatiles
SV = SW846 Semivolatiles
P/P = SW846 Pesticides w/PCB's
pH = SW846 pH
TAL = SW846 Metals
CN = SW846 Cyanide

DATA ASSESSMENT NARRATIVE
METALS AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM03.0 Method; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24056

A validation was performed on the Metals Data from SDG 24056. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Calibrations
	•	Blanks
*	•	Interferences
	•	Matrix Spike Recovery
*	•	Matrix Duplicates
*	•	Field Duplicates
*	•	Laboratory Control Samples
*	•	Serial Dilutions
*	•	MSAs

* - All criteria were met for this parameter.

Preparation and Field Blanks

Specific Finding

The preparation blank exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Chromium	0.13 mg/kg	no impact
Potassium	54.3 mg/kg	all soil samples below 272 mg/kg
Sodium	21.0 mg/kg	all soil samples below 105 mg/kg
Tin	2.45 mg/kg	all soil samples below 12.3 mg/kg

The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as non-detect, "U". The field or DI water blanks exhibited contamination but had no impact on the data.

Matrix Spike Analysis

Specific Finding

The Matrix Spike recoveries for Antimony (70%), Mercury (63%) and Cyanide (70%) were below the lower control limits. All positive and non-detect results results are qualified as estimated, "J" or "UJ".

Specific Finding

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafe's request.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all soil samples below 272 mg/kg	K.	+	U
all soil samples below 105 mg/kg	Na.		
all soil samples below 12.3 mg/kg	Sn.		
all soil samples	Sb, Hg and Cn.	+/U	J/UJ
All "B" results	all analytes	B	J

DATA ASSESSMENT AND NARRATIVE

VOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846, Method 8240 Appendix IX; the National Functional Guidelines for Organic Data Review, June 1991, and DQO Level IV. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG # 24056A

A validation was performed on the Volatile Data from SDG # 24056A. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibrations
*	•	Internal Standard Performance
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Continuing calibrations

The continuing calibrations that were analyzed with this data package exhibited %Ds that were not within %D continuing calibration criteria. All RRFs were within calibration criteria.

Continuing Calibrations (continued)

Specific Finding:

The continuing calibration, UI181, contained compounds with RRFs less than 0.05. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and reject all non detects (R).

570CB01502	2-chloroethylvinyl ether
	acrolein
	acetonitrile
	isobutanol
	1,4-dioxane

Trip Blanks

Associated blank	Compound	Conc.	Action Level
570TB01102	methylene chloride	9	90

Samples	Compound	Qualification
570CB01102	methylene chloride	CRQL

Rinseate Blanks

Associated blank	Compound	Conc.	Action Level
054EB00201	acetone	8J	80

Samples	Compound	Qualification
570CB01102	acetone	U

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

NJ = Presumptive evidence for the presence of the material at an estimated value

K = Result is biased high

L = Result is biased low

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
570CB01502	2-chloroethylvinyl ether acrolein acetonitrile isobutanol 1,4-dioxane	+/-	J/R
570CB01102	methylene chloride	+	CRQL
570CB01102	acetone	+	U

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846, Method 8270; National Functional Guidelines for Organic Data Review, and DQO Level IV. All comments made within this report should be considered when examining the analytical results (Form I's).

SDG # 24056A

A validation was performed on the Semivolatile Data from SDG 24056A. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibrations
*	•	Internal Standard Performance
	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Continuing calibrations

The continuing calibrations that were analyzed with this data package exhibited %Ds that were not within %D continuing calibration criteria. All RRFs were within calibration criteria.

Continuing calibrations (continued)

Specific Finding:

The continuing calibration, A0152,-153,-154,-155,-156,-157, contained compounds with %Ds greater than 50%, but less than 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and all non detect as estimated (UJ).

570CB01502	1,3,5-trinitrobenzene (62.6)

The continuing calibration, A0152,-153,-154,-155,-156,-157, contained compounds with RRFs less than 0.05. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and reject all non detects (R).

570CB01502	aramite 4-nitroquinoline-1-oxide hexachlorophene

Method Blanks

Associated blank	Compound	Conc.	Action level
SBLK1	bis(2-ethylhexyl)phthalate	60J	600

Samples	Compound	Qualification
570CB01502	bis(2-ethylhexyl)phthalate	CRQL

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

NJ = Presumptive evidence for the presence of the material at an estimated value

K = Result is biased high

L = Result is biased low

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
570CB01502	1,3,5-trinitrobenzene (62.6)	+/-	J/UJ
570CB01502	aramite 4-nitroquinoline-1-oxide hexachlorophene	+/-	J/R
570CB01502	bis(2-ethylhexyl)phthalate	+	CRQL

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

DIOXIN/FURANS - 8290

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, internal standard recoveries, clean-up standard recoveries, matrix spike recoveries, GC/MS high resolution performance, tuning results, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8290; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level IV requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 24056

A validation was performed on the Dioxin/Furan Data from SDG 24056. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Mass Resolution Checks
*	•	Column Performance
*	•	Calibrations
*	•	Internal Standard Recovery
	•	Blanks
*	•	Laboratory Control Samples
N/A	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Congener Identification/Quantitation

* - All criteria were met for this parameter.

Method Blanks

Congener ID	MB Conc. (pg/L)	570CB01502	Q
OCDD	1.642	6.19	NA
OCDF	0.75	1.14	NA

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	CONGENER ID	DL	QL
570CB015-02	OCDD, OCDF	+B	NA

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846, Method 8270; National Functional Guidelines for Organic Data Review, and DQO Level III. All comments made within this report should be considered when examining the analytical results (Form I's).

SDG # 24056B

A validation was performed on the Semivolatile Data from SDG 24056B. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
	•	Internal Standard Performance
*	•	Blanks
	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Internal Standards

All internal standard EICP areas did not meet the internal standard EICP area QA/QC criteria.

Specific Finding:

The samples listed below, exhibited non compliant internal standard areas. Qualify all associated positive results as estimated (J) and all non detects as estimated (UJ).

570SB00301RE	phenanthrene-d_{10}
	chrysene-d_{12}
	perylene-d_{12}

Internal Standards

All internal standard EICP areas did not meet the internal standard EICP area QA/QC criteria.

Specific Finding:

The samples listed below, exhibited non compliant internal standard areas. Qualify all associated positive results as estimated (J) and all non detects as estimated (UJ).

570SB00301 perylene-d_{12}

Surrogates

The surrogate recoveries for all samples and blanks were not within QA/QC limits.

Specific Finding:

All of the samples listed below, exhibited surrogate recoveries that were less than 10%. Qualify all positive results as estimated (J) and reject all non detects (R).

SB01501
SB01501MS
SB01501MSD
559SB01602

Compound Identification/Quantitation

Specific Finding:

Reject all results for samples listed below, due to non compliant internal standard areas and or non compliant surrogate recoveries.

570SB00301
559SB01602
SB01501

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

NJ = Presumptive evidence for the presence of the material at an estimated value

K = Result is biased high

L = Result is biased low

METHOD BLANK QUALIFICATION CODES

CRQL =	The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.
U =	The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.
No Action =	The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
570SB00301RE	All associated analytes phenanthrene-d_{10} chrysene-d_{12} perylene-d_{12}	+/-	J/UJ
570SB00301	perylene-d_{12}		
SB01501 559SB01602	All analytes	+/-	J/R
570SB00301RE 559SB01602 SB01501	All analytes	+/-	R

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT AND NARRATIVE

VOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846, Method 8240; the National Functional Guidelines for Organic Data Review, June 1991, and DQO Level III. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG # 24056B

A validation was performed on the Volatile Data from SDG 24056B, The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibrations
*	•	Internal Standard Performance
	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Continuing calibrations

The continuing calibrations that were analyzed with this data package exhibited %Ds that were not within %D continuing calibration criteria. All RRFs were within calibration criteria.

Continuing calibrations (continued)

Specific Finding:

The continuing calibration, UJ181, contained compounds with %Ds greater than 25% but less than 50%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J).

570SB00301	acetone (46.3)
570SB01501	

The continuing calibration, UJ181, contained compounds with %Ds greater than 25% but less than 50%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J).

559SB01601	acetone (49.9)

Trip blanks

Associated blank	Compound	Conc.	Action Level
559TB01102	methylene chloride	9	90

Samples	Compound	Qualification
559SB01102	methylene chloride	CRQL
559SB01601		
570SB00301		
570SB00302		
570SB01501		

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on the dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL =	The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.
U =	The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.
No Action =	The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
570SB00301 570SB01501	acetone (46.3)	+	J
559SB01601	acetone (49.9)	+	J
559SB01102 559SB01601 570SB00301 570SB00302 570SB01501	methylene chloride	+	CRQL

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

ORGANOPHOSPHORUS PESTICIDES

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW846 Method 8140; the National Functional Guidelines for Organic Data Validation, June 1991; and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24056A

A validation was performed on the Organophosphorus Pesticide Data from SDG 24056A. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC Performance
*	•	Calibration
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 10% of the data required qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL

NO QUALIFICATIONS ARE REQUIRED.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non-detect result

DATA ASSESSMENT NARRATIVE

CHLORINATED HERBICIDES

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW846 Method 8150; the National Functional Guidelines for Organic Data Validation, June 1991; and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24056A

A validation was performed on the Herbicide Data from SDG 24056A. The data was evaluated based on the following parameters:

* • Data Completeness
* • Holding Times
* • GC Performance
* • Calibration
* • Blanks
* • Surrogate Recoveries
* • Matrix Spike/Matrix Spike Duplicates
* • Field Duplicates
* • Compound Identification
* • Compound Quantitation

* - All criteria were met for this parameter.

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 10% of the data required qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL

NO QUALIFICATIONS ARE REQUIRED.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non-detect result

DATA ASSESSMENT AND NARRATIVE

VOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846, Method 8240; the National Functional Guidelines for Organic Data Review, June 1991, and DQO Level III. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG # 24056B

A validation was performed on the Volatile Data from SDG 24056B, The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibrations
*	•	Internal Standard Performance
	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Continuing calibrations

The continuing calibrations that were analyzed with this data package exhibited %Ds that were not within %D continuing calibration criteria. All RRFs were within calibration criteria.

Continuing calibrations (continued)

Specific Finding:

The continuing calibration, UJ181, contained compounds with %Ds greater than 25% but less than 50%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J).

570SB00301	acetone (46.3)
570SB01501	

The continuing calibration, UJ181, contained compounds with %Ds greater than 25% but less than 50%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J).

559SB01601	acetone (49.9)

Trip blanks

Associated blank	Compound	Conc.	Action Level
559TB01102	methylene chloride	9	90

Samples	Compound	Qualification
559SB01102	methylene chloride	CRQL
559SB01601		
570SB00301		
570SB00302		
570SB01501		

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on the dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
570SB00301 570SB01501	acetone (46.3)	+	J
559SB01601	acetone (49.9)	+	J
559SB01102 559SB01601 570SB00301 570SB00302 570SB01501	methylene chloride	+	CRQL

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

CHLORINATED PESTICIDES/PCBs

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8080; the National Functional Guidelines for Organic Data Validation, June 1991, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24056

A validation was performed on the Chlorinated Pesticide/PCB Data from SDG 24056. The data was evaluated based on the following parameters:

* Data Completeness
* Holding Times
* Calibration
* Blanks
* Surrogate Recoveries
* Matrix Spike/Matrix Spike Duplicates
* Field Duplicates
* Compound Identification
* Compound Quantitation

* - All criteria were met for this parameter.

System Performance and Overall Assessment

Overall performance was acceptable. The data did not require qualifications/rejections.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated Value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for the analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non-detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL

NO QUALIFICATIONS WERE REQUIRED

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non-detect result.

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	24074A
Date:	March 13, 1996
Client Name:	Ensafe/Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	November 15, 1995
Number of Samples:	1 Non-aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level IV
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Volatiles, Semivolatiles, Pesticides w/PCB's, Herbicides, Organophosphorus Pesticides, Hexavalent Chromium, Dioxin, Metals, Cyanide

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig M. Swafford
Eugene M. Watson, Vice President

3-13-96
Date

4127 Plaza 94 South · St. Charles, MO 63304
(314) 936-1332 · Fax (314) 936-1335

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all soil samples below 855 mg/kg	K.	+	U
all soil samples below 199 mg/kg	Na.		
all soil samples below 12.8 mg/kg	Sn.		
all soil samples	Ca and Ni.	+	J
All "B" results	all analytes	B	J

The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as non-detect, "U". The field or DI water blanks exhibited contamination but had no impact on the data.

Serial Dilution Analysis

Specific Finding

The Serial dilutions for Calcium and Nickel were outside the control limits. All positive results are qualified as estimated, "J".

Specific Finding

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafe's request.

DATA ASSESSMENT NARRATIVE
METALS AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM03.0 Method; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24074

A validation was performed on the Metals Data from SDG 24074. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Calibrations
	•	Blanks
*	•	Interferences
*	•	Matrix Spike Recovery
*	•	Matrix Duplicates
*	•	Field Duplicates
*	•	Laboratory Control Samples
	•	Serial Dilutions
*	•	MSAs

* - All criteria were met for this parameter.

Preparation and Field Blanks

Specific Finding

The preparation blank exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Chromium	0.20 mg/kg	no impact
Iron	2.09 mg/kg	no impact
Potassium	171 mg/kg	all soil samples below 855 mg/kg
Sodium	39.8 mg/kg	all soil samples below 199 mg/kg
Tin	2.56 mg/kg	all soil samples below 12.8 mg/kg

SDG# 24074B

Samples and Fractions Reviewed

Sample Identifications — Analytical Fractions

ENSAFE ID	MATRIX	VOA		SV		P/P		pH		TAL		CN	
560SB00101	SOIL		X		X		X				X		X
560SB00102	SOIL		X		X		X				X		X
560SB00201	SOIL		X		X		X				X		X
560SB00202	SOIL		X		X		X				X		X
561SB00101	SOIL		X		X		X				X		X
561SB00102	SOIL		X		X		X				X		X
561SB00201	SOIL		X		X		X				X		X
561TB00201	WATER	X											
561SB00401	SOIL		X		X		X		X		X		X
561SB00402	SOIL		X		X		X		X		X		X
561SB00501	SOIL		X		X		X				X		X
561SB00502	SOIL		X		X		X				X		X
570SB00401	SOIL		X		X						X		
570SB00402	SOIL		X		X						X		
570SB01201	SOIL		X		X				X		X		
570SB01202	SOIL		X		X				X		X		
Total Billable Samples	(Water/Soil)	1	15	0	15	0	11	0	4	0	15	0	11

VOA = SW846 Volatiles
SV = SW846 Semivolatiles
P/P = SW846 Pesticides w/PCB's
pH = SW846 pH
TAL = SW846 Metals
CN = SW846 Cynaide

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	24074B
Date:	March 13, 1996
Client Name:	Ensafe/Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	November 15, 1995
Number of Samples:	1 Aqueous Sample(s) with 0 MS/MSD(s) 15 Non-aqueous Sample(s) with 2 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Volatiles, Semivolatiles, pesticides w/PCB's, pH, Metals, Cyanide

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Surfon
for Eugene M. Watson, Vice President

3-13-96
Date

4127 Plaza 94 South · St. Charles, MO 63304
(314) 936-1332 · Fax (314) 936-1335

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all soil samples below 107 mg/kg	Na.	+	J
all soil samples below 11.6 mg/kg	Sn.		
all soil samples below 224 mg/kg	K.	+/U	J/UJ
All "B" results	all analytes	B	J

The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as non-detect, "U". The field or DI water blanks exhibited contamination but had no impact on the data.

The preparation blank exhibited negative bias for the following elements.

Elements	Conc.	Samples affected
Potassium	-22.4 mg/kg	all soil samples below 224 mg/kg

This reviewer qualifies all samples results below ten times the negative bias as estimated, "J" or "UJ".

Specific Finding

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafe's request.

DATA ASSESSMENT NARRATIVE
METALS, HEXAVALENT CHROMIUM AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM03.0 Method; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24074

A validation was performed on the Metals Data from SDG 24074. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Calibrations
	•	Blanks
*	•	Interferences
*	•	Matrix Spike Recovery
*	•	Matrix Duplicates
*	•	Field Duplicates
*	•	Laboratory Control Samples
*	•	Serial Dilutions
*	•	MSAs

* - All criteria were met for this parameter.

Preparation and Field Blanks

Specific Finding

The preparation blank exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Sodium	21.4 mg/kg	all soil samples below 107 mg/kg
Tin	2.32 mg/kg	all soil samples below 11.6 mg/kg

SDG# 24074A

Samples and Fractions Reviewed

Sample Identifications | Analytical Fractions

ENSAFE ID	MATRIX	VOA		SV		P/P		HB		OPP		HCR		DIO		TAL		CN	
561CB00201	SOIL		X		X		X		X		X		X		X		X		X
Total Billable Samples (Water/Soil)		0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1

VOA = SW846 Volatiles
SV = SW846 Semivolatiles
P/P = SW846 Pesticides w/PCB's
HB = SW846 Herbicides
OPP = SW846 Organophosphorus Pesticides
HCR = SW846 Hexavalent Chromium
DIO = SW846 Dioxin
TAL = SW846 Metals
CN = SW846 Cyanide

DATA ASSESSMENT NARRATIVE

CHLORINATED PESTICIDES/PCBs

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8080; the National Functional Guidelines for Organic Data Validation, June 1991, and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24074

A validation was performed on the Chlorinated Pesticide/PCB Data from SDG 24074. The data was evaluated based on the following parameters:

* Data Completeness
* Holding Times
* Calibration
* Blanks
* Surrogate Recoveries
* Matrix Spike/Matrix Spike Duplicates
* Field Duplicates
* Compound Identification
* Compound Quantitation

* - All criteria were met for this parameter.

System Performance and Overall Assessment

Overall performance was acceptable. The data did not require qualifications/rejections.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated Value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for the analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non-detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL

NO QUALIFICATIONS WERE REQUIRED

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non-detect result.

DATA ASSESSMENT AND NARRATIVE

VOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846, Method 8240; the National Functional Guidelines for Organic Data Review, June 1991, and DQO Level III. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG # 24074B

A validation was performed on the Volatile Data from SDG 24074B, The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
	•	Internal Standard Performance
	•	Blanks
	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Internal Standards

All internal standard EICP areas did not meet the internal standard EICP area QA/QC criteria.

Internal Standards (continued)

Specific Finding:

The Samples listed below, exhibited low internal standard areas. Qualify all associated positive results as estimated (J) and all non detects as estimated (UJ).

561SB00102	chlorobenzene-d_5
561SB00102RE	
561SB00501	1,4-difluorobenzene
561SB00501RE	chlorobenzene-d_5

Trip blanks

Associated blank	Compound	Conc.	Action Level
561TB00201	methylene chloride	8	80

Samples	Compound	Qualification
506SB00201	methylene chloride	CRQL
561SB00101		
561SB00401		
561SB00501		
561SB00501RE		
561SB00102	methylene chloride	U
561SB00102RE		
570SB01202		

Rinseate blanks

Associated blank	Compound	Conc.	Action Level
054EB00201	acetone	8J	80

Samples	Compound	Qualification
560SB00202	acetone	U
561SB00102		
561SB00102RE		

Surrogates

All of the surrogate recoveries for the all blanks and samples were not within QA/QC limits.

Specific Finding:

The samples listed below, exhibited surrogate recoveries that exceeded the QA/QC limit. Qualify all positive results as estimated (J)

561SB00102RE	toluene-d_8	140

The samples listed below, exhibited surrogate recoveries that exceeded the QA/QC limit and recoveries that were less than the QA/QC limit. Qualify all positive results as estimated (J) and all non detects as estimated (UJ).

561SB00102	toluene-d_8	120
	bromofluorobenzene	68
561SB00501	toluene-d_8	137
	bromofluorobenzene	69
561SB00501RE	toluene-d_8	123
	bromofluorobenzene	68

Compound Identification/Quantitation

Specific Finding:

Reject (R) all results for the re-analyzed samples listed below, due to non compliant internal standard areas and/or non compliant surrogate recoveries.

561SB00102RE
561SB00501RE

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on the dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
	All associated analytes	+/-	J/UJ
561SB00102	chlorobenzene-d_5		
561SB00102RE			
561SB00501	1,4-difluorobenzene		
561SB00501RE	chlorobenzene-d_5		
506SB00201	methylene chloride	+	CRQL
561SB00101			
561SB00401			
561SB00501			
561SB00501RE			
561SB00102	methylene chloride	+	U
561SB00102RE			
570SB01202			
560SB00202	acetone	+	U
561SB00102			
561SB00102RE			
561SB00102RE	All analytes	+	J
561SB00102	All analytes	+/-	J/UJ
561SB00501			
561SB00501RE			
561SB00102RE	All analytes	+/-	R
561SB00501RE			

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

ORGANOPHOSPHORUS PESTICIDES

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW846 Method 8140; the National Functional Guidelines for Organic Data Validation, June 1991; and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24074A

A validation was performed on the Organophosphorus Pesticide Data from SDG 24074A. The data was evaluated based on the following parameters:

* • Data Completeness
* • Holding Times
* • GC Performance
* • Calibration
* • Blanks
* • Surrogate Recoveries
* • Matrix Spike/Matrix Spike Duplicates
* • Field Duplicates
* • Compound Identification
* • Compound Quantitation

* - All criteria were met for this parameter.

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 10% of the data required qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL

NO QUALIFICATIONS ARE REQUIRED.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non-detect result

DATA ASSESSMENT NARRATIVE

CHLORINATED HERBICIDES

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW846 Method 8150; the National Functional Guidelines for Organic Data Validation, June 1991; and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24074A

A validation was performed on the Herbicide Data from SDG 24074A. The data was evaluated based on the following parameters:

* • Data Completeness
* • Holding Times
* • GC Performance
* • Calibration
* • Blanks
* • Surrogate Recoveries
* • Matrix Spike/Matrix Spike Duplicates
* • Field Duplicates
* • Compound Identification
* • Compound Quantitation

* - All criteria were met for this parameter.

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 10% of the data required qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL

NO QUALIFICATIONS ARE REQUIRED.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non-detect result

DATA ASSESSMENT NARRATIVE

CHLORINATED PESTICIDES/PCBs

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8080; the National Functional Guidelines for Organic Data Validation, June 1991, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24074

A validation was performed on the Chlorinated Pesticide/PCB Data from SDG 24074. The data was evaluated based on the following parameters:

*	Data Completeness
*	Holding Times
*	Calibration
*	Blanks
	Surrogate Recoveries
*	Matrix Spike/Matrix Spike Duplicates
*	Field Duplicates
*	Compound Identification
*	Compound Quantitation

* - All criteria were met for this parameter.

Surrogate Recoveries

One sample exhibits surrogate recoveries greater than 10% and less than the lower limit. Qualify all positive results as estimated (J) and all non-detects as estimated (UJ).

Sample ID	Surrogate	%Rec
561SB00501	DCB-1	25
561SB00501	DCB-2	24

System Performance and Overall Assessment

Overall performance was acceptable. The data did require qualifications/rejections as stated above.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated Value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for the analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non-detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL
561SB00501	ALL	+/-	J/UJ
561SB00501		+/-	J/UJ

SAMPLE ID	SURROGATE	%REC
561SB00501	DCB-1	25
561SB00501	DCB-2	24

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non-detect result.

DATA ASSESSMENT NARRATIVE

DIOXIN/FURANS - 8290

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, internal standard recoveries, clean-up standard recoveries, matrix spike recoveries, GC/MS high resolution performance, tuning results, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8290; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level IV requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 24074

A validation was performed on the Dioxin/Furan Data from SDG 24074. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Mass Resolution Checks
*	•	Column Performance
*	•	Calibrations
*	•	Internal Standard Recovery
	•	Blanks
*	•	Laboratory Control Samples
N/A	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Congener Identification/Quantitation

* - All criteria were met for this parameter.

Method Blanks

Congener ID	MB Conc. (pg/L)	561CB00201	Q
OCDD	1.64	15.4	NA
OCDF	0.75	1.2	NA

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	CONGENER ID	DL	QL
GDECB01801	OCDD	+B	U
	OCDF	+B	NA

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT AND NARRATIVE

VOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846, Method 8240 Appendix IX; the National Functional Guidelines for Organic Data Review, June 1991, and DQO Level IV. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG # 24074A

A validation was performed on the Volatile Data from SDG # 24074A. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibrations
*	•	Internal Standard Performance
	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Continuing calibrations

The continuing calibrations that were analyzed with this data package exhibited %Ds that were not within %D continuing calibration criteria. All RRFs were within calibration criteria.

Continuing Calibrations (continued)

Specific Finding:

The continuing calibration, UI181, contained compounds with RRFs less than 0.05. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and reject all non detects (R).

561CB00201	2-chloroethylvinyl ether acrolein acetonitrile isobutanol 1,4-dioxane

Rinseate Blanks

Associated blank	Compound	Conc.	Action Level
054EB00201	acetone	8J	80

Samples	Compound	Qualification
561CB00201	acetone	CRQL

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

NJ = Presumptive evidence for the presence of the material at an estimated value

K = Result is biased high

L = Result is biased low

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
561CB00201	2-chloroethylvinyl ether acrolein acetonitrile isobutanol 1,4-dioxane	+/-	J/R
561CB00201	acetone	+	CRQL

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846, Method 8270; National Functional Guidelines for Organic Data Review, and DQO Level IV. All comments made within this report should be considered when examining the analytical results (Form I's).

SDG # 24074A

A validation was performed on the Semivolatile Data from SDG 24074A. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibrations
*	•	Internal Standard Performance
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Continuing calibrations

The continuing calibrations that were analyzed with this data package exhibited %Ds that were not within %D continuing calibration criteria. All RRFs were within calibration criteria.

Continuing calibrations (continued)

Specific Finding:

The continuing calibration, A0237,-238,-239,-240,-241,-242, contained compounds with %Ds greater than 50%, but less than 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and all non detect as estimated (UJ).

561CB00201	1,3,5-trinitrobenzene (63.1) dialate (71.2) 3,3'-dimethylbenzidine (56.7)

The continuing calibration, A0237,-238,-239,-240,-241,-242, contained compounds with %Ds greater than 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and reject all non detect (R).

561CB00201	4-nitroquinoline-1-oxide (239.7) hexachlorophene (156.7)

The continuing calibration,A0237,-238,-239,-240,-241,-242, contained compounds with RRFs less than 0.05. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and reject all non detects (R).

561CB00201	pentachloronitrobenzene methapyrilene aramite

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

NJ = Presumptive evidence for the presence of the material at an estimated value

K = Result is biased high

L = Result is biased low

METHOD BLANK QUALIFICATION CODES

CRQL =	The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.
U =	The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.
No Action =	The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
561CB00201	1,3,5-trinitrobenzene (63.1) dialate (71.2) 3,3'-dimethylbenzidine (56.7)	+/-	J/UJ
561CB00201	4-nitroquinoline-1-oxide (239.7) hexachlorophene (156.7)	+/-	J/R
561CB00201	pentachloronitrobenzene methapyrilene aramite	+/-	J/R

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846, Method 8270; National Functional Guidelines for Organic Data Review, and DQO Level III. All comments made within this report should be considered when examining the analytical results (Form I's).

SDG # 24074B

A validation was performed on the Semivolatile Data from SDG 24074B. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibrations
	•	Internal Standard Performance
	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Continuing calibrations

The continuing calibrations that were analyzed with this data package exhibited %Ds that were not within %D continuing calibration criteria. All RRFs were within calibration criteria.

Continuing calibrations (continued)

Specific Finding:

The continuing calibration, S0529, contained compounds with %Ds greater than 25% but less than 50%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J).

570SB01201	benzo(b)fluoranthene (26.4)
570SB01202	
560SB00201	
561SB00401	

Internal Standards

All internal standard EICP areas did not meet the internal standard EICP area QA/QC criteria.

Specific Finding:

The Samples listed below, exhibited low internal standard areas. Qualify all associated positive results as estimated (J) and all non detects as estimated (UJ).

560SB00101	1,4-dichlorobenzene-d_4
560SB00102	naphthalene-d_8
560SB00201	acenaphthene-d_{10}
561SB00401	phenanthrene-d_{10}
560SB00101RE	chrysene-d_{12}
561SB00102	perylene-d_{12}
570SB01201RE	1,4-dichlorobenzene-d_4
	acenaphthene-d_{10}
	phenanthrene-d_{10}
	chrysene-d_{12}
560SB00102RE	1,4-dichlorobenzene-d_4
	acenaphthene-d_{10}
	phenanthrene-d_{10}
	chrysene-d_{12}
	perylene-d_{12}

Internal Standards (continued)

Specific Finding:

The Samples listed below, exhibited low internal standard areas. Qualify all associated positive results as estimated (J) and all non detects as estimated (UJ).

560SB00201RE	1,4-dichlorobenzene-d_4 naphthalene-d_8 acenaphthene-d_{10} phenanthrene-d_{10} chrysene-d_{12}
561SB00401RE	acenaphthene-d_{10} phenanthrene-d_{10} chrysene-d_{12} perylene-d_{12}
561SB00102RE	1,4-dichlorobenzene-d_4 naphthalene-d_8 acenaphthene-d_{10} phenanthrene-d_{10}
570SB01201	chrysene-d_{12} perylene-d_{12}

DI Blanks

Associated blank	Compound	Conc.	Action Level
054DB00201	bis(2-ethylhexyl)phthalate	5J	1700

Samples	Compound	Qualification
560SB00101	bis(2-ethylhexyl)phthalate	CRQL
570SB00402		
570SB001201		
570SB01201RE		
570SB01202		

Compound Identification/Quantitation

Specific Finding:

Reject all results for samples listed below, due to non compliant internal standard areas.

560SB00102
570SB01201RE
560SB00201
561SB00401
560SB00101RE
561SB00102

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

NJ = Presumptive evidence for the presence of the material at an estimated value

K = Result is biased high

L = Result is biased low

METHOD BLANK QUALIFICATION CODES

CRQL =	The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.
U =	The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.
No Action =	The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
570SB01201	benzo(b)fluoranthene (26.4)	+	J
570SB01202			
560SB00201			
561SB00401			
	All associated analytes	+/-	J/UJ
560SB00101	1,4-dichlorobenzene-d_4		
560SB00102	naphthalene-d_8		
560SB00201	acenaphthene-d_{10}		
561SB00401	phenanthrene-d_{10}		
560SB00101RE	chrysene-d_{12}		
561SB00102	perylene-d_{12}		
570SB01201RE	1,4-dichlorobenzene-d_4		
	acenaphthene-d_{10}		
	phenanthrene-d_{10}		
	chrysene-d_{12}		
560SB00102RE	1,4-dichlorobenzene-d_4		
	acenaphthene-d_{10}		
	phenanthrene-d_{10}		
	chrysene-d_{12}		
	perylene-d_{12}		
560SB00201RE	1,4-dichlorobenzene-d_4		
	naphthalene-d_8		
	acenaphthene-d_{10}		
	phenanthrene-d_{10}		
	chrysene-d_{12}		
561SB00401RE	acenaphthene-d_{10}		
	phenanthrene-d_{10}		
	chrysene-d_{12}		
	perylene-d_{12}		

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
	All associated analytes	+/-	J/UJ
561SB00102RE	1,4-dichlorobenzene-d_4 naphthalene-d_8 acenaphthene-d_{10} phenanthrene-d_{10}		
570SB01201	chrysene-d_{12} perylene-d_{12}		
560SB00101 570SB00402 570SB001201 570SB01201RE 570SB01202	bis(2-ethylhexyl)phthalate	+	CRQL
560SB00102 570SB01201RE 560SB00201 561SB00401 560SB00101RE 561SB00102	All analytes	+/-	R

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT AND NARRATIVE

VOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846, Method 8240; the National Functional Guidelines for Organic Data Review, June 1991, and DQO Level III. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG # 24074B

A validation was performed on the Volatile Data from SDG 24074B, The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
	•	Internal Standard Performance
	•	Blanks
	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Internal Standards

All internal standard EICP areas did not meet the internal standard EICP area QA/QC criteria.

Internal Standards (continued)

Specific Finding:

The Samples listed below, exhibited low internal standard areas. Qualify all associated positive results as estimated (J) and all non detects as estimated (UJ).

561SB00102	chlorobenzene-d_5
561SB00102RE	
561SB00501	1,4-difluorobenzene
561SB00501RE	chlorobenzene-d_5

Trip blanks

Associated blank	Compound	Conc.	Action Level
561TB00201	methylene chloride	8	80

Samples	Compound	Qualification
506SB00201	methylene chloride	CRQL
561SB00101		
561SB00401		
561SB00501		
561SB00501RE		
561SB00102	methylene chloride	U
561SB00102RE		
570SB01202		

Rinseate blanks

Associated blank	Compound	Conc.	Action Level
054EB00201	acetone	8J	80

Samples	Compound	Qualification
560SB00202	acetone	U
561SB00102		
561SB00102RE		

Surrogates

All of the surrogate recoveries for the all blanks and samples were not within QA/QC limits.

Specific Finding:

The samples listed below, exhibited surrogate recoveries that exceeded the QA/QC limit. Qualify all positive results as estimated (J)

561SB00102RE	toluene-d_8	140

The samples listed below, exhibited surrogate recoveries that exceeded the QA/QC limit and recoveries that were less than the QA/QC limit. Qualify all positive results as estimated (J) and all non detects as estimated (UJ).

561SB00102	toluene-d_8	120
	bromofluorobenzene	68
561SB00501	toluene-d_8	137
	bromofluorobenzene	69
561SB00501RE	toluene-d_8	123
	bromofluorobenzene	68

Compound Identification/Quantitation

Specific Finding:

Reject (R) all results for the re-analyzed samples listed below, due to non compliant internal standard areas and/or non compliant surrogate recoveries.

561SB00102RE
561SB00501RE

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on the dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
	All associated analytes	+/-	J/UJ
561SB00102	chlorobenzene-d_5		
561SB00102RE			
561SB00501	1,4-difluorobenzene		
561SB00501RE	chlorobenzene-d_5		
506SB00201	methylene chloride	+	CRQL
561SB00101			
561SB00401			
561SB00501			
561SB00501RE			
561SB00102	methylene chloride	+	U
561SB00102RE			
570SB01202			
560SB00202	acetone	+	U
561SB00102			
561SB00102RE			
561SB00102RE	All analytes	+	J
561SB00102	All analytes	+/-	J/UJ
561SB00501			
561SB00501RE			
561SB00102RE	All analytes	+/-	R
561SB00501RE			

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	24094A
Date:	February 25, 1996
Client Name:	Ensafe/ Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	November 16, 1995
Number of Samples:	3 Non-aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level IV
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Volatiles, Semivolatiles, Pesticide/PCB's, Herbicides, Organophosphorus Pesticides, Organotins, Dioxin/Furans, Hexavalent Chromium, Metals, Cyanide

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig K. Scarborough — 2-29-96.

Eugene M. Watson, Vice President — Date

4127 Plaza 94 South · St. Charles, MO 63304
(314) 936-1332 · Fax (314) 936-1335

SDG# 24094A

Samples and Fractions Reviewed

Sample Identifications | Analytical Fractions

ENSAFE ID	MATRIX	VOA		SV		P/P		HERB		OPP		ORG		D/F		HCR		TAL/CN	
053CB00101	SOIL		X		X		X		X		X		X		X		X		X
053CB00102	SOIL		X		X		X		X		X		X		X		X		X
526CB00201	SOIL		X		X		X		X		X		X		X		X		X
Total Billable Samples	(Water/Soil)	0	3	0	3	0	3	0	3	0	3	0	3	0	3	0	3	0	3

VOA = SW846 Volatiles
SV = SW846 Semivolatiles
P/P = SW846 Pesticides/PCB's
HERB = SW846 Herbicides
OPP = SW846 Organophosphorus Pesticides
ORG = SW846 Organotins
D/F = SW846 Dioxin/Furans
HCR = SW846 Hexavalent Chromium
TAL/CN = SW846 Metals w/Cyanide

DATA ASSESSMENT AND NARRATIVE

VOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA 8240 Appendix IX; the National Functional Guidelines for Organic Data Review, June 1991, and DQO Level IV. All comments made within this report should be considered when examining the analytical results.

SDG # 24094

A validation was performed on the Volatile Data from SDG 24094. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibrations
*	•	Internal Standard Performance
	•	Blanks
*	•	Surrogate Recoveries
*	•	Laboratory Control Samples
*	•	Field Duplicates
*	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Continuing calibrations

The continuing calibrations that were analyzed with this data package exhibited %Ds and RRFs that were not within continuing calibration criteria. Qualifications are required.

Continuing calibrations (continued)

Specific Finding:

The continuing calibration, I17920.D, contained compounds with %Ds greater than 25%, and RRFs less than 0.050 . For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and non detects as rejected (R).

053CB00101	acrolein
053CB00102	1,4-dioxane
526CB00201	

The continuing calibration, I17920.D, contained compounds with RRFs less than 0.050 . For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and non detects as rejected (R).

053CB00101	acetonitrile
053CB00102	
526CB00201	

The continuing calibration, I17920.D, contained compounds with %Ds greater than 50%, and less than 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and non detects as rejected (R).

053CB00101	dichlorodifluoromethane
053CB00102	
526CB00201	

Method Blank

Associated blank	Compound	Concentration
VBLK1	methylene chloride	3J

Samples	Compound	Qualification
053CB00101	methylene chloride	U
053CB00102		

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
053CB00101 053CB00102 526CB00201	acrolein 1,4-dioxane	+/-	J/R
053CB00101 053CB00102 526CB00201	acetonitrile	+/-	J/R
053CB00101 053CB00102 526CB00201	dichlorodifluoromethane	+/-	J/R
053CB00101 053CB00102	methylene chloride	+	U

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE
METALS, HEX CR AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM03.0 Method; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24094

A validation was performed on the Metals Data from SDG 24029. The data was evaluated based on the following parameters.

*	●	Data Completeness
*	●	Holding Times
*	●	Calibrations
	●	Blanks
*	●	Interferences
*	●	Matrix Spike Recovery
*	●	Matrix Duplicates
*	●	Field Duplicates
*	●	Laboratory Control Samples
*	●	Serial Dilutions
*	●	MSAs

* - All criteria were met for this parameter.

Preparation and Field Blanks

Specific Finding

The preparation blank exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Sodium	21.4 mg/kg	all FD samples
Tin	2.32 mg/kg	all FD samples

The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as non-detect, "U". The field or DI water blanks exhibited contamination but had no impact on the data.

The preparation blank exhibited negative bias for the following elements.

Elements	Conc.	Samples affected
Potassium	-22.4 mg/kg	all FD samples

This reviewer qualifies all samples results below ten times the negative bias as estimated, "J" or "UJ".

Specific Finding

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafe's request.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
All FD samples	Na and Sn.	+	U
All FD samples	K.	+/U	J/UJ
All "B" results	all analytes	B	J

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	24094B
Date:	February 25, 1996
Client Name:	Ensafe/ Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	November 16, 1996
Number of Samples:	1 Aqueous Sample(s) with 0 MS/MSD(s) 16 Non-aqueous Sample(s) with 1 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Volatiles, Semivolatiles, Pesticides/PCB's, Organotins, Cyanide, Metals

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Senfoss
for Eugene M. Watson, Vice President

2-29-96
Date

4127 Plaza 94 South · St. Charles, MO 63304
(314) 936-1332 · Fax (314) 936-1335

SDG# 24094B

Samples and Fractions Reviewed

Sample Identifications — Analytical Fractions

ENSAFE ID	MATRIX	VOA		SV		P/P		ORG		CN		TAL	
053SB00101	SOIL		X		X		X		X		X		X
053SB00102	SOIL		X		X		X		X		X		X
053SB00201	SOIL		X		X		X		X		X		X
053SB00202	SOIL		X		X		X		X		X		X
526SB00201	SOIL		X		X		X		X		X		X
526SB00202	SOIL		X		X		X		X		X		X
526SB00401	SOIL		X		X		X		X		X		X
526SB00402	SOIL		X		X		X		X		X		X
526TB00402	WATER	X											
526SB00501	SOIL		X		X		X		X		X		X
526SB00502	SOIL		X		X		X		X		X		X
526SB00601	SOIL		X		X		X		X		X		X
526SB00602	SOIL		X		X		X		X		X		X
559SB02101	SOIL		X		X		X				X		X
559SB02102	SOIL		X		X		X				X		X
GDESB02001	SOIL		X		X		X				X		X
GDESB02002	SOIL		X		X		X				X		X
Total Billable Samples	(Water/Soil)	1	16	0	16	0	16	0	12	0	16	0	16

VOA = SW846 Volatiles
SV = SW846 Semivolatiles
P/P = SW846 Pesticides/PCB's
ORG = SW846 Organotins
CN = SW846 Cyanide
TAL = SW846 Metals

DATA ASSESSMENT AND NARRATIVE

VOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA 8240; the National Functional Guidelines for Organic Data Review, June 1991, and DQO Level III. All comments made within this report should be considered when examining the analytical results.

SDG # 24094

A validation was performed on the Volatile Data from SDG 24094. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibrations
*	•	Internal Standard Performance
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Laboratory Control Samples
*	•	Field Duplicates
*	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Continuing calibrations

The continuing calibrations that were analyzed with this data package exhibited %Ds that were not within continuing calibration criteria. All RRFs were within calibration criteria. Qualifications are required.

Continuing calibrations (continued)

Specific Finding:

The continuing calibration, UJ198.D, contained compounds with %Ds greater than 25%, but less than 50%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J).

GDESB02002	acetone
559SB02101	
053SB00101	
053SB00102	
053SB00201	
053SB00202	
526SB00401	
526SB00501	
526SB00502	

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
GDESB02002	acetone	+	J
559SB02101			
053SB00101			
053SB00102			
053SB00201			
053SB00202			
526SB00401			
526SB00501			
526SB00502			

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE
METALS, HEX CR AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM03.0 Method; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24094

A validation was performed on the Metals Data from SDG 24094. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Calibrations
	•	Blanks
*	•	Interferences
	•	Matrix Spike Recovery
	•	Matrix Duplicates
*	•	Field Duplicates
*	•	Laboratory Control Samples
*	•	Serial Dilutions
*	•	MSAs

* - All criteria were met for this parameter.

Preparation and Field Blanks

Specific Finding

The preparation blank exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Chromium	0.17 mg/kg	no impact
Nickel	0.28 mg/kg	all soil samples below 1.90 mg/kg
Potassium	202. mg/kg	all soil samples below 1010. mg/kg
Sodium	17.8 mg/kg	all soil samples below 89.0 mg/kg
Tin	2.66 mg/kg	all soil samples

The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as non-detect, "U". The field or DI water blanks exhibited contamination but had no impact on the data.

Matrix Spike Analysis

Specific Finding

The Matrix Spike recoveries for soils for Antimony and Mercury were below the lower control limits. All positive and non-detect results are qualified as estimated, "J" or "UJ".

The Matrix Spike recovery for Zinc was above the upper control limits. All positive results are qualified as estimated, "J".

Duplicate Analysis

Specific Finding

The duplicate analysis for Aluminum was outside the control limits. All positive results are qualified as estimated, "J". The RPD for Antimony was below 35% and will not be qualified. The field duplicate results were below 50% and require no qualification.

Specific Finding

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafe's request.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all soil samples below 1.90 mg/kg	Ni.	+	U
all soil samples below 1010 mg/kg	K.		
all soil samples below 89.0 mg/kg	Na.		
all soil samples	Sn.		
all soil samples	Sb and Hg.	+/U	J/UJ
all soil samples	Zn.	+	J
all soil samples	Al.	+	J
All "B" results	all analytes	B	J

DATA ASSESSMENT NARRATIVE

CHLORINATED HERBICIDES

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW846 Method 8150; the National Functional Guidelines for Organic Data Validation, June 1991; and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24094A

A validation was performed on the Herbicide Data from SDG 24094A. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC Performance
*	•	Calibration
*	•	Blanks
	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

Surrogate Recoveries

One (1) sample exhibited a non-compliant DCAA recovery.

Surrogate Recoveries, Continued

Specific Finding

One (1) sample exhibited a low DCAA recovery. For the following sample, the positive results are qualified as estimated, J, and the non-detect results are qualified as estimated, UJ.

Sample ID	Surrogate	% Recovery
053CB00101	DCAA	16%

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 10% of the data required qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
053CB00101	ALL	+/-	J/UJ

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non-detect result

DATA ASSESSMENT NARRATIVE

ORGANOPHOSPHORUS PESTICIDES

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW846 Method 8140; the National Functional Guidelines for Organic Data Validation, June 1991; and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24094A

A validation was performed on the Organophosphorus Pesticide Data from SDG 24094A. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC Performance
*	•	Calibration
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 10% of the data required qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL

NO QUALIFICATIONS ARE REQUIRED.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non-detect result

DATA ASSESSMENT NARRATIVE

DIOXIN/FURANS - 8290

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, internal standard recoveries, clean-up standard recoveries, matrix spike recoveries, GC/MS high resolution performance, tuning results, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8290; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level IV requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 24094

A validation was performed on the Dioxin/Furan Data from SDG 24094. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Mass Resolution Checks
*	•	Column Performance
*	•	Calibrations
*	•	Internal Standard Recovery
*	•	Blanks
*	•	Laboratory Control Samples
N/A	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Congener Identification/Quantitation

* - All criteria were met for this parameter.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	CONGENER ID	DL	QL

No qualifications are required.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

SEMIVOLATILES - ORGANOTINS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, calibration results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8270, modified for organotins; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level III requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 24094

A validation was performed on the volatile organics data from SDGs 24094. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
*	•	Internal Standard Performance
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Identification/Quantitation

* - All criteria were met for this parameter.

Overall Performance

Overall performance was acceptable.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL

No qualifications are required.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

SEMIVOLATILES - ORGANOTINS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, calibration results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8270, modified for organotins; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level IV requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 24094

A validation was performed on the volatile organics data from SDGs 24094. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
*	•	Internal Standard Performance
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Identification/Quantitation

* - All criteria were met for this parameter.

Overall Performance

Overall performance was acceptable.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL

No qualifications are required.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8270; the National Functional Guidelines for Organic Data Validation, June 1991, and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24094A

A validation was performed on the Semivolatile Data from SDG 24094A. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibration
	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
	•	Internal Standard Performance
*	•	Compound Identification
	•	Compound Quantitation

* - All criteria were met for this parameter.

Initial Calibrations

The Initial calibrations standards that were analyzed exhibited non-compliant %Ds and RRFs for which qualification of the data was required.

Initial Calibrations, continued

Specific Findings

The initial calibration analyzed on 11/29/95 on instrument A, contained compounds with RRFs less than 0.05. For the samples and non-compliant compounds listed below, the positive results are qualified as estimated, J, and the non-detect results are rejected, R.

053CB00101	aramite (0.032)
053CB00102	hexachlorophene (0.023)
526CB00201	
053CB00102RE	
526CB00201RE	

The initial calibration analyzed on 11/29/95 on instrument A, contained compounds with %D greater than 50% but less than 90%. For the samples and non-compliant compounds listed below, the positive results are qualified as estimated, J, and the non-detect results are qualified as estimated, J/UJ.

053CB00101	1,3,5-trinitrobenzene (69.7%)
053CB00102	diallate (54.5%)
526CB00201	dimethoate (52.5)
053CB00102RE	kepone (51.3%)
526CB00201RE	pyridine (49.5%)

Internal Standards

Specific Findings

The following samples exhibited non-compliant internal standard area recoveries. All positive and non-detect results are qualified as estimated, J/UJ, for the compounds quantitated with the noted internal standard.

053CB00102	1,4-dichlorobenzene-d4
526CB00201	1,4-dichlorobenzene-d4 Naphthalene-d10 Perylene-d12

Internal Standards, continued

Specific Findings, continued

The following samples exhibited non-compliant internal standard area recoveries. All positive and non-detect results are qualified as estimated, J/UJ, for the compounds quantitated with the noted internal standard.

053CB00102RE	1,4-dichlorobenzene-d4 Naphthalene-d8 Acenaphthene-d10
526CB00201RE	1,4-dichlorobenzene-d4 Naphthalene-d10

Method Blanks

One (1) method blank exhibited contamination which resulted in the qualification of field samples.

	SBLK1
BIS(2-ETHYLHEXYL)PHTHALATE	150 μg/Kg

Specific Findings

Sample	Contaminant	Action Level	Qualification
053CB00101 053CB00102 053CB00102RE 526CB00201	bis(2-ethylhexyl)phthalate	1500 μg/Kg	CRQL

Compound Quantitation

Specific Findings

For the following sample, the reported compounds are rejected, UR, in favor of the results from the initial or the RE analysis of the sample. The reviewer chose to report the results which exhibited better internal standard recoveries.

053CB00102RE
526CB00201

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 5% of data required qualifications

.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
053CB00101 053CB00102 526CB00201 053CB00102RE 526CB00201RE	aramite hexachlorophene	+/-	J/R
053CB00101 053CB00102 526CB00201 053CB00102RE 526CB00201RE	1,3,5-trinitrobenzene diallate dimethoate kepone pyridine	+/-	J/R
053CB00102	All associated with 1,4-dichlorobenzene-d4	+/-	J/UJ
526CB00201	All associated with 1,4-dichlorobenzene-d4 Naphthalene-d10 Perylene-d12	+/-	J/UJ
053CB00102RE	All associated with 1,4-dichlorobenzene-d4 Naphthalene-d8 Acenaphthene-d10	+/-	J/UJ
526CB00201RE	All associated with 1,4-dichlorobenzene-d4 Naphthalene-d10	+/-	J/UJ

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
053CB00101 053CB00102 053CB00102RE 526CB00201	bis(2-ethylhexyl)phthalate	+	CRQL
053CB00102RE 526CB00201	All compounds	+/-	UR

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8270; the National Functional Guidelines for Organic Data Validation, June 1991, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24094B

A validation was performed on the Semivolatile Data from SDG 24094B. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibration
	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
	•	Internal Standard Performance
*	•	Compound Identification
	•	Compound Quantitation

* - All criteria were met for this parameter.

Internal Standards

Two (2) samples required qualification due to non-compliant internal standard area recoveries.

Internal Standards, continued

Specific Findings

The following samples exhibited non-compliant internal standard area recoveries. All positive and non-detect results are qualified as estimated, J/UJ, for the compounds quantitated with the noted internal standard.

GDESB02001	1,4-dichlorobenzene-d4 Naphthalene -d8 Perylene-d12
GDESB02001RE	chrysene-d12

Field QC Blanks

One (1) DI blank exhibited contamination which resulted in the qualification of field samples.

	054DB00201
1,3-dichlorobenzene	2 μg/L
2,4,6-trichlorophenol	4 μg/L
bis(2-ethylhexyl)phthalate	5 μg/L

Specific Findings

Sample	Contaminant	Action Level	Qualification
526SB00401	bis(2-ethylhexyl)phthalate	50 μg/L	U

Compound Quantitation

Specific Findings

For the following sample, the reported compounds are rejected, UR, in favor of the results from the RE analysis of the sample. The RE analysis exhibited better internal standard recoveries.

GDESB02001

DATA ASSESSMENT NARRATIVE
SEMIVOLATILE ANALYSIS

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 5% of data required qualifications

.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
GDESB02001	All associated with 1,4-dichlorobenzene-d4 Naphthalene -d8 Perylene-d12	+/-	J/UJ
GDESB02001RE	All associated with chrysene-d12	+/-	J/UJ
526SB00401	bis(2-ethylhexyl)phthalate	+	U
GDESB02001	All	+/-	UR

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

CHLORINATED PESTICIDES/PCBs

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8080; the National Functional Guidelines for Organic Data Validation, June 1991, and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24094

A validation was performed on the Chlorinated Pesticide/PCB Data from SDG 24094. The data was evaluated based on the following parameters:

*	Data Completeness
*	Holding Times
	Calibration
*	Blanks
	Surrogate Recoveries
*	Matrix Spike/Matrix Spike Duplicates
*	Field Duplicates
*	Compound Identification
*	Compound Quantitation

* - All criteria were met for this parameter.

Calibration

The initial calibration exhibits non-linearity for some compounds. Qualify all positive results for the non-linear compounds as estimated (J).

Analyte	%RSD
4,4'-DDT	38

Surrogate Recoveries

One sample exhibited a surrogate recovery greater than 10% and less than the lower limit. Qualify all positive results as estimated (J) and all non-detect results as estimated (UJ)..

Surrogate Recoveries, Continued

SAMPLE ID	SURROGATE	%REC
526CB00201	DCB-2	31

System Performance and Overall Assessment

Overall performance was acceptable. The data did require qualifications/rejections as stated above.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated Value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for the analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non-detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL
053CB00101	4,4'-DDT	+	J
526CB00201	ALL	+/-	J/UJ

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non-detect result.

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	24105A
Date:	February 25, 1996
Client Name:	Ensafe/ Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	November 17-20, 1995
Number of Samples:	2 Non-aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level IV
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Semivolatiles, Herbicides, Organophosphorus Pesticides, Organotins, Dioxin/Furans, Hexavalent Chromium, Metals

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig R. Sawyer

Eugene M. Watson, Vice President

2-29-96

Date

4127 Plaza 94 South · St. Charles, MO 63304
(314) 936-1332 · Fax (314) 936-1335

SDG# 24105A

Samples and Fractions Reviewed

Sample Identifications — Analytical Fractions

ENSAFE ID	MATRIX	SV		HERB		OPP		ORG		D/F		HCR		TAL	
054CB00701	SOIL		X		X		X		X		X		X		X
054CB00801	SOIL		X		X		X		X		X		X		X
Total Billable Samples (Water/Soil)		0	2	0	2	0	2	0	2	0	2	0	2	0	2

SV = SW846 Semivolatiles
HERB = SW846 Herbicides
OPP = SW846 Organophosphorus Pesticides
ORG = SW846 Organotins
D/F = SW846 Dioxin/Furans
HCR = SW846 Hexavalent Chromium
TAL = SW846 Metals

DATA ASSESSMENT NARRATIVE
METALS, HEX CR AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM03.0 Method; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24105

A validation was performed on the Metals Data from SDG 24029. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Calibrations
	•	Blanks
*	•	Interferences
*	•	Matrix Spike Recovery
*	•	Matrix Duplicates
*	•	Field Duplicates
*	•	Laboratory Control Samples
	•	Serial Dilutions
*	•	MSAs

* - All criteria were met for this parameter.

Preparation and Field Blanks

Specific Finding

The preparation blank exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Aluminum	18.7 mg/kg	no impact
Barium	0.14 mg/kg	no impact
Calcium	24.7 mg/kg	no impact
Chromium	0.32 mg/kg	no impact
Copper	1.20 mg/kg	no impact

Iron	76.1 mg/kg	no impact
Lead	1.12 mg/kg	no impact
Manganese	0.19 mg/kg	no impact
Nickel	0.35 mg/kg	no impact
Potassium	77.8 mg/kg	no impact
Sodium	10.5 mg/kg	no impact
Tin	2.92 mg/kg	no impact
Zinc	2.84 mg/kg	no impact

The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as non-detect, "U". The field or DI water blanks exhibited contamination but had no impact on the data.

Serial Dilution

Specific Findings

The Serial dilutions for Calcium, Zinc and Potassium for waters were outside the control limits. All positive results are qualified as estimated, "J".

Specific Finding

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafe's request.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all field duplicates	Ca, Zn and K.	+	J
All "B" results	all analytes	B	J

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	24105B
Date:	February 25, 1996
Client Name:	Ensafe/ Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	November 17-20, 1995
Number of Samples:	4 Aqueous Sample(s) with 0 MS/MSD(s) 16 Non-aqueous Sample(s) with 1 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Volatiles, Semivolatiles, Pesticides/PCB's, Organotins, pH, Metals, Cyanide

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Senzas
Eugene M. Watson, Vice President

2-29-96
Date

4127 Plaza 94 South · St. Charles, MO 63304
(314) 936-1332 · Fax (314) 936-1335

SDG# 24105B

Samples and Fractions Reviewed

Sample Identifications — Analytical Fractions

ENSAFE ID	MATRIX	VOA		SV		P/P		ORG		CN		TAL		pH	
054SB00402	SOIL				X				X				X		
054SB00501	SOIL				X				X				X		
054SB00502	SOIL				X				X				X		
054SB00601	SOIL				X				X				X		
054TB00601	WATER	X													
054EB00601	WATER	X		X		X				X		X			
054DB00601	WATER	X		X		X				X		X			
054SB00602	SOIL				X				X				X		
054SB00701	SOIL				X		X		X		X		X		
054SB00702	SOIL				X		X		X		X		X		
054SB00801	SOIL				X		X		X		X		X		
054SB00802	SOIL				X		X		X		X		X		
526SB00401	SOIL				X				X				X		
526TB00402	WATER	X													
526SB00701	SOIL		X		X				X				X		
526SB00702	SOIL		X		X				X				X		
526SB00801	SOIL		X		X				X				X		
526SB00802	SOIL		X		X				X				X		
570SB01101	SOIL		X		X								X		X
570SB01102	SOIL		X		X								X		X
Total Billable Samples	(Water/Soil)	4	6	2	16	2	4	0	14	2	4	2	16	0	2

VOA = SW846 Volatiles
SV = SW846 Semivolatiles
P/P = SW846 Pesticides/PCB's
ORG = SW846 Organotins
CN = SW846 Cyanide
TAL = SW846 Metals
pH = SW846 pH

DATA ASSESSMENT AND NARRATIVE

VOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA 8240; the National Functional Guidelines for Organic Data Review, June 1991, and DQO Level III. All comments made within this report should be considered when examining the analytical results.

SDG # 24105

A validation was performed on the Volatile Data from SDG 24105. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
	•	Internal Standard Performance
	•	Blanks
*	•	Surrogate Recoveries
*	•	Laboratory Control Samples
*	•	Field Duplicates
	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Internal Standards

All internal standard EICP areas did not meet the internal standard EICP area QA/QC criteria.

Specific Finding:

The Samples listed below, exhibited low internal standard areas. Qualify all associated positive results as estimated (J) and all non detects as estimated(UJ).

526SB00701	1,4-difluorobenzene
	chlorobenzene-d_5

Trip Blanks

Associated blank	Compound	Concentration
570SB01101	methylene chloride	2J

Samples	Compound	Qualification
570SB01101 570SB01102	methylene chloride	U

Surrogates

All of the surrogate recoveries for these samples were not within QA/QC limits.

Specific Finding:

Sample listed below exhibited high recovery for toluene-d_8 and low recovery for bromofluorobenzene. Qualify all positive results as estimated (J) and non detects as estimated (UJ).

526SB00701

Compound Identification /Quantitation

Reject sample 526SB00701RE, in favor of the reanalysis due to non compliant internal standard area and surrogate recoveries.

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
526SB00701	All associated analytes 1,4-difluorobenzene chlorobenzene-d_5	+/-	J/UJ
570SB01101 570SB01102	methylene chloride	+	U
526SB00701	all analytes	+/-	J/UJ
526SB00701RE	all analytes	+/-	R

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE
METALS, HEX CR AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM03.0 Method; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24105

A validation was performed on the Metals Data from SDG 24029. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Calibrations
	•	Blanks
*	•	Interferences
	•	Matrix Spike Recovery
	•	Matrix Duplicates
	•	Field Duplicates
*	•	Laboratory Control Samples
	•	Serial Dilutions
*	•	MSAs

* - All criteria were met for this parameter.

Preparation and Field Blanks

Specific Finding

The preparation blank exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Chromium	0.18 mg/kg	no impact
Nickel	0.10 mg/kg	no impact
Potassium	126. mg/kg	all soil samples below 630. mg/kg
Sodium	16.7 mg/kg	all soil samples below 83.5 mg/kg
Tin	2.52 mg/kg	all soil samples below 12.6 mg/kg

The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as non-detect, "U". The field or DI water blanks exhibited contamination but had no impact on the data.

Matrix Spike Analysis

Specific Finding

The Matrix Spike recovery for soils for Antimony was below 30%. All non-detect results are rejected and all positive results are qualified as estimated, "J".

The Matrix Spike recoveries for soils for Silver and Mercury were below the lower control limits. All positive and non-detect results are qualified as estimated, "J" or "UJ".

Duplicate Analysis

Specific Finding

The duplicate analysis for Antimony was outside the control limits. All positive results are qualified as estimated, "J". The RPD for Silver was below 35% and will not be qualified. The field duplicate results for Barium, Calcium, Copper, Iron, Lead, Manganese, Nickel, Zinc and Tin for soils were greater than 50% and all positive results will be qualified as estimated, "J" for all soil samples.

Serial Dilution

Specific Finding

The Serial dilution for Potassium for soils was outside the control limits. All positive results will be qualified as estimated, "J".

Specific Finding

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafe's request.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all soil samples below 630. mg/kg	K.	+	U
all soil samples below 83.5 mg/kg	Na.		
all soil samples below 12.6 mg/kg	Sn.		
all soil samples	Sb.	+	J
		U	R
All soil samples	Ag and Hg.	+/U	J/UJ
all soil samples	Sb, Ba, Ca, Cu, Fe, Pb, Mn, Ni, Zn and Sn.	+	J
All soil samples	K.	+	J
All "B" results	all analytes	B	J

DATA ASSESSMENT NARRATIVE

CHLORINATED PESTICIDES/PCBs

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8080; the National Functional Guidelines for Organic Data Validation, June 1991, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24105

A validation was performed on the Chlorinated Pesticide/PCB Data from SDG 24105. The data was evaluated based on the following parameters:

*	Data Completeness
*	Holding Times
	Calibration
*	Blanks
*	Surrogate Recoveries
*	Compound Identification
	Compound Quantitation

* - All criteria were met for this parameter.

Calibration

The initial calibration exhibits non-linearity for some compounds. Qualify all positive results for the non-linear compounds as estimated (J).

Analyte	%RSD
alpha-BHC	26.33, 29.07
4,4'-DDT	38

Compound Quantitation

One sample (526SB00801) exhibited results greater than the calibration range for 4,4'-DDE and 4,4'-DDT. A dilution was run for this sample. Qualify extrapolated results in original sample as rejected (R). Qualify all results other than extrapolated in dilution as rejected (UR).

Qualify extrapolated result in dilution as diluted (D).

System Performance and Overall Assessment

Overall performance was acceptable. The data did require qualifications/rejections as stated above.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated Value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for the analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non-detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL
526SB00801	4,4'-DDE	E	R
526SB00801	4,4'-DDT	E	R
526SB00801DL	4,4'-DDE	D	D
526SB00801DL	4,4'-DDT	D	D

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non-detect result.

DATA ASSESSMENT NARRATIVE

ORGANOPHOSPHORUS PESTICIDES

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW846 Method 8140; the National Functional Guidelines for Organic Data Validation, June 1991; and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24105A

A validation was performed on the Organophosphorus Pesticide Data from SDG 24105A. The data was evaluated based on the following parameters:

* • Data Completeness
* • Holding Times
* • GC Performance
* • Calibration
* • Blanks
* • Surrogate Recoveries
* • Matrix Spike/Matrix Spike Duplicates
* • Field Duplicates
* • Compound Identification
* • Compound Quantitation

* - All criteria were met for this parameter.

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 10% of the data required qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL

NO QUALIFICATIONS ARE REQUIRED.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non-detect result

DATA ASSESSMENT NARRATIVE

CHLORINATED HERBICIDES

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW846 Method 8150; the National Functional Guidelines for Organic Data Validation, June 1991; and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24105A

A validation was performed on the Herbicide Data from SDG 24105A. The data was evaluated based on the following parameters:

* • Data Completeness
* • Holding Times
* • GC Performance
* • Calibration
* • Blanks
* • Surrogate Recoveries
* • Matrix Spike/Matrix Spike Duplicates
* • Field Duplicates
* • Compound Identification
* • Compound Quantitation

* - All criteria were met for this parameter.

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 10% of the data required qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL

NO QUALIFICATIONS ARE REQUIRED.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non-detect result

DATA ASSESSMENT NARRATIVE

DIOXIN/FURANS - 8290

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, internal standard recoveries, clean-up standard recoveries, matrix spike recoveries, GC/MS high resolution performance, tuning results, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8290; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level IV requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 24105

A validation was performed on the Dioxin/Furan Data from SDG 24105. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Mass Resolution Checks
*	•	Column Performance
*	•	Calibrations
*	•	Internal Standard Recovery
*	•	Blanks
*	•	Laboratory Control Samples
N/A	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Congener Identification/Quantitation

* - All criteria were met for this parameter.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	CONGENER ID	DL	QL

No qualifications are required.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA 8270; National Functional Guidelines for Organic Data Review, and DQO Level III. All comments made within this report should be considered when examining the analytical results (Form I's).

SDG # 24105B

A validation was performed on the Semivolatile Data from SDG 24105B. The data was evaluated based on the following parameters.

- * Data Completeness
- * Holding Times
- * GC/MS Tuning
- * Calibrations
- * Internal Standard Performance
- Blanks
- * Surrogate Recoveries
- * Laboratory Control Sample
- * Field Duplicates
- * Compound Identification /Quantitation

* - All criteria were met for this parameter

Rinseate Blank

Associated blank	Compound	Concentration	Action Level
054EB00601	bis(2ethylhexyl)phthalate	7J	70
	Benzoic acid	3J	30

Samples	Compound	Qualification
054SB00402	bis(2ethylhexyl)phthalate	CRQL
054SB00502		
054SB00601		

Rinseate Blank (continued)

Samples	Compound	Qualification
054SB00701 054SB00801 526SB00401 526SB00702 526SB00802	bis(2ethylhexyl)phthalate	CRQL
054SB00501	bis(2ethylhexyl)phthalate	CRQL
054SB00401 054SB00502 526SB00401	benzoic acid	CRQL

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL =	The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.
U =	The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.
No Action =	The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
054SB00402	bis(2ethylhexyl)phthalate	+	CRQL
054SB00502			
054SB00601			
054SB00701			
054SB00801			
526SB00401			
526SB00702			
526SB00802			
054SB00501	bis(2ethylhexyl)phthalate	+	CRQL
054SB00401	benzoic acid	+	CRQL
054SB00502			
526SB00401			

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QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA 8270 Appendix IX; National Functional Guidelines for Organic Data Review, and DQO Level IV. All comments made within this report should be considered when examining the analytical results (Form I's).

SDG # 24105A

A validation was performed on the Semivolatile Data from SDG 24105A. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibrations
	•	Internal Standard Performance
	•	Blanks
*	•	Surrogate Recoveries
*	•	Laboratory Control Sample
*	•	Field Duplicates
	•	Compound Identification/Quantitation

* - All criteria were met for this parameter

Continuing calibrations

The continuing calibrations that were analyzed with this data package exhibited %Ds that were not within %D and RRF continuing calibration criteria. Qualifications are required.

Continuing calibrations (continued)

Specific Finding:

The continuing calibration, A0322, contained compounds with RRFs less than 0.05. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and all non detects as rejected (R).

054CB00701	hexachlorophene (0.023)
054CB00701RE	aramite (0.032)
054CB00801	methapyrilene (0.037)

The continuing calibration, A0318, contained compounds with %Ds greater than 50%, but less than 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and all non detects as estimated (UJ).

054CB00701	1,3,5-trinitrobenzene (69.7%)
054CB00701RE	Kepone (51.3%)
054CB00801	diallate (54.5%)
	Dimethoate (52.5%)

Internal Standards

All internal standard EICP areas did not meet the internal standard EICP area QA/QC criteria.

Specific Finding:

The Samples listed below, exhibited low internal standard areas. Qualify all associated positive results as estimated (J) and all non detects as estimated(UJ).

054CB00701	1,4-dichlorobenzene-d_4

Method Blank

Associated blank	Compound	Concentration	Action Level
SBLK1	bis(2ethylhexyl)phthalate	150J	1500

Samples	Compound	Qualification
054CB00701	bis(2ethylhexyl)phthalate	CRQL
054CB00801	bis(2ethylhexyl)phthalate	U

Compound Identification /Quantitation

Reject sample, 054CB00701RE, in favor of the initial analysis, due to non compliant internal standard areas.

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL =	The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.
U =	The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.
No Action =	The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
054CB00701 054CB00701RE 054CB00801	hexachlorophene aramite methapyrilene	+/-	J/R
054CB00701 054CB00701RE 054CB00801	1,3,5-trinitrobenzene Kepone diallate Dimethoate	+/-	J/UJ
	All associated analytes	+/-	J/UJ
054CB00701	1,4-dichlorobenzene-d_4		
054CB00701	bis(2ethylhexyl)phthalate	+	CRQL
054CB00801	bis(2ethylhexyl)phthalate	+	U

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE
METALS, HEX CR AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM03.0 Method; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24105

A validation was performed on the Metals Data from SDG 24029. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Calibrations
	•	Blanks
*	•	Interferences
	•	Matrix Spike Recovery
	•	Matrix Duplicates
	•	Field Duplicates
*	•	Laboratory Control Samples
	•	Serial Dilutions
*	•	MSAs

* - All criteria were met for this parameter.

Preparation and Field Blanks

Specific Finding

The preparation blank exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Chromium	0.18 mg/kg	no impact
Nickel	0.10 mg/kg	no impact
Potassium	126. mg/kg	all soil samples below 630. mg/kg
Sodium	16.7 mg/kg	all soil samples below 83.5 mg/kg
Tin	2.52 mg/kg	all soil samples below 12.6 mg/kg

The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as non-detect, "U". The field or DI water blanks exhibited contamination but had no impact on the data.

Matrix Spike Analysis

Specific Finding

The Matrix Spike recovery for soils for Antimony was below 30%. All non-detect results are rejected and all positive results are qualified as estimated, "J".

The Matrix Spike recoveries for soils for Silver and Mercury were below the lower control limits. All positive and non-detect results are qualified as estimated, "J" or "UJ".

Duplicate Analysis

Specific Finding

The duplicate analysis for Antimony was outside the control limits. All positive results are qualified as estimated, "J". The RPD for Silver was below 35% and will not be qualified. The field duplicate results for Barium, Calcium, Copper, Iron, Lead, Manganese, Nickel, Zinc and Tin for soils were greater than 50% and all positive results will be qualified as estimated, "J" for all soil samples.

Serial Dilution

Specific Finding

The Serial dilution for Potassium for soils was outside the control limits. All positive results will be qualified as estimated, "J".

Specific Finding

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafe's request.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all soil samples below 630. mg/kg	K.	+	U
all soil samples below 83.5 mg/kg	Na.		
all soil samples below 12.6 mg/kg	Sn.		
all soil samples	Sb.	+	J
		U	R
All soil samples	Ag and Hg.	+/U	J/UJ
all soil samples	Sb, Ba, Ca, Cu, Fe, Pb, Mn, Ni, Zn and Sn.	+	J
All soil samples	K.	+	J
All "B" results	all analytes	B	J

DATA ASSESSMENT NARRATIVE

SEMIVOLATILES - ORGANOTINS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, calibration results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8270, modified for organotins; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level III requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 24105

A validation was performed on the volatile organics data from SDGs 24105. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
	•	Internal Standard Performance
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
	•	Identification/Quantitation

* - All criteria were met for this parameter.

Internal Standards

Samples 526SB00802, 054SB00801, and 054SB00802 exhibited a low internal standard. Qualify all positive and non detect results as estimated (J/UJ).

Identification/Quantitation

Reject (R) 054SB00801RE and 054SB00802RE in favor of the original analyses due to similar internal standard area results.

Overall Performance

The overall performance was acceptable except where noted.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
526SB00802 054SB00801 054SB00802	all compounds	+/-	J/UJ
054SB00801RE 054SB00802RE	all compounds	+/-	R

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

SEMIVOLATILES - ORGANOTINS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, calibration results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8270, modified for organotins; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level IV requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 24105

A validation was performed on the volatile organics data from SDGs 24105. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
*	•	Internal Standard Performance
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Identification/Quantitation

* - All criteria were met for this parameter.

Overall Performance

Overall performance was acceptable.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL

No qualifications are required.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	24133
Date:	February 25, 1996
Client Name:	Ensafe/ Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	November 21, 1995
Number of Samples:	12 Non-aqueous Sample(s) with 1 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Volatiles, Semivolatiles, Organotins, Metals

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig B. Searfoss

Eugene M. Watson, Vice President

2-29-96

Date

4127 Plaza 94 South · St. Charles, MO 63304
(314) 936-1332 · Fax (314) 936-1335

SDG# 24133

Samples and Fractions Reviewed

Sample Identifications | Analytical Fractions

ENSAFE ID	MATRIX	VOA		SV		ORG		TAL	
054SB00901	SOIL				X		X		X
054SB00902	SOIL				X		X		X
054SB01001	SOIL				X		X		X
054SB01002	SOIL				X		X		X
054SB01101	SOIL				X		X		X
054SB01102	SOIL		X		X		X		X
054SB01201	SOIL				X		X		X
054SB01202	SOIL		X		X		X		X
054SB01301	SOIL				X		X		X
054SB01302	SOIL		X		X		X		X
054SB01401	SOIL		X		X		X		X
054SB01402	SOIL		X		X		X		X
Total Billable Samples	(Water/Soil)	0	5	0	12	0	12	0	12

VOA = SW846 Volatiles
SV = SW846 Semivolatiles
ORG = SW846 Organotins
TAL = SW846 Metals

DATA ASSESSMENT AND NARRATIVE

VOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA 8240; the National Functional Guidelines for Organic Data Review, June 1991, and DQO Level III. All comments made within this report should be considered when examining the analytical results.

SDG # 24133

A validation was performed on the Volatile Data from SDG 24133. The data was evaluated based on the following parameters.

- * Data Completeness
- * Holding Times
- * GC/MS Tuning
- * Calibrations
- * Internal Standard Performance
- Blanks
- * Surrogate Recoveries
- * Laboratory Control Samples
- * Field Duplicates
- Compound Identification /Quantitation

* - All criteria were met for this parameter

Rinseate Blanks

Associated blank	Compound	Concentration
054EB00601	methylene chloride	1J
	Acetone	2J

Samples	Compound	Qualification
054SB01102	methylene chloride	CRQL
054SB01202		
054SB01302		

Rinseate Blanks (continued)

Samples	Compound	Qualification
054SB01402	methylene chloride	CRQL

Surrogates

All of the surrogate recoveries for these samples were not within QA/QC limits.

Specific Finding:

Sample listed below exhibited high recoveries for toluene-d_8. Qualify all positive results as estimated (J).

054SB01102

Compound Identification /Quantitation

Reject sample 054SB01102RE, in favor of the reanalysis due to surrogate recoveries.

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
054SB01102 054SB01202 054SB01302	methylene chloride	+	CRQL
054SB01402	methylene chloride	+	CRQL
054SB01102	all analytes	+	J
054SB01102RE	all analytes	+/-	R

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE
METALS, HEX CR AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM03.0 Method; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24133

A validation was performed on the Metals Data from SDG 24133. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Calibrations
	•	Blanks
*	•	Interferences
*	•	Matrix Spike Recovery
*	•	Matrix Duplicates
*	•	Field Duplicates
*	•	Laboratory Control Samples
	•	Serial Dilutions
*	•	MSAs

* - All criteria were met for this parameter.

Preparation and Field Blanks

Specific Finding

The preparation blank exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Chromium	0.20 mg/kg	no impact
Tin	2.77 mg/kg	all soil samples below 13.9 mg/kg

The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as non-detect, "U". The field or DI water blanks exhibited contamination but had no impact on the data.

The preparation blank exhibited negative bias for the following elements.

Elements	Conc.	Samples affected
Thallium	-0.56 mg/kg	all soil samples

This reviewer qualifies all samples results below ten times the negative bias as estimated, "J" or "UJ".

Serial Dilution

Specific Findings

The Serial Dilution for Zinc for soils was outside the control limits. All positive results are qualified as estimated, "J".

Specific Finding

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafe's request.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all soil samples below 13.9 mg/kg	Sn.	+	U
all soil samples	Tl.	+/U	J/UJ
all soil samples	Zn.	+	J
All "B" results	all analytes	B	J

DATA ASSESSMENT NARRATIVE

SEMIVOLATILES - ORGANOTINS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, calibration results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8270, modified for organotins; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level III requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 24133

A validation was performed on the volatile organics data from SDGs 24133. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
*	•	Internal Standard Performance
*	•	Blanks
*	•	Surrogate Recoveries
	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Identification/Quantitation

* - All criteria were met for this parameter.

MS/MSDs

Sample 054SB01202 MS/MSD exhibited a 5% and 0% recovery for TBT. Reject (R) the non detect result in sample

Overall Performance

The overall performance was acceptable except where noted.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
054SB01202	TBT	-	R

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846, Method 8270; National Functional Guidelines for Organic Data Review, and DQO Level III. All comments made within this report should be considered when examining the analytical results (Form I's).

SDG # 24133B

A validation was performed on the Semivolatile Data from SDG 24133B. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
*	•	Internal Standard Performance
	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Rinseate Blanks

Associated blank	Compound	Conc.	Action Level
054EB00601	bis(2-ethylhexyl)phthalate	7J	2300

Samples	Compound	Qualification
054SB00901	bis(2-ethylhexyl)phthalate	CRQL
054SB01102		
054SB01302		

Rinseate Blanks

Associated blank	Compound	Conc.	Action Level
054EB00601	bis(2-ethylhexyl)phthalate	7J	2300

Samples	Compound	Qualification
054SB01001	bis(2-ethylhexyl)phthalate	U
054SB01101		
054SB01201		
054SB01202		
054SB01301		
054SB01401		

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

NJ = Presumptive evidence for the presence of the material at an estimated value

K = Result is biased high

L = Result is biased low

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
054SB00901	bis(2-ethylhexyl)phthalate	+	CRQL
054SB01102			
054SB01302			
054SB01001	bis(2-ethylhexyl)phthalate	+	U
054SB01101			
054SB01201			
054SB01202			
054SB01301			
054SB01401			

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT AND NARRATIVE

VOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA 8240; the National Functional Guidelines for Organic Data Review, June 1991, and DQO Level III. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG # 24152B

A validation was performed on the Volatile Data from SDG 24152B. The data was evaluated based on the following parameters.

* • Data Completeness
* • Holding Times
* • GC/MS Tuning
* • Calibrations
* • Internal Standard Performance
* • Blanks
* • Surrogate Recoveries
* • Laboratory Control Samples
* • Field Duplicates
* • Compound Identification /Quantitation

* - All criteria were met for this parameter

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that none of this data requires qualification.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL =	The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.
U =	The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.
No Action =	The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

DATA ASSESSMENT AND NARRATIVE

VOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA 8240; the National Functional Guidelines for Organic Data Review, June 1991, and DQO Level III. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG # 24152B

A validation was performed on the Volatile Data from SDG 24152B. The data was evaluated based on the following parameters.

* • Data Completeness
* • Holding Times
* • GC/MS Tuning
* • Calibrations
* • Internal Standard Performance
* • Blanks
* • Surrogate Recoveries
* • Laboratory Control Samples
* • Field Duplicates
* • Compound Identification /Quantitation

* - All criteria were met for this parameter

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that none of this data requires qualification.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	24152A
Date:	March 13, 1996
Client Name:	Ensafe/Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	November 27, 1995
Number of Samples:	2 Aqueous Sample(s) with 0 MS/MSD(s) 20 Non-aqueous Sample(s) with 1 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Metals, Cyanide

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Sewfass
for Eugene M. Watson, Vice President

3-19-96
Date

4127 Plaza 94 South · St. Charles, MO 63304
(314) 936-1332 · Fax (314) 936-1335

SDG# 24152A

Samples and Fractions Reviewed

Sample Identifications Analytical Fractio

ENSAFE ID	MATRIX	TAL		CN	
054EB01401	WATER	X		X	
054DB01401	WATER	X		X	
054SB01501	SOIL		X		
054SB01502	SOIL		X		
054SB01601	SOIL		X		
054SB01602	SOIL		X		
054SB01701	SOIL		X		
054SB01702	SOIL		X		
054SB01801	SOIL		X		
054SB01802	SOIL		X		
054SB01901	SOIL		X		
054SB01902	SOIL		X		
054SB02001	SOIL		X		
054SB02002	SOIL		X		
054SB02101	SOIL		X		
054SB02102	SOIL		X		
054SB02201	SOIL		X		
054SB02202	SOIL		X		
054SB02301	SOIL		X		
054SB02302	SOIL		X		
054SB03201	SOIL		X		
054SB03202	SOIL		X		
Total Billable Samples (Water/Soil)		2	20	2	0

TAL = SW846 Metals
CN = SW846 Cyanide

DATA ASSESSMENT NARRATIVE
METALS AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM03.0 Method; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24152

A validation was performed on the Metals Data from SDG 24152. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Calibrations
	•	Blanks
*	•	Interferences
	•	Matrix Spike Recovery
*	•	Matrix Duplicates
	•	Field Duplicates
*	•	Laboratory Control Samples
	•	Serial Dilutions
*	•	MSAs

* - All criteria were met for this parameter.

Preparation and Field Blanks

Specific Finding

The preparation blank exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Chromium	0.29 mg/kg	no impact
Iron	3.90 mg/kg	no impact
Nickel	0.19 mg/kg	all soil samples below 0.95 mg/kg
Tin	2.62 mg/kg	all soil samples below 13.3 mg/kg

The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as non-detect, "U". The field or DI water blanks exhibited contamination but had no impact on the data.

Matrix Spike Recovery

Specific Finding

The Matrix Spike recovery for Antimony (68%) was below the lower control limits. All positive and non-detect results are qualified as estimated, "J" or "UJ".

The Matrix Spike recoveries for Lead (145%) and Mercury (167%) were above the upper control limits. All positive results are qualified as estimated, "J".

Duplicate Analysis

Specific Finding

The Field Duplicate analyses for Calcium, Chromium, Copper, Lead and Zinc were outside the control limits of 50%. All positive results are qualified as estimated, "J".

Serial Dilution Analysis

Specific Finding

The Serial dilution for Zinc was outside the control limits. All positive results are qualified as estimated, "J".

Specific Finding

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafe's request.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all soil samples below 0.95 mg/kg	Ni.	+	U
all soil samples below 13.3 mg/kg	Sn.		
all soil samples	Sb.	+/U	J/UJ
all soil samples	Pb and Hg.	+	J
all soil samples	Cr, Ca, Cu, Pb and Zn.	+	J
all soil samples	Zn.	+	J
All "B" results	all analytes	B	J

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	24152C
Date:	March 13, 1996
Client Name:	Ensafe/Allen & Hoshall
Project/Site Name:	charleston; Zone E
Date Sampled:	November 27, 1995
Number of Samples:	3 Non-aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level IV
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Metals, Hexavalent Chromium

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig M. Seufson
Eugene M. Watson, Vice President

3-19-96.
Date

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SDG# 24152C

Samples and Fractions Reviewed

Sample Identifications Analytical Fractions

ENSAFE ID	MATRIX	TAL		HCR	
054CB01701	SOIL		X		X
054CB01801	SOIL		X		X
054CB02101	SOIL		X		X
Total Billable Samples (Water/Soil)		0	3	0	3

TAL = SW846 Metals
HCR = SW846 Hexavalent Chromium

DATA ASSESSMENT NARRATIVE
METALS, HEXAVALENT CHROMIUM AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM03.0 Method; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24152

A validation was performed on the Metals Data from SDG 24152. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Calibrations
	•	Blanks
*	•	Interferences
*	•	Matrix Spike Recovery
*	•	Matrix Duplicates
*	•	Field Duplicates
*	•	Laboratory Control Samples
	•	Serial Dilutions
*	•	MSAs

* - All criteria were met for this parameter.

Preparation and Field Blanks

Specific Finding

The preparation blank exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Chromium	0.19 mg/kg	no impact
Potassium	123 mg/kg	all field duplicate samples below 615 mg/kg
Sodium	18.6 mg/kg	all field duplicate samples below 93 mg/kg
Tin	2.41 mg/kg	all field duplicate samples below 12.1 mg/kg

The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as non-detect, "U". The field or DI water blanks exhibited contamination but had no impact on the data.

Serial Dilution Analysis

Specific Finding

The Serial Dilutions for field duplicate samples for Calcium, Potassium and Zinc were outside the control limits. All positive results are qualified as estimated, "J".

Specific Finding

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafe's request.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all field duplicate samples below 615 mg/kg	K.	+	U
all field duplicate samples below 93 mg/kg	Na.		
all field duplicate samples below 12.1 mg/kg	Sn.		
all field duplicate samples	Ca, K and Zn.	+	J
All "B" results	all analytes	B	J

DATA ASSESSMENT NARRATIVE

ORGANOPHOSPHORUS PESTICIDES

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW846 Method 8140; the National Functional Guidelines for Organic Data Validation, June 1991; and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24152A

A validation was performed on the Organophosphorus Pesticide Data from SDG 24152A. The data was evaluated based on the following parameters:

* • Data Completeness
* • Holding Times
* • GC Performance
* • Calibration
* • Blanks
* • Surrogate Recoveries
* • Matrix Spike/Matrix Spike Duplicates
* • Field Duplicates
* • Compound Identification
* • Compound Quantitation

* - All criteria were met for this parameter.

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 10% of the data required qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL

NO QUALIFICATIONS ARE REQUIRED.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non-detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	24152A
Date:	March 13, 1996
Client Name:	Ensafe/Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	November 27, 1995
Number of Samples:	3 Non-aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level IV
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Semivolatiles, Organophosphorus Pesticides, Herbicides, Dioxin

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Simpson — 3-19-96

Eugene M. Watson, Vice President — Date

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SDG# 24152A

Samples and Fractions Reviewed

Sample Identifications Analytical Fractions

ENSAFE ID	MATRIX	SV		OPP		HB		DIO	
054CB01701	SOIL		X		X		X		X
054CB01801	SOIL		X		X		X		X
054CB02101	SOIL		X		X		X		X
Total Billable Samples	(Water/Soil)	0	3	0	3	0	3	0	3

SV = SW846 Semivolatiles
OPP = SW846 Organophosphorus Pesticides
HB = SW846 Herbicides
DIO = SW846 Dioxins

DATA ASSESSMENT NARRATIVE

CHLORINATED HERBICIDES

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW846 Method 8150; the National Functional Guidelines for Organic Data Validation, June 1991; and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24152A

A validation was performed on the Herbicide Data from SDG 24152A. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC Performance
*	•	Calibration
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 10% of the data required qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL

NO QUALIFICATIONS ARE REQUIRED.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non-detect result

DATA ASSESSMENT NARRATIVE

DIOXIN/FURANS - 8290

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, internal standard recoveries, clean-up standard recoveries, matrix spike recoveries, GC/MS high resolution performance, tuning results, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8290; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level IV requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 24152

A validation was performed on the Dioxin/Furan Data from SDG 24152. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Mass Resolution Checks
*	•	Column Performance
*	•	Calibrations
*	•	Internal Standard Recovery
*	•	Blanks
N/A	•	Laboratory Control Samples
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Congener Identification/Quantitation

* - All criteria were met for this parameter.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	CONGENER ID	DL	QL

No qualifications are required.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT AND NARRATIVE

VOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA 8240; the National Functional Guidelines for Organic Data Review, June 1991, and DQO Level III. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG # 24152B

A validation was performed on the Volatile Data from SDG 24152B. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
*	•	Internal Standard Performance
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Laboratory Control Samples
*	•	Field Duplicates
*	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that none of this data requires qualification.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	24152C
Date:	March 13, 1996
Client Name:	Ensafe/Allen & Hoshall
Project/Site Name:	charleston; Zone E
Date Sampled:	November 27, 1995
Number of Samples:	3 Non-aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level IV
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Metals, Hexavalent Chromium

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig H. Scufan

Eugene M. Watson, Vice President

3-19-96.

Date

4127 Plaza 94 South St Charles, MO 63304
(314) 936-1333 Fax (314) 936-1335

SDG# 24152C

Samples and Fractions Reviewed

Sample Identifications Analytical Fractions

ENSAFE ID	MATRIX	TAL		HCR	
054CB01701	SOIL		X		X
054CB01801	SOIL		X		X
054CB02101	SOIL		X		X
Total Billable Samples (Water/Soil)		0	3	0	3

TAL= SW846 Metals
HCR= SW846 Hexavalent Chromium

DATA ASSESSMENT NARRATIVE
METALS, HEXAVALENT CHROMIUM AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM03.0 Method; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24152

A validation was performed on the Metals Data from SDG 24152. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Calibrations
	•	Blanks
*	•	Interferences
*	•	Matrix Spike Recovery
*	•	Matrix Duplicates
*	•	Field Duplicates
*	•	Laboratory Control Samples
	•	Serial Dilutions
*	•	MSAs

* - All criteria were met for this parameter.

Preparation and Field Blanks

Specific Finding

The preparation blank exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Chromium	0.19 mg/kg	no impact
Potassium	123 mg/kg	all field duplicate samples below 615 mg/kg
Sodium	18.6 mg/kg	all field duplicate samples below 93 mg/kg
Tin	2.41 mg/kg	all field duplicate samples below 12.1 mg/kg

The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as non-detect, "U". The field or DI water blanks exhibited contamination but had no impact on the data.

Serial Dilution Analysis

Specific Finding

The Serial Dilutions for field duplicate samples for Calcium, Potassium and Zinc were outside the control limits. All positive results are qualified as estimated, "J".

Specific Finding

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafe's request.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all field duplicate samples below 615 mg/kg	K.	+	U
all field duplicate samples below 93 mg/kg	Na.		
all field duplicate samples below 12.1 mg/kg	Sn.		
all field duplicate samples	Ca, K and Zn.	+	J
All "B" results	all analytes	B	J

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846, Method 8270; National Functional Guidelines for Organic Data Review, and DQO Level IV. All comments made within this report should be considered when examining the analytical results (Form I's).

SDG # 24152A

A validation was performed on the Semivolatile Data from SDG 24152A. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibrations
*	•	Internal Standard Performance
	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Continuing calibrations

The continuing calibrations that were analyzed with this data package exhibited %Ds that were not within %D continuing calibration criteria. All RRFs were within calibration criteria.

Continuing calibrations (continued)

Specific Finding:

The continuing calibration, A0395,-396,-397,-398,-399,-400, contained compounds with %Ds greater than 50%, but less than 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and all non detect as estimated (UJ).

054CB01701	1,3,5-trinitrobenzene (79.5)
054CB01801	diallate (62.8)
054CB02101	

The continuing calibration, A0395,-396,-397,-398,-399,-400, contained compounds with %Ds greater than 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and reject all non detect (R).

054CB01701	4-nitroquinoline-1-oxide (101.7)
054CB01801	
054CB02101	

The continuing calibration, A0395,-396,-397,-398,-399,-400, contained compounds with RRFs less than 0.05. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and reject all non detects (R).

054CB01701	methapyrilene (45.9)
054CB01801	hexachlorophene (79.8)
054CB02101	

Method Blanks

Associated blank	Compound	Conc.	Action level
SBLK1	bis(2-ethylhexyl)phthalate	90J	900

Samples	Compound	Qualification
054CB01701	bis(2-ethylhexyl)phthalate	CRQL
054CB01801		
054CB02101		

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

NJ = Presumptive evidence for the presence of the material at an estimated value

K = Result is biased high

L = Result is biased low

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
054CB01701 054CB01801 054CB02101	1,3,5-trinitrobenzene (79.5) diallate (62.8)	+/-	J/UJ
054CB01701 054CB01801 054CB02101	4-nitroquinoline-1-oxide (101.7)	+/-	J/R
054CB01701 054CB01801 054CB02101	methapyrilene (45.9) hexachlorophene (79.8)	+/-	J/R
054CB01701 054CB01801 054CB02101	bis(2-ethylhexyl)phthalate	+	CRQL

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	24152S
Date:	March 13, 1996
Client Name:	Ensafe/Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	November 27, 1995
Number of Samples:	20 Non-aqueous Sample(s) with 1 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Organotins

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

for Kimberly S. Thorp
Eugene M. Watson, Vice President

20 March 1996
Date

4127 Plaza 94 South · St. Charles, MO 63304
(314) 936-1332 · Fax (314) 936-1335

SDG# 24152S

Samples and Fractions Reviewed

Sample Identifications Analytical Fractions

ENSAFE ID	MATRIX	TAL	
054SB01501	SOIL		X
054SB01502	SOIL		X
054SB01601	SOIL		X
054SB01602	SOIL		X
054SB01701	SOIL		X
054SB01702	SOIL		X
054SB01801	SOIL		X
054SB01802	SOIL		X
054SB01901	SOIL		X
054SB01902	SOIL		X
054SB02001	SOIL		X
054SB02002	SOIL		X
054SB02101	SOIL		X
054SB02102	SOIL		X
054SB02201	SOIL		X
054SB02202	SOIL		X
054SB02301	SOIL		X
054SB02302	SOIL		X
054SB03201	SOIL		X
054SB03202	SOIL		X
Total Billable Samples	(Water/Soil)	0	20

ORG= SW846 Organotins

DATA ASSESSMENT NARRATIVE

SEMIVOLATILES - ORGANOTINS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, calibration results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8270, modified for organotins; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level III requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 24152S

A validation was performed on the organotin data from SDGs 24152S. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
*	•	Internal Standard Performance
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Identification/Quantitation

* - All criteria were met for this parameter.

Overall Performance

Overall performance was acceptable.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL

NO QUALIFICATIONS WERE REQUIRED

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	24152F
Date:	March 13, 1996
Client Name:	Ensafe/Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	November 27, 1995
Number of Samples:	3 Non-aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level IV
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Organotins

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

for Kimberly S. Stopp
Eugene M. Watson, Vice President

20 March 1996
Date

4127 Plaza 94 South · St. Charles, MO 63304
(314) 936-1332 · Fax (314) 936-1335

SDG# 24152F

Samples and Fractions Reviewed

Sample Identifications Analytical Fractions

ENSAFE ID	MATRIX	ORG	
054CB01701	SOIL		X
054CB01801	SOIL		X
054CB02101	SOIL		X
Total Billable Samples (Water/Soil)		0	3

ORG= SW846 Organotins

DATA ASSESSMENT NARRATIVE

SEMIVOLATILES - ORGANOTINS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, calibration results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8270, modified for organotins; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level IV requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 24152F

A validation was performed on the organotin data from SDGs 24152F. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
*	•	Internal Standard Performance
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Identification/Quantitation

* - All criteria were met for this parameter.

Overall Performance

Overall performance was acceptable.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL

NO QUALIFICATIONS WERE REQUIRED

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	24152B
Date:	March 13, 1996
Client Name:	Ensafe/Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	November 27, 1995
Number of Samples:	3 Aqueous Sample(s) with 0 MS/MSD(s) 20 Non-aqueous Sample(s) with 2 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Volatiles, Semivolatiles, Pesticides w/PCB's, Metals, Cyanide

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Senjon
Eugene M. Watson, Vice President

3-13-96
Date

4127 Plaza 94 South · St. Charles, MO 63304
(314) 936-1332 · Fax (314) 936-1335

SDG# 24152B

Samples and Fractions Reviewed

Sample Identifications | Analytical Fractions

ENSAFE ID	MATRIX	VOA		SV		P/P		TAL		CN	
054TB01401	WATER	X									
054EB01401	WATER	X		X		X		X		X	
054DB01401	WATER	X		X		X		X		X	
054SB01501	SOIL				X				X		
054SB01502	SOIL				X				X		
054SB01601	SOIL				X				X		
054SB01602	SOIL				X				X		
054SB01701	SOIL				X				X		
054SB01702	SOIL				X				X		
054SB01801	SOIL				X				X		
054SB01802	SOIL				X				X		
054SB01901	SOIL				X				X		
054SB01902	SOIL				X				X		
054SB02001	SOIL				X				X		
054SB02002	SOIL				X				X		
054SB02101	SOIL				X				X		
054SB02102	SOIL				X				X		
054SB02201	SOIL				X				X		
054SB02202	SOIL				X				X		
054SB02301	SOIL				X				X		
054SB02302	SOIL				X				X		
054SB03201	SOIL				X				X		
054SB03202	SOIL				X				X		
Total Billable Samples (Water/Soil)		3	0	2	20	2	0	2	20	2	0

VOA = SW846 Volatiles
SV = SW846 Semivolatiles
P/P = SW846 Pesticides w/PCB's
TAL = SW846 Metals
CN = SW846 Cyanide

DATA ASSESSMENT NARRATIVE

CHLORINATED PESTICIDES/PCBs

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8080; the National Functional Guidelines for Organic Data Validation, June 1991, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24152

A validation was performed on the Chlorinated Pesticide/PCB Data from SDG 24152. The data was evaluated based on the following parameters:

* Data Completeness
* Holding Times
* Calibration
* Blanks
* Surrogate Recoveries
* Matrix Spike/Matrix Spike Duplicates
* Field Duplicates
* Compound Identification
* Compound Quantitation

* - All criteria were met for this parameter.

System Performance and Overall Assessment

Overall performance was acceptable. The data did not require qualifications/rejections.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated Value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for the analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non-detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL

NO QUALIFICATIONS WERE REQUIRED

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non-detect result.

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846, Method 8270; National Functional Guidelines for Organic Data Review, and DQO Level III. All comments made within this report should be considered when examining the analytical results (Form I's).

SDG # 24152B

A validation was performed on the Semivolatile Data from SDG 24152B. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
	•	Internal Standard Performance
	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Internal Standards

All internal standard EICP areas did not meet the internal standard EICP area QA/QC criteria.

Specific Finding:

The Samples listed below, exhibited low internal standard areas. Qualify all associated positive results as estimated (J) and all non detects as estimated (UJ).

054SB03201	chrysene-d_{12}
	perylene-d_{12}

Internal Standards (continued)

Specific Finding:

The Samples listed below, exhibited low internal standard areas. Qualify all associated positive results as estimated (J) and all non detects as estimated (UJ).

054SB03201RE perylene-d_{12}

DI Blanks

Associated blank	Compound	Conc.	Action Level
054DB01401	bis(2-ethylhexyl)phthalate	1JB	10

Samples	Compound	Qualification
054SB01501	bis(2-ethylhexyl)phthalate	CRQL
054SB01701		
054SB01702		
054SB01801		
054SB02001		
054SB02002		
054SB02102		
054SB02202		
054SB02301		
054SB02302		
054SB03201		
054SB03201RE		

Compound Identification/Quantitation

Specific Finding:

Reject all results for sample 054SB03201, in favor of the re-analyzed due to non compliant internal standard areas.

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

NJ = Presumptive evidence for the presence of the material at an estimated value

K = Result is biased high

L = Result is biased low

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
	All associated analytes	+/-	J/UJ
054SB03201	chrysene-d_{12} perylene-d_{12}		
054SB03201RE	perylene-d_{12}		
054SB01501 054SB01701 054SB01702 054SB01801 054SB02001 054SB02002 054SB02102 054SB02202 054SB02301 054SB02302 054SB03201 054SB03201RE	bis(2-ethylhexyl)phthalate	+	CRQL
054SB03201	All analytes	+/-	R

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846, Method 8270; National Functional Guidelines for Organic Data Review, and DQO Level III. All comments made within this report should be considered when examining the analytical results (Form I's).

SDG # 24529B

A validation was performed on the Semivolatile Data from SDG 24529B. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
*	•	Internal Standard Performance
	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Rinseate Blanks

Associated blank	Compound	Concentration
570E000501	bis(2-ethylhexyl)phthalate	42B

Samples	Compound	Qualification
5706000501	bis(2-ethylhexyl)phthalate	CRQL

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

NJ = Presumptive evidence for the presence of the material at an estimated value

K = Result is biased high

L = Result is biased low

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
5706000501	bis(2-ethylhexyl)phthalate	+	CRQL

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

DIOXIN/FURANS - 8290

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, internal standard recoveries, clean-up standard recoveries, matrix spike recoveries, GC/MS high resolution performance, tuning results, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8290; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level IV requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 24159

A validation was performed on the Dioxin/Furan Data from SDG 24159. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Mass Resolution Checks
*	•	Column Performance
*	•	Calibrations
	•	Internal Standard Recovery
*	•	Blanks
*	•	Laboratory Control Samples
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
	•	Congener Identification/Quantitation

* - All criteria were met for this parameter.

Internal Standard Recovery

Reject (R) the non detect result for TCDD in sample 054CB03101RE due to a 0% recovery for $^{13}C_{12}$-TCDD. The original analysis of the sample exhibited 0% recovery for five (5) internal standards.

Identification/Quantitation

Reject (R) sample 054CB03101 in favor of the reanalysis due to poor internal standard recoveries.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	CONGENER ID	DL	QL
054CB03101RE	TCDD	-	R
054CB03101	all congeners	+/-	R

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

ORGANOPHOSPHORUS PESTICIDES

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW846 Method 8140; the National Functional Guidelines for Organic Data Validation, June 1991; and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24159A

A validation was performed on the Organophosphorus Pesticide Data from SDG 24159A. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC Performance
*	•	Calibration
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 10% of the data required qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL

NO QUALIFICATIONS ARE REQUIRED.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non-detect result

DATA ASSESSMENT NARRATIVE

CHLORINATED HERBICIDES

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW846 Method 8150; the National Functional Guidelines for Organic Data Validation, June 1991; and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24159A

A validation was performed on the Herbicide Data from SDG 24159A. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC Performance
*	•	Calibration
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 10% of the data required qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL

NO QUALIFICATIONS ARE REQUIRED.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non-detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	24159F
Date:	February 7, 1996
Client Name:	Ensafe/Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	November 28, 1995
Number of Samples:	2 Non-aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level IV
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Organotins

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

for Kimberly S. Stopp
Eugene M. Watson, Vice President

20 March 1996
Date

6716 Mexico Road · St. Peters, MO 63376
(314) 928-9533 · (314) 278-1828 · Fax (314) 278-2709

SDG# 24159F

Samples and Fractions Reviewed

Sample Identifications Analytical Fractions

ENSAFE ID	MATRIX	TAL	
054CB03101	SOIL		X
054CB02801	SOIL		X
Total Billable Samples	(Water/Soil)	0	2

ORG= SW846 Organotins

DATA ASSESSMENT NARRATIVE

SEMIVOLATILES - ORGANOTINS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, calibration results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8270, modified for organotins; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level IV requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 24159F

A validation was performed on the organotin data from SDGs 24159F. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
*	•	Internal Standard Performance
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Identification/Quantitation

* - All criteria were met for this parameter.

Overall Performance

Overall performance was acceptable.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL

NO QUALIFICATIONS WERE REQUIRED

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	24159S
Date:	February 7, 1996
Client Name:	Ensafe/Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	November 28, 1995
Number of Samples:	16 Non-aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Organotins

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

for Kimberly S. Stopp
Eugene M. Watson, Vice President

20 March 1996
Date

6716 Mexico Road · St. Peters, MO 63376
(314) 928-9533 · (314) 278-1828 · Fax (314) 278-2709

SDG# 24159S

Samples and Fractions Reviewed

Sample Identifications Analytical Fractions

ENSAFE ID	MATRIX	ORG	
054SB02902	SOIL		X
054SB03001	SOIL		X
054SB03002	SOIL		X
054SB03101	SOIL		X
054SB03102	SOIL		X
054SB02701	SOIL		X
054SB02702	SOIL		X
054SB02801	SOIL		X
054SB02802	SOIL		X
054SB02901	SOIL		X
054SB02401	SOIL		X
054SB02402	SOIL		X
054SB02501	SOIL		X
054SB02502	SOIL		X
054SB02601	SOIL		X
054SB02602	SOIL		X
Total Billable Samples	(Water/Soil)	0	16

ORG= SW846 Organotins

DATA ASSESSMENT NARRATIVE

SEMIVOLATILES - ORGANOTINS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, calibration results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8270, modified for organotins; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level III requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 24159S

A validation was performed on the volatile organics data from SDGs 24159S. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
*	•	Internal Standard Performance
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Identification/Quantitation

* - All criteria were met for this parameter.

Overall Performance

Overall performance was acceptable.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL

NO QUALIFICATIONS WERE REQUIRED

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	24159A
Date:	February 7, 1996
Client Name:	Ensafe/Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	November 28, 1995
Number of Samples:	2 Non-aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level IV
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Semivolatiles, Organophosphorus Pesticides, Herbicides, Dioxin

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Sewfson — 3-13-96

Eugene M. Watson, Vice President — Date

6716 Mexico Road · St. Peters, MO 63376
(314) 928-9533 · (314) 278-1828 · Fax (314) 278-2709

SDG# 24159A

Samples and Fractions Reviewed

Sample Identifications Analytical Fractions

ENSAFE ID	MATRIX	SV		HERB		OPP		DIO	
054CB02801	SOIL		X		X		X		X
054CB03101	SOIL		X		X		X		X
Total Billable Samples	(Water/Soil)	0	2	0	2	0	2	0	2

SV = SW846 Semivolatiles
HERB = SW846 Herbicides
OPP = SW846 Organophosphorus Pesticides
DIO = SW846 Dioxin

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846, Method 8270; National Functional Guidelines for Organic Data Review, and DQO Level IV. All comments made within this report should be considered when examining the analytical results (Form I's).

SDG # 24159A

A validation was performed on the Semivolatile Data from SDG 24159A. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibrations
*	•	Internal Standard Performance
	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Continuing calibrations

The continuing calibrations that were analyzed with this data package exhibited %Ds that were not within %D continuing calibration criteria. All RRFs were within calibration criteria.

Continuing calibrations (continued)

Specific Finding:

The continuing calibration, A0395,-396,-397,-398,-399,-400, contained compounds with %Ds greater than 50%, but less than 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and all non detect as estimated (UJ).

054CB02801	1,3,5-trinitrobenzene (79.5)
054CB03101	diallate (62.8)

The continuing calibration, A0395,-396,-397,-398,-399,-400, contained compounds with RRFs less than 0.05. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and reject all non detects (R).

054CB02801	methapyrilene (45.9)
054CB03101	hexachlorophene (79.8)

Method Blanks

Associated blank	Compound	Conc.	Action level
SBLK1	bis(2-ethylhexyl)phthalate	67J	670

Samples	Compound	Qualification
054CB02801	bis(2-ethylhexyl)phthalate	CRQL
054CB03101		

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

NJ = Presumptive evidence for the presence of the material at an estimated value

K = Result is biased high

L = Result is biased low

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
054CB02801 054CB03101	1,3,5-trinitrobenzene (79.5) diallate (62.8)	+/-	J/UJ
054CB02801 054CB03101	methapyrilene (45.9) hexachlorophene (79.8)	+/-	J/R
054CB02801 054CB03101	bis(2-ethylhexyl)phthalate	+	CRQL

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	24159B
Date:	February 7, 1996
Client Name:	Ensafe/Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	November 28, 1995
Number of Samples:	1 Aqueous Sample(s) with 0 MS/MSD(s) 16 Non-aqueous Sample(s) with 1 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Volatiles, Semivolatiles

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Sewfan
Eugene M. Watson, Vice President

3-13-96
Date

6716 Mexico Road · St. Peters, MO 63376
(314) 928-9533 · (314) 278-1828 · Fax (314) 278-2709

SDG# 24159B

Samples and Fractions Reviewed

Sample Identifications Analytical Fractions

ENSAFE ID	MATRIX	VOA		SV	
054SB02402	SOIL		X		X
054TB03101	WATER	X			
054SB02401	SOIL				X
054SB02501	SOIL				X
054SB02502	SOIL				X
054SB02601	SOIL				X
054SB02602	SOIL				X
054SB02701	SOIL				X
054SB02702	SOIL				X
054SB02801	SOIL				X
054SB02802	SOIL				X
054SB02901	SOIL				X
054SB02902	SOIL				X
054SB03001	SOIL				X
054SB03001	SOIL				X
054SB03101	SOIL				X
054SB03102	SOIL				X
Total Billable Samples (Water/Soil)		1	1	0	16

VOA = SW846 Volatiles
SV = SW846 Semivolatiles

DATA ASSESSMENT AND NARRATIVE

VOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846, Method 8240; the National Functional Guidelines for Organic Data Review, June 1991, and DQO Level III. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG # 24159B

A validation was performed on the Volatile Data from SDG 24159B, The data was evaluated based on the following parameters.

- * Data Completeness
- * Holding Times
- * GC/MS Tuning
- * Calibrations
- * Internal Standard Performance
- Blanks
- * Surrogate Recoveries
- * Matrix Spike/Matrix Spike Duplicate
- * Field Duplicates
- * Compound Identification /Quantitation

* - All criteria were met for this parameter

Trip Blanks

Associated blank	Compound	Conc.	Action Level
054TB03101	methylene chloride	8 ug/L	80 ug/L

Samples	Compound	Qualification
054SB02402	methylene chloride	U

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on the dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
054SB02402	methylene chloride	+	U

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846, Method 8270; National Functional Guidelines for Organic Data Review, and DQO Level III. All comments made within this report should be considered when examining the analytical results (Form I's).

SDG # 24159B

A validation was performed on the Semivolatile Data from SDG 24159B. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
	•	Internal Standard Performance
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Internal Standards

All internal standard EICP areas did not meet the internal standard EICP area QA/QC criteria.

Specific Finding:

The Samples listed below, exhibited low internal standard areas. Qualify all associated positive results as estimated (J) and all non detects as estimated (UJ).

054SB03102	1,4-dichlorobenzene-d_4
	chrysene-d_{12}

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

NJ = Presumptive evidence for the presence of the material at an estimated value

K = Result is biased high

L = Result is biased low

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
054SB03102	All associated analytes 1,4-dichlorobenzene-d_4 chrysene-d_{12}	+/-	J/UJ

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	24159A
Date:	February 7, 1996
Client Name:	Ensafe/Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	November 28, 1995
Number of Samples:	16 Non-aqueous Sample(s) with 1 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Metals

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Serfan
for Eugene M. Watson, Vice President

3-14-96
Date

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SDG# 24159A

Samples and Fractions Reviewed

Sample Identifications Analytical Fractions

ENSAFE ID	MATRIX	TAL	
054SB03102	SOIL		X
054SB02602	SOIL		X
054SB02701	SOIL		X
054SB02702	SOIL		X
054SB02801	SOIL		X
054SB02802	SOIL		X
054SB02901	SOIL		X
054SB02902	SOIL		X
054SB03001	SOIL		X
054SB03002	SOIL		X
054SB03101	SOIL		X
054SB02401	SOIL		X
054SB02402	SOIL		X
054SB02501	SOIL		X
054SB02502	SOIL		X
054SB02601	SOIL		X
Total Billable Samples	(Water/Soil)	0	16

TAL = SW846 Metals

DATA ASSESSMENT NARRATIVE
METALS

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM03.0 Method; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24159

A validation was performed on the Metals Data from SDG 24159. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Calibrations
	•	Blanks
*	•	Interferences
	•	Matrix Spike Recovery
*	•	Matrix Duplicates
	•	Field Duplicates
*	•	Laboratory Control Samples
*	•	Serial Dilutions
*	•	MSAs

* - All criteria were met for this parameter.

Preparation and Field Blanks

Specific Finding

The preparation blank exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Chromium	0.33 mg/kg	no impact
Iron	5.11 mg/kg	no impact
Nickel	0.21 mg/kg	all soil samples below 1.05 mg/kg
Potassium	31.2 mg/kg	all soil samples below 156 mg/kg
Sodium	13.1 mg/kg	all soil samples below 65.5 mg/kg

Tin	2.56 mg/kg	all soil samples below 12.8 mg/kg

The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as non-detect, "U". The field or DI water blanks exhibited contamination but had no impact on the data.

Matrix Spike Recovery

Specific Finding

The Matrix Spike recoveries for Antimony (68%) and Mercury (31%) were below the lower control limits. All positive and non-detect results are qualified as estimated, "J" or "UJ".

The Matrix Spike recoveries for Chromium (186%) and Manganese (137%) were above the upper control limits. All positive results are qualified as estimated, "J".

Duplicate Analysis

Specific Finding

The Field Duplicate analyses for Calcium, Manganese, Nickel and Tin were outside the control limits of 50%. All positive results are qualified as estimated, "J" >

The RPDs for Calcium and Chromium for the laboratory duplicate were less than 35% and will not be qualified.

Specific Finding

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafe's request.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all soil samples below 1.05 mg/kg	Ni.	+	U
all soil samples below 156 mg/kg	K.		
all soil samples below 65.5 mg/kg	Na.		
all soil samples below 12.8 mg/kg	Sn.		
all soil samples	Sb and Hg.	+/U	J/UJ
all soil samples	Cr and Mn.	+	J
all soil samples	Ca, Na, Mn and Sn.	+	J
All "B" results	all analytes	B	J

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	24159B
Date:	February 7, 1996
Client Name:	Ensafe/Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	November 28, 1995
Number of Samples:	2 Non-aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level IV
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Metals, Hexavalent Chromium

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Scofan
Eugene M. Watson, Vice President

3-14-96
Date

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(314) 936-1332 · Fax (314) 936-1335

SDG# 24159B

Samples and Fractions Reviewed

Sample Identifications Analytical Fractions

ENSAFE ID	MATRIX	TAL		HCR	
054CB03101	SOIL		X		X
054CB02801	SOIL		X		X
Total Billable Samples (Water/Soil)		0	2	0	2

TAL = SW846 Metals
HCR = SW846 Hexavalent Chromium

DATA ASSESSMENT NARRATIVE
METALS AND HEXAVALENT CHROMIUM

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM03.0 Method; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24159

A validation was performed on the Metals Data from SDG 24159. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Calibrations
	•	Blanks
*	•	Interferences
*	•	Matrix Spike Recovery
*	•	Matrix Duplicates
*	•	Field Duplicates
*	•	Laboratory Control Samples
	•	Serial Dilutions
*	•	MSAs

* - All criteria were met for this parameter.

Preparation and Field Blanks

Specific Finding

The preparation blank exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Chromium	0.40 mg/kg	no impact
Iron	3.14 mg/kg	no impact
Nickel	0.25 mg/kg	no impact
Potassium	87.5 mg/kg	all soil samples below 438 mg/kg
Sodium	12.7 mg/kg	no impact

Tin	2.76 mg/kg	all soil samples below 13.8 mg/kg

The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as non-detect, "U". The field or DI water blanks exhibited contamination but had no impact on the data.

The preparation blank exhibited negative bias for the following elements.

Elements	Conc.	Samples affected
Copper	-0.34 mg/kg	no impact

This reviewer qualifies all samples results below ten times the negative bias as estimated, "J" or "UJ".

Serial Dilution Analysis

Specific Finding

The Serial Dilution for field duplicate samples for Zinc was outside the control limits. All positive results are qualified as estimated, "J".

Specific Finding

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafe's request.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all soil samples below 438 mg/kg	K.	+	U
all soil samples below 13.8 mg/kg	Sn.		
all field duplicates	Zn.	+	J
All "B" results	all analytes	B	J

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	24170A
Date:	February 7, 1996
Client Name:	Ensafe/Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	November 29 - 30, 1995
Number of Samples:	25 Non-aqueous Sample(s) with 2 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Metals, Cyanide

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Seafoor
for Eugene M. Watson, Vice President

3-14-96
Date

6716 Mexico Road · St. Peters, MO 63376
(314) 928-9533 · (314) 278-1828 · Fax (314) 278-2709

SDG# 24170A

Samples and Fractions Reviewed

Sample Identifications Analytical Fractions

ENSAFE ID	MATRIX	TAL		CN	
054SB03601	SOIL		X		
054SB03701	SOIL		X		
054SB03801	SOIL		X		
054SB03901	SOIL		X		
054SB04001	SOIL		X		
054SB03301	SOIL		X		
054SB03302	SOIL		X		
054SB03401	SOIL		X		
054SB03501	SOIL		X		
054SB03502	SOIL		X		
054SB04002	SOIL		X		
083SB00101	SOIL		X		X
083SB00102	SOIL		X		X
084SB00101	SOIL		X		X
084SB00102	SOIL		X		X
574SB00101	SOIL		X		X
574SB00102	SOIL		X		X
574SB00201	SOIL		X		X
574SB00202	SOIL		X		X
574SB00301	SOIL		X		X
574SB00302	SOIL		X		X
574SB00401	SOIL		X		X
574SB00402	SOIL		X		X
574SB00501	SOIL		X		X
574SB00502	SOIL		X		X
Total Billable Samples (Water/Soil)		0	25	0	14

TAL = SW846 Metals
CN = SW846 Cyanide

DATA ASSESSMENT NARRATIVE
METALS AND CYANIDE

General

The inorganic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, matrix spike and LCS recoveries, matrix duplicates and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the CLP ILM03.0 Method; the Functional Guidelines for Inorganic Data Validation, February 1994, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24170

A validation was performed on the Metals Data from SDG 24170. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	Calibrations
	•	Blanks
*	•	Interferences
	•	Matrix Spike Recovery
*	•	Matrix Duplicates
	•	Field Duplicates
*	•	Laboratory Control Samples
	•	Serial Dilutions
*	•	MSAs

* - All criteria were met for this parameter.

Preparation and Field Blanks

Specific Finding

The preparation blank exhibited contamination for the following elements.

Elements	Conc.	Samples affected
Chromium	0.16 mg/kg	no impact
Iron	2.07 mg/kg	no impact
Lead	0.41 mg/kg	no impact
Potassium	109 mg/kg	all soil samples below 545 mg/kg
Sodium	16.4 mg/kg	all soil samples below 82.0 mg/kg

Tin	3.44 mg/kg	all soil samples below 17.2 mg/kg
Nickel	0.43 mg/kg	no impact

The USEPA requires that all sample values below five times the preparation, field, DI or calibration blank contamination be qualified as non-detect, "U". The field or DI water blanks exhibited contamination but had no impact on the data.

Matrix Spike Recovery

Specific Finding

The Matrix Spike recovery for Mercury (16%) was below 30%. All non-detect results are rejected and all positive results are qualified as estimated, "J".

The Matrix Spike recoveries for Antimony (67%) and Tin (71%) were below the lower control limits. All positive and non-detect results are qualified as estimated, "J" or "UJ".

The Matrix Spike recovery for Lead (206%) was above the upper control limits. All positive results are qualified as estimated, "J".

Duplicate Analysis

Specific Finding

The Field Duplicate analyses for Calcium, Manganese, Nickel and Tin were outside the control limits of 50%. All positive results are qualified as estimated, "J" >

Specific Finding

All sample results left with a "B" qualifier after all other qualifications, will be qualified with a "J" qualifier in place of the "B" per Ensafe's request.

SUMMARY OF DATA QUALIFICATIONS

Sample ID	Analyte	DL	QL
all soil samples below 545 mg/kg	K.	+	U
all soil samples below 82.0 mg/kg	Na.		
all soil samples below 17.2 mg/kg	Sn.		
all soil samples	Hg.	+	J
		U	R
all soil samples	Sb and Sn.	+/U	J/UJ
all soil samples	Pb.	+	J
all soil samples	Ca, Na, Mn and Sn.	+	J
All "B" results	all analytes	B	J

DATA ASSESSMENT NARRATIVE

CHLORINATED PESTICIDES/PCBs

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW-846 Method 8080; the National Functional Guidelines for Organic Data Validation, June 1991, and DQO Level III requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24170

A validation was performed on the Chlorinated Pesticide/PCB Data from SDG 24170. The data was evaluated based on the following parameters:

*	Data Completeness
*	Holding Times
	Calibration
*	Blanks
	Surrogate Recoveries
*	Matrix Spike/Matrix Spike Duplicates
*	Field Duplicates
*	Compound Identification
*	Compound Quantitation

* - All criteria were met for this parameter.

Calibration

Two samples contain percent differences greater than 15% for the calibration verification. Qualify positive results for specific compounds as estimated.

Sample ID	Analyte	%D
574SB00502	4,4'-DDT	23.8
574SB00102	4,4'-DDT	-32.4, -34.8

Surrogate Recoveries

Four samples exhibit surrogate recoveries greater than the upper limit. Qualify all positive results as estimated (J). Two samples exhibit surrogate recoveries Greater than 10% and less

than the lower limit. Qualify all positive results as estimated (J) and all non-detect results as estimated (UJ).

Sample ID	Surrogate	%Rec
574SB00201	DCB-1	151
574SB00301	DCB-1	288
574SB00401	TCX-1	18
574SB00401	DCB-1	229
574SB00402	TCX-1	17
574SB00502	DCB-1	204
083SB00102	DCB-1	318

System Performance and Overall Assessment

Overall performance was acceptable. The data did require qualifications/rejections as stated above.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated Value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for the analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non-detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE	DL	QL
083SB00102	Methoxychlor	+	J
574SB00102	4,4'-DDD	+	J
574SB00201	4,4'-DDE	+	J
574SB00301	4,4'-DDE	+	J
574SB00401	ALL	-	UJ
574SB00402	ALL	-	UJ
574SB00502	Endosulfan Sulfate	+	J
574SB00502	4,4'-DDT	+	J
574SB00502	Methoxychlor	+	J
574SB00502	Endrin Ketone	+	J
574SB00502	Endrin Aldehyde	+	J

SAMPLE ID	SURROGATE	%REC
574SB00201	DCB-1	151
574SB00301	DCB-1	288
574SB00401	TCX-1	18
574SB00401	DCB-1	229
574SB00402	TCX-1	17
574SB00502	DCB-1	204
083SB00102	DCB-1	318

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non-detect result.

DATA ASSESSMENT NARRATIVE

ORGANOPHOSPHORUS PESTICIDES

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW846 Method 8140; the National Functional Guidelines for Organic Data Validation, June 1991; and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24170A

A validation was performed on the Organophosphorus Pesticide Data from SDG 24170A. The data was evaluated based on the following parameters:

* • Data Completeness
* • Holding Times
* • GC Performance
* • Calibration
* • Blanks
* • Surrogate Recoveries
* • Matrix Spike/Matrix Spike Duplicates
* • Field Duplicates
* • Compound Identification
* • Compound Quantitation

* - All criteria were met for this parameter.

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 10% of the data required qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL

NO QUALIFICATIONS ARE REQUIRED.

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
\+ in the DL column denotes a positive result
\- in the DL column denotes a non-detect result

DATA ASSESSMENT NARRATIVE

CHLORINATED HERBICIDES

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC performance, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the SW846 Method 8150; the National Functional Guidelines for Organic Data Validation, June 1991; and DQO Level IV requirements. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualification table.

SDG # 24170A

A validation was performed on the Herbicide Data from SDG 24170A. The data was evaluated based on the following parameters:

*	•	Data Completeness
*	•	Holding Times
*	•	GC Performance
*	•	Calibration
*	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicates
*	•	Field Duplicates
*	•	Compound Identification
*	•	Compound Quantitation

* - All criteria were met for this parameter.

System Performance and Overall Assessment

Overall performance was acceptable. The data reviewer estimates less than 10% of the data required qualifications.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	24170
Date:	February 7, 1996
Client Name:	Ensafe/Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	November 29 - 30, 1995
Number of Samples:	8 Non-aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Gasoline Range Organics, Diesel Range Organics

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Simpson

Eugene M. Watson, Vice President

4-12-96

Date

6716 Mexico Road · St. Peters, MO 63376
(314) 928-9533 · (314) 278-1828 · Fax (314) 278-2709

SDG# 24170

Samples and Fractions Reviewed

Sample Identifications Analytical Fractions

ENSAFE ID	MATRIX	GRO		DRO	
574SB00101	SOIL		X		X
574SB00102	SOIL		X		X
574SB00201	SOIL		X		X
574SB00202	SOIL		X		X
574SB00301	SOIL		X		X
574SB00302	SOIL		X		X
574SB00401	SOIL		X		X
574SB00402	SOIL		X		X
Total Billable Samples (Water/Soil)		0	8	0	8

GRO= SW846 Gasoline Range Organics
DRO= SW846 Diesel Range Organics

DATA ASSESSMENT NARRATIVE

TPH - EXTRACTABLES AND PURGEABLES

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, calibration results, surrogate and matrix spike recoveries, and GC performance. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8015, modified for extractable and purgeable TPH; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level III requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 24170 (24190)

A validation was performed on the TPH by GC data from SDG 24170. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
*	•	Calibrations
*	•	Internal Standard Performance
*	•	Blanks
	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Identification/Quantitation

* - All criteria were met for this parameter.

Surrogate Recoveries

Several samples required qualification due to non-compliant surrogate recoveries for the purgeables fraction (gasoline).

Specific Findings

The following samples exhibited surrogate recoveries above the QC limits. All positive results are qualified as estimated, J.

Sample	Surrogate	%Recovery
574SB00302	Naphthalene	292%
574SB00102		150%

The following samples exhibited surrogate recoveries below the QC limits. All positive results are qualified as estimated, J, and all non-detect results are qualified as estimated, UJ.

Sample	Surrogate	%Recovery
574SB00101	Naphthalene	23%
574SB00201		31%
574SB00202		55%
574SB00301		38%

Overall Performance

Overall performance was acceptable. The reviewer estimates that less than 5% of the data required qualification.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
574SB00302 574SB00102	gasoline	+	J
574SB00101 574SB00201 574SB00202 574SB00301	gasoline	+/-	J/UJ

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

DIOXIN/FURANS - 8290

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, internal standard recoveries, clean-up standard recoveries, matrix spike recoveries, GC/MS high resolution performance, tuning results, and calibration results. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8290; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level IV requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 24170

A validation was performed on the Dioxin/Furan Data from SDG 24170. The data was evaluated based on the following parameters.

- * Data Completeness
- * Holding Times
- * Mass Resolution Checks
- * Column Performance
- * Calibrations
- * Internal Standard Recovery
- Blanks
- * Laboratory Control Samples
- * Matrix Spike/Matrix Spike Duplicate
- * Field Duplicates
- * Congener Identification/Quantitation

* - All criteria were met for this parameter.

Blanks

Congener ID	MB Conc. (pg/L)	054CB03301	Q	054CB03701	Q
1,2,3,4,6,7,8-HpCDF	0.343	16.8	NA	43	NA

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	CONGENER ID	DL	QL
All samples	1,2,3,4,6,7,8-HpCDF	+B	NA

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT NARRATIVE

SEMIVOLATILES - ORGANOTINS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, calibration results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8270, modified for organotins; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level III requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 24170S

A validation was performed on the organotin data from SDGs 24170S. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibrations
*	•	Internal Standard Performance
*	•	Blanks
*	•	Surrogate Recoveries
	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
	•	Identification/Quantitation

* - All criteria were met for this parameter.

Continuing Calibration

Specific Finding

The continuing calibration standard FFF684.D exhibited a %D for one (1) compound that was above 50% but less than 90%. All positive and non-detect results in associated samples are qualified as estimated, J/UJ.

574SB00101	574SB00202	054SB03502	tributyltin (58.3%)
574SB00201	574SB00301		

Matrix Spike/Matrix Spike Duplicates

The MS/MSD pair and two (2) of the LCS/LCSD pairs extracted with two (2) of the three (3) analytical batches in this SDG exhibited recoveries for tributyltin between 0% and 7%. The laboratory noted in the case narrative that problems have developed with the recovery of this compound. Therefore, based on the lack of data supporting that the compound can be recovered in the DI water or the sample matrix for those two (2) extraction batches, non-detect results required rejection in the samples.

Specific Finding

Reported positive results required qualification as estimated, J, and non-detect results required rejection, R, due to 0% recoveries in the MS/MSD pair and LCS/LCSD pair for the compound tributyltin in the following samples.

Samples	Compound	MS/MSD	LCS/LCSD1	LCS/LCSD3
574SB00101	tributyltin	6%/7%	0%/0%	NA
574SB00201				
574SB00202				
574SB00301				
054SB03502				
574SB00302				
574SB00501				
574SB00502				
083SB00101				
574SB00102				
574SB00401				
574SB00402				
054SB03301				
054SB03302				
054SB03501				
054SB03502RE				
054SB03601				
054SB03401				
083SB00102				
054SB03701	tributyltin	NA	NA	0%/0%
054SB04001				
054SB04002				
054SB03901				

Identification/Quantitation

Specific Finding

The following RE sample is rejected in favor of the results reported from the original analysis.

054SB03502RE

Overall Performance

Overall performance was not acceptable.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL
574SB00101	tributyltin	+/-	J/UJ
574SB00202			
054SB03502			
574SB00201			
574SB00301			
574SB00101	tributyltin	+/-	J/R
574SB00201			
574SB00202			
574SB00301			
054SB03502			
574SB00302			
574SB00501			
574SB00502			
083SB00101			
574SB00102			
574SB00401			
574SB00402			
054SB03301			
054SB03302			
054SB03501			
054SB03502RE			
054SB03601			
054SB03401			
083SB00102			
054SB03701			
054SB04001			
054SB04002			
054SB03901			
054SB03502RE	ALL COMPOUNDS	+/-	UR

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	24170F
Date:	February 7, 1996
Client Name:	Ensafe/Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	November 29 - 30, 1995
Number of Samples:	2 Non-aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	Southwest laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level IV
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Organotins

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Kimberly S. Gropp — 20 March 1996

for Eugene M. Watson, Vice President — Date

6716 Mexico Road · St. Peters, MO 63376
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SDG# 24170F

Samples and Fractions Reviewed

Sample Identifications Analytical Fractions

ENSAFE ID	MATRIX	ORG	
054CB03701	SOIL		X
054CB03301	SOIL		X
Total Billable Samples (Water/Soil)		0	2

ORG= SW846 Organotins

DATA ASSESSMENT NARRATIVE

SEMIVOLATILES - ORGANOTINS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, calibration results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. SW-846 Method 8270, modified for organotins; the National Functional Guidelines for Organic Data Review, where applicable; and EPA DQO Level IV requirements. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG# 24170F

A validation was performed on the organotin data from SDGs 24170F. The data was evaluated based on the following parameters.

* • Data Completeness
* • Holding Times
* • GC/MS Tuning
* • Calibrations
* • Internal Standard Performance
* • Blanks
* • Surrogate Recoveries
* • Matrix Spike/Matrix Spike Duplicate
* • Field Duplicates
* • Identification/Quantitation

* - All criteria were met for this parameter.

Overall Performance

Overall performance was acceptable.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported Quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	COMPOUND ID	DL	QL

NO QUALIFICATIONS WERE REQUIRED

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	24170A
Date:	February 7, 1996
Client Name:	Ensafe/Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	November 29 - 30, 1995
Number of Samples:	2 Non-aqueous Sample(s) with 0 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level IV
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Semivolatiles, Organophosphorus Pesticides, Herbicides, Dioxin, Hexavalent Chromium

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig B. Seaton

Eugene M. Watson, Vice President

3-13-96

Date

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(314) 928-9533 · (314) 278-1828 · Fax (314) 278-2709

SDG# 24170A

Samples and Fractions Reviewed

Sample Identifications — Analytical Fractions

ENSAFE ID	MATRIX	SV		OPP		HERB		DIO		HCR	
054CB03301	SOIL		X		X		X		X		X
054CB03701	SOIL		X		X		X		X		X
Total Billable Samples	(Water/Soil)	0	2	0	2	0	2	0	2	0	2

SV = SW846 Semivolatiles
OPP = SW846 Organophosphorus Pesticides
HERB = SW846 Herbicides
DIO = SW846 Dioxin
HCR = SW846 Hexavalent Chromium

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846, Method 8270; National Functional Guidelines for Organic Data Review, and DQO Level IV. All comments made within this report should be considered when examining the analytical results (Form I's).

SDG # 24170A

A validation was performed on the Semivolatile Data from SDG 24170A. The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibrations
*	•	Internal Standard Performance
	•	Blanks
*	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
*	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Continuing calibrations

The continuing calibrations that were analyzed with this data package exhibited %Ds that were not within %D continuing calibration criteria. All RRFs were within calibration criteria.

Continuing calibrations (continued)

Specific Finding:

The continuing calibration, A0511,-513, contained compounds with %Ds greater than 50%, but less than 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and all non detect as estimated (UJ).

054CB03301	2,3,4,6-tetrachlorophenol (51.7)
054CB03701	

The continuing calibration, A0532,-533,- 534.-535,-536,-537, contained compounds with %Ds greater than 50%, but less than 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and all non detect as estimated (UJ).

054CB03301	3,3'-dimethylbenzidine (66.6)
054CB03701	1,3,5-trinitrobenzene (68.4)
	diallate (67.1)
	kepone (79.7)

The continuing calibration, A0532,-533,- 534.-535,-536,-537, contained compounds with %Ds greater than 90%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and reject all non detect (R).

054CB03301	4-nitroquinoline-1-oxide (236.5)
054CB03701	hexachlorophene (164.3)

The continuing calibration, A0532,-533,- 534.-535,-536,-537, contained compounds with RRFs less than 0.05. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J) and reject all non detects (R).

054CB03301	aramite
054CB03701	methapyriline (77.5)

Method Blanks

Associated blank	Compound	Conc.	Action level
SBLK1	bis(2-ethylhexyl)phthalate	1200	12000

Samples	Compound	Qualification
054CB03301	bis(2-ethylhexyl)phthalate	CRQL
054CB03701	bis(2-ethylhexyl)phthalate	U

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

NJ = Presumptive evidence for the presence of the material at an estimated value

K = Result is biased high

L = Result is biased low

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
054CB03301 054CB03701	2,3,4,6-tetrachlorophenol (51.7)	+/-	J/UJ
054CB03301 054CB03701	3,3'-dimethylbenzidine (66.6) 1,3,5-trinitrobenzene (68.4) diallate (67.1) kepone (79.7)	+/-	J/UJ
054CB03301 054CB03701	4-nitroquinoline-1-oxide (236.5) hexachlorophene (164.3)	+/-	J/R
054CB03301 054CB03701	aramite methapyriline (77.5)	+/-	J/R
054CB03301	bis(2-ethylhexyl)phthalate	+	CRQL
054CB03701	bis(2-ethylhexyl)phthalate	+	U

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

HEARTLAND
ENVIRONMENTAL SERVICES, INC.

Data Validation Report

SDG#:	24170B
Date:	February 7, 1996
Client Name:	Ensafe/Allen & Hoshall
Project/Site Name:	Charleston; Zone E
Date Sampled:	November 29 -30, 1995
Number of Samples:	2 Aqueous Sample(s) with 0 MS/MSD(s) 25 Non-aqueous Sample(s) with 3 MS/MSD(s)
Laboratory:	Southwest Laboratory of Oklahoma
Validation Guidance:	National Functional Guidelines for Organic and Inorganic Data, June 1991 and February, 1994, respectively
QA/QC Level:	EPA DQO Level III
Method(s) Utilized:	SW846 Third Edition
Analytical Fractions:	Volatiles, Semivolatiles, Pesticides/PCB's, Organotins

Analytical data in this report were screened to determine usability of results and also to determine contractual compliance relative to these requirements and deliverables. This screening assumes analytical results are correct as reported and merely provides an interpretation of the reported quality control results. A minimum of 10% of all laboratory calculations have been verified as part of this validation. All instrument output, i.e. spectra, chromatograms, etc., for each sample have been carefully reviewed. The end-user in urged to review the Specific Findings and associated Data Qualifications presented in this report. Annotated Form 1s or spreadsheets for all samples reviewed are included after the Data Assessment Narratives. Form 1s for MS/MSD samples or spreadsheets are not annotated.

The release of this Data Validation Report is authorized by the following signature:

Craig G. Seafess
for Eugene M. Watson, Vice President

3-13-96
Date

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SDG# 24170B

Samples and Fractions Reviewed

Sample Identifications — Analytical Fractions

ENSAFE ID	MATRIX	VOA		SV		P/P		ORG	
054SB03302	SOIL		X		X				X
054SB03401	SOIL		X		X				X
054TB03401	WATER	X							
083SB00101	SOIL		X		X		X		X
083SB00102	SOIL		X		X		X		X
084SB00101	SOIL		X		X		X		X
084TB00101	WATER	X							
084SB00102	SOIL		X		X		X		X
574SB00101	SOIL		X		X		X		X
574SB00102	SOIL		X		X		X		X
574SB00201	SOIL		X		X		X		X
574SB00202	SOIL		X		X		X		X
574SB00301	SOIL		X		X		X		X
574SB00302	SOIL		X		X		X		X
574SB00401	SOIL		X		X		X		X
574SB00402	SOIL		X		X		X		X
574SB00501	SOIL		X		X		X		X
574SB00502	SOIL		X		X		X		X
054SB03301	SOIL				X				X
054SB03501	SOIL				X				X
054SB03502	SOIL				X				X
054SB03601	SOIL				X				X
054SB03701	SOIL				X				X
054SB03801	SOIL				X				
054SB03901	SOIL				X				X
054SB04001	SOIL				X				X
054SB04002	SOIL				X				X
Total Billable Samples	(Water/Soil)	2	16	0	25	0	14	0	24

VOA = SW846 Volatiles
SV = SW846 Semivolatiles
P/P = SW846 Pesticides/PCB's
ORG = SW846 Organotins

DATA ASSESSMENT AND NARRATIVE

VOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846, Method 8240; the National Functional Guidelines for Organic Data Review, June 1991, and DQO Level III. All comments made within this report should be considered when examining the analytical results. Please refer the specific findings found in each category to the Summary of Data Qualifications table.

SDG # 24170B

A validation was performed on the Volatile Data from SDG 24170B, The data was evaluated based on the following parameters.

*	•	Data Completeness
*	•	Holding Times
*	•	GC/MS Tuning
	•	Calibrations
	•	Internal Standard Performance
	•	Blanks
	•	Surrogate Recoveries
*	•	Matrix Spike/Matrix Spike Duplicate
*	•	Field Duplicates
	•	Compound Identification /Quantitation

* - All criteria were met for this parameter

Continuing calibrations

The continuing calibrations that were analyzed with this data package exhibited %Ds that were not within %D continuing calibration criteria. All RRFs were within calibration criteria.

Continuing calibrations (continued)

Specific Finding:

The continuing calibration, K12554, contained compounds with %Ds greater than 25% but less than 50%. For the samples and non-compliant compounds listed below, qualify all positive results as estimated (J).

083SB00102	acetone (28.1)
054SB03401	
574SB00301RE	
054SB03302	
574SB00101RE	
574SB00302	
083SB00101RE	
574SB00201RE	
574SB00501	
574SB00102	
574SB00401DL	

Internal Standards

All internal standard EICP areas did not meet the internal standard EICP area QA/QC criteria.

Specific Finding:

The Samples listed below, exhibited low internal standard areas. Qualify all associated positive results as estimated (J) and all non detects as estimated (UJ).

574SB00101	chlorobenzene-d_5
574SB00201	
574SB00301	
574SB00301RE	
574SB00101RE	
574SB00201RE	
574SB00501	

574SB00102	bromochloromethane
574SB00501RE	1,4-difluorobenzene
574SB00102RE	chlorobenzene-d_5

Trip Blanks

Associated blank	Compound	Conc.	Action Level
084TB00101	methylene chloride	8 ug/L	80 ug/L

Samples	Compound	Qualification
084SB00101	methylene chloride	U
084SB00102		
574SB00101		
574SB00201		
574SB00202		
574SB00301		
574SB00401		
574SB00402		
574SB00502		
083SB00101		
574SB00101RE	methylene chloride	CRQL
574SB00201RE		
574SB00301RE		
574SB00302		
574SB00501		
574SB00501RE		
083SB00101RE		
083SB00102		

Surrogates

All of the surrogate recoveries for the all blanks and samples were not within QA/QC limits.

Specific Finding:

The samples listed below, exhibited surrogate recoveries that exceeded the QA/QC limit. Qualify all positive results as estimated (J).

574SB00301	toluene-d_8	130
574SB00401	toluene-d_8	121
	bromofluorobenzene	129
083SB00101	toluene-d_8	119
574SB00301RE	toluene-d_8	126
574SB00101RE	toluene-d_8	121
083SB00101RE	toluene-d_8	121
574SB00201RE	toluene-d_8	134
574SB00501	toluene-d_8	126
574SB00102	toluene-d_8	122
574SB00401DL	toluene-d_8	124
574SB00501RE	toluene-d_8	144
574SB00102RE	toluene-d_8	146

The samples listed below, exhibited surrogate recoveries that exceeded the QA/QC limit and the were less than the QA/QC limits. Qualify all positive results as estimated (J) and all non detects as estimated (UJ).

574SB00101	toluene-d_8	130
	bromofluorobenzene	63
574SB00201	toluene-d_8	121
	bromofluorobenzene	72

Compound Identification/Quantitation

Specific Finding:

Reject (R) all results for the re-analyzed samples listed below, due to non compliant surrogate recoveries and /or non compliant internal standard areas.

574SB00101
574SB00201
574SB00301RE
083SB00101RE
574SB00501RE
574SB00102RE

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

D = Result value is based on the dilution analysis

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
083SB00102	acetone (28.1)	+	J
054SB03401			
574SB00301RE			
054SB03302			
574SB00101RE			
574SB00302			
083SB00101RE			
574SB00201RE			
574SB00501			
574SB00102			
574SB00401DL			
	All associated analytes	+	J/UJ
574SB00101	chlorobenzene-d_5		
574SB00201			
574SB00301			
574SB00301RE			
574SB00101RE			
574SB00201RE			
574SB00501			
574SB00102	bromochloromethane		
574SB00501RE	1,4-difluorobenzene		
574SB00102RE	chlorobenzene-d_5		
084SB00101	methylene chloride	+	U
084SB00102			
574SB00101			
574SB00201			
574SB00202			
574SB00301			
574SB00401			
574SB00402			
574SB00502			
083SB00101			

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
574SB00101RE	methylene chloride	+	CRQL
574SB00201RE			
574SB00301RE			
574SB00302			
574SB00501			
574SB00501RE			
083SB00101RE			
083SB00102			
574SB00301	All analytes	+	J
574SB00401			
083SB00101			
574SB00301RE			
574SB00101RE			
574SB00201RE			
574SB00501			
574SB00102			
574SB00401DL			
574SB00501RE			
574SB00102RE			
574SB00101	All analytes	+/-	J/UJ
574SB00201			
574SB00101	All analytes	+/-	R
574SB00201			
574SB00301RE			
083SB00101RE			
574SB00501RE			
574SB00102RE			

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ORGANICS

General

The organic findings offered in this screening report assumes that all analytical results are correct as reported and is based upon the examination of the reported holding times, blank analysis results, surrogate and matrix spike recoveries, GC/MS performance, tuning results, calibration results and internal standard areas. This report was prepared in compliance relative to the analytical and deliverable requirements specified in the U.S. EPA SW846, Method 8270; National Functional Guidelines for Organic Data Review, and DQO Level III. All comments made within this report should be considered when examining the analytical results (Form I's).

SDG # 24170B

A validation was performed on the Semivolatile Data from SDG 24170B. The data was evaluated based on the following parameters.

- * Data Completeness
- * Holding Times
- * GC/MS Tuning
- * Calibrations
- * Internal Standard Performance
- Blanks
- * Surrogate Recoveries
- * Matrix Spike/Matrix Spike Duplicate
- * Field Duplicates
- * Compound Identification /Quantitation

* - All criteria were met for this parameter

Method Blanks

Associated blank	Compound	Conc.	Action level
SBLK1	bis(2-ethylhexyl)phthalate	83J	830

Samples	Compound	Qualification
083SB00102	bis(2-ethylhexyl)phthalate	CRQL
054SB03301		
054SB03302		
054SB03801		
054SB03701	bis(2-ethylhexyl)phthalate	U

DATA ASSESSMENT AND NARRATIVE

SEMIVOLATILE ANALYSIS

Method Blanks

Associated blank	Compound	Conc.	Action level
SBLK2	bis(2-ethylhexyl)phthalate	510J	5100

Samples	Compound	Qualification
083SB00101	bis(2-ethylhexyl)phthalate	U
574SB00101		
574SB00301		
574SB00402		
574SB00201	bis(2-ethylhexyl)phthalate	CRQL
574SB00202		
574SB00502		
574SB00102		
574SB00302		
574SB00401		

System Performance and Overall Assessment

The overall system performance was fair. The laboratory did not encounter any large problems. The data reviewer estimates that less than 5% of the data is qualified.

GLOSSARY OF DATA QUALIFIERS

QUALIFICATION CODES

U = Not detected

J = Estimated value

UJ = Reported quantitation limit is qualified as estimated

R = Result is rejected and unusable

NJ = Presumptive evidence for the presence of the material at an estimated value

K = Result is biased high

L = Result is biased low

METHOD BLANK QUALIFICATION CODES

CRQL = The sample result for the blank contaminant is less than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is rejected and the CRQL for that analyte is reported.

U = The sample result for the blank contaminant is greater than the sample CRQL and is less than 10X the method blank value. The sample result for the blank contaminant is qualified as non detected at the analyte value reported.

No Action = The sample result for the blank contaminant is greater than the sample CRQL and is greater than 10X the method blank value. The sample result for the blank contaminant is not qualified with any blank qualifiers.

The specific findings will be noted in numerical form on the Form Is in this data validation report. These specific finding footnotes will reflect the conclusions found in the data validation process that resulted in the qualification of the data.

SUMMARY OF DATA QUALIFICATIONS

SAMPLE ID	ANALYTE ID	DL	QL
083SB00102	bis(2-ethylhexyl)phthalate	+	CRQL
054SB03301			
054SB03302			
054SB03801			
054SB03701	bis(2-ethylhexyl)phthalate	+	U
083SB00101	bis(2-ethylhexyl)phthalate	+	U
574SB00101			
574SB00301			
574SB00402			
574SB00201	bis(2-ethylhexyl)phthalate	+	CRQL
574SB00202			
574SB00502			
574SB00102			
574SB00302			
574SB00401			

* DL denotes the Form I qualifier supplied by the laboratory
QL denotes the qualifier used by the data validation firm
+ in the DL column denotes a positive result
- in the DL column denotes a non detect result