ORIGINAL (Red)

1456 1

Ruetgers-Nease

Chemical Company, Inc. • A subsidiary of Rütgerswerke AG

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April 19, 1991

David Byro
U.S.EPA Region III (3HW-21)
841 Chestnut Building
Philadelphia, PA 19107

Jack Wagner
PaDER
200 Pine Street
Williamsport, PA 17701-6510

Re: RI/FS Data Validation Report
Ruetgers-Nease Chemical Company
State College, PA Site

Enclosed please find a copy of the raw data and data validation report for samples collected at the Ruetgers-Nease Chemical Company, Inc. as part of the Remedial Investigation/Feasibility Study of the State College, PA Site. The data included is for 6 soil samples, 6 fish tissue samples, 8 sediment samples and 2 aqueous field blank samples.

As I mentioned to you earlier, the results reported in several samples (e.g. fish) for kepone are not consistent with previous data that has been generated. As a result, we have asked the laboratory to re-extract and analyze several fish tissue samples that had been retained and kept frozen by SMC Environmental Services. When the results of those duplicate analyses are available, we will forward those results to you. Based on Ruetgers-Nease's previous experience in the analysis of samples for kepone, we know that the analysis is extremely difficult and want to ensure that we are all in agreement on the data on which conclusions will be based.

If you have any questions after reviewing this data, please contact me.

Sincerely,

Steven W. Foard

Steven W. Foard
Manager Environmental Services

AR302523

cc: B. Greene- Ruetgers-Nease
K. Reinert- SMC

Environmental Standards, Inc.
Specialists in Environmental Risk Assessment and Data Validation

The Commons at Valley Forge, Unit 4, 1220 Valley Forge Rd.
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QUALITY ASSURANCE REVIEW OF THE

RUETGERS-NEASE CHEMICAL COMPANY, INC.

STATE COLLEGE, PA SITE

February 28, 1991

Prepared for:

SMC ENVIRONMENTAL SERVICES
501 Allendale Road
King of Prussia, PA 19406

Prepared by:

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Introduction

This quality assurance review is based upon a review of all data generated from the 6 soil samples, 6 fish tissue samples, 8 sediment samples and 2 aqueous field blank samples that were collected during December of 1990 and January of 1991 for the Ruetgers-Nease Chemical Company, Inc. State College Site. The samples that have undergone a rigorous quality assurance review are listed on Table 1. The data packages were received in 4 distinct Sample Delivery Groups (SDGs), as specified on Table 1.

This review has been performed with guidance from the "Functional Guidelines for Evaluating Organics Analyses With Modifications for Use Within Region III" (U.S. EPA, 1988).

The reported analytical results are presented as a summary of the data in Section 2. All of the analytical data were examined to determine contractual compliance relative to the analytical requirements and deliverables specified in the U.S. EPA Contract Laboratory Program (CLP) protocol and/or the project-specific Standard Operating Procedures for Mirex and Kepone. Qualifier codes have been placed next to the results so that the data user can quickly assess the qualitative and/or quantitative reliability of any result. Details of this quality assurance review are presented in the narrative section of this report. This report was prepared to provide a critical review of the laboratory analyses and reported analytical results. Rigorous quality assurance reviews of laboratory-generated data routinely identify various problems associated with analytical measurements, even from the most experienced and capable laboratories. The nature and extent of problems identified in this critical review should not be interpreted to mean that those results that do not have qualifier codes are less than valid.

ORIGINAL (Red)

TABLE 1

SAMPLES INCLUDED IN THIS QUALITY ASSURANCE REVIEW

SMC Environmental Services Sample Number	Laboratory Sample Number	Case Number/ SDG	Date of Sample Collection	Fractions Examined
36-1-7-91-SED1	7978-01	0110/SDG01	1/7/91	V,M,K
39-1-7-91-SED2	7978-02	0110/SDG01	1/7/91	V,M,K
40-1-7-91-SED6	7978-06	0110/SDG01	1/7/91	V,M,K
41-1-7-91-SED4	7978-04	0110/SDG01	1/7/91	V,M,K
42-1-7-91-SED3	7978-03	0110/SDG01	1/7/91	V,M,K
43-1-7-91-SED5	7978-05	0110/SDG01	1/7/91	V,M,K
37-1-7-91-SED1-MS	7978-01MS	0110/SDG01	1/7/91	V,M,K
38-1-7-91-SED1-MSD	7978-01MSD	0110/SDG01	1/7/91	V,M,K
44-1-8-91-SS4	7977-01	0109/SDG01	1/8/91	V,M,K
45-1-8-91-SS5	7977-02	0109/SDG01	1/8/91	V,M,K
46-1-8-91-SS6	7977-03	0109/SDG01	1/8/19	V,M,K
47-1-8-91-FB	7977-04	0109/SDG01	1/8/91	V,M,K
1-12-11-90-SS3	7839-01	1213/SDG01	12/11/90	M,K
3-12-11-90-SS1	7839-02	1213/SDG01	12/11/90	M,K
4-12-11-90-SS2	7839-03	1213/SDG01	12/11/90	M,K
2-12-11-90-FB	7839-04	1213/SDG01	12/11/90	M,K
F3U	7838-01	1212/SDG01	12/11/90	M,K
F3L	7838-02	1212/SDG01	12/11/90	M,K
F2U	7838-03	1212/SDG01	12/11/90	M,K
F2L	7838-04	1212/SDG01	12/11/90	M,K
F1U	7838-05	1212/SDG01	12/11/90	M,K
F1L	7838-06	1212/SDG01	12/11/90	M,K

NOTES:

V - TCL Volatiles
M - Mirex
K - Kepone

Section 1 Quality Assurance Review

A. Data Evaluation

The organic analyses of 6 soil samples, 6 fish tissue samples, 8 sediment samples and 2 aqueous field blank samples were performed by Enseco-ERCO Laboratory of Cambridge, Massachusetts. The samples were analyzed for the Target Compound List (TCL) volatiles by CLP protocols and for mirex and kepone utilizing the project-specific analytical SOPs. The findings in this report are based upon a rigorous review of holding times, blank analysis results, matrix spike recoveries, GC/MS tuning, target compound matching quality, isotope ratios, calibrations, system performance and quantitation of positive results. The analytical results are provided in Section 2 of this report.

Overall, the organic data was good. Contractual criteria and reporting requirements were met for this data set, with the exception of the following. It should be emphasized that the following items are contractual in nature and do not necessarily affect data usability. Data usability is addressed separately.

Correctable Deficiencies

1. For the medium VOA analysis of sample 43-1-7-91-SED5 (Case 0110/SDG01), the VOA surrogate recoveries on Form II did not include the appropriate "D" qualifier indicating that the surrogate recoveries were diluted out. This notation correctly appears in the raw data (pg. 103).

2. The Form V for the initial calibration associated with the medium-level VOA analysis of sample 43-1-7-91-SED5 (Case 0110/SDG01) indicates that this BFB tune and initial calibration are applicable to "low water" samples. Based on the data provided, this should be "medium soil". It appears possible that the calibration may actually be for "low water", since the same calibration is specified in Case 0109/SDG01 as being applicable to the VOA analysis of an aqueous field blank. This will also be addressed as a potential noncorrectable deficiency.

3. The Form V for the BFB tune associated with sample 47-1-8-91-FB (Case 0109/SDG01) performed on 1/10/91 at 09:40 on MS-V3 has incorrect percent relative abundance values for mass ions (m/z) 50 and 176. Although the values observed in the raw data differ by 0.1-0.3, the percent relative abundances were still met with respect to the CLP acceptance criteria.

4. The concentrations of mirex and kepone added to the matrix spikes of sample 36-1-7-91-SED1 (Case 0110/SDG01) are not consistent with those specified in the project-specific SOP. However, it appears there is a reasonable possibility that the concentrations added were consistent with the SOP but were merely transcribed to the QC result form

(pg. 001) incorrectly. If the reviewer's suspicions are correct, the following discrepancies exist for the percent recoveries.

Compound	Reported MS & MSD Recovery	Calculated MS & MSD Recovery
mirex	16% and 16%	90.1% and 88.9%
kepone	0% and NC	7% and NC

NOTE:

NC - not calculable

5. The Form I's provided for the mirex and kepone analyses for samples 36-1-7-91-SED1 and 39-1-7-91-SED2 (Case 1110/SDG01) indicate that these samples were analyzed on 1/15/91. While it is true that the initial analyses of these samples were performed on 1/15/91, data from these analyses were not reported. The analytical results for these samples is based on the ten-fold dilutions that were performed on 1/19/91 for both target analytes. Accordingly, it appears most appropriate to report that the analysis was performed on 1/19/91 on the Form I.

6. The reported results of "not-detected" for mirex and kepone in sample 44-1-8-91-SS4 (Case 0109/SDG01) are incorrect. Examination of the raw data revealed that mirex (5.9 μg/Kg) and kepone (51.7 μg/Kg) are confidently present in this sample (all qualitative ion ratio criteria were met for this sample for the quantitation as well as the confirmation cluster). Since the concentrations of mirex and kepone were detected at levels less than the quantitation limits, these results should be considered estimated. Accordingly, these results have been added to the data table with the appropriate "J" qualifier. Documentation of the reviewer's calculations are presented as the last several pages of Section 3, Part B.

7. The Project Case Narratives and field Chain-of-Custody records for the tissue samples for Case 1212/SDG01 were located in the data package received for the soil samples for Case 1213/SDG01 and vice-versa.

8. The method blanks summary form (Form IV) associated with the analysis for mirex and kepone (Case 1213/SDG01) indicates that the aqueous method blank associated with sample 2-12-11-90-FB was extracted on 12/4/90, yet the aforementioned sample was not received at the laboratory until 12/12/90. It appears that the method blank extraction date may be in error. If this method blank was, in fact, extracted 8 days before the sample was received, this represents a noncorrectable deficiency.

Noncorrectable Deficiencies

1. It appears that the initial and continuing VOA calibrations associated with the medium-level soil analyses of sample 43-1-7-91-SED5 (Case 0110/SDG01) were actually low-level "water" calibrations. The CLP protocol requires that medium-level calibrations (containing additional methanol to simulate sample analysis conditions) must be performed (SOW288, D-29/VOA). From an analytical viewpoint, although this is technically not consistent with the CLP protocols, this analysis may have actually been more appropriate utilizing the low-level water calibration. Since only a very small volume (20 μl) of the methanol extract was utilized for analysis, the low-level water calibration appears to more closely simulate the sample analysis conditions.

2. A medium-level VOA matrix spike and matrix spike duplicate associated with sample 43-1-7-91-SED5 (Case 0110/SDG01) were not performed as required by the CLP protocols (SOW288, E-22/VOA).

3. The percent difference for kepone was above the maximum percent difference criteria of 40% specified in the project-specific SOP, for both the quantitation and confirmation clusters. All 8 sediment samples for Case 0110/SDG01 were associated with this noncompliant continuing calibration standard. Similarly, the positive results for kepone in 7 of the 8 project samples were quantitated using this noncompliant standard.

4. The reported concentration of kepone in sample 45-1-8-91-SS5 (Case 0109/SDG01) was in excess of the calibration range, the dilution that was performed to properly quantitate mirex in this sample effectively diluted kepone out of the extract. Accordingly, a third analysis (at a less dilution) should have been performed to properly quantitate the kepone in this sample.

5. The percent difference for kepone was above the maximum criteria of 40% for both the quantitation and confirmation clusters and above the 30% criteria for mirex in the confirmation cluster in the continuing calibration standard associated with sample F2L (Case 1212/SDG01). Kepone was detected (and reported) in this sample.

6. The instrument level of mirex in sample 1-12-11-90-SS3 (Case 1213/SDG01) was observed to be in excess of the calibrated range. Although the laboratory appropriately flagged this result with an "E" qualifier on the Form I, a subsequent dilution analysis was not performed as required.

7. The instrument level for kepone in sample F3L (Case 1212/SDG01) was in excess of the highest calibration standard. A dilution reanalysis was not performed as required.

8. The percent difference for kepone in the calibration associated with samples 1-12-11-90-SS3, 3-12-11-90-SS1 and 4-12-11-90-SS2 (Case 1213/SDG01) was in excess of the

maximum criteria of 40% for the quantitation cluster. Kepone was detected (and reported) in 2 of the 3 aforementioned samples.

9. The laboratory did not perform a matrix spike (MS) and matrix spike duplicate (MSD) for mirex and kepone in Case 1212/SDG01 which consisted of 6 tissue samples.

Comments

1. Secondary dilutions were performed for the analysis of mirex in samples 43-1-7-91-SED5, 45-1-8-91-SS5 and 46-1-8-91-SS6. The reported results for mirex in the aforementioned samples have been flagged "*" on the data tables. The latter of the two analysis dates that appear on the data table corresponds to the secondary dilution analyses. The concentration of mirex obtained in the initial analyses of these samples resulted in instrument levels in excess of the calibration range. Accordingly, the C_{13}-mirex internal standard was diluted out and additional C_{13}-mirex was added to the diluted extracts just prior to the GC/MS analyses at a concentration of 1 ng/μl.

2. Dilutions were performed for the analysis for mirex and kepone in samples 36-1-7-91-SED1, 39-17-91-SED2, 40-1-7-91-SED6, 41-1-7-91-SED4, 42-1-7-91-SED3, 37-1-7-91-SED1-MS and 38-1-7-91-SED-MSD. According to the data provided, these dilutions were performed due to the highly colored extracts that were obtained for these samples. The C_{13}-mirex was effectively diluted out of these samples and the laboratory respiked additional C_{13}-mirex to the sample extracts just prior to the GC/MS analysis of the aforementioned samples.

With regard to data usability, principal areas of concern include blank results, matrix spike recoveries, surrogate recoveries and calibrations. Based upon a review of the data provided, the following data qualifiers are offered.

Data Qualifiers

- Due to the trace level presence of methylene chloride, acetone, 2-butanone and chloroform in the laboratory method blanks, the reported presence of these compounds in the following samples are qualitatively questionable and have been flagged "B" on the data tables.

Compounds	Applicable Samples
methylene chloride	All positive sample results except samples 45-1-8-91-SS5 and 46-1-8-91-SS6

Compounds	Applicable Samples
acetone	39-1-7-91-SED2, 41-1-7-91-SED4, 37-1-7-91-SED1-MS, 38-1-7-91-SED1-MSD and 45-1-8-91-SS5
chloroform	44-1-8-91-SS4, 45-1-8-91-SS5 and 46-1-8-91-SS6
2-butanone	All positive sample results.

- The analysis for VOA compounds reported as "not-detected" for samples 41-1-7-91-SED4 and 41-1-7-91-SED4DL should be considered unreliable and have been flagged "R" on the data tables. Similarly, positive VOA results in these samples should be considered estimated and have been flagged "J" on the data tables. Very low recoveries (12%-23%) were obtained for the VOA surrogate compound d_8-toluene in the analyses of the aforementioned samples. It should, however, be noted that very high (218%-288%) recoveries were obtained for the VOA surrogate bromofluorobenzene in these samples and acceptable (102%-104%) recoveries were obtained for the VOA surrogate d_4-1,2-dichloroethane in these samples. Accordingly, it appears that an interference is evident that may be primarily affecting the analysis for late-eluting VOA compounds. This is further corroborated by the fact that low area counts were obtained for the last internal standard d_5-chlorobenzene in both analyses of sample 41-1-7-91-SED4.

- The reported result for 1,1,2,2-tetrachloroethane in sample 41-1-7-91-SED4 should be considered estimated and has been flagged "J" on the data table. The instrument level that this result was based on was in excess of the calibrated range. The subsequent dilution analysis of this sample yielded an instrument level for this compound within the calibrated range.

- The reported results for methylene chloride in samples 45-1-8-91-SS5 and 46-1-8-91-SS6 should be considered estimated and have been flagged "J" on the data tables. A high relative standard deviation was calculated for the response factors obtained for methylene chloride in the initial multi-point calibration.

- The reported results for kepone in samples 3-12-11-90-SS1, 4-12-11-90-SS2, F2L, 36-1-7-91-SED1, 39-1-7-91-SED2, 40-1-7-91-SED6, 41-1-7-91-SED4 and 43-1-7-91-SED5 should be considered estimated and have been flagged "J" on the data tables. High percent differences (>40%) were obtained between the response factors (quantitation cluster) used to quantitate these results compared to the average response factors calculated from the initial multi-point calibration.

- The laboratory reported results for the compound in the samples presented below with the following qualifiers. The reviewer agrees with the laboratory's qualification.

Sample	Compound	Qualification
4-12-11-90-SS2	kepone	x
36-1-7-91-SED1	kepone	z
	mirex	y
39-1-7-91-SED2	kepone	x,y
40-1-7-91-SED6	kepone	x,y,z

NOTES:

x - Presence of this compound is strongly indicated, but the ion abundance ratio criteria were not met for the confirmation cluster ions.

y - Presence of the compound is strongly indicated, but not all specified ions in the clusters are present.

z - Presence of this compound is strongly indicated, but the ion abundance ratio criteria were not met for the quantitation cluster ion.

- The reported concentrations of kepone in samples 45-1-8-91-SS5 and F3L and mirex in sample 1-12-11-90-SS3 should be considered estimated and have been flagged "J" on the data tables. The instrument levels that these results were based on were in excess of the calibration range.

- The actual concentration of kepone in sample 36-1-7-91-SED1 may be substantially higher than reported and has been flagged "J" on the data table. A very low (7%) recovery was obtained for kepone in the matrix spike associated with sample 36-1-7-91-SED1.

- The laboratory reported "not-detected" for kepone in sample 46-1-8-91-SS6; however, the laboratory qualified this by stating that the "analysis at no dilution indicates the presence of kepone." Examination of the raw data for the undiluted analysis of this revealed that all qualitative criteria (quantitation cluster and confirmation cluster ion abundance criteria) were met for this sample; however, the ion abundance criteria for the quantitation cluster for the C_{13}-mirex internal standard was slightly outside the specified criteria for this analysis. This does not diminish the qualitative reliability of this kepone identification. Accordingly, the calculated concentration of [illegible] (estimated "J")

for kepone in sample 46-1-8-91-SS6 has been added to the data table. Documentation of the reviewer's calculation is presented as the last several pages of Section 3, Part B.

- Tentatively Identified Compounds (TICs) for the VOA analyses performed have been evaluated and are presented on the data tables. The only VOA TIC that was apparent was a compound that did not reveal a successful mass spectral tentative identification (viz., unknown) for samples 41-1-7-91-SED4 and 41-1-7-91-SED4DL.

- Per CLP protocols, all results reported below the quantitation limits should be considered estimated and have been flagged "J" on the data tables.

A complete support documentation of this quality assurance review is presented in Section 3 of this report.

B. Conclusions

This quality assurance review has identified aspects of the analytical data that have required qualification. The majority of the data appear to be acceptable for use although a portion of the sample results should be considered estimated (or designated unreliable) due to interferences. To confidently use any of the analytical results from the data sets examined, the data users should understand the qualifications and limitations stated in this report.

Report prepared by:

Rock J. Vitale
Quality Assurance Specialist/Principal

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Date: 2/28/91

SECTION 2

ANALYTICAL RESULTS

VOLATILE ORGANIC ANALYSES - ANALYTICAL RESULTS - ALL SOLIDS REPORTED ON A DRY WEIGHT BASIS

SMC Environmental Services Sample Number			36-1-7-91-SED1	39-1-7-91-SED2	40-1-7-91-SED6	41-1-7-91-SED4	41-1-7-91-SED4DL	42-1-7-91-SED3	43-1-7-91-SED5	37-1-7-91-SED1MS	38-1-7-91-SED1MSD	44-1-8-91-SS4	45-1-8-91-SS5	46-1-8-91-SS6	47-1-8-91-FB
Laboratory Sample Number			7978-01	7978-02	7978-06	7978-04	7978-04DL	7978-03	7978-05	7978-01MS	7978-01MSD	7977-01	7977-02	7977-03	7977-04
Remarks							Dilution								Field Blank
Units			ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/L
VOLATILE COMPOUNDS	Quant. Limit (Aq)	Quant. Limit (Sol)													
cis-1,3-Dichloropropene	5	5				R	R								
Bromoform	5	5				R	R								
2-Hexanone	10	10				R	R								
4-Methyl-2-Pentanone	10	10				R	R								
Tetrachloroethene	5	5				300 J	100 J								
Toluene	5	5	7 J			3 J	R		810 J	S	S				
Chlorobenzene	5	5				5 J	R		42,000	S	S				
Ethylbenzene	5	5				5 J	R								
Styrene	5	5				R	R								
Total Xylenes	5	5				23 J	R		1700 J						
Quantitation Limit Multiplier			2.40	6.50	1.40	2.30	9.70	2.00	360	2.50	2.30	1.20	1.20	1.20	1.00
Date of Sample Collection			01/07/91	01/07/91	01/07/91	01/07/91	01/07/91	01/07/91	01/07/91	01/07/91	01/07/91	01/08/91	01/08/91	01/08/91	01/08/91
Date Sample Received by Laboratory			01/09/91	01/09/91	01/09/91	01/09/91	01/09/91	01/09/91	01/09/91	01/09/91	01/09/91	01/09/91	01/09/91	01/09/91	01/09/91
Date of Sample Analysis			01/14/91	01/14/91	01/15/91	01/14/91	01/15/91	01/14/91	01/13/91	01/15/91	01/15/91	01/10/91	01/10/91	01/10/91	01/10/91
Instrument Used for Analysis			MS-V2	MS-V2	MS-V2	MS-V2	MS-V2	MS-V2	MS-V3	MS-V2	MS-V2	MS-V1	MS-V1	MS-V1	MS-V3

NOTES:
- \- Compound was not detected.
- B This result is qualitatively suspect since this compound was detected in field and/or laboratory blanks at similar levels.
- R Unreliable result - Compound may or may not be present in this sample.
- J Quantitation is approximate due to limitations identified during the quality assurance review (data validation).
- UJ This compound was not detected, but the quantitation limit is probably higher due to a low bias identified during the quality assurance review.
- S Matrix spike compound.

CLP - TENTATIVELY IDENTIFIED COMPOUNDS - ESTIMATED CONCENTRATIONS ALL SOLIDS REPORTED ON A DRY WEIGHT BASIS

SMC Environmental Services Sample Number	36-1-7-91-SED1	39-1-7-91-SED2	40-1-7-91-SED6	41-1-7-91-SED4	41-1-7-91-SED4DL	42-1-7-91-SED3	43-1-7-91-SED5	37-1-7-91-SED1MS	38-1-7-91-SED1MSD	44-1-8-91-SS4	45-1-8-91-SS5	46-1-8-91-SS6	47-1-8-91-FB
Laboratory Sample Number	7978-01	7978-02	7978-06	7978-04	7978-04DL	7978-03	7978-05	7978-01MS	7978-01MSD	7977-01	7977-02	7977-03	7977-04
Remarks					Dilution								Field Blank
Units	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/L
COMPOUNDS													
VOLATILE COMPOUNDS	-	-	-			-	-	NA	NA	-	-	-	-
Unknown (Number of Peaks)				140(1) J	110(1) J								

NOTES:
- \- Compound was not detected.
- B This result is qualitatively suspect since this compound was detected in field and/or laboratory blanks at similar levels.
- R Unreliable result - Compound may or may not be present in this sample.
- J Quantitation is approximate due to limitations identified during the quality assurance review (data validation).
- UL This compound was not detected, but the quantitation limit is probably higher due to a low bias identified during the quality assurance review.
- NA This fraction was not analyzed.

EXTRACTABLE ORGANIC ANALYSIS - ANALYTICAL RESULTS - SOLIDS REPORTED ON A DRY WEIGHT BASIS -page 4

SRC Environmental Services Sample Number			1-12-11-90-SS3	3-12-11-90-SS1	4-12-11-90-SS2	2-12-11-90-FB
Laboratory Sample Number			7839-01	7839-02	7839-03	7839-04
Remarks						Field Blank
Units			ug/Kg	ug/Kg	ug/Kg	ug/L
COMPOUNDS	Reporting Limit (Aq)	Reporting limit (Sol)				
Kepone	0.130	68.0		53 J	23 J	
Mirex	0.0054	18.5	190 J	32	97	
Reporting Limit Multiplier			1.21	1.18	1.43	1.00
Date of Sample Collection			12/11/90	12/11/90	12/11/90	12/11/90
Date Sample Received by Laboratory			12/12/90	12/12/90	12/12/90	12/12/90
Date Sample Extracted			12/17/90	12/17/90	12/17/90	12/14/90
Date of Sample Analysis			12/21/90	12/21/90	12/21/90	12/19/90
Instrument Used for Analysis			GCMSS3	GCMSS3	GCMSS3	GCMSS3

NOTES: - Compound was not detected.
B This result is qualitatively suspect since this compound was detected in field and/or laboratory blanks at similar levels.
R Unreliable result - Compound may or may not be present in this sample.
J Quantitation is approximate due to limitations identified during the quality assurance review (data validation).
UL This compound was not detected, but the quantitation limit is probably higher due to a low bias identified during the quality assurance review.

SWC Environmental Services Sample Number			F3U	F3L	F2U	F2L	F1U	F1L
Laboratory Sample Number			7838-01	7838-02	7838-03	7838-04	7838-05	7838-06
Percent Lipids			0.42%	1.9%	0.3%	1.1%	0.42%	1.3%
Units			ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
COMPOUNDS	Reporting limit (Aq)	Reporting limit (Sol)						
Kepone	0.130	190		500 J		550 J	330	
Mirex	0.0054	25	110	180	170	330	110	
Reporting Limit Multiplier			1.00	1.00	1.00	2.00	1.00	1.00
Date of Sample Collection			12/11/90	12/11/90	12/11/90	12/11/90	12/11/90	12/11/90
Date Sample Received by Laboratory			12/12/90	12/12/90	12/12/90	12/12/90	12/12/90	12/12/90
Date Sample Extracted			12/18/90	12/18/90	12/18/90	12/18/90	12/18/90	12/18/90
Date of Sample Analysis			12/27/90	12/27/90	12/27/90	12/28/90	12/27/90	12/27/90
Instrument Used for Analysis			GCMSS3	GCMSS3	GCMSS3	GCMSS3	GCMSS3	GCMSS3

NOTES:
- \- Compound was not detected.
- B This result is qualitatively suspect since this compound was detected in field and/or laboratory blanks at similar levels.
- R Unreliable result - Compound may or may not be present in this sample.
- J Quantitation is approximate due to limitations identified during the quality assurance review (data validation).
- UJ This compound was not detected, but the quantitation limit is probably higher due to a low bias identified during the quality assurance review.

EXTRACTABLE ORGANIC ANALYSIS - ANALYTICAL RESULTS - ALL SOLIDS REPORTED ON A DRY WEIGHT BASIS

SRC Environmental Services Sample Number			36-1-7-91-SED1	39-1-7-91-SED2	40-1-7-91-SED6	41-1-7-91-SED4	42-1-7-91-SED3	43-1-7-91-SED5	37-1-7-91-SED1MS	38-1-7-91-SED1MSD
Laboratory Sample Number			7978-01	7978-02	7978-06	7978-04	7978-03	7978-05	7978-01MS	7978-01MSD
Remarks										
Units			ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
COMPOUNDS	Reporting Limit (Aq)	Reporting Limit (Sol)						Analyzed Twice		
Kepone	0.130	68.0	48.1 J	18.4 J	8.0 J	750 J		667 J	S	S
Mirex	0.0054	10.5	36.9 J	42.4 J	185 J	626		6240*	S	S
Reporting Limit Multiplier			24.0	16.8	14.1	22.7	19.3	9.8	24.1	24.3
Date of Sample Collection			01/07/91	01/07/91	01/07/91	01/07/91	01/07/91	01/07/91	01/07/91	01/07/91
Date Sample Received by Laboratory			01/09/91	01/09/91	01/09/91	01/09/91	01/09/91	01/09/91	01/09/91	01/09/91
Date Sample Extracted			01/10/91	01/10/91	01/10/91	01/10/91	01/10/91	01/10/91	01/10/91	01/10/91
Date of Sample Analysis			01/19/91	01/19/91	01/19/91	01/19/91	01/19/91	1/19 & 1/23	01/19/91	01/19/91
Instrument Used for Analysis			GCMSS3	GCMSS3	GCMSS3	GCMSS3	GCMSS3	GCMSS3	GCMSS3	GCMSS3

NOTES: - Compound was not detected.

B This result is qualitatively suspect since this compound was detected in field and/or laboratory blanks at similar levels.

R Unreliable result - Compound may or may not be present in this sample.

J Quantitation is approximate due to limitations identified during the quality assurance review (data validation).

UL This compound was not detected, but the quantitation limit is probably higher due to a low bias identified during the quality assurance review.

S Matrix spike compound.

* Result reported from secondary dilution.

EXTRACTABLE ORGANIC ANALYSIS - ANALYTICAL RESULTS - SOLIDS REPORTED ON A DRY WEIGHT BASIS -page 7

SMC Environmental Services Sample Number			44-1-8-91-SS4	45-1-8-91-SS5	46-1-8-91-SS6	47-1-8-91-FB
Laboratory Sample Number			7977-01	7977-02	7977-03	7977-04
Remarks						Field Blank
Units			ug/Kg	ug/Kg	ug/Kg	ug/L
COMPOUNDS	Reporting limit (Aq)	Reporting limit (Sol)		Analyzed Twice	Analyzed Twice	
Kepone	0.132	68.0	51.7 J	417 J	160 J	
Mirex	0.0054	18.5	5.9 J	1520*	4770*	
Reporting Limit Multiplier			1.20	1.24	1.17	1.00
Date of Sample Collection			01/08/91	01/08/91	01/08/91	01/08/91
Date Sample Received by Laboratory			01/09/91	01/09/91	01/09/91	01/09/91
Date Sample Extracted			01/10/91	01/10/91	01/10/91	01/10/91
Date of Sample Analysis			1/12/91	1/12 & 1/15	1/12 & 1/15	1/12/91
Instrument Used for Analysis			GCMSS3	GCMSS3	GCMSS3	GCMSS3

NOTES:
- \- Compound was not detected.
- B This result is qualitatively suspect since this compound was detected in field and/or laboratory blanks at similar levels.
- R Unreliable result - Compound may or may not be present in this sample.
- J Quantitation is approximate due to limitations identified during the quality assurance review (data validation).
- UL This compound was not detected, but the quantitation limit is probably higher due to a low bias identified during the quality assurance review.
- * Results reported from secondary dilution.

VOLATILE ORGANIC ANALYSES - ANALYTICAL RESULTS - ALL SOLIDS REPORTED ON A DRY WEIGHT BASIS

SMC Environmental Services Sample Number			36-1-7-91-SED1	39-1-7-91-SED2	40-1-7-91-SED6	41-1-7-91-SED4	41-1-7-91-SED4DL	42-1-7-91-SED3	43-1-7-91-SED5	37-1-7-91-SED1MS	38-1-7-91-SED1MSD	44-1-8-91-SS4	45-1-8-91-SS5	46-1-8-91-SS6	47-1-8-91-FB
Laboratory Sample Number			7978-01	7978-02	7978-06	7978-04	7978-04DL	7978-03	7978-05	7978-01MS	7978-01MSD	7977-01	7977-02	7977-03	7977-04
Remarks							Dilution								Field Blank
Units			ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/L
VOLATILE COMPOUNDS	Quant. limit (Aq)	Quant. limit (Sol)													
Chloromethane	10	10				R	R								
Bromomethane	10	10				R	R								
Vinyl Chloride	10	10				16 J	R								
Chloroethane	10	10				R	R								
Methylene Chloride	5	5	8 B	16 B	3 B	7 B	14 B	4 B		4 B	3 B	6 B	8 J	7 J	
Acetone	10	10	110	84 B		12 B	R			12 B	20 B		24 B		
Carbon Disulfide	5	5				3 J	16 J								
1,1-Dichloroethene	5	5				R	R			S	S				
1,1-Dichloroethane	5	5				R	R								
Total 1,2-Dichloroethene	5	5				190 J	200 J								
Chloroform	5	5				R	R					4 B	5 B	4 B	
1,2-Dichloroethane	5	5				R	R								
2-Butanone	10	10	20 B	45 B	4 B	5 B	19 B	3 B		8 B	13 B				
1,1,1-Trichloroethane	5	5				R	R								
Carbon Tetrachloride	5	5				R	R								
Vinyl Acetate	10	10				R	R								
Bromodichloromethane	5	5				R	R								
1,1,2,2-Tetrachloroethane	5	5				3200 J	1500 J						6 J		
1,2-Dichloropropane	5	5				R	R								
trans-1,3-Dichloropropene	5	5				R	R								
Trichloroethene	5	5				110 J	67 J			S	S		3 J		
Dibromochloromethane	5	5				R	R								
1,1,2-Trichloroethane	5	5				46 J	24 J								
Benzene	5	5				R	R			S	S				

ORIGINAL (Red)