HAND DELIVERED
JAN 30 2004
04-00521
Utah Division of Solid and Hazardous Waste

TOOELE CHEMICAL AGENT DISPOSAL FACILITY (TOCDF)

MUSTARD CHARACTERIZATION PROJECT REPORT FOR DESERET CHEMICAL DEPOT MUSTARD TON CONTAINERS

Revision 0

Appendix C-5 – Appendix G

EG&G DEFENSE MATERIALS, INC.

January 14, 2004

DEPARTMENT OF THE ARMY
US ARMY CHEMICAL MATERIALS AGENCY (PROVISIONAL)
TOOELE CHEMICAL AGENT DISPOSAL FACILITY
11620 STARK ROAD
STOCKTON, UTAH 84071

HAND DELIVERED

JAN 30 2004
04.00521

Utah Division of Solid and Hazardous Waste

REPLY TO
ATTENTION OF:

January 26, 2004

Tooele Chemical Agent Disposal Facility

SUBJECT: Mustard Characterization Project

Mr. Dennis Downs, Director
Utah Department of Environmental Quality
Division of Solid and Hazardous Waste
288 North 1460 West
Salt Lake City, Utah 84116-0690

Dear Mr. Downs:

Enclosed are two copies (a printed version, as well as an electronic copy on a CD) of "Mustard Characterization Project Report for Deseret Chemical Depot Mustard Ton Containers". This report is submitted to the State of Utah, Department of Environmental Quality, Division of Solid and Hazardous Waste. This report summarizes the sampling and analyses of 98 ton containers and 12 H 155mm projectiles from the Deseret Chemical Depot.

Your technical the point of contact is Ms. Elizabeth A. Lowes at (435) 833-7483 or Mr. Monte S. Caldwell at (435) 833-7428.

Sincerely,

Stephen L. Frankiewicz
EG&G Defense Materials, Inc.
*CERTIFICATION STATEMENT

Dale A. Ormond
TOCDF Site Project Manager
*CERTIFICATION STATEMENT

Harold K. Oliver
Assistant to the Installation Commander

Copies Furnished:

Joseph Stang
Snow
File

* I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS.

HAND DELIVERED

JAN 2

04.00521

Utah Division of Solid and Hazardous Waste

Appendix C-5

Analytical Test Report
Sample Set #5

U.S. Army Research, Development and Engineering Command
Edgewood Chemical Biological Center
ATTN: Edgewood Chemical Biological
Forensic Analytical Center
Aberdeen Proving Ground, MD 21010-5424
Phone: (410) 436-8600
Fax: (410) 436-3384

ANALYTICAL TEST REPORT

Report Date: 20 November 2003

Project/Event Title: Analysis of HD Sample Collected From Ton Containers Stored at the Deseret Chemical Depot – Sample Set 5

Project/Event Number: 97P-0033-46

Report Number: 0033-46-112003B5

Report Prepared for:

EG&G Defense Materials Division
Attn.: Mr. Don Milton
11600 Stark Rd
Tooele, UT 84074

NOTE: This report replaces Analytical Test Report Numbered 0033-46-070903B5.

This report shall not be reproduced except in full, without the written approval of the laboratory. Test results reported herein refer only to samples tested.

CASE NARRATIVE
Tooele Samples (Set 5)
Project/Event # 97P-0033-46

Receiving Notes

All sample containers were visually checked and compared to sample transfer form 1911. The containers were noted to be in satisfactory condition and all samples were received intact.

Sample Preparatory Notes

No discrepancies.

Analytical Notes:

Organic Compounds Analysis

VOLATILE ORGANIC COMPOUNDS

Volatile Organic Compounds (VOCs) were extracted on 29-Apr-03 and analyzed 5-May-03 through 6-May-03 by method AM-101.

The bromofluorobenzene (BFB) tune and the tune evaluation and performance standard both passed acceptance criteria.

The calibration curves for the target compounds along with the surrogate resulted in correlation coefficient (r^2) of 0.999 for Linear / (0, 0) curve fits for all compounds except for Tetrachloroethylene (TCE) which was 1.000. The individual calibration curve recovery values for all compounds of interest were within the acceptance criteria of ±15%. All levels had recovery values between 86% and 112% for all compounds.

The Continuing Calibration Verification (CCV) samples were all within acceptance criteria (±25%).

The Surrogate (1,4-difluorobenzene) was present and fulfilled the recovery criteria (50%-150%) in all samples. Recovery values ranged from 81% to 90%.

The Matrix Spike (MS) and Matrix Spike Duplicate (MSD) fulfilled the recovery criteria (50%-150%) in all analytes of interest. Recovery values for the surrogate, 1,2-Dichloroethane (1,2-DCE), Tetrachloroethylene (TCE) and 1,1,2,2-TCE were 81% to 98%. The Relative Percent Difference (RPD) for the MS and the MSD for 1,2-DCE, TCE, and 1,1,2,2-TCE were 4.1 to 6.1% with acceptance criteria (±25%) for all analytes of interest.

The Blank Spike (BS) and Blank Spike Duplicate (BSD) fulfilled the recovery criteria (50%-150%) for all analytes of interest. The BS/BSD are identified in the report as the Laboratory Control Sample (LCS).

Results showed that target compounds were not detected in either the Method Blank (MB) or the Reagent Blanks (RB).

The RPD values for the sample and sample duplicate met the specification required in AM-101 of ≤25%. 1,2-DCE was 1.0% (TCE and 1,1,2,2-TCE were not detected in either sample).

A CCV was run after twelve samples instead of ten. The CCV was within criteria after the twelfth sample. Another CCV was analyzed at the end of the run and it was also within ≤25%.

Sample holding time of 28 days from collection to analysis was met for all samples. Samples were collected starting 14-Apr-03 through 19-Apr-03 and analyzed on 5-May-03 through 6-May-03.

SEMI-VOLATILE ORGANIC COMPOUNDS

Semi-Volatiles Organic Compounds (SVOCs) were extracted on 8-May-03 and analyzed on 9-May-03 through 10-May-03 by method AM-117.

The decafluorotriphenylphosphine (DFTPP) tune and the tune evaluation and performance standard both passed acceptance criteria.

The calibration curves for the target compounds along with the surrogate resulted in correlation coefficient (r^2) of 0.999 for 1,4-dithiane-d4 and 1.000 for Hexachloroethane (HCE) for a Linear / (0, 0) curve fit. Compound Q had an r^2 of 0.999 for a linear curve with a Practical Quantitation Limit (PQL) of 25 µg/ml. T had an r^2 of 1.000 for a linear curve with a PQL of 25 µg/ml.

All analytes in the calibration curve standards were within the method criteria (±15%). For the surrogate, HCE, Q, and T recovery values ranged from 87% to 106%.

The CCV recovery values for HCE, Q, and T were within the method criteria of ±25%. The CCV level for HCE was 10 ug/mL. The CCV levels for Q and T were 100 ug/mL for the first two and 250 ug/mL for the last.

The MS/MSD values for the surrogate, HCE, Q and T were within criteria of 50% to 150% and ±25% for the RPD (<20%).

The BS recovery values for the surrogate, HCE, Q and T were within acceptance levels.

When duplicate samples were analyzed, the RPDs for all analytes were below the method criteria of ±25% (<6%). HCE was not detected in the sample or sample duplicate.

Results showed that target compounds were not detected in either the MB or RB.

Sample holding time of 28 days from collection to analysis was met for all of the submitted samples. Samples were collected starting 14-Apr-03 through 19-Apr-03 and analyzed on 10-May-03.

THIODIGLYCOL

Samples for the non-volatile organic compound, thiodiglycol (TDG), were extracted 30-Apr-03 and analyzed on 7-May-03 through 8-May-03 by method AM-100.

The decafluorotriphenylphosphine (DFTPP) tune and the tune evaluation and performance standard both passed acceptance criteria.

The calibration curves for TDG along with the surrogate (TDG_{d8}) resulted in correlation coefficient (r^2) of 1.000 for Linear / (0, 0) curves.

The individual calibration curve levels (83% to 101%) for TDG and TDG-d8 were within the acceptance criteria of ±15% except for the lowest level standard (2.5 ug/ml) for TDG-d8 (83%).

All CCV samples passed acceptance criteria of ±25% for TDG and the surrogate (90% to 115%).

When duplicate samples were analyzed, the RPDs for all analytes were below the method criteria of ±25% (<6%). TDG was not detected in the sample or sample duplicate.

The MSD recovery was outside of the ±50% limits (39.9%) and the RPD of the MS/MSD was 93%, when the criteria is ±25%.

The BS/BSD fulfilled the acceptance criteria.

Results showed that target compounds were not detected in either the MB or the RB.

Sample holding time of 28 days from collection to analysis was met for all samples. Samples were collected 14-Apr-03 through 19-Apr-03 and analyzed 8-May-03.

LEWISITE

Lewisite was extracted on 30-Apr-03 and analyzed on 6-May-03 through 7-May-03 by method AM-126.

The decafluorotriphenylphosphine (DFTPP) tune and the tune evaluation and performance standard both passed acceptance criteria.

A quadratic fit was used to determine the calibration curve. Calibration curves behave differently for compounds over large orders of magnitude as well as for instrumental conditions and column types. After investigation, it was determined that a quadratic curve best represented the existing data. Six concentration levels were used in this curve. This meets the minimal requirements specified in EPA SW846 method 8000b. The individual calibration curve levels (85% to 111%) for Lewisite were within the acceptance criteria of ±15%.

The CCV samples (89% to 96%) were all within acceptance criteria (±25%).

The MS/MSD and BS/BSD recovery values were within acceptance limits.

Results showed that lewisite was not detected in either the Method or the Reagent Blanks.

Sample holding time of 28 days from collection to analysis was met for all samples. Samples were collected starting 14-Apr-03 through 19-Apr-03 and analyzed on 6-May-03 through 7-May-03.

PURITY

Purity samples were extracted on 8-May-03 and analyzed on 14-May-03 by method AM-098.

The decafluorotriphenylphosphine (DFTPP) tune passed acceptance criteria.

The calibration curve for the target compound (HD) resulted in a correlation coefficient (r^2) of 1.000 for a Linear / (0, 0) curve fit. All individual points of the curve were between 99% and 105%.

The CCV standards all passed the acceptance criteria of ±15%.

The CASARM grade (HD) Laboratory Control Sample (LCS) results showed a purity that was 97.3% of its true value.

When duplicate samples were analyzed, the RPD for the purity was <6.0%, well below the method criteria of ±25%.

Results showed that HD was not detected in either the Method or the Reagent Blanks.

Samples were collected starting 14-Apr-03 through 19-Apr-03 and analyzed on 14-May-03. Sample holding time of 28 days from collection to analysis was not met for all samples. Samples 03004-04101 and 03004-04102 were collected 14-Apr-03 and samples 3004-04103 and030004-04104 were collected 15-Apr-03, thus missing the holding time for analysis.

METALS ANALYSIS

Liquids:
All undiluted samples were analyzed on 02-May-03. Samples that needed to be rerun were analyzed on 06-May-03. There were no dilutions. All samples were analyzed following Method AM-118.

Aluminum, beryllium, boron, and mercury were outside the acceptance limits of 90% to 110% for the CCV when analyzed on 02-May-03. Upon reanalysis on 06-May-03 all were within the acceptable limits.

The percent recovery (%R) for the MS/MSD, Post Digestion Spike Addition Sample (PDSA), lab control spike (LCS), and lab control spike duplicate (LCSD) indicated that all elements met the acceptance criteria of 75%-125%. The MS/MSD RPD met the criterium.

The %R for the BS indicated that all elements except for Boron (74%) met the acceptance criteria of 75%-125%. All other QC passed for boron so no corrective action was taken.

Copper, the only element that had a result above 100 times the Instrument Detection Limit (IDL) had an acceptable RPD for the sample duplicate.

All liquid samples were analyzed within the 28-day holding period.

Non-Cohesive Solids:
All undiluted samples were analyzed on 07-May-03. Dilutions and reruns were analyzed on 08-May-03 and 13-May-03. All samples were analyzed following Method AM-118.

Antimony, barium, cadmium, lead, silver, thallium, and tin were outside the acceptance limits of 90% to 110% for the CCV when analyzed on 07-May-03. Upon reanalysis on 08-May-03, barium and cadmium were within the acceptable limits; however antimony, lead, silver, thallium, and tin were outside the acceptance limits. Upon reanalysis on 13-May-03, all elements were within the acceptable limits.

Cadmium was found in all reagent blanks at a level above the MDL, but below the PQL when analyzed on 08-May-03. No corrective action was taken. Barium was found in the last reagent blank at a level above the Method Detection Limit (MDL), but below the Practical Quantitation Limit (PQL) when analyzed on 08-May-03. No corrective action was taken. Arsenic was found in the middle and last reagent blank at a level above the Method Detection Limit (MDL), but below the Practical Quantitation Limit (PQL) when analyzed on 08-May-03. No corrective action was taken. Barium and cadmium were found in the method blank at a level above the MDL, but below the PQL when analyzed on 08-May-03. No corrective action was taken.

The native sample used for the MS (4240) and the MSD (4241) had high levels of arsenic, manganese and mercury. Since the spike level was considerably less than the original levels in the sample, the MS and the MSD could not be properly evaluated for those elements. The RPD values for the MS and MSD were within acceptable limits for all elements except for arsenic (49.4%) and mercury (79%). All other elements gave acceptable recoveries and RPD's for the MS and MSD.

Sample 030004-042-03 was diluted and reanalyzed for arsenic on 08-May-03. The batch QC for that day is as follows: Method Blank (ND), Blank Spike, (99.4%), MS (239%), MSD (117%), MS/MSD RPD (68.5%), CRM (101%), CRMD (99.1%), and CRM/CRMD RPD (1.55%). The MS/MSD could not be properly evaluated due to high levels of arsenic.

Copper had an acceptable RPD for the sample duplicate. However arsenic (42.9%), manganese (41.7%), mercury (43.4%), and zinc (43.4%) failed RPD criteria. The failure was attributed to the sample being non-homogenous.

The %R for the BS indicated that all elements met the acceptance criteria of 75%-125%. The %R for the certified reference material (CRM) indicated that all elements met the acceptance criteria of 75%-125%. The %R for the CRM duplicate indicated that all elements met the acceptance criteria. The CRM/CRMD RPD met the criterium.

The %R for the PDSA indicated that all elements with the exception of mercury (69.4%) met the acceptance criteria of 75%-125%. Corrective action was first to reanalyze the sample and, if it failed again, the next action was to re-prepare the sample and reanalyze. The PDSA failed for mercury each time it was run. A matrix effect was suspected to be the problem.

All the Non-Cohesive samples were initially analyzed within the 28-day hold time, however due to instrument failure some samples were reanalyzed after the hold time. Antimony, lead, mercury, silver, thallium and tin were analyzed past holding time for samples 030004-042-01 and 030004-042-02.

Solids:
All undiluted samples were analyzed on 08-May-03. Dilutions and reruns were analyzed on 13-May-03. All samples were analyzed following Method AM-118.

Antimony, beryllium, boron, lead, mercury, silver, thallium, tin, and zinc were outside the acceptance limits of 90% to 110% for the CCV when analyzed on 08-May-03. Upon reanalysis on 13-May-03, all elements were within the acceptable limits.

Cadmium was detected in all reagent blanks at a level above the MDL, but below the PQL when analyzed on 08-May-03. No corrective action was taken. Barium was detected in first reagent blank at a level above the MDL, but below the PQL when analyzed on 08-May-03. No corrective action was taken. Aluminum, cadmium and barium were found in the method blank at a level above the MDL, but below the PQL when analyzed on 08-May-03. No corrective action was taken.

The native sample used for the MS (4247) and MSD (4248) had high levels of arsenic, manganese, copper, mercury, and zinc. Since the spike level was considerably less than the original levels in the sample, the MS/MSD could not be properly evaluated for those elements. The RPD and %R for the MS and MSD were within acceptable limits for all elements except for those elements at high concentrations in the native sample.

Sample 030004-043-01 was diluted and reanalyzed for arsenic on 13-May-03. The batch QC for that day is as follows: Method Blank (ND), Blank Spike (109%), CRM (101%), CRMD (103%), and CRM/CRMD RPD (1.39%). The MS/MSD also were diluted and reanalyzed on 13-May-03. Their results are listed in the QC section of the report. The original results for the MS/MSD were over the calibration limit when analyzed so they were not reported. All other batch QC run with the original MS/MSD passed and is listed in the report.

Sample 030004-043-04 was diluted and reanalyzed for copper on 13-May-03. The batch QC for that day is as follows: Method Blank (ND), Blank Spike (107%), MS (179%), MSD (208%), MS/MSD RPD (15.4%), CRM (90.1%), CRMD (91.0%), and CRM/CRMD RPD (0.97%). The MS/MSD could not be properly evaluated due to high levels of copper.

Sample 030004-043-09 was diluted and reanalyzed for manganese on 13-May-03. The batch QC for that day is as follows: Method Blank (ND), Blank Spike (104%), MS (97.7%), MSD (59.2%), MS/MSD RPD (49.1%), CRM (96.3%), CRMD (95.6%), and CRM/CRMD RPD (2.69%). The MS/MSD could not be properly evaluated due to high levels of manganese.

The %R for the BS, CRM and CRM duplicate indicated that all elements met the acceptance criteria of 75%-125%. The CRM/CRMD RPD met the criterium.

Copper, lead, manganese, mercury and nickel had an acceptable RPD for the sample duplicate. However arsenic (38.3%) and zinc (33.8%) failed RPD criteria. The failure was attributed to the sample being non-homogenous.

The %R for the PDSA indicated that all elements except for mercury (138%) and arsenic (137%) met the acceptance criteria of 75%-125%. Corrective action was first to reanalyze the sample and, if it failed again, the next action was to reprepare the sample and reanalyze. The PDSA failed for mercury and arsenic each time it was run. A matrix effect was suspected to be the problem.

All the solid samples were initially analyzed within the 28-day hold time, however due to instrument failure some samples were reanalyzed past the hold time. Antimony, beryllium, boron, lead, mercury, silver, thallium, tin and zinc were analyzed after the hold time for samples 030004-043-01 and 030004-043-02. Sample 030004-043-01 was analyzed for arsenic after the hold time.

Analyst(s) of Record (Signature) 12-17-03 (Date) **Thomas Rusek** **Principal Investigator, Battelle Memorial Institute**	**Analyst(s) of Record** (Signature) 12/17/03 (Date) **Brian L. Boyd** **Researcher, Battelle Memorial Institute**
Analyst(s) of Record (Signature) 17 Dec 03 (Date) **Robert L. Calloway** **Physical Science Technician, Edgewood Chemical & Biological Forensic Analytical Center**	**Analyst(s) of Record** (Signature) 12-17-03 (Date) for **Stephen S. Houck** **Researcher, Battelle Memorial Institute**
Analyst(s) of Record (Signature) 12-17-03 (Date) for **Doug S. Nichols** **Researcher, Battelle Memorial Institute**	**Analyst(s) of Record** (Signature) 12-17-03 (Date) **Michael W. Wensing, Ph.D.** **Principal Research Scientist, Battelle Memorial Institute**
Analyst(s) of Record (Signature) 12-17-03 (Date) **James Roetke** **Researcher, Battelle Memorial Institute**	**Report Reviewed by** (Signature) 12/18/03 (Date) **Timothy L. Kehring** **LIMS Technologist, Battelle Memorial Institute**
Report Reviewed by (Signature) 12-17-03 (Date) for **Audrey J. Raunig** **Principal Research Scientist, Battelle Memorial Institute**	**Report Reviewed by** (Signature) 12-17-03 (Date) **James H. Newman** **Laboratory Manager, Battelle Memorial Institute**

Report Reviewed by

(Signature)

17 Dec 03 (Date)

Robert L. Calloway

Designated Authority, Edgewood C/B Forensic Analytical Center

Report Approved by

(Signature)

15 Dec 2003 (Date)

Dennis J. Reutter, Ph.D.

Chief, Edgewood C/B Forensic Analytical Center

Appendix A

LIMS DATA REPORT

This appendix contains the 73-page data report produced from the LIMS system. It contains a summary of sample numbers, sample results, method blank results and results of QC samples analyzed. Since the report is generated by the LIMS, the page numbers will begin again at 1, but each page has been identified as part of the appendix so that it may be distinguishable from the main report.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

ANALYTICAL RESULTS

Report Date: 11/20/2003

Work Order: Tooele HD/TC 04/29/2003

Deliver To: Don Milton
EG&G Defense Materials Div.
11600 Stark Road
Tooele, UT 84074

James Newman
Project Manager

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

The following represents qualifications to the associated analytical reports.

1. These descriptors will help identify the specific sample and clarify the report.

   DUP - Matrix Duplicate
   MS - Matrix Spike
   MSD - Matrix Spike Duplicate
   RPD - Relative Percent Difference
   PQL - Practical Quantitiation Limit
   MDL - Method Detection Limit
   ND - Not Detected at the PQL
   * - Indicates a limit was exceeded

   Surrogate - Organic compounds which are similar to analytes of interest in chemical composition, extraction, and chromotography, but which are not normally found in the samples.

2. Qualifier keys - These descriptors will follow individual results for a specific sample and a specific analyte and will help qualify the data.

   J - Indicates an estimated value between the PQL and MDL

NOTE: This document is included as part of the Analytical Report for the above referenced and should be retained as a permanent record thereof.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Client
EG&G Defense Materials Division

Work ID
Tooele HD/TC 04/29/2003

Workorder Sample Summary

Lab ID	Sample ID	Matrix	Collect Date/Time	Receive Date/Time
030004-041-01	21-03-177	Liquid	4/14/2003 8:38	4/28/2003 8:31
030004-041-02	21-03-178	Liquid	4/14/2003 8:38	4/28/2003 8:31
030004-041-03	21-03-183	Liquid	4/15/2003 8:38	4/28/2003 8:31
030004-041-04	21-03-186	Liquid	4/15/2003 8:38	4/28/2003 8:31
030004-041-05	21-03-189	Liquid	4/16/2003 8:38	4/28/2003 8:31
030004-041-06	21-03-192	Liquid	4/16/2003 8:38	4/28/2003 8:31
030004-041-07	21-03-195	Liquid	4/17/2003 8:38	4/28/2003 8:31
030004-041-08	21-03-198	Liquid	4/17/2003 8:38	4/28/2003 8:31
030004-041-09	21-03-201	Liquid	4/18/2003 8:38	4/28/2003 8:31
030004-041-10	21-03-204	Liquid	4/18/2003 8:38	4/28/2003 8:31
030004-041-11	21-03-207	Liquid	4/19/2003 8:38	4/28/2003 8:31
030004-041-12	21-03-210	Liquid	4/19/2003 8:38	4/28/2003 8:31
030004-042-01	21-03-179	Non-cohesive Solid	4/14/2003 8:38	4/28/2003 8:31
030004-042-02	21-03-180	Non-cohesive Solid	4/14/2003 8:38	4/28/2003 8:31
030004-042-03	21-03-184	Non-cohesive Solid	4/15/2003 8:38	4/28/2003 8:31
030004-042-04	21-03-187	Non-cohesive Solid	4/15/2003 8:38	4/28/2003 8:31
030004-042-05	21-03-190	Non-cohesive Solid	4/16/2003 8:38	4/28/2003 8:31
030004-042-06	21-03-193	Non-cohesive Solid	4/16/2003 8:38	4/28/2003 8:31
030004-042-07	21-03-196	Non-cohesive Solid	4/17/2003 8:38	4/28/2003 8:31
030004-042-08	21-03-199	Non-cohesive Solid	4/17/2003 8:38	4/28/2003 8:31
030004-042-09	21-03-202	Non-cohesive Solid	4/18/2003 8:38	4/28/2003 8:31
030004-042-10	21-03-205	Non-cohesive Solid	4/18/2003 8:38	4/28/2003 8:31
030004-042-11	21-03-208	Non-cohesive Solid	4/19/2003 8:38	4/28/2003 8:31
030004-042-12	21-03-211	Non-cohesive Solid	4/19/2003 8:38	4/28/2003 8:31
030004-043-01	21-03-181	Solid	4/14/2003 8:38	4/28/2003 8:31
030004-043-02	21-03-182	Solid	4/14/2003 8:38	4/28/2003 8:31
030004-043-03	21-03-185	Solid	4/15/2003 8:38	4/28/2003 8:31
030004-043-04	21-03-188	Solid	4/15/2003 8:38	4/28/2003 8:31
030004-043-05	21-03-191	Solid	4/16/2003 8:38	4/28/2003 8:31
030004-043-06	21-03-194	Solid	4/16/2003 8:38	4/28/2003 8:31
030004-043-07	21-03-197	Solid	4/17/2003 8:38	4/28/2003 8:31
030004-043-08	21-03-200	Solid	4/17/2003 8:38	4/28/2003 8:31
030004-043-09	21-03-203	Solid	4/18/2003 8:38	4/28/2003 8:31
030004-043-10	21-03-206	Solid	4/18/2003 8:38	4/28/2003 8:31
030004-043-11	21-03-209	Solid	4/19/2003 8:38	4/28/2003 8:31
030004-043-12	21-03-212	Solid	4/19/2003 8:38	4/28/2003 8:31

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-041-01	21-03-177	4/14/2003 08:38	4/28/2003 08:31	7/9/2003 15:15	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/8/2003 09:24	7001	AM098 HD Purity by GC	1	5/14/2003 18:05	tfr	7102

Parameter	Result	MDL	PQL	Units
bis-(2-Chloroethyl)sulfide	92.1			%

AM100 Non-Vols in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:10	6306	AM100 Non-Vols in HD by GC	1	5/8/2003 0:00	ssh	6905

Parameter	Result	MDL	PQL	Units
Thiodiglycol (TDG)	ND	209	249	ug/g

Surrogates	Expected	Result	Recovery	Limits
Thiodiglycol-d8 (TDG-d8)	997	1050 ug/g	106	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
4/29/2003 16:14	6304	AM101 Vols in Liquid HD by GC	1	5/5/2003 19:33	tfr	6702

Parameter	Result	MDL	PQL	Units
1,2-Dichloroethane	5820	267	513	ug/g
Tetrachloroethylene	ND	103	513	ug/g
1,1,2,2-Tetrachloroethane	ND	154	513	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Difluorobenzene	10600	8970 ug/g	84.4	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
4/30/2003 14:02	6305	AM118 Metals in Liq HD by ICP	1	5/2/2003 14:04	blb	6403

Parameter	Result	MDL	PQL	Units
Antimony	ND	0.645	5.12	ug/g
Arsenic	21.6	1.25	5.12	ug/g
Barium	ND	0.440	5.12	ug/g
Cadmium	ND	0.420	5.12	ug/g
Chromium	4.61 J	1.32	5.12	ug/g
Cobalt	ND	0.276	1.02	ug/g
Copper	57.0	2.49	5.12	ug/g
Lead	ND	0.420	5.12	ug/g
Manganese	0.515 J	0.328	1.02	ug/g
Nickel	1.10 J	0.358	5.12	ug/g
Selenium	ND	1.20	10.2	ug/g
Silver	ND	0.481	5.12	ug/g
Thallium	ND	1.00	5.12	ug/g
Tin	ND	2.55	10.2	ug/g
Vanadium	1.30 J	1.02	5.12	ug/g
Zinc	ND	3.19	10.2	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
4/30/2003 14:02	6305	AM118 Metals in Liq HD by ICP	1	5/6/2003 14:17	blb	6901

Parameter	Result	MDL	PQL	Units
Aluminum	ND	10.2	51.2	ug/g
Beryllium	ND	0.921	5.12	ug/g
Boron	ND	3.83	10.2	ug/g
Mercury	1.47	0.0512	0.512	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/8/2003 09:20	7002	AM117 Semi-Vols Liq HD by GC	1	5/10/2003 0:00	ssh	7104

Parameter	Result	MDL	PQL	Units
Hexachloroethane	ND	85.7	2680	ug/g
Q	42900	54.6	2680	ug/g
T	1670 J	74.9	2680	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Dithiane-d4	1070	1140 ug/g	106	50 - 150

AM126 Lewisite in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:18	6401	AM126 Lewisite in HD by GC	1	5/6/2003 22:38	tfr	6903

Parameter	Result	MDL	PQL	Units
Lewisite	12.7	2.06	5.29	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-041-02	21-03-178	4/14/2003 08:38	4/28/2003 08:31	7/9/2003 15:16	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/8/2003 09:24	7001	AM098 HD Purity by GC	1	5/14/2003 18:43	tfr	7102

Parameter	Result	MDL	PQL	Units
bis-(2-Chloroethyl)sulfide	93.0			%

AM100 Non-Vols in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
N/A			1	5/8/2003 0:00	ssh	6905

Parameter	Result	MDL	PQL	Units
Thiodiglycol (TDG)	ND	215	256	ug/g

Surrogates	Expected	Result	Recovery	Limits
Thiodiglycol-d8 (TDG-d8)	1030	998 ug/g	97.3	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
N/A			1	5/5/2003 20:44	tfr	6702

Parameter	Result	MDL	PQL	Units
1,2-Dichloroethane	5780	269	518	ug/g
Tetrachloroethylene	ND	104	518	ug/g
1,1,2,2-Tetrachloroethane	ND	155	518	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Difluorobenzene	10700	9100 ug/g	85	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
4/30/2003 14:02	6305	AM118 Metals in Liq HD by ICP	1	5/2/2003 14:44	blb	6403

Parameter	Result	MDL	PQL	Units
Antimony	ND	0.658	5.22	ug/g
Arsenic	21.7	1.27	5.22	ug/g
Barium	ND	0.449	5.22	ug/g
Cadmium	ND	0.428	5.22	ug/g
Chromium	4.92 J	1.35	5.22	ug/g
Cobalt	ND	0.282	1.04	ug/g
Copper	58.7	2.54	5.22	ug/g
Lead	ND	0.428	5.22	ug/g
Manganese	0.519 J	0.334	1.04	ug/g
Nickel	1.14 J	0.366	5.22	ug/g
Selenium	1.67 J	1.22	10.4	ug/g
Silver	ND	0.491	5.22	ug/g
Thallium	ND	1.02	5.22	ug/g
Tin	ND	2.60	10.4	ug/g
Vanadium	1.26 J	1.04	5.22	ug/g
Zinc	ND	3.26	10.4	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
4/30/2003 14:02	6305	AM118 Metals in Liq HD by ICP	1	5/6/2003 14:57	blb	6901

Parameter	Result	MDL	PQL	Units
Aluminum	ND	10.4	52.2	ug/g
Beryllium	ND	0.940	5.22	ug/g
Boron	ND	3.91	10.4	ug/g
Mercury	1.48	0.0522	0.522	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/8/2003 09:20	7002	AM117 Semi-Vols Liq HD by GC	1	5/10/2003 0:00	ssh	7104

Parameter	Result	MDL	PQL	Units
Hexachloroethane	ND	80.1	2500	ug/g
Q	43300	51.1	2500	ug/g
T	1560 J	70.1	2500	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Dithiane-d4	1000	1070 ug/g	107	50 - 150

AM126 Lewisite in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:18	6401	AM126 Lewisite in HD by GC	1	5/6/2003 23:47	tfr	6903

Parameter	Result	MDL	PQL	Units
Lewisite	13.9	2.04	5.22	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-041-03	21-03-183	4/15/2003 08:38	4/28/2003 08:31	11/20/2003 08:33	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/8/2003 09:24	7001	AM098 HD Purity by GC	1	5/14/2003 19:03	tfr	7102

Parameter	Result	MDL	PQL	Units
bis-(2-Chloroethyl)sulfide	96.3			%

AM100 Non-Vols in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:10	6306	AM100 Non-Vols in HD by GC	1	5/8/2003 4:04	ssh	6905

Parameter	Result	MDL	PQL	Units
Thiodiglycol (TDG)	ND	238	283	ug/g

Surrogates	Expected	Result	Recovery	Limits
Thiodiglycol-d8 (TDG-d8)	1130	1130 ug/g	99.9	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
N/A			1	5/5/2003 21:19	tfr	6702

Parameter	Result	MDL	PQL	Units
1,2-Dichloroethane	6380	273	525	ug/g
Tetrachloroethylene	ND	105	525	ug/g
1,1,2,2-Tetrachloroethane	ND	157	525	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Difluorobenzene	10900	9110 ug/g	83.9	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
4/30/2003 14:02	6305	AM118 Metals in Liq HD by ICP	1	5/2/2003 14:49	blb	6403

Parameter	Result	MDL	PQL	Units
Antimony	ND	0.651	5.17	ug/g
Arsenic	4.32 J	1.26	5.17	ug/g
Barium	ND	0.444	5.17	ug/g
Cadmium	ND	0.424	5.17	ug/g
Chromium	5.02 J	1.33	5.17	ug/g
Cobalt	ND	0.279	1.03	ug/g
Copper	45.8	2.51	5.17	ug/g
Lead	ND	0.424	5.17	ug/g
Manganese	ND	0.331	1.03	ug/g
Nickel	ND	0.362	5.17	ug/g
Selenium	1.52 J	1.21	10.3	ug/g
Silver	ND	0.486	5.17	ug/g
Thallium	ND	1.01	5.17	ug/g
Tin	ND	2.57	10.3	ug/g
Vanadium	1.35 J	1.03	5.17	ug/g
Zinc	ND	3.22	10.3	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
4/30/2003 14:02	6305	AM118 Metals in Liq HD by ICP	1	5/6/2003 15:02	blb	6901

Parameter	Result	MDL	PQL	Units
Aluminum	ND	10.3	51.7	ug/g
Beryllium	ND	0.930	5.17	ug/g
Boron	ND	3.86	10.3	ug/g
Mercury	ND	0.0517	0.517	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/8/2003 09:20	7002	AM117 Semi-Vols Liq HD by GC	1	5/10/2003 0:00	ssh	7104

Parameter	Result	MDL	PQL	Units
Hexachloroethane	ND	79.4	2480	ug/g
Q	21700	50.6	2480	ug/g
T	882 J	69.5	2480	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Dithiane-d4	993	1070 ug/g	108	50 - 150

AM126 Lewisite in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:18	6401	AM126 Lewisite in HD by GC	1	5/7/2003 0:21	tfr	6903

Parameter	Result	MDL	PQL	Units
Lewisite	ND	2.04	5.22	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-041-04	21-03-186	4/15/2003 08:38	4/28/2003 08:31	11/20/2003 08:33	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/8/2003 09:24	7001	AM098 HD Purity by GC	1	5/14/2003 19:22	tfr	7102

Parameter	Result	MDL	PQL	Units
bis-(2-Chloroethyl)sulfide	92.5			%

AM100 Non-Vols in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
N/A			1	5/8/2003 0:00	ssh	6905

Parameter	Result	MDL	PQL	Units
Thiodiglycol (TDG)	ND	203	242	ug/g

Surrogates

	Expected	Result	Recovery	Limits
Thiodiglycol-d8 (TDG-d8)	967	1020 ug/g	105	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
N/A			1	5/5/2003 21:54	tfr	6702

Parameter	Result	MDL	PQL	Units
1,2-Dichloroethane	5220	269	517	ug/g
Tetrachloroethylene	ND	103	517	ug/g
1,1,2,2-Tetrachloroethane	ND	155	517	ug/g

Surrogates

	Expected	Result	Recovery	Limits
1,4-Difluorobenzene	10700	8990 ug/g	84.1	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
4/30/2003 14:02	6305	AM118 Metals in Liq HD by ICP	1	5/2/2003 14:54	blb	6403

Parameter	Result	MDL	PQL	Units
Antimony	ND	0.658	5.22	ug/g
Arsenic	6.35	1.27	5.22	ug/g
Barium	ND	0.449	5.22	ug/g
Cadmium	ND	0.428	5.22	ug/g
Chromium	4.93 J	1.35	5.22	ug/g
Cobalt	ND	0.282	1.04	ug/g
Copper	44.4	2.54	5.22	ug/g
Lead	ND	0.428	5.22	ug/g
Manganese	0.584 J	0.334	1.04	ug/g
Nickel	2.42 J	0.365	5.22	ug/g
Selenium	ND	1.22	10.4	ug/g
Silver	ND	0.491	5.22	ug/g
Thallium	ND	1.02	5.22	ug/g
Tin	ND	2.60	10.4	ug/g
Vanadium	1.34 J	1.04	5.22	ug/g
Zinc	ND	3.26	10.4	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
4/30/2003 14:02	6305	AM118 Metals in Liq HD by ICP	1	5/6/2003 15:07	blb	6901

Parameter	Result	MDL	PQL	Units
Aluminum	ND	10.4	52.2	ug/g
Beryllium	ND	0.939	5.22	ug/g
Boron	ND	3.90	10.4	ug/g
Mercury	ND	0.0522	0.522	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/8/2003 09:20	7002	AM117 Semi-Vols Liq HD by GC	1	5/10/2003 0:00	ssh	7104

Parameter	Result	MDL	PQL	Units
Hexachloroethane	ND	82.1	2560	ug/g
Q	56600	52.3	2560	ug/g
T	1810 J	71.8	2560	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Dithiane-d4	1030	1110 ug/g	108	50 - 150

AM126 Lewisite in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:18	6401	AM126 Lewisite in HD by GC	1	5/7/2003 0:55	tfr	6903

Parameter	Result	MDL	PQL	Units
Lewisite	ND	2.05	5.26	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-041-05	21-03-189	4/16/2003 08:38	4/28/2003 08:31	11/20/2003 08:33	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/8/2003 09:24	7001	AM098 HD Purity by GC	1	5/14/2003 19:41	tfr	7102

Parameter	Result	MDL	PQL	Units
bis-(2-Chloroethyl)sulfide	93.0			%

AM100 Non-Vols in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
N/A			1	5/8/2003 0:00	ssh	6905

Parameter	Result	MDL	PQL	Units
Thiodiglycol (TDG)	ND	210	250	ug/g

Surrogates	Expected	Result	Recovery	Limits
Thiodiglycol-d8 (TDG-d8)	998	991 ug/g	99.3	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
N/A			1	5/5/2003 22:29	tfr	6702

Parameter	Result	MDL	PQL	Units
1,2-Dichloroethane	6000	267	513	ug/g
Tetrachloroethylene	ND	103	513	ug/g
1,1,2,2-Tetrachloroethane	ND	154	513	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Difluorobenzene	10600	8550 ug/g	80.6	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
4/30/2003 14:02	6305	AM118 Metals in Liq HD by ICP	1	5/2/2003 14:59	blb	6403

Parameter	Result	MDL	PQL	Units
Antimony	ND	0.646	5.13	ug/g
Arsenic	5.94	1.25	5.13	ug/g
Barium	ND	0.441	5.13	ug/g
Cadmium	ND	0.421	5.13	ug/g
Chromium	4.72 J	1.32	5.13	ug/g
Cobalt	ND	0.277	1.03	ug/g
Copper	61.2	2.49	5.13	ug/g
Lead	ND	0.421	5.13	ug/g
Manganese	1.04	0.328	1.03	ug/g
Nickel	3.11 J	0.359	5.13	ug/g
Selenium	ND	1.20	10.3	ug/g
Silver	ND	0.482	5.13	ug/g
Thallium	ND	1.01	5.13	ug/g
Tin	ND	2.55	10.3	ug/g
Vanadium	ND	1.03	5.13	ug/g
Zinc	ND	3.20	10.3	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
4/30/2003 14:02	6305	AM118 Metals in Liq HD by ICP	1	5/6/2003 15:12	blb	6901

Parameter	Result	MDL	PQL	Units
Aluminum	22.6 J	10.3	51.3	ug/g
Beryllium	ND	0.923	5.13	ug/g
Boron	ND	3.84	10.3	ug/g
Mercury	ND	0.0513	0.513	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/8/2003 09:20	7002	AM117 Semi-Vols Liq HD by GC	1	5/10/2003 0:00	ssh	7104

Parameter	Result	MDL	PQL	Units
Hexachloroethane	ND	80.4	2510	ug/g
Q	29600	51.3	2510	ug/g
T	1320 J	70.4	2510	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Dithiane-d4	1010	1100 ug/g	110	50 - 150

AM126 Lewisite in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:18	6401	AM126 Lewisite in HD by GC	1	5/7/2003 0:00	tfr	6903

Parameter	Result	MDL	PQL	Units
Lewisite	ND	1.97	5.05	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-041-06	21-03-192	4/16/2003 08:38	4/28/2003 08:31	11/20/2003 08:33	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/8/2003 09:24	7001	AM098 HD Purity by GC	1	5/14/2003 20:00	tfr	7102

Parameter	Result	MDL	PQL	Units
bis-(2-Chloroethyl)sulfide	89.2			%

AM100 Non-Vols in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
N/A			1	5/8/2003 0:00	ssh	6905

Parameter	Result	MDL	PQL	Units
Thiodiglycol (TDG)	ND	202	240	ug/g

Surrogates	Expected	Result	Recovery	Limits
Thiodiglycol-d8 (TDG-d8)	960	1150 ug/g	120	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
N/A			1	5/5/2003 23:04	tfr	6702

Parameter	Result	MDL	PQL	Units
1,2-Dichloroethane	5200	265	510	ug/g
Tetrachloroethylene	ND	102	510	ug/g
1,1,2,2-Tetrachloroethane	ND	153	510	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Difluorobenzene	10500	9190 ug/g	87.2	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
4/30/2003 14:02	6305	AM118 Metals in Liq HD by ICP	1	5/2/2003 15:04	blb	6403

Parameter	Result	MDL	PQL	Units
Antimony	ND	0.685	5.43	ug/g
Arsenic	1.34 J	1.33	5.43	ug/g
Barium	ND	0.467	5.43	ug/g
Cadmium	ND	0.446	5.43	ug/g
Chromium	4.27 J	1.40	5.43	ug/g
Cobalt	ND	0.293	1.09	ug/g
Copper	28.2	2.64	5.43	ug/g
Lead	ND	0.446	5.43	ug/g
Manganese	2.93	0.348	1.09	ug/g
Nickel	0.530 J	0.380	5.43	ug/g
Selenium	ND	1.27	10.9	ug/g
Silver	ND	0.511	5.43	ug/g
Thallium	ND	1.07	5.43	ug/g
Tin	ND	2.71	10.9	ug/g
Vanadium	1.24 J	1.09	5.43	ug/g
Zinc	ND	3.39	10.9	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
4/30/2003 14:02	6305	AM118 Metals in Liq HD by ICP	1	5/6/2003 15:17	blb	6901

Parameter	Result	MDL	PQL	Units
Aluminum	ND	10.9	54.3	ug/g
Beryllium	ND	0.978	5.43	ug/g
Boron	ND	4.07	10.9	ug/g
Mercury	ND	0.0543	0.543	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/8/2003 09:20	7002	AM117 Semi-Vols Liq HD by GC	1	5/10/2003 0:00	ssh	7104

Parameter	Result	MDL	PQL	Units
Hexachloroethane	ND	78.4	2450	ug/g
Q	30300	50.0	2450	ug/g
T	1560 J	68.6	2450	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Dithiane-d4	980	1010 ug/g	103	50 - 150

AM126 Lewisite in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:18	6401	AM126 Lewisite in HD by GC	1	5/7/2003 0:00	tfr	6903

Parameter	Result	MDL	PQL	Units
Lewisite	ND	1.97	5.06	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-041-07	21-03-195	4/17/2003 08:38	4/28/2003 08:31	11/20/2003 08:33	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/8/2003 09:24	7001	AM098 HD Purity by GC	1	5/14/2003 20:19	tfr	7102

Parameter	Result	MDL	PQL	Units
bis-(2-Chloroethyl)sulfide	98.8			%

AM100 Non-Vols in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
N/A			1	5/8/2003 0:00	ssh	6905

Parameter	Result	MDL	PQL	Units
Thiodiglycol (TDG)	ND	219	261	ug/g

Surrogates	Expected	Result	Recovery	Limits
Thiodiglycol-d8 (TDG-d8)	1040	1040 ug/g	99.3	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
N/A			1	5/5/2003 23:40	tfr	6702

Parameter	Result	MDL	PQL	Units
1,2-Dichloroethane	6150	275	529	ug/g
Tetrachloroethylene	ND	106	529	ug/g
1,1,2,2-Tetrachloroethane	ND	159	529	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Difluorobenzene	10900	9860 ug/g	90.1	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
4/30/2003 14:02	6305	AM118 Metals in Liq HD by ICP	1	5/2/2003 15:09	blb	6403

Parameter	Result	MDL	PQL	Units
Antimony	ND	0.651	5.17	ug/g
Arsenic	11.3	1.26	5.17	ug/g
Barium	ND	0.445	5.17	ug/g
Cadmium	ND	0.424	5.17	ug/g
Chromium	4.16 J	1.33	5.17	ug/g
Cobalt	ND	0.279	1.03	ug/g
Copper	52.9	2.51	5.17	ug/g
Lead	0.610 J	0.424	5.17	ug/g
Manganese	0.383 J	0.331	1.03	ug/g
Nickel	5.26	0.362	5.17	ug/g
Selenium	ND	1.21	10.3	ug/g
Silver	ND	0.486	5.17	ug/g
Thallium	ND	1.01	5.17	ug/g
Tin	ND	2.57	10.3	ug/g
Vanadium	1.12 J	1.03	5.17	ug/g
Zinc	ND	3.23	10.3	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
4/30/2003 14:02	6305	AM118 Metals in Liq HD by ICP	1	5/6/2003 15:22	blb	6901

Parameter	Result	MDL	PQL	Units
Aluminum	ND	10.3	51.7	ug/g
Beryllium	ND	0.931	5.17	ug/g
Boron	ND	3.87	10.3	ug/g
Mercury	ND	0.0517	0.517	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/8/2003 09:20	7002	AM117 Semi-Vols Liq HD by GC	1	5/10/2003 0:00	ssh	7104

Parameter	Result	MDL	PQL	Units
Hexachloroethane	ND	80.2	2510	ug/g
Q	30600	51.2	2510	ug/g
T	1190 J	70.2	2510	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Dithiane-d4	1000	1060 ug/g	106	50 - 150

AM126 Lewisite in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:18	6401	AM126 Lewisite in HD by GC	1	5/7/2003 0:00	tfr	6903

Parameter	Result	MDL	PQL	Units
Lewisite	ND	2.06	5.29	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-041-08	21-03-198	4/17/2003 08:38	4/28/2003 08:31	11/20/2003 08:33	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/8/2003 09:24	7001	AM098 HD Purity by GC	1	5/14/2003 20:38	tfr	7102

Parameter	Result	MDL	PQL	Units
bis-(2-Chloroethyl)sulfide	92.4			%

AM100 Non-Vols in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
N/A			1	5/8/2003 0:00	ssh	6905

Parameter	Result	MDL	PQL	Units
Thiodiglycol (TDG)	ND	221	263	ug/g

Surrogates	Expected	Result	Recovery	Limits
Thiodiglycol-d8 (TDG-d8)	1050	1150 ug/g	109	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
N/A			1	5/6/2003 0:15	tfr	6702

Parameter	Result	MDL	PQL	Units
1,2-Dichloroethane	6120	269	517	ug/g
Tetrachloroethylene	ND	103	517	ug/g
1,1,2,2-Tetrachloroethane	ND	155	517	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Difluorobenzene	10700	8820 ug/g	82.5	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
4/30/2003 14:02	6305	AM118 Metals in Liq HD by ICP	1	5/2/2003 15:14	blb	6403

Parameter	Result	MDL	PQL	Units
Antimony	ND	0.649	5.15	ug/g
Arsenic	ND	1.26	5.15	ug/g
Barium	ND	0.443	5.15	ug/g
Cadmium	ND	0.423	5.15	ug/g
Chromium	5.20	1.33	5.15	ug/g
Cobalt	ND	0.278	1.03	ug/g
Copper	29.3	2.51	5.15	ug/g
Lead	ND	0.423	5.15	ug/g
Manganese	ND	0.330	1.03	ug/g
Nickel	ND	0.361	5.15	ug/g
Selenium	2.02 J	1.21	10.3	ug/g
Silver	ND	0.485	5.15	ug/g
Thallium	ND	1.01	5.15	ug/g
Tin	ND	2.57	10.3	ug/g
Vanadium	1.24 J	1.03	5.15	ug/g
Zinc	ND	3.22	10.3	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
4/30/2003 14:02	6305	AM118 Metals in Liq HD by ICP	1	5/6/2003 15:27	blb	6901

Parameter	Result	MDL	PQL	Units
Aluminum	ND	10.3	51.5	ug/g
Beryllium	ND	0.928	5.15	ug/g
Boron	ND	3.86	10.3	ug/g
Mercury	ND	0.0515	0.515	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/8/2003 09:20	7002	AM117 Semi-Vols Liq HD by GC	1	5/10/2003 0:00	ssh	7104

Parameter	Result	MDL	PQL	Units
Hexachloroethane	ND	81.1	2530	ug/g
Q	34700	51.7	2530	ug/g
T	1620 J	70.9	2530	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Dithiane-d4	1010	1040 ug/g	103	50 - 150

AM126 Lewisite in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:18	6401	AM126 Lewisite in HD by GC	1	5/7/2003 0:00	tfr	6903

Parameter	Result	MDL	PQL	Units
Lewisite	ND	1.99	5.11	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-041-09	21-03-201	4/18/2003 08:38	4/28/2003 08:31	11/20/2003 08:33	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/8/2003 09:24	7001	AM098 HD Purity by GC	1	5/14/2003 20:57	tfr	7102

Parameter	Result	MDL	PQL	Units
bis-(2-Chloroethyl)sulfide	88.1			%

AM100 Non-Vols in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
N/A			1	5/8/2003 0:00	ssh	6905

Parameter	Result	MDL	PQL	Units
Thiodiglycol (TDG)	ND	219	260	ug/g

Surrogates	Expected	Result	Recovery	Limits
Thiodiglycol-d8 (TDG-d8)	1040	1250 ug/g	120	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
N/A			1	5/6/2003 0:50	tfr	6702

Parameter	Result	MDL	PQL	Units
1,2-Dichloroethane	3210	263	506	ug/g
Tetrachloroethylene	ND	101	506	ug/g
1,1,2,2-Tetrachloroethane	ND	152	506	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Difluorobenzene	10500	8520 ug/g	81.5	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
4/30/2003 14:02	6305	AM118 Metals in Liq HD by ICP	1	5/2/2003 15:19	blb	6403

Parameter	Result	MDL	PQL	Units
Antimony	ND	0.650	5.16	ug/g
Arsenic	ND	1.26	5.16	ug/g
Barium	ND	0.444	5.16	ug/g
Cadmium	ND	0.423	5.16	ug/g
Chromium	4.59 J	1.33	5.16	ug/g
Cobalt	ND	0.279	1.03	ug/g
Copper	7.97	2.51	5.16	ug/g
Lead	ND	0.423	5.16	ug/g
Manganese	4.97	0.330	1.03	ug/g
Nickel	1.78 J	0.361	5.16	ug/g
Selenium	ND	1.21	10.3	ug/g
Silver	ND	0.485	5.16	ug/g
Thallium	ND	1.01	5.16	ug/g
Tin	ND	2.57	10.3	ug/g
Vanadium	1.22 J	1.03	5.16	ug/g
Zinc	ND	3.22	10.3	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
4/30/2003 14:02	6305	AM118 Metals in Liq HD by ICP	1	5/6/2003 15:32	blb	6901

Parameter	Result	MDL	PQL	Units
Aluminum	ND	10.3	51.6	ug/g
Beryllium	ND	0.929	5.16	ug/g
Boron	ND	3.86	10.3	ug/g
Mercury	ND	0.0516	0.516	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/8/2003 09:20	7002	AM117 Semi-Vols Liq HD by GC	1	5/10/2003 0:00	ssh	7104

Parameter	Result	MDL	PQL	Units
Hexachloroethane	ND	79.7	2490	ug/g
Q	26600	50.8	2490	ug/g
T	1530 J	69.7	2490	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Dithiane-d4	996	1050 ug/g	105	50 - 150

AM126 Lewisite in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:18	6401	AM126 Lewisite in HD by GC	1	5/7/2003 0:00	tfr	6903

Parameter	Result	MDL	PQL	Units
Lewisite	ND	1.98	5.08	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-041-10	21-03-204	4/18/2003 08:38	4/28/2003 08:31	11/20/2003 08:33	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/8/2003 09:24	7001	AM098 HD Purity by GC	1	5/14/2003 21:17	tfr	7102

Parameter	Result	MDL	PQL	Units
bis-(2-Chloroethyl)sulfide	93.0			%

AM100 Non-Vols in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
N/A			1	5/8/2003 0:00	ssh	6905

Parameter	Result	MDL	PQL	Units
Thiodiglycol (TDG)	ND	213	254	ug/g

Surrogates	Expected	Result	Recovery	Limits
Thiodiglycol-d8 (TDG-d8)	1010	1160 ug/g	115	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
N/A			1	5/6/2003 0:00	tfr	6702

Parameter	Result	MDL	PQL	Units
1,2-Dichloroethane	4470	265	510	ug/g
Tetrachloroethylene	ND	102	510	ug/g
1,1,2,2-Tetrachloroethane	ND	153	510	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Difluorobenzene	10600	9020 ug/g	85.5	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
4/30/2003 14:02	6305	AM118 Metals in Liq HD by ICP	1	5/2/2003 15:24	blb	6403

Parameter	Result	MDL	PQL	Units
Antimony	ND	0.646	5.13	ug/g
Arsenic	ND	1.25	5.13	ug/g
Barium	ND	0.441	5.13	ug/g
Cadmium	ND	0.421	5.13	ug/g
Chromium	3.42 J	1.32	5.13	ug/g
Cobalt	ND	0.277	1.03	ug/g
Copper	20.2	2.49	5.13	ug/g
Lead	ND	0.421	5.13	ug/g
Manganese	3.06	0.328	1.03	ug/g
Nickel	ND	0.359	5.13	ug/g
Selenium	ND	1.20	10.3	ug/g
Silver	ND	0.482	5.13	ug/g
Thallium	ND	1.01	5.13	ug/g
Tin	ND	2.55	10.3	ug/g
Vanadium	ND	1.03	5.13	ug/g
Zinc	ND	3.20	10.3	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
4/30/2003 14:02	6305	AM118 Metals in Liq HD by ICP	1	5/6/2003 15:37	blb	6901

Parameter	Result	MDL	PQL	Units
Aluminum	ND	10.3	51.3	ug/g
Beryllium	ND	0.923	5.13	ug/g
Boron	ND	3.84	10.3	ug/g
Mercury	ND	0.0513	0.513	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/8/2003 09:20	7002	AM117 Semi-Vols Liq HD by GC	1	5/10/2003 0:00	ssh	7104

Parameter	Result	MDL	PQL	Units
Hexachloroethane	ND	79.5	2490	ug/g
Q	28900	50.7	2490	ug/g
T	1300 J	69.6	2490	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Dithiane-d4	994	1010 ug/g	102	50 - 150

AM126 Lewisite in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:18	6401	AM126 Lewisite in HD by GC	1	5/7/2003 0:00	tfr	6903

Parameter	Result	MDL	PQL	Units
Lewisite	ND	2.01	5.15	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-041-11	21-03-207	4/19/2003 08:38	4/28/2003 08:31	11/20/2003 08:33	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/8/2003 09:24	7001	AM098 HD Purity by GC	1	5/14/2003 22:14	tfr	7102

Parameter	Result	MDL	PQL	Units
bis-(2-Chloroethyl)sulfide	95.4			%

AM100 Non-Vols in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
N/A			1	5/8/2003 12:07	ssh	6905

Parameter	Result	MDL	PQL	Units
Thiodiglycol (TDG)	ND	216	257	ug/g

Surrogates	Expected	Result	Recovery	Limits
Thiodiglycol-d8 (TDG-d8)	1030	1030 ug/g	100	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
N/A			1	5/6/2003 0:00	tfr	6702

Parameter	Result	MDL	PQL	Units
1,2-Dichloroethane	5300	275	530	ug/g
Tetrachloroethylene	ND	106	530	ug/g
1,1,2,2-Tetrachloroethane	ND	159	530	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Difluorobenzene	11000	9330 ug/g	85.2	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
4/30/2003 14:02	6305	AM118 Metals in Liq HD by ICP	1	5/2/2003 15:39	blb	6403

Parameter	Result	MDL	PQL	Units
Antimony	ND	0.645	5.12	ug/g
Arsenic	5.31	1.25	5.12	ug/g
Barium	ND	0.440	5.12	ug/g
Cadmium	ND	0.420	5.12	ug/g
Chromium	4.18 J	1.32	5.12	ug/g
Cobalt	ND	0.276	1.02	ug/g
Copper	68.5	2.49	5.12	ug/g
Lead	ND	0.420	5.12	ug/g
Manganese	ND	0.328	1.02	ug/g
Nickel	ND	0.358	5.12	ug/g
Selenium	ND	1.20	10.2	ug/g
Silver	ND	0.481	5.12	ug/g
Thallium	ND	1.00	5.12	ug/g
Tin	ND	2.55	10.2	ug/g
Vanadium	1.08 J	1.02	5.12	ug/g
Zinc	ND	3.19	10.2	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
4/30/2003 14:02	6305	AM118 Metals in Liq HD by ICP	1	5/6/2003 16:02	blb	6901

Parameter	Result	MDL	PQL	Units
Aluminum	ND	10.2	51.2	ug/g
Beryllium	ND	0.921	5.12	ug/g
Boron	ND	3.83	10.2	ug/g
Mercury	ND	0.0512	0.512	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/8/2003 09:20	7002	AM117 Semi-Vols Liq HD by GC	1	5/10/2003 11:50	ssh	7104

Parameter	Result	MDL	PQL	Units
Hexachloroethane	ND	80.2	2510	ug/g
Q	37800	51.2	2510	ug/g
T	1130 J	70.2	2510	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Dithiane-d4	1000	1060 ug/g	106	50 - 150

AM126 Lewisite in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:18	6401	AM126 Lewisite in HD by GC	1	5/7/2003 0:00	tfr	6903

Parameter	Result	MDL	PQL	Units
Lewisite	ND	1.99	5.09	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-041-12	21-03-210	4/19/2003 08:38	4/28/2003 08:31	11/20/2003 08:33	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/8/2003 09:24	7001	AM098 HD Purity by GC	1	5/14/2003 22:33	tfr	7102

Parameter	Result	MDL	PQL	Units
bis-(2-Chloroethyl)sulfide	101			%

AM100 Non-Vols in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
N/A			1	5/8/2003 12:51	ssh	6905

Parameter	Result	MDL	PQL	Units
Thiodiglycol (TDG)	ND	214	255	ug/g

Surrogates	Expected	Result	Recovery	Limits
Thiodiglycol-d8 (TDG-d8)	1020	1100 ug/g	108	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
N/A			1	5/6/2003 0:00	tfr	6702

Parameter	Result	MDL	PQL	Units
1,2-Dichloroethane	6150	264	509	ug/g
Tetrachloroethylene	ND	102	509	ug/g
1,1,2,2-Tetrachloroethane	ND	153	509	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Difluorobenzene	10500	9300 ug/g	88.4	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
4/30/2003 14:02	6305	AM118 Metals in Liq HD by ICP	1	5/2/2003 15:44	blb	6403

Parameter	Result	MDL	PQL	Units
Antimony	ND	0.656	5.20	ug/g
Arsenic	12.1	1.27	5.20	ug/g
Barium	ND	0.447	5.20	ug/g
Cadmium	ND	0.427	5.20	ug/g
Chromium	4.43 J	1.34	5.20	ug/g
Cobalt	ND	0.281	1.04	ug/g
Copper	60.0	2.53	5.20	ug/g
Lead	ND	0.427	5.20	ug/g
Manganese	ND	0.333	1.04	ug/g
Nickel	ND	0.364	5.20	ug/g
Selenium	ND	1.22	10.4	ug/g
Silver	ND	0.489	5.20	ug/g
Thallium	ND	1.02	5.20	ug/g
Tin	ND	2.59	10.4	ug/g
Vanadium	1.25 J	1.04	5.20	ug/g
Zinc	ND	3.25	10.4	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
4/30/2003 14:02	6305	AM118 Metals in Liq HD by ICP	1	5/6/2003 16:07	blb	6901

Parameter	Result	MDL	PQL	Units
Aluminum	ND	10.4	52.0	ug/g
Beryllium	ND	0.937	5.20	ug/g
Boron	ND	3.89	10.4	ug/g
Mercury	ND	0.0520	0.520	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/8/2003 09:20	7002	AM117 Semi-Vols Liq HD by GC	1	5/10/2003 12:28	ssh	7104

Parameter	Result	MDL	PQL	Units
Hexachloroethane	ND	79.4	2480	ug/g
Q	24500	50.6	2480	ug/g
T	937 J	69.5	2480	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Dithiane-d4	993	1040 ug/g	105	50 - 150

AM126 Lewisite in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:18	6401	AM126 Lewisite in HD by GC	1	5/7/2003 0:00	tfr	6903

Parameter	Result	MDL	PQL	Units
Lewisite	ND	2.04	5.24	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-042-01	21-03-179	4/14/2003 08:38	4/28/2003 08:31	7/9/2003 15:16	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:06	6501	AM118 Metals in NCS HD by ICP	1	5/7/2003 13:39	blb	6804

Parameter	Result	MDL	PQL	Units
Aluminum	10.1 J	9.97	49.9	ug/g
Arsenic	309	0.568	4.99	ug/g
Beryllium	ND	0.0499	4.99	ug/g
Boron	ND	3.99	9.97	ug/g
Chromium	8.07	0.997	4.99	ug/g
Cobalt	0.983 J	0.120	0.997	ug/g
Copper	51.6	3.22	9.97	ug/g
Manganese	67.3	3.29	9.97	ug/g
Nickel	8.93	0.618	4.99	ug/g
Selenium	ND	0.708	24.9	ug/g
Vanadium	ND	0.997	4.99	ug/g
Zinc	22.8	2.19	9.97	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:06	6501	AM118 Metals in NCS HD by ICP	1	5/8/2003 16:32	blb	8305

Parameter	Result	MDL	PQL	Units
Barium	0.198 J	0.0399	4.99	ug/g
Cadmium	0.133 J	0.0199	4.99	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:06	6501	AM118 Metals in NCS HD by ICP	1	5/13/2003 19:16	blb	8605

Parameter	Result	MDL	PQL	Units
Antimony	0.412 J	0.130	4.99	ug/g
Lead	1.89 J	1.88	9.97	ug/g
Mercury	101	0.0698	0.499	ug/g
Silver	ND	0.0598	4.99	ug/g
Thallium	ND	0.329	4.99	ug/g
Tin	1.47 J	0.439	9.97	ug/g

Comments: Sample diluted for mercury an additional 50 fold.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-042-02	21-03-180	4/14/2003 08:38	4/28/2003 08:31	11/20/2003 08:33	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:06	6501	AM118 Metals in NCS HD by ICP	1	5/7/2003 14:07	blb	6804

Parameter	Result	MDL	PQL	Units
Aluminum	ND	10.7	53.4	ug/g
Arsenic	225	0.609	5.34	ug/g
Beryllium	ND	0.0534	5.34	ug/g
Boron	ND	4.27	10.7	ug/g
Chromium	8.68	1.07	5.34	ug/g
Cobalt	0.994 J	0.128	1.07	ug/g
Copper	65.3	3.45	10.7	ug/g
Manganese	69.0	3.53	10.7	ug/g
Nickel	13.1	0.662	5.34	ug/g
Selenium	ND	0.759	26.7	ug/g
Vanadium	1.29 J	1.07	5.34	ug/g
Zinc	23.2	2.35	10.7	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:06	6501	AM118 Metals in NCS HD by ICP	1	5/8/2003 17:00	blb	8305

Parameter	Result	MDL	PQL	Units
Barium	0.143 J	0.0427	5.34	ug/g
Cadmium	0.119 J	0.0214	5.34	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:06	6501	AM118 Metals in NCS HD by ICP	1	5/13/2003 19:43	blb	8605

Parameter	Result	MDL	PQL	Units
Antimony	0.288 J	0.139	5.34	ug/g
Lead	3.02 J	2.02	10.7	ug/g
Mercury	77.8	0.0748	0.534	ug/g
Silver	ND	0.0641	5.34	ug/g
Thallium	ND	0.353	5.34	ug/g
Tin	1.29 J	0.470	10.7	ug/g

Comments: Sample diluted for mercury an additional 40 fold.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-042-03	21-03-184	4/15/2003 08:38	4/28/2003 08:31	11/20/2003 08:33	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:06	6501	AM118 Metals in NCS HD by ICP	1	5/7/2003 14:12	blb	6804

Parameter	Result	MDL	PQL	Units
Aluminum	ND	10.5	52.7	ug/g
Arsenic	513	0.601	5.27	ug/g
Beryllium	ND	0.0527	5.27	ug/g
Boron	ND	4.22	10.5	ug/g
Chromium	15.4	1.05	5.27	ug/g
Cobalt	2.42	0.127	1.05	ug/g
Copper	79.3	3.41	10.5	ug/g
Manganese	172	3.48	10.5	ug/g
Nickel	26.7	0.654	5.27	ug/g
Selenium	ND	0.749	26.4	ug/g
Vanadium	1.29 J	1.05	5.27	ug/g
Zinc	91.7	2.32	10.5	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:06	6501	AM118 Metals in NCS HD by ICP	1	5/8/2003 17:16	blb	8305

Parameter	Result	MDL	PQL	Units
Barium	0.162 J	0.0422	5.27	ug/g
Cadmium	0.184 J	0.0211	5.27	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:06	6501	AM118 Metals in NCS HD by ICP	1	5/13/2003 20:00	blb	8605

Parameter	Result	MDL	PQL	Units
Antimony	0.613 J	0.137	5.27	ug/g
Lead	14.3	1.99	10.5	ug/g
Mercury	0.0769 J	0.0738	0.527	ug/g
Silver	ND	0.0633	5.27	ug/g
Thallium	ND	0.348	5.27	ug/g
Tin	6.75 J	0.464	10.5	ug/g

Comments: Sample reanalyzed for arsenic on May 8th, 2003 with appropriate batch QC. Result shown is for the May 8th reanalysis of arsenic. Sample diluted for arsenic an additional 2 fold.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-042-04	21-03-187	4/15/2003 08:38	4/28/2003 08:31	11/20/2003 08:33	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:06	6501	AM118 Metals in NCS HD by ICP	1	5/7/2003 14:18	blb	6804

Parameter	Result	MDL	PQL	Units
Aluminum	ND	11.1	55.3	ug/g
Arsenic	78.2	0.631	5.53	ug/g
Beryllium	ND	0.0553	5.53	ug/g
Boron	ND	4.42	11.1	ug/g
Chromium	11.4	1.11	5.53	ug/g
Cobalt	1.98	0.133	1.11	ug/g
Copper	47.6	3.57	11.1	ug/g
Manganese	145	3.65	11.1	ug/g
Nickel	10.8	0.686	5.53	ug/g
Selenium	ND	0.785	27.7	ug/g
Vanadium	ND	1.11	5.53	ug/g
Zinc	48.9	2.43	11.1	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:06	6501	AM118 Metals in NCS HD by ICP	1	5/8/2003 17:22	blb	8305

Parameter	Result	MDL	PQL	Units
Barium	0.235 J	0.0442	5.53	ug/g
Cadmium	0.178 J	0.0221	5.53	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:06	6501	AM118 Metals in NCS HD by ICP	1	5/13/2003 20:05	blb	8605

Parameter	Result	MDL	PQL	Units
Antimony	0.586 J	0.144	5.53	ug/g
Lead	126	2.09	11.1	ug/g
Mercury	0.156 J	0.0774	0.553	ug/g
Silver	ND	0.0664	5.53	ug/g
Thallium	ND	0.365	5.53	ug/g
Tin	2.46 J	0.487	11.1	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-042-05	21-03-190	4/16/2003 08:38	4/28/2003 08:31	11/20/2003 08:33	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:06	6501	AM118 Metals in NCS HD by ICP	1	5/7/2003 14:23	blb	6804

Parameter	Result	MDL	PQL	Units
Aluminum	ND	10.6	52.8	ug/g
Arsenic	304	0.602	5.28	ug/g
Beryllium	ND	0.0528	5.28	ug/g
Boron	ND	4.22	10.6	ug/g
Chromium	14.1	1.06	5.28	ug/g
Cobalt	2.39	0.127	1.06	ug/g
Copper	62.0	3.41	10.6	ug/g
Manganese	183	3.48	10.6	ug/g
Nickel	17.7	0.655	5.28	ug/g
Selenium	ND	0.750	26.4	ug/g
Vanadium	1.35 J	1.06	5.28	ug/g
Zinc	61.2	2.32	10.6	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:06	6501	AM118 Metals in NCS HD by ICP	1	5/8/2003 17:27	blb	8305

Parameter	Result	MDL	PQL	Units
Barium	0.167 J	0.0422	5.28	ug/g
Cadmium	0.131 J	0.0211	5.28	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:06	6501	AM118 Metals in NCS HD by ICP	1	5/13/2003 20:11	blb	8605

Parameter	Result	MDL	PQL	Units
Antimony	0.619 J	0.137	5.28	ug/g
Lead	27.5	2.00	10.6	ug/g
Mercury	0.261 J	0.0739	0.528	ug/g
Silver	ND	0.0634	5.28	ug/g
Thallium	ND	0.348	5.28	ug/g
Tin	3.13 J	0.465	10.6	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-042-06	21-03-193	4/16/2003 08:38	4/28/2003 08:31	11/20/2003 08:33	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:06	6501	AM118 Metals in NCS HD by ICP	1	5/7/2003 14:29	blb	6804

Parameter	Result	MDL	PQL	Units
Aluminum	12.9 J	10.7	53.3	ug/g
Arsenic	8.74	0.608	5.33	ug/g
Beryllium	ND	0.0533	5.33	ug/g
Boron	ND	4.26	10.7	ug/g
Chromium	69.9	1.07	5.33	ug/g
Cobalt	12.4	0.128	1.07	ug/g
Copper	31.2	3.44	10.7	ug/g
Manganese	273	3.52	10.7	ug/g
Nickel	25.1	0.661	5.33	ug/g
Selenium	ND	0.757	26.7	ug/g
Vanadium	2.03 J	1.07	5.33	ug/g
Zinc	76.0	2.35	10.7	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:06	6501	AM118 Metals in NCS HD by ICP	1	5/8/2003 17:33	blb	8305

Parameter	Result	MDL	PQL	Units
Barium	0.186 J	0.0426	5.33	ug/g
Cadmium	0.184 J	0.0213	5.33	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:06	6501	AM118 Metals in NCS HD by ICP	1	5/13/2003 20:17	blb	8605

Parameter	Result	MDL	PQL	Units
Antimony	1.13 J	0.139	5.33	ug/g
Lead	9.74 J	2.01	10.7	ug/g
Mercury	0.849	0.0746	0.533	ug/g
Silver	ND	0.0640	5.33	ug/g
Thallium	ND	0.352	5.33	ug/g
Tin	8.42 J	0.469	10.7	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-042-07	21-03-196	4/17/2003 08:38	4/28/2003 08:31	11/20/2003 08:33	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:06	6501	AM118 Metals in NCS HD by ICP	1	5/7/2003 14:34	blb	6804

Parameter	Result	MDL	PQL	Units
Aluminum	ND	9.75	48.7	ug/g
Arsenic	119	0.556	4.87	ug/g
Beryllium	ND	0.0487	4.87	ug/g
Boron	ND	3.90	9.75	ug/g
Chromium	18.3	0.975	4.87	ug/g
Cobalt	2.59	0.117	0.975	ug/g
Copper	67.3	3.15	9.75	ug/g
Manganese	170	3.22	9.75	ug/g
Nickel	10.5	0.604	4.87	ug/g
Selenium	ND	0.692	24.4	ug/g
Vanadium	1.27 J	0.975	4.87	ug/g
Zinc	78.8	2.14	9.75	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:06	6501	AM118 Metals in NCS HD by ICP	1	5/8/2003 17:38	blb	8305

Parameter	Result	MDL	PQL	Units
Barium	0.186 J	0.0390	4.87	ug/g
Cadmium	0.154 J	0.0195	4.87	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:06	6501	AM118 Metals in NCS HD by ICP	1	5/13/2003 20:22	blb	8605

Parameter	Result	MDL	PQL	Units
Antimony	0.470 J	0.127	4.87	ug/g
Lead	23.1	1.84	9.75	ug/g
Mercury	0.134 J	0.0682	0.487	ug/g
Silver	ND	0.0585	4.87	ug/g
Thallium	ND	0.322	4.87	ug/g
Tin	3.26 J	0.429	9.75	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-042-08	21-03-199	4/17/2003 08:38	4/28/2003 08:31	11/20/2003 08:33	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:06	6501	AM118 Metals in NCS HD by ICP	1	5/7/2003 14:40	blb	6804

Parameter	Result	MDL	PQL	Units
Aluminum	14.0 J	11.2	55.8	ug/g
Arsenic	5.73	0.636	5.58	ug/g
Beryllium	ND	0.0558	5.58	ug/g
Boron	ND	4.46	11.2	ug/g
Chromium	24.4	1.12	5.58	ug/g
Cobalt	5.26	0.134	1.12	ug/g
Copper	64.0	3.60	11.2	ug/g
Manganese	348	3.68	11.2	ug/g
Nickel	19.6	0.692	5.58	ug/g
Selenium	ND	0.792	27.9	ug/g
Vanadium	1.32 J	1.12	5.58	ug/g
Zinc	92.4	2.46	11.2	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:06	6501	AM118 Metals in NCS HD by ICP	1	5/8/2003 17:55	blb	8305

Parameter	Result	MDL	PQL	Units
Barium	3.17 J	0.0446	5.58	ug/g
Cadmium	0.201 J	0.0223	5.58	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:06	6501	AM118 Metals in NCS HD by ICP	1	5/13/2003 20:39	blb	8605

Parameter	Result	MDL	PQL	Units
Antimony	0.773 J	0.145	5.58	ug/g
Lead	17.2	2.11	11.2	ug/g
Mercury	0.347 J	0.0781	0.558	ug/g
Silver	ND	0.0670	5.58	ug/g
Thallium	ND	0.368	5.58	ug/g
Tin	2.04 J	0.491	11.2	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-042-09	21-03-202	4/18/2003 08:38	4/28/2003 08:31	11/20/2003 08:33	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:06	6501	AM118 Metals in NCS HD by ICP	1	5/7/2003 14:45	blb	6804

Parameter	Result	MDL	PQL	Units
Aluminum	ND	10.8	53.8	ug/g
Arsenic	1.39 J	0.614	5.38	ug/g
Beryllium	ND	0.0538	5.38	ug/g
Boron	ND	4.31	10.8	ug/g
Chromium	5.62	1.08	5.38	ug/g
Cobalt	ND	0.129	1.08	ug/g
Copper	9.71 J	3.48	10.8	ug/g
Manganese	7.17 J	3.55	10.8	ug/g
Nickel	2.51 J	0.667	5.38	ug/g
Selenium	ND	0.764	26.9	ug/g
Vanadium	1.45 J	1.08	5.38	ug/g
Zinc	ND	2.37	10.8	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:06	6501	AM118 Metals in NCS HD by ICP	1	5/8/2003 18:01	blb	8305

Parameter	Result	MDL	PQL	Units
Barium	0.180 J	0.0431	5.38	ug/g
Cadmium	0.155 J	0.0215	5.38	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:06	6501	AM118 Metals in NCS HD by ICP	1	5/13/2003 20:44	blb	8605

Parameter	Result	MDL	PQL	Units
Antimony	ND	0.140	5.38	ug/g
Lead	ND	2.03	10.8	ug/g
Mercury	0.0829 J	0.0753	0.538	ug/g
Silver	ND	0.0646	5.38	ug/g
Thallium	ND	0.355	5.38	ug/g
Tin	ND	0.474	10.8	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-042-10	21-03-205	4/18/2003 08:38	4/28/2003 08:31	11/20/2003 08:33	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:06	6501	AM118 Metals in NCS HD by ICP	1	5/7/2003 14:51	blb	6804

Parameter	Result	MDL	PQL	Units
Aluminum	11.4 J	9.79	49.0	ug/g
Arsenic	5.73	0.558	4.90	ug/g
Beryllium	ND	0.0490	4.90	ug/g
Boron	ND	3.92	9.79	ug/g
Chromium	20.1	0.979	4.90	ug/g
Cobalt	3.51	0.118	0.979	ug/g
Copper	17.7	3.16	9.79	ug/g
Manganese	250	3.23	9.79	ug/g
Nickel	25.9	0.607	4.90	ug/g
Selenium	ND	0.695	24.5	ug/g
Vanadium	1.79 J	0.979	4.90	ug/g
Zinc	37.6	2.15	9.79	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:06	6501	AM118 Metals in NCS HD by ICP	1	5/8/2003 18:06	blb	8305

Parameter	Result	MDL	PQL	Units
Barium	1.13 J	0.0392	4.90	ug/g
Cadmium	0.161 J	0.0196	4.90	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:06	6501	AM118 Metals in NCS HD by ICP	1	5/13/2003 20:50	blb	8605

Parameter	Result	MDL	PQL	Units
Antimony	0.222 J	0.127	4.90	ug/g
Lead	7.98 J	1.85	9.79	ug/g
Mercury	0.390 J	0.0686	0.490	ug/g
Silver	ND	0.0588	4.90	ug/g
Thallium	ND	0.323	4.90	ug/g
Tin	0.752 J	0.431	9.79	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-042-11	21-03-208	4/19/2003 08:38	4/28/2003 08:31	11/20/2003 08:33	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:06	6501	AM118 Metals in NCS HD by ICP	1	5/7/2003 15:08	blb	6804

Parameter	Result	MDL	PQL	Units
Aluminum	15.5 J	9.71	48.5	ug/g
Arsenic	101	0.553	4.85	ug/g
Beryllium	ND	0.0485	4.85	ug/g
Boron	ND	3.88	9.71	ug/g
Chromium	14.9	0.971	4.85	ug/g
Cobalt	1.87	0.117	0.971	ug/g
Copper	76.2	3.14	9.71	ug/g
Manganese	114	3.20	9.71	ug/g
Nickel	11.5	0.602	4.85	ug/g
Selenium	ND	0.689	24.3	ug/g
Vanadium	1.58 J	0.971	4.85	ug/g
Zinc	63.2	2.14	9.71	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:06	6501	AM118 Metals in NCS HD by ICP	1	5/8/2003 18:12	blb	8305

Parameter	Result	MDL	PQL	Units
Barium	0.383 J	0.0388	4.85	ug/g
Cadmium	0.157 J	0.0194	4.85	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:06	6501	AM118 Metals in NCS HD by ICP	1	5/13/2003 20:56	blb	8605

Parameter	Result	MDL	PQL	Units
Antimony	0.155 J	0.126	4.85	ug/g
Lead	4.56 J	1.83	9.71	ug/g
Mercury	ND	0.0680	0.485	ug/g
Silver	ND	0.0583	4.85	ug/g
Thallium	ND	0.320	4.85	ug/g
Tin	0.722 J	0.427	9.71	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-042-12	21-03-211	4/19/2003 08:38	4/28/2003 08:31	11/20/2003 08:33	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:06	6501	AM118 Metals in NCS HD by ICP	1	5/7/2003 15:13	blb	6804

Parameter	Result	MDL	PQL	Units
Aluminum	17.8 J	10.7	53.4	ug/g
Arsenic	178	0.608	5.34	ug/g
Beryllium	ND	0.0534	5.34	ug/g
Boron	ND	4.27	10.7	ug/g
Chromium	11.6	1.07	5.34	ug/g
Cobalt	2.75	0.128	1.07	ug/g
Copper	68.8	3.45	10.7	ug/g
Manganese	103	3.52	10.7	ug/g
Nickel	18.8	0.662	5.34	ug/g
Selenium	ND	0.758	26.7	ug/g
Vanadium	ND	1.07	5.34	ug/g
Zinc	51.2	2.35	10.7	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:06	6501	AM118 Metals in NCS HD by ICP	1	5/8/2003 18:18	blb	8305

Parameter	Result	MDL	PQL	Units
Barium	0.154 J	0.0427	5.34	ug/g
Cadmium	0.162 J	0.0213	5.34	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:06	6501	AM118 Metals in NCS HD by ICP	1	5/13/2003 21:01	blb	8605

Parameter	Result	MDL	PQL	Units
Antimony	0.415 J	0.139	5.34	ug/g
Lead	5.93 J	2.02	10.7	ug/g
Mercury	0.0876 J	0.0747	0.534	ug/g
Silver	ND	0.0640	5.34	ug/g
Thallium	ND	0.352	5.34	ug/g
Tin	3.42 J	0.470	10.7	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-043-01	21-03-181	4/14/2003 08:38	4/28/2003 08:31	7/9/2003 15:16	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 16:16	6601	AM118 Metals in Sld HD by ICP	1	5/8/2003 19:55	blb	6802

Parameter	Result	MDL	PQL	Units
Aluminum	ND	10.6	52.9	ug/g
Arsenic	2050	0.603	5.29	ug/g
Barium	0.216 J	0.0423	5.29	ug/g
Cadmium	0.267 J	0.0212	5.29	ug/g
Chromium	12.2	1.06	5.29	ug/g
Cobalt	3.63	0.127	1.06	ug/g
Copper	207	3.42	10.6	ug/g
Manganese	301	3.49	10.6	ug/g
Nickel	30.8	0.656	5.29	ug/g
Selenium	ND	0.751	26.5	ug/g
Vanadium	ND	1.06	5.29	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 16:16	6601	AM118 Metals in Sld HD by ICP	1	5/14/2003 1:46	blb	8606

Parameter	Result	MDL	PQL	Units
Antimony	1.90 J	0.138	5.29	ug/g
Beryllium	ND	0.0529	5.29	ug/g
Boron	ND	4.23	10.6	ug/g
Lead	14.9	2.00	10.6	ug/g
Mercury	694	0.0741	0.529	ug/g
Silver	ND	0.0635	5.29	ug/g
Thallium	ND	0.349	5.29	ug/g
Tin	10.9	0.466	10.6	ug/g
Zinc	133	2.33	10.6	ug/g

Comments: Sample reanalyzed for arsenic on May 13th, 2003 with appropriate batch QC. Results shown are for the May 13th reanalysis of arsenic.

Sample diluted for mercury an additional 400 fold.
Sample diluted for arsenic an additional 10 fold.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-043-02	21-03-182	4/14/2003 08:38	4/28/2003 08:31	11/20/2003 08:33	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 16:16	6601	AM118 Metals in Sld HD by ICP	1	5/8/2003 21:25	blb	6802

Parameter	Result	MDL	PQL	Units
Aluminum	15.4 J	9.68	48.4	ug/g
Arsenic	3940	0.552	4.84	ug/g
Barium	0.194 J	0.0387	4.84	ug/g
Cadmium	0.280 J	0.0194	4.84	ug/g
Chromium	16.1	0.968	4.84	ug/g
Cobalt	5.13	0.116	0.968	ug/g
Copper	196	3.13	9.68	ug/g
Manganese	384	3.19	9.68	ug/g
Nickel	26.8	0.600	4.84	ug/g
Selenium	ND	0.687	24.2	ug/g
Vanadium	ND	0.968	4.84	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 16:16	6601	AM118 Metals in Sld HD by ICP	1	5/14/2003 2:14	blb	8606

Parameter	Result	MDL	PQL	Units
Antimony	1.54 J	0.126	4.84	ug/g
Beryllium	ND	0.0484	4.84	ug/g
Boron	5.06 J	3.87	9.68	ug/g
Lead	24.5	1.83	9.68	ug/g
Mercury	895	0.0678	0.484	ug/g
Silver	ND	0.0581	4.84	ug/g
Thallium	ND	0.319	4.84	ug/g
Tin	8.03 J	0.426	9.68	ug/g
Zinc	159	2.13	9.68	ug/g

Comments: Sample diluted for mercury an additional 400 fold.
Sample diluted for arsenic an additional 10 fold.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-043-03	21-03-185	4/15/2003 08:38	4/28/2003 08:31	11/20/2003 08:33	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 16:16	6601	AM118 Metals in Sld HD by ICP	1	5/8/2003 20:29	blb	6802

Parameter	Result	MDL	PQL	Units
Aluminum	33.9 J	11.0	55.0	ug/g
Arsenic	79.3	0.627	5.50	ug/g
Barium	0.220 J	0.0440	5.50	ug/g
Cadmium	0.287 J	0.0220	5.50	ug/g
Chromium	12.4	1.10	5.50	ug/g
Cobalt	4.10	0.132	1.10	ug/g
Copper	420	3.55	11.0	ug/g
Manganese	306	3.63	11.0	ug/g
Nickel	16.2	0.682	5.50	ug/g
Selenium	ND	0.781	27.5	ug/g
Vanadium	1.18 J	1.10	5.50	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 16:16	6601	AM118 Metals in Sld HD by ICP	1	5/13/2003 23:03	blb	8606

Parameter	Result	MDL	PQL	Units
Antimony	1.30 J	0.143	5.50	ug/g
Beryllium	ND	0.0550	5.50	ug/g
Boron	ND	4.40	11.0	ug/g
Lead	49.4	2.08	11.0	ug/g
Mercury	0.106 J	0.0770	0.550	ug/g
Silver	ND	0.0660	5.50	ug/g
Thallium	ND	0.363	5.50	ug/g
Tin	7.41 J	0.484	11.0	ug/g
Zinc	287	2.42	11.0	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-043-04	21-03-188	4/15/2003 08:38	4/28/2003 08:31	11/20/2003 08:33	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 16:16	6601	AM118 Metals in Sld HD by ICP	1	5/8/2003 20:34	blb	6802

Parameter	Result	MDL	PQL	Units
Aluminum	ND	10.1	50.5	ug/g
Arsenic	91.7	0.575	5.05	ug/g
Barium	0.227 J	0.0404	5.05	ug/g
Cadmium	2.22 J	0.0202	5.05	ug/g
Chromium	21.2	1.01	5.05	ug/g
Cobalt	3.99	0.121	1.01	ug/g
Copper	2350	3.26	10.1	ug/g
Manganese	299	3.33	10.1	ug/g
Nickel	18.2	0.626	5.05	ug/g
Selenium	ND	0.716	25.2	ug/g
Vanadium	ND	1.01	5.05	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 16:16	6601	AM118 Metals in Sld HD by ICP	1	5/13/2003 23:09	blb	8606

Parameter	Result	MDL	PQL	Units
Antimony	1.03 J	0.131	5.05	ug/g
Beryllium	ND	0.0505	5.05	ug/g
Boron	ND	4.04	10.1	ug/g
Lead	154	1.91	10.1	ug/g
Mercury	0.920	0.0706	0.505	ug/g
Silver	0.243 J	0.0605	5.05	ug/g
Thallium	ND	0.333	5.05	ug/g
Tin	11.2	0.444	10.1	ug/g
Zinc	4950	2.22	10.1	ug/g

Comments: Sample reanalyzed for copper on May 13th, 2003 with appropriate batch QC. Result shown is for the May 13th reanalysis for copper.
Sample diluted for copper an additional 10 fold.
Sample diluted for zinc an additional 10 fold.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-043-05	21-03-191	4/16/2003 08:38	4/28/2003 08:31	11/20/2003 08:33	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 16:16	6601	AM118 Metals in Sld HD by ICP	1	5/8/2003 20:40	blb	6802

Parameter	Result	MDL	PQL	Units
Aluminum	13.6 J	10.4	51.9	ug/g
Arsenic	279	0.592	5.19	ug/g
Barium	0.159 J	0.0415	5.19	ug/g
Cadmium	0.197 J	0.0208	5.19	ug/g
Chromium	11.0	1.04	5.19	ug/g
Cobalt	3.26	0.125	1.04	ug/g
Copper	167	3.35	10.4	ug/g
Manganese	261	3.43	10.4	ug/g
Nickel	26.6	0.644	5.19	ug/g
Selenium	ND	0.737	26.0	ug/g
Vanadium	ND	1.04	5.19	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 16:16	6601	AM118 Metals in Sld HD by ICP	1	5/13/2003 23:15	blb	8606

Parameter	Result	MDL	PQL	Units
Antimony	3.06 J	0.135	5.19	ug/g
Beryllium	ND	0.0519	5.19	ug/g
Boron	ND	4.15	10.4	ug/g
Lead	64.5	1.96	10.4	ug/g
Mercury	0.563	0.0727	0.519	ug/g
Silver	ND	0.0623	5.19	ug/g
Thallium	ND	0.343	5.19	ug/g
Tin	3.76 J	0.457	10.4	ug/g
Zinc	86.0	2.28	10.4	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-043-06	21-03-194	4/16/2003 08:38	4/28/2003 08:31	11/20/2003 08:33	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 16:16	6601	AM118 Metals in Sld HD by ICP	1	5/8/2003 20:46	blb	6802

Parameter	Result	MDL	PQL	Units
Aluminum	21.7 J	10.3	51.7	ug/g
Arsenic	5.84	0.589	5.17	ug/g
Barium	0.401 J	0.0414	5.17	ug/g
Cadmium	0.180 J	0.0207	5.17	ug/g
Chromium	93.6	1.03	5.17	ug/g
Cobalt	9.98	0.124	1.03	ug/g
Copper	78.1	3.34	10.3	ug/g
Manganese	285	3.41	10.3	ug/g
Nickel	57.2	0.641	5.17	ug/g
Selenium	ND	0.734	25.9	ug/g
Vanadium	1.88 J	1.03	5.17	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 16:16	6601	AM118 Metals in Sld HD by ICP	1	5/13/2003 23:20	blb	8606

Parameter	Result	MDL	PQL	Units
Antimony	2.16 J	0.134	5.17	ug/g
Beryllium	ND	0.0517	5.17	ug/g
Boron	ND	4.14	10.3	ug/g
Lead	17.3	1.95	10.3	ug/g
Mercury	1.02	0.0724	0.517	ug/g
Silver	ND	0.0620	5.17	ug/g
Thallium	ND	0.341	5.17	ug/g
Tin	7.83 J	0.455	10.3	ug/g
Zinc	97.4	2.28	10.3	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-043-07	21-03-197	4/17/2003 08:38	4/28/2003 08:31	11/20/2003 08:33	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 16:16	6601	AM118 Metals in Sld HD by ICP	1	5/8/2003 20:52	blb	6802

Parameter	Result	MDL	PQL	Units
Aluminum	ND	10.9	54.3	ug/g
Arsenic	28.7	0.619	5.43	ug/g
Barium	0.223 J	0.0434	5.43	ug/g
Cadmium	0.260 J	0.0217	5.43	ug/g
Chromium	35.7	1.09	5.43	ug/g
Cobalt	4.74	0.130	1.09	ug/g
Copper	185	3.51	10.9	ug/g
Manganese	430	3.58	10.9	ug/g
Nickel	21.1	0.673	5.43	ug/g
Selenium	ND	0.771	27.1	ug/g
Vanadium	ND	1.09	5.43	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 16:16	6601	AM118 Metals in Sld HD by ICP	1	5/13/2003 23:26	blb	8606

Parameter	Result	MDL	PQL	Units
Antimony	1.05 J	0.141	5.43	ug/g
Beryllium	ND	0.0543	5.43	ug/g
Boron	ND	4.34	10.9	ug/g
Lead	68.5	2.05	10.9	ug/g
Mercury	0.223 J	0.0760	0.543	ug/g
Silver	ND	0.0651	5.43	ug/g
Thallium	ND	0.358	5.43	ug/g
Tin	4.40 J	0.478	10.9	ug/g
Zinc	182	2.39	10.9	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-043-08	21-03-200	4/17/2003 08:38	4/28/2003 08:31	11/20/2003 08:33	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 16:16	6601	AM118 Metals in Sld HD by ICP	1	5/8/2003 20:57	blb	6802

Parameter	Result	MDL	PQL	Units
Aluminum	ND	9.98	49.9	ug/g
Arsenic	3.77 J	0.569	4.99	ug/g
Barium	0.432 J	0.0399	4.99	ug/g
Cadmium	0.198 J	0.0200	4.99	ug/g
Chromium	17.1	0.998	4.99	ug/g
Cobalt	4.39	0.120	0.998	ug/g
Copper	148	3.22	9.98	ug/g
Manganese	337	3.29	9.98	ug/g
Nickel	30.5	0.619	4.99	ug/g
Selenium	ND	0.709	25.0	ug/g
Vanadium	1.04 J	0.998	4.99	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 16:16	6601	AM118 Metals in Sld HD by ICP	1	5/13/2003 23:31	blb	8606

Parameter	Result	MDL	PQL	Units
Antimony	0.265 J	0.130	4.99	ug/g
Beryllium	ND	0.0499	4.99	ug/g
Boron	ND	3.99	9.98	ug/g
Lead	32.8	1.89	9.98	ug/g
Mercury	0.252 J	0.0699	0.499	ug/g
Silver	ND	0.0599	4.99	ug/g
Thallium	ND	0.329	4.99	ug/g
Tin	1.78 J	0.439	9.98	ug/g
Zinc	142	2.20	9.98	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-043-09	21-03-203	4/18/2003 08:38	4/28/2003 08:31	11/20/2003 08:33	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 16:16	6601	AM118 Metals in Sld HD by ICP	1	5/8/2003 21:03	blb	6802

Parameter	Result	MDL	PQL	Units
Aluminum	10.9 J	9.69	48.4	ug/g
Arsenic	11.3	0.552	4.84	ug/g
Barium	0.270 J	0.0388	4.84	ug/g
Cadmium	0.122 J	0.0194	4.84	ug/g
Chromium	51.8	0.969	4.84	ug/g
Cobalt	13.2	0.116	0.969	ug/g
Copper	8.14 J	3.13	9.69	ug/g
Manganese	651	3.20	9.69	ug/g
Nickel	152	0.601	4.84	ug/g
Selenium	ND	0.688	24.2	ug/g
Vanadium	1.45 J	0.969	4.84	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 16:16	6601	AM118 Metals in Sld HD by ICP	1	5/13/2003 23:37	blb	8606

Parameter	Result	MDL	PQL	Units
Antimony	2.25 J	0.126	4.84	ug/g
Beryllium	ND	0.0484	4.84	ug/g
Boron	ND	3.88	9.69	ug/g
Lead	25.9	1.83	9.69	ug/g
Mercury	1.91	0.0678	0.484	ug/g
Silver	ND	0.0581	4.84	ug/g
Thallium	ND	0.320	4.84	ug/g
Tin	8.78 J	0.426	9.69	ug/g
Zinc	6.57 J	2.13	9.69	ug/g

Comments: Sample reanalyzed for manganese on May 13th, 2003 with appropriate batch QC. Result shown is for the May 13th reanalysis of manganese.
Sample diluted for manganese an additional 2 fold.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-043-10	21-03-206	4/18/2003 08:38	4/28/2003 08:31	11/20/2003 08:33	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 16:16	6601	AM118 Metals in Sld HD by ICP	1	5/8/2003 21:08	blb	6802

Parameter	Result	MDL	PQL	Units
Aluminum	ND	9.51	47.6	ug/g
Arsenic	7.55	0.542	4.76	ug/g
Barium	1.83 J	0.0381	4.76	ug/g
Cadmium	0.188 J	0.0190	4.76	ug/g
Chromium	38.2	0.951	4.76	ug/g
Cobalt	7.16	0.114	0.951	ug/g
Copper	42.4	3.07	9.51	ug/g
Manganese	435	3.14	9.51	ug/g
Nickel	71.6	0.590	4.76	ug/g
Selenium	ND	0.676	23.8	ug/g
Vanadium	0.980 J	0.951	4.76	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 16:16	6601	AM118 Metals in Sld HD by ICP	1	5/13/2003 23:43	blb	8606

Parameter	Result	MDL	PQL	Units
Antimony	0.851 J	0.124	4.76	ug/g
Beryllium	ND	0.0476	4.76	ug/g
Boron	ND	3.81	9.51	ug/g
Lead	15.5	1.80	9.51	ug/g
Mercury	0.519	0.0666	0.476	ug/g
Silver	ND	0.0571	4.76	ug/g
Thallium	ND	0.314	4.76	ug/g
Tin	2.56 J	0.419	9.51	ug/g
Zinc	71.0	2.09	9.51	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-043-11	21-03-209	4/19/2003 08:38	4/28/2003 08:31	11/20/2003 08:33	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 16:16	6601	AM118 Metals in Sld HD by ICP	1	5/8/2003 21:31	blb	6802

Parameter	Result	MDL	PQL	Units
Aluminum	19.0 J	10.8	53.9	ug/g
Arsenic	126	0.614	5.39	ug/g
Barium	0.227 J	0.0431	5.39	ug/g
Cadmium	0.190 J	0.0216	5.39	ug/g
Chromium	19.1	1.08	5.39	ug/g
Cobalt	3.32	0.129	1.08	ug/g
Copper	176	3.48	10.8	ug/g
Manganese	230	3.56	10.8	ug/g
Nickel	14.2	0.668	5.39	ug/g
Selenium	ND	0.765	26.9	ug/g
Vanadium	ND	1.08	5.39	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 16:16	6601	AM118 Metals in Sld HD by ICP	1	5/13/2003 23:59	blb	8606

Parameter	Result	MDL	PQL	Units
Antimony	0.236 J	0.140	5.39	ug/g
Beryllium	ND	0.0539	5.39	ug/g
Boron	ND	4.31	10.8	ug/g
Lead	103	2.04	10.8	ug/g
Mercury	0.0807 J	0.0754	0.539	ug/g
Silver	ND	0.0647	5.39	ug/g
Thallium	ND	0.356	5.39	ug/g
Tin	1.54 J	0.474	10.8	ug/g
Zinc	111	2.37	10.8	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-043-12	21-03-212	4/19/2003 08:38	4/28/2003 08:31	11/20/2003 08:33	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 16:16	6601	AM118 Metals in Sld HD by ICP	1	5/8/2003 21:36	blb	6802

Parameter	Result	MDL	PQL	Units
Aluminum	ND	10.9	54.4	ug/g
Arsenic	69.0	0.620	5.44	ug/g
Barium	0.153 J	0.0435	5.44	ug/g
Cadmium	0.234 J	0.0218	5.44	ug/g
Chromium	12.8	1.09	5.44	ug/g
Cobalt	6.22	0.131	1.09	ug/g
Copper	151	3.51	10.9	ug/g
Manganese	279	3.59	10.9	ug/g
Nickel	10.3	0.675	5.44	ug/g
Selenium	ND	0.773	27.2	ug/g
Vanadium	ND	1.09	5.44	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 16:16	6601	AM118 Metals in Sld HD by ICP	1	5/14/2003 0:05	blb	8606

Parameter	Result	MDL	PQL	Units
Antimony	1.15 J	0.141	5.44	ug/g
Beryllium	ND	0.0544	5.44	ug/g
Boron	ND	4.35	10.9	ug/g
Lead	18.1	2.06	10.9	ug/g
Mercury	0.209 J	0.0762	0.544	ug/g
Silver	ND	0.0653	5.44	ug/g
Thallium	ND	0.359	5.44	ug/g
Tin	5.18 J	0.479	10.9	ug/g
Zinc	140	2.39	10.9	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Method Blank

Lab ID	Sample ID	Reported
4196	MB for HBN 6304 [PREP/1440] *(Results reported on a wet weight basis)*	5/26/2003 17:00

AM101 Vols in Liquid HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
4/29/2003 16:06	6304	AM101 Vols in Liquid HD by GC	1	5/5/2003 18:23	tfr	6702

Surrogates	Expected	Result	Recovery	Limits
1,4-Difluorobenzene	103	99.1 ug/mL	95.8	50 - 150

Method Blank

Lab ID	Sample ID	Reported
4217	MB for HBN 6306 [PREP/1442] *(Results reported on a wet weight basis)*	5/7/2003 09:56

AM100 Non-Vols in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:10	6306	AM100 Non-Vols in HD by GC	1	5/8/2003 0:24	ssh	6905

Surrogates	Expected	Result	Recovery	Limits
Thiodiglycol-d8 (TDG-d8)	10	9.18 ug/mL	91.8	50 - 150

Method Blank

Lab ID	Sample ID	Reported
4289	MB for HBN 7002 [PREP/1447] *(Results reported on a wet weight basis)*	5/26/2003 17:00

AM117 Semi-Vols Liq HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/8/2003 09:20	7002	AM117 Semi-Vols Liq HD by GC	1	5/10/2003 0:55	ssh	7104

Surrogates	Expected	Result	Recovery	Limits
1,4-Dithiane-d4	10000	11300 ug/mL	113	50 - 150

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Method Blank

Lab ID	Sample ID	Reported
4223	MB for HBN 6401 [PREP/1443] *(Results reported on a wet weight basis)*	5/26/2003 17:00

AM126 Lewisite in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:18	6401	AM126 Lewisite in HD by GC	1	5/6/2003 21:30	tfr	6903

Parameter	Result	MDL	PQL	Units
Lewisite	ND	1.95	5.00	ug/g

Method Blank

Lab ID	Sample ID	Reported
4286	MB for HBN 7001 [PREP/1446] *(Results reported on a wet weight basis)*	5/26/2003 17:00

AM098 HD Purity by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/8/2003 09:24	7001	AM098 HD Purity by GC	1	5/14/2003 17:27	tfr	7102

Parameter	Result	MDL	PQL	Units
bis-(2-Chloroethyl)sulfide	0.00			%

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Method Blank

Lab ID	Sample ID	Reported
4209	MB for HBN 6305 [PREP/1441]	5/26/2003 17:00
	(Results reported on a wet weight basis)	

AM118 Metals in Liq HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
4/30/2003 14:02	6305	AM118 Metals in Liq HD by ICP	1	5/2/2003 13:49	blb	6403

Parameter	Result	MDL	PQL	Units
Antimony	ND	0.630	5.00	ug/g
Arsenic	ND	1.22	5.00	ug/g
Barium	ND	0.430	5.00	ug/g
Cadmium	ND	0.410	5.00	ug/g
Chromium	ND	1.29	5.00	ug/g
Cobalt	ND	0.270	1.00	ug/g
Copper	ND	2.43	5.00	ug/g
Lead	ND	0.410	5.00	ug/g
Manganese	ND	0.320	1.00	ug/g
Nickel	ND	0.350	5.00	ug/g
Selenium	ND	1.17	10.0	ug/g
Silver	ND	0.470	5.00	ug/g
Thallium	ND	0.980	5.00	ug/g
Tin	ND	2.49	10.0	ug/g
Vanadium	ND	1.00	5.00	ug/g
Zinc	ND	3.12	10.0	ug/g

Method Blank

Lab ID	Sample ID	Reported
4244	MB for HBN 6601 [PREP/1445]	5/26/2003 17:00
	(Results reported on a wet weight basis)	

AM118 Metals in Sld HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 16:16	6601	AM118 Metals in Sld HD by ICP	1	5/8/2003 19:39	blb	6802

Parameter	Result	MDL	PQL	Units
Aluminum	16.3 J	10.0	50.0	ug/g
Arsenic	ND	0.570	5.00	ug/g
Barium	0.186 J	0.0400	5.00	ug/g
Cadmium	0.0857 J	0.0200	5.00	ug/g
Chromium	ND	1.00	5.00	ug/g
Cobalt	ND	0.120	1.00	ug/g
Copper	ND	3.23	10.0	ug/g
Manganese	ND	3.30	10.0	ug/g
Nickel	ND	0.620	5.00	ug/g
Selenium	ND	0.710	25.0	ug/g
Vanadium	ND	1.00	5.00	ug/g

Report of Analysis

Method Blank

Lab ID	Sample ID	Reported
4237	MB for HBN 6501 [PREP/1444]	5/26/2003 17:00
	(Results reported on a wet weight basis)	

AM118 Metals in NCS HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:06	6501	AM118 Metals in NCS HD by ICP	1	5/7/2003 13:22	blb	6804

Parameter	Result	MDL	PQL	Units
Aluminum	ND	10.0	50.0	ug/g
Arsenic	ND	0.570	5.00	ug/g
Beryllium	ND	0.0500	5.00	ug/g
Boron	ND	4.00	10.0	ug/g
Chromium	ND	1.00	5.00	ug/g
Cobalt	ND	0.120	1.00	ug/g
Copper	ND	3.23	10.0	ug/g
Manganese	ND	3.30	10.0	ug/g
Nickel	ND	0.620	5.00	ug/g
Selenium	ND	0.710	25.0	ug/g
Vanadium	ND	1.00	5.00	ug/g
Zinc	ND	2.20	10.0	ug/g

Method Blank

Lab ID	Sample ID	Reported
4209	MB for HBN 6305 [PREP/1441]	6/1/2003 12:27
	(Results reported on a wet weight basis)	

AM118 Metals in Liq HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
4/30/2003 14:02	6305	AM118 Metals in Liq HD by ICP	1	5/6/2003 14:03	blb	6901

Parameter	Result	MDL	PQL	Units
Aluminum	ND	10.0	50.0	ug/g
Beryllium	ND	0.900	5.00	ug/g
Boron	ND	3.74	10.0	ug/g
Mercury	ND	0.0500	0.500	ug/g

Method Blank

Lab ID	Sample ID	Reported
4237	MB for HBN 6501 [PREP/1444]	6/29/2003 17:29
	(Results reported on a wet weight basis)	

AM118 Metals in NCS HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:06	6501	AM118 Metals in NCS HD by ICP	1	5/8/2003 15:31	blb	8305

Parameter	Result	MDL	PQL	Units
Barium	0.136 J	0.0400	5.00	ug/g
Cadmium	0.116 J	0.0200	5.00	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Method Blank

Lab ID	Sample ID	Reported
4237	MB for HBN 6501 [PREP/1444]	7/6/2003 16:48
	(Results reported on a wet weight basis)	

AM118 Metals in NCS HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:06	6501	AM118 Metals in NCS HD by ICP	1	5/13/2003 18:14	blb	8605

Parameter	Result	MDL	PQL	Units
Antimony	ND	0.130	5.00	ug/g
Lead	ND	1.89	10.0	ug/g
Mercury	ND	0.0700	0.500	ug/g
Silver	ND	0.0600	5.00	ug/g
Thallium	ND	0.330	5.00	ug/g
Tin	ND	0.440	10.0	ug/g

Method Blank

Lab ID	Sample ID	Reported
4244	MB for HBN 6601 [PREP/1445]	7/6/2003 20:02
	(Results reported on a wet weight basis)	

AM118 Metals in Sld HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 16:16	6601	AM118 Metals in Sld HD by ICP	1	5/13/2003 22:13	blb	8606

Parameter	Result	MDL	PQL	Units
Antimony	ND	0.130	5.00	ug/g
Beryllium	ND	0.0500	5.00	ug/g
Boron	ND	4.00	10.0	ug/g
Lead	ND	1.89	10.0	ug/g
Mercury	ND	0.0700	0.500	ug/g
Silver	ND	0.0600	5.00	ug/g
Thallium	ND	0.330	5.00	ug/g
Tin	ND	0.440	10.0	ug/g
Zinc	ND	2.20	10.0	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Method Blank

Lab ID	Sample ID	Reported
4217	MB for HBN 6306 [PREP/1442] *(Results reported on a wet weight basis)*	5/7/2003 09:56

AM100 Non-Vols in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/2/2003 10:10	6306	AM100 Non-Vols in HD by GC	1	5/8/2003 0:24	ssh	6905

Parameter	Result	MDL	PQL	Units
Thiodiglycol (TDG)	ND	210	250	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Method Blank

Lab ID	Sample ID	Reported
4289	MB for HBN 7002 [PREP/1447] *(Results reported on a wet weight basis)*	5/26/2003 17:00

AM117 Semi-Vols Liq HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/8/2003 09:20	7002	AM117 Semi-Vols Liq HD by GC	1	5/10/2003 0:55	ssh	7104

Parameter	Result	MDL	PQL	Units
Hexachloroethane	ND	80.0	2500	ug/g
Q	ND	51.0	2500	ug/g
T	ND	70.0	2500	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Method Blank

Lab ID	Sample ID	Reported
4196	MB for HBN 6304 [PREP/1440] *(Results reported on a wet weight basis)*	5/26/2003 17:00

AM101 Vols in Liquid HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
4/29/2003 16:06	6304	AM101 Vols in Liquid HD by GC	1	5/5/2003 18:23	tfr	6702

Parameter	Result	MDL	PQL	Units
1,2-Dichloroethane	ND	260	500	ug/g
Tetrachloroethylene	ND	100	500	ug/g
1,1,2,2-Tetrachloroethane	ND	150	500	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

QC Summary

LCS Lab ID: 4224 — **Original Lab ID:** — **Matrix:** Liquid — **Prep Batch:** 6401 — **Analytical:** 6903

AM126 Lewisite in HD by GC	Expected	Result	Recovery	Rec Limits
Lewisite	25.2 ug/g	23.9	94.8	50 - 150

DUP Lab ID: 4225 — **Original Lab ID:** 030004-041-01 — **Matrix:** Liquid — **Prep Batch:** — **Analytical:** 6903

AM126 Lewisite in HD by GC	Original Result	Result	RPD	RPD Limits
Lewisite	12.7	12.6	0.53	0 - 25

MS Lab ID: 4226 — **Original Lab ID:** 030004-041-01 — **Matrix:** Liquid — **Prep Batch:** 6401 — **Analytical:** 6903

AM126 Lewisite in HD by GC	Original Result	Expected	Result	Recovery	Rec Limits
Lewisite	12.7	25.9 ug/g	33.3	79.5	50 - 150

MSD Lab ID: 4227 — **Original Lab ID:** 030004-041-01 — **Matrix:** Liquid — **Prep Batch:** 6401 — **Analytical:** 6903

AM126 Lewisite in HD by GC	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits
Lewisite	25.6 ug/g	33.5	81.6	50 - 150	2.61	0 - 25

LCS Lab ID: 4228 — **Original Lab ID:** — **Matrix:** Liquid — **Prep Batch:** 6401 — **Analytical:** 6903

AM126 Lewisite in HD by GC	Expected	Result	Recovery	Rec Limits
Lewisite	25.2 ug/g	25	98.9	50 - 150

LCS Lab ID: 4287 — **Original Lab ID:** — **Matrix:** Liquid — **Prep Batch:** 7001 — **Analytical:** 7102

AM098 HD Purity by GC	Expected	Result	Recovery	Rec Limits
bis-(2-Chloroethyl)sulfide	98.2 %	95.6	97.3	85 - 115

DUP Lab ID: 4288 — **Original Lab ID:** 030004-041-01 — **Matrix:** Liquid — **Prep Batch:** 7001 — **Analytical:** 7102

AM098 HD Purity by GC	Original Result	Result	RPD	RPD Limits
bis-(2-Chloroethyl)sulfide	92.1	97.2	5.46	0 - 25

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

QC Summary

LCS Lab ID: 4210 | **Original Lab ID:** | **Prep Batch:** 6305
Matrix: Liquid | **Analytical:** 6403

AM118 Metals in Liq HD by ICP	Expected	Result	Recovery	Rec Limits
Antimony	50 ug/g	42.7	85.4	75 - 125
Arsenic	50 ug/g	50.7	101	75 - 125
Barium	50 ug/g	49	98	75 - 125
Cadmium	50 ug/g	46.8	93.6	75 - 125
Chromium	50 ug/g	49.1	98.2	75 - 125
Cobalt	50 ug/g	48	96	75 - 125
Copper	50 ug/g	49.1	98.2	75 - 125
Lead	50 ug/g	52.1	104	75 - 125
Manganese	50 ug/g	49.3	98.6	75 - 125
Nickel	50 ug/g	47.3	94.6	75 - 125
Selenium	50 ug/g	47.2	94.4	75 - 125
Silver	50 ug/g	47.2	94.4	75 - 125
Thallium	50 ug/g	50.5	101	75 - 125
Tin	50 ug/g	47	94	75 - 125
Vanadium	50 ug/g	49.2	98.4	75 - 125
Zinc	50 ug/g	47.9	95.8	75 - 125

DUP Lab ID: 4211 | **Original Lab ID:** 030004-041-01 | **Prep Batch:** 6305
Matrix: Liquid | **Analytical:** 6403

AM118 Metals in Liq HD by ICP	Original Result	Result	RPD		RPD Limits
Antimony	0.208	0.0687	101	*	0 - 20
Arsenic	21.6	22	1.68		0 - 20
Barium	0.0534	0.0366	37.3	*	0 - 20
Cadmium	0.226	0.234	3.31		0 - 20
Chromium	4.61	4.97	7.6		0 - 20
Cobalt	0.0181	0.0264	37.3	*	0 - 20
Copper	57	57.1	0.129		0 - 20
Lead	0.14	0.0758	59.6	*	0 - 20
Manganese	0.515	0.511	0.723		0 - 20
Nickel	1.1	1.18	7.81		0 - 20
Selenium	0.624	1.71	93	*	0 - 20
Silver	0.0134	0.018	29.3	*	0 - 20
Thallium	0.0951	0.0697	30.8	*	0 - 20
Tin	0.0474	0.061	25.2	*	0 - 20
Vanadium	1.3	1.4	7.18		0 - 20
Zinc	1.44	1.12	24.9	*	0 - 20

MS Lab ID: 4212 | **Original Lab ID:** 030004-041-01 | **Prep Batch:**
Matrix: Liquid | **Analytical:** 6403

AM118 Metals in Liq HD by ICP	Original Result	Expected	Result	Recovery	Rec Limits
Antimony	0.208	51.2 ug/g	48.8	95	75 - 125
Arsenic	21.6	51.2 ug/g	77.4	109	50 - 150
Barium	0.0534	51.2 ug/g	53.3	104	75 - 125
Cadmium	0.226	51.2 ug/g	50.6	98.4	75 - 125
Chromium	4.61	51.2 ug/g	57.3	103	75 - 125

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

MS Lab ID: 4212 | Original Lab ID: 030004-041-01 | Prep Batch: 6305
Matrix: Liquid | Analytical: 6403

AM118 Metals in Liq HD by ICP	Original Result	Expected	Result	Recovery	Rec Limits
Cobalt	0.0181	51.2 ug/g	52.5	103	75 - 125
Copper	57	51.2 ug/g	112	107	75 - 125
Lead	0.14	51.2 ug/g	58.8	115	75 - 125
Manganese	0.515	51.2 ug/g	54.2	105	75 - 125
Nickel	1.1	51.2 ug/g	53	101	75 - 125
Selenium	0.624	51.2 ug/g	57.3	111	50 - 150
Silver	0.0134	51.2 ug/g	53.6	105	50 - 150
Thallium	0.0951	51.2 ug/g	58.3	114	75 - 125
Tin	0.0474	51.2 ug/g	51.1	99.7	75 - 125
Vanadium	1.3	51.2 ug/g	54.7	104	75 - 125
Zinc	1.44	51.2 ug/g	50.9	96.6	50 - 150

MSD Lab ID: 4213 | Original Lab ID: 030004-041-01 | Prep Batch: 6305
Matrix: Liquid | Analytical: 6403

AM118 Metals in Liq HD by ICP	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits
Antimony	52 ug/g	46.9	89.8	75 - 125	5.63	0 - 25
Arsenic	52 ug/g	75.4	103	50 - 150	5.66	0 - 25
Barium	52 ug/g	51.1	98.1	75 - 125	5.84	0 - 25
Cadmium	52 ug/g	48.8	93.4	75 - 125	5.21	0 - 25
Chromium	52 ug/g	54.5	95.9	75 - 125	7.14	0 - 25
Cobalt	52 ug/g	50.3	96.6	75 - 125	6.41	0 - 25
Copper	52 ug/g	106	94.4	75 - 125	12.5	0 - 25
Lead	52 ug/g	56.5	108	75 - 125	6.28	0 - 25
Manganese	52 ug/g	52	99	75 - 125	5.88	0 - 25
Nickel	52 ug/g	50.9	95.7	75 - 125	5.39	0 - 25
Selenium	52 ug/g	55.9	106	50 - 150	4.61	0 - 25
Silver	52 ug/g	50.2	96.4	50 - 150	8.54	0 - 25
Thallium	52 ug/g	55.4	106	75 - 125	7.27	0 - 25
Tin	52 ug/g	49.7	95.5	75 - 125	4.3	0 - 25
Vanadium	52 ug/g	51.4	96.3	75 - 125	7.69	0 - 25
Zinc	52 ug/g	49.9	93.2	50 - 150	3.58	0 - 25

LCS Lab ID: 4245 | Original Lab ID: | Prep Batch: 6601
Matrix: Solid | Analytical: 6802

AM118 Metals in Sld HD by ICP	Expected	Result	Recovery	Rec Limits
Aluminum	500 ug/g	543	109	75 - 125
Arsenic	50 ug/g	52.7	105	75 - 125
Barium	50 ug/g	54.3	109	75 - 125
Cadmium	50 ug/g	57.9	116	75 - 125
Chromium	50 ug/g	49.1	98.2	75 - 125
Cobalt	50 ug/g	48.6	97.2	75 - 125
Copper	50 ug/g	50.9	102	75 - 125
Manganese	50 ug/g	51.1	102	75 - 125
Nickel	50 ug/g	48.7	97.4	75 - 125
Selenium	50 ug/g	49.7	99.4	75 - 125
Vanadium	50 ug/g	50.2	100	75 - 125

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

DUP Lab ID: 4246 | Original Lab ID: 030004-043-01 | Prep Batch: 6601
Matrix: Solid | Analytical: 6802

AM118 Metals in Sld HD by ICP	Original Result	Result	RPD	RPD Limits
Aluminum	8.62	34.7	120 *	0 - 20
Arsenic	2050	1390	38.3 *	0 - 20
Barium	0.216	0.243	12	0 - 20
Cadmium	0.267	0.291	8.58	0 - 20
Chromium	12.2	15.1	21.7 *	0 - 20
Cobalt	3.63	3.2	12.7	0 - 20
Copper	207	213	2.86	0 - 20
Manganese	301	279	7.59	0 - 20
Nickel	30.8	34.6	11.6	0 - 20
Selenium	0	0	0	0 - 20
Vanadium	0.642	0.853	28.1 *	0 - 20

MS Lab ID: 4247 | Original Lab ID: 030004-043-01 | Prep Batch: 6601
Matrix: Solid | Analytical: 6802

AM118 Metals in Sld HD by ICP	Original Result	Expected	Result	Recovery	Rec Limits
Aluminum	8.62	493 ug/g	402	79.8	75 - 125
Arsenic	2050	49.3 ug/g	1500	-1130 *	50 - 150
Barium	0.216	49.3 ug/g	47.8	96.6	75 - 125
Cadmium	0.267	49.3 ug/g	48.9	98.7	75 - 125
Chromium	12.2	49.3 ug/g	59.3	95.7	75 - 125
Cobalt	3.63	49.3 ug/g	49.6	93.2	75 - 125
Copper	207	49.3 ug/g	291	169 *	75 - 125
Manganese	301	49.3 ug/g	347	93.9	75 - 125
Nickel	30.8	49.3 ug/g	85	110	75 - 125
Selenium	0	49.3 ug/g	51	104	50 - 150
Vanadium	0.642	49.3 ug/g	45.9	91.9	75 - 125

MSD Lab ID: 4248 | Original Lab ID: 030004-043-01 | Prep Batch: 6601
Matrix: Solid | Analytical: 6802

AM118 Metals in Sld HD by ICP	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits
Aluminum	497 ug/g	462	91.3	75 - 125	13.4	0 - 25
Arsenic	49.7 ug/g	1050	-2010 *	50 - 150	-56.1 *	0 - 25
Barium	49.7 ug/g	51.7	104	75 - 125	7.38	0 - 25
Cadmium	49.7 ug/g	51.8	104	75 - 125	5.23	0 - 25
Chromium	49.7 ug/g	56.5	89.3	75 - 125	6.92	0 - 25
Cobalt	49.7 ug/g	51.5	96.5	75 - 125	3.48	0 - 25
Copper	49.7 ug/g	293	172 *	75 - 125	1.76	0 - 25
Manganese	49.7 ug/g	321	40.7 *	75 - 125	79 *	0 - 25
Nickel	49.7 ug/g	87.1	113	75 - 125	2.69	0 - 25
Selenium	49.7 ug/g	52.4	106	50 - 150	1.9	0 - 25
Vanadium	49.7 ug/g	49.3	97.9	75 - 125	6.32	0 - 25

LCS Lab ID: 4249 | Original Lab ID: | Prep Batch: 6601
Matrix: Solid | Analytical: 6802

AM118 Metals in Sld HD by ICP	Expected	Result	Recovery	Rec Limits
Aluminum	6000 ug/g	5320	88.6	75 - 125

Report of Analysis

LCS Lab ID: 4249 | Original Lab ID: | Prep Batch: 6601
Matrix: Solid | Analytical: 6802

AM118 Metals in Sld HD by ICP	Expected	Result	Recovery	Rec Limits
Arsenic	141 ug/g	148	105	75 - 125
Barium	58.2 ug/g	59	101	75 - 125
Chromium	111 ug/g	108	96.9	75 - 125
Cobalt	11.1 ug/g	11	99.5	75 - 125
Copper	398 ug/g	359	90.1	75 - 125
Manganese	480 ug/g	466	97.1	75 - 125
Nickel	195 ug/g	186	95.2	75 - 125
Vanadium	11.9 ug/g	13.7	115	75 - 125

LCSD Lab ID: 4250 | Original Lab ID: 4244 | Prep Batch: 6601
Matrix: Solid | Analytical: 6802

AM118 Metals in Sld HD by ICP	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits
Aluminum	6000 ug/g	5210	86.6	75 - 125	2.28	0 - 25
Arsenic	141 ug/g	143	101	75 - 125	3.88	0 - 25
Barium	58.2 ug/g	58.6	100	75 - 125	0.995	0 - 25
Chromium	111 ug/g	105	94.4	75 - 125	2.61	0 - 25
Cobalt	11.1 ug/g	10.8	97.1	75 - 125	2.44	0 - 25
Copper	398 ug/g	349	87.8	75 - 125	2.59	0 - 25
Manganese	480 ug/g	454	94.6	75 - 125	2.61	0 - 25
Nickel	195 ug/g	181	92.6	75 - 125	2.77	0 - 25
Vanadium	11.9 ug/g	13.5	113	75 - 125	1.75	0 - 25

LCS Lab ID: 4238 | Original Lab ID: | Prep Batch: 6501
Matrix: Non-cohesive Solid | Analytical: 6804

AM118 Metals in NCS HD by ICP	Expected	Result	Recovery	Rec Limits
Aluminum	500 ug/g	490	98	75 - 125
Arsenic	50 ug/g	53.6	107	75 - 125
Beryllium	50 ug/g	44.6	89.2	75 - 125
Boron	500 ug/g	413	82.6	75 - 125
Chromium	50 ug/g	48.3	96.6	75 - 125
Cobalt	50 ug/g	47.9	95.8	75 - 125
Copper	50 ug/g	50.1	100	75 - 125
Manganese	50 ug/g	49.1	98.2	75 - 125
Nickel	50 ug/g	47	94	75 - 125
Selenium	50 ug/g	50.9	102	75 - 125
Vanadium	50 ug/g	48.6	97.2	75 - 125
Zinc	50 ug/g	52.1	104	75 - 125

DUP Lab ID: 4239 | Original Lab ID: 030004-042-01 | Prep Batch: 6501
Matrix: Non-cohesive Solid | Analytical: 6804

AM118 Metals in NCS HD by ICP	Original Result	Result	RPD	RPD Limits
Aluminum	10.1	15.4	41.7 *	0 - 20
Arsenic	309	200	42.9 *	0 - 20
Beryllium	0.0137	0.00438	103 *	0 - 20
Boron	0.692	2.79	121 *	0 - 20
Chromium	8.07	11.2	32.2 *	0 - 20

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

DUP Lab ID: 4239 | Original Lab ID: 030004-042-01 | Prep Batch: 6501
Matrix: Non-cohesive Solid | Analytical: 6804

AM118 Metals in NCS HD by ICP	Original Result	Result	RPD	RPD Limits
Cobalt	0.983	0.625	44.6 *	0 - 20
Copper	51.6	54.8	5.84	0 - 20
Manganese	67.3	44.1	41.7 *	0 - 20
Nickel	8.93	9.1	1.84	0 - 20
Selenium	0	0	0	0 - 20
Vanadium	0.804	1.16	35.9 *	0 - 20
Zinc	22.8	14.7	43.4 *	0 - 20

MS Lab ID: 4240 | Original Lab ID: 030004-042-01 | Prep Batch: 6501
Matrix: Non-cohesive Solid | Analytical: 6804

AM118 Metals in NCS HD by ICP	Original Result	Expected	Result	Recovery	Rec Limits
Aluminum	10.1	527 ug/g	517	96.1	75 - 125
Arsenic	309	52.7 ug/g	441	250 *	50 - 150
Beryllium	0.0137	52.7 ug/g	50.7	96.2	75 - 125
Boron	0.692	527 ug/g	515	97.5	75 - 125
Chromium	8.07	52.7 ug/g	61.8	102	75 - 125
Cobalt	0.983	52.7 ug/g	51.1	94.9	75 - 125
Copper	51.6	52.7 ug/g	103	96.5	75 - 125
Manganese	67.3	52.7 ug/g	146	148 *	75 - 125
Nickel	8.93	52.7 ug/g	56.9	90.9	75 - 125
Selenium	0	52.7 ug/g	52.6	99.8	50 - 150
Vanadium	0.804	52.7 ug/g	53.8	100	75 - 125
Zinc	22.8	52.7 ug/g	79.2	107	50 - 150

MSD Lab ID: 4241 | Original Lab ID: 030004-042-01 | Prep Batch: 6501
Matrix: Non-cohesive Solid | Analytical: 6804

AM118 Metals in NCS HD by ICP	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits
Aluminum	493 ug/g	523	104	75 - 125	7.9	0 - 25
Arsenic	49.3 ug/g	383	151 *	50 - 150	49.4 *	0 - 25
Beryllium	49.3 ug/g	51.2	104	75 - 125	7.79	0 - 25
Boron	493 ug/g	478	96.9	75 - 125	0.617	0 - 25
Chromium	49.3 ug/g	63.6	113	75 - 125	10.2	0 - 25
Cobalt	49.3 ug/g	51.8	103	75 - 125	8.19	0 - 25
Copper	49.3 ug/g	103	105	75 - 125	8.44	0 - 25
Manganese	49.3 ug/g	132	131 *	75 - 125	12.2	0 - 25
Nickel	49.3 ug/g	59.6	103	75 - 125	12.5	0 - 25
Selenium	49.3 ug/g	53.7	109	50 - 150	8.81	0 - 25
Vanadium	49.3 ug/g	54.7	109	75 - 125	8.61	0 - 25
Zinc	49.3 ug/g	76.6	109	50 - 150	1.85	0 - 25

LCS Lab ID: 4242 | Original Lab ID: | Prep Batch: 6501
Matrix: Non-cohesive Solid | Analytical: 6804

AM118 Metals in NCS HD by ICP	Expected	Result	Recovery	Rec Limits
Aluminum	6000 ug/g	4750	79.1	75 - 125
Arsenic	141 ug/g	152	108	75 - 125
Chromium	111 ug/g	107	96.3	75 - 125

Report of Analysis

LCS Lab ID: 4242 | Original Lab ID: | Prep Batch: 6501
Matrix: Non-cohesive Solid | Analytical: 6804

AM118 Metals in NCS HD by ICP	Expected	Result	Recovery	Rec Limits
Cobalt	11.1 ug/g	11.3	102	75 - 125
Copper	398 ug/g	360	90.4	75 - 125
Manganese	480 ug/g	463	96.4	75 - 125
Nickel	195 ug/g	189	96.7	75 - 125
Vanadium	11.9 ug/g	13.5	114	75 - 125
Zinc	249 ug/g	234	94	75 - 125

LCSD Lab ID: 4243 | Original Lab ID: 4237 | Prep Batch: 6501
Matrix: Non-cohesive Solid | Analytical: 6804

AM118 Metals in NCS HD by ICP	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits
Aluminum	6000 ug/g	4920	81.9	75 - 125	3.48	0 - 25
Arsenic	141 ug/g	150	106	75 - 125	1.87	0 - 25
Chromium	111 ug/g	107	96.1	75 - 125	0.208	0 - 25
Cobalt	11.1 ug/g	11.1	99.8	75 - 125	2.18	0 - 25
Copper	398 ug/g	359	90.1	75 - 125	0.332	0 - 25
Manganese	480 ug/g	462	96.2	75 - 125	0.208	0 - 25
Nickel	195 ug/g	186	95.5	75 - 125	1.25	0 - 25
Vanadium	11.9 ug/g	13.4	112	75 - 125	1.77	0 - 25
Zinc	249 ug/g	236	94.6	75 - 125	0.636	0 - 25

LCS Lab ID: 4210 | Original Lab ID: | Prep Batch: 6305
Matrix: Liquid | Analytical: 6901

AM118 Metals in Liq HD by ICP	Expected	Result	Recovery	Rec Limits
Aluminum	500 ug/g	458	91.6	75 - 125
Beryllium	50 ug/g	41.9	83.8	75 - 125
Boron	500 ug/g	370	74 *	75 - 125
Mercury	2.5 ug/g	2.42	96.8	75 - 125

DUP Lab ID: 4211 | Original Lab ID: 030004-041-01 | Prep Batch: 6305
Matrix: Liquid | Analytical: 6901

AM118 Metals in Liq HD by ICP	Original Result	Result	RPD	RPD Limits
Aluminum	1.64	4.23	88.4 *	0 - 20
Beryllium	0.00386	0.00893	79.3 *	0 - 20
Boron	0.745	0.0931	156 *	0 - 20
Mercury	1.47	1.4	5.37	0 - 20

MS Lab ID: 4212 | Original Lab ID: 030004-041-01 | Prep Batch: 6305
Matrix: Liquid | Analytical: 6901

AM118 Metals in Liq HD by ICP	Original Result	Expected	Result	Recovery	Rec Limits
Aluminum	1.64	512 ug/g	478	93.1	75 - 125
Beryllium	0.00386	51.2 ug/g	45.2	88.4	75 - 125
Boron	0.745	512 ug/g	397	77.5	75 - 125
Mercury	1.47	2.56 ug/g	4.17	105	50 - 150

MSD Lab ID: 4213 | Original Lab ID: 030004-041-01 | Prep Batch: 6305
Matrix: Liquid | Analytical: 6901

Report of Analysis

MSD Lab ID: 4213 | Original Lab ID: 030004-041-01 | Prep Batch: 6305
Matrix: Liquid | Analytical: 6901

AM118 Metals in Liq HD by ICP	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits
Aluminum	520 ug/g	465	89.1	75 - 125	4.39	0 - 25
Beryllium	52 ug/g	46.6	89.6	75 - 125	1.35	0 - 25
Boron	520 ug/g	409	78.5	75 - 125	1.28	0 - 25
Mercury	2.6 ug/g	4.25	107	50 - 150	1.89	0 - 25

LCS Lab ID: 4238 | Original Lab ID: | Prep Batch: 6501
Matrix: Non-cohesive Solid | Analytical: 8305

AM118 Metals in NCS HD by ICP	Expected	Result	Recovery	Rec Limits
Barium	50 ug/g	53.1	106	75 - 125
Cadmium	50 ug/g	56.9	114	75 - 125

DUP Lab ID: 4239 | Original Lab ID: 030004-042-01 | Prep Batch: 6501
Matrix: Non-cohesive Solid | Analytical: 8305

AM118 Metals in NCS HD by ICP	Original Result	Result	RPD	RPD Limits
Barium	0.198	0.2	0.703	0 - 20
Cadmium	0.133	0.17	25 *	0 - 20

MS Lab ID: 4240 | Original Lab ID: 030004-042-01 | Prep Batch: 6501
Matrix: Non-cohesive Solid | Analytical: 8305

AM118 Metals in NCS HD by ICP	Original Result	Expected	Result	Recovery	Rec Limits
Barium	0.198	52.7 ug/g	49.8	94	75 - 125
Cadmium	0.133	52.7 ug/g	51.5	97.3	75 - 125

MSD Lab ID: 4241 | Original Lab ID: 030004-042-01 | Prep Batch: 6501
Matrix: Non-cohesive Solid | Analytical: 8305

AM118 Metals in NCS HD by ICP	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits
Barium	49.3 ug/g	50.3	102	75 - 125	8.16	0 - 25
Cadmium	49.3 ug/g	52.3	106	75 - 125	8.56	0 - 25

LCS Lab ID: 4242 | Original Lab ID: | Prep Batch: 6501
Matrix: Non-cohesive Solid | Analytical: 8305

AM118 Metals in NCS HD by ICP	Expected	Result	Recovery	Rec Limits
Barium	58.2 ug/g	59.3	102	75 - 125

LCSD Lab ID: 4243 | Original Lab ID: 4237 | Prep Batch: 6501
Matrix: Non-cohesive Solid | Analytical: 8305

AM118 Metals in NCS HD by ICP	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits
Barium	58.2 ug/g	62.9	108	75 - 125	5.71	0 - 25

LCS Lab ID: 4238 | Original Lab ID: | Prep Batch: 6501
Matrix: Non-cohesive Solid | Analytical: 8605

AM118 Metals in NCS HD by ICP	Expected	Result	Recovery	Rec Limits
Antimony	50 ug/g	44.6	89.2	75 - 125
Lead	50 ug/g	49	98	75 - 125
Mercury	2.5 ug/g	2.56	102	75 - 125
Silver	50 ug/g	54.6	109	75 - 125

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

LCS Lab ID: 4238 | Original Lab ID: | Prep Batch: 6501
Matrix: Non-cohesive Solid | Analytical: 8605

AM118 Metals in NCS HD by ICP	Expected	Result	Recovery	Rec Limits
Thallium	50 ug/g	48.4	96.8	75 - 125
Tin	50 ug/g	52.2	104	75 - 125

DUP Lab ID: 4239 | Original Lab ID: 030004-042-01 | Prep Batch: 6501
Matrix: Non-cohesive Solid | Analytical: 8605

AM118 Metals in NCS HD by ICP	Original Result	Result	RPD	RPD Limits
Antimony	0.412	0.233	55.4 *	0 - 20
Lead	1.89	1.24	41.5 *	0 - 20
Mercury	101	65.1	43.4 *	0 - 20
Silver	0.0177	0.00824	73.2 *	0 - 20
Thallium	0	0.00225	200 *	0 - 20
Tin	1.47	0.903	47.5 *	0 - 20

MS Lab ID: 4240 | Original Lab ID: 030004-042-01 | Prep Batch: 6501
Matrix: Non-cohesive Solid | Analytical: 8605

AM118 Metals in NCS HD by ICP	Original Result	Expected	Result	Recovery	Rec Limits
Antimony	0.412	52.7 ug/g	56	105	75 - 125
Lead	1.89	52.7 ug/g	50.8	92.8	75 - 125
Mercury	101	2.64 ug/g	145	1640 *	50 - 150
Silver	0.0177	52.7 ug/g	49.5	93.8	50 - 150
Thallium	0	52.7 ug/g	48.7	92.4	75 - 125
Tin	1.47	52.7 ug/g	56	103	75 - 125

MSD Lab ID: 4241 | Original Lab ID: 030004-042-01 | Prep Batch: 6501
Matrix: Non-cohesive Solid | Analytical: 8605

AM118 Metals in NCS HD by ICP	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits
Antimony	49.3 ug/g	51.7	104	75 - 125	0.957	0 - 25
Lead	49.3 ug/g	51.4	101	75 - 125	8.46	0 - 25
Mercury	2.46 ug/g	119	711 *	50 - 150	79 *	0 - 25
Silver	49.3 ug/g	50	101	50 - 150	7.39	0 - 25
Thallium	49.3 ug/g	49.3	100	75 - 125	7.9	0 - 25
Tin	49.3 ug/g	51.5	102	75 - 125	0.976	0 - 25

LCS Lab ID: 4242 | Original Lab ID: | Prep Batch: 6501
Matrix: Non-cohesive Solid | Analytical: 8605

AM118 Metals in NCS HD by ICP	Expected	Result	Recovery	Rec Limits
Lead	5.73 ug/g	5.55	96.8	75 - 125

LCSD Lab ID: 4243 | Original Lab ID: 4237 | Prep Batch: 6501
Matrix: Non-cohesive Solid | Analytical: 8605

AM118 Metals in NCS HD by ICP	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits
Lead	5.73 ug/g	5.94	103	75 - 125	6.21	0 - 25

LCS Lab ID: 4245 | Original Lab ID: | Prep Batch: 6601
Matrix: Solid | Analytical: 8606

AM118 Metals in Sld HD by ICP	Expected	Result	Recovery	Rec Limits

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

LCS Lab ID: 4245 | Original Lab ID: | Prep Batch: 6601
Matrix: Solid | Analytical: 8606

AM118 Metals in Sld HD by ICP	Expected	Result	Recovery	Rec Limits
Antimony	50 ug/g	50.6	101	75 - 125
Beryllium	50 ug/g	54.9	110	75 - 125
Boron	500 ug/g	512	102	75 - 125
Lead	50 ug/g	51.3	103	75 - 125
Mercury	2.5 ug/g	2.65	106	75 - 125
Silver	50 ug/g	51.4	103	75 - 125
Thallium	50 ug/g	50.9	102	75 - 125
Tin	50 ug/g	49.6	99.2	75 - 125
Zinc	50 ug/g	53.4	107	75 - 125

DUP Lab ID: 4246 | Original Lab ID: 030004-043-01 | Prep Batch: 6601
Matrix: Solid | Analytical: 8606

AM118 Metals in Sld HD by ICP	Original Result	Result	RPD	RPD Limits
Antimony	1.9	2.71	34.7 *	0 - 20
Beryllium	0.00188	0.0114	143 *	0 - 20
Boron	0.95	2.28	82.5 *	0 - 20
Lead	14.9	16.3	9.04	0 - 20
Mercury	694	605	13.7	0 - 20
Silver	0.046	0.0399	14.3	0 - 20
Thallium	0	0	0	0 - 20
Tin	10.9	9.09	18.1	0 - 20
Zinc	133	94.8	33.8 *	0 - 20

MS Lab ID: 4247 | Original Lab ID: 030004-043-01 | Prep Batch: 6601
Matrix: Solid | Analytical: 8606

AM118 Metals in Sld HD by ICP	Original Result	Expected	Result	Recovery	Rec Limits
Antimony	1.9	49.3 ug/g	54.8	107	75 - 125
Beryllium	0.00188	49.3 ug/g	49.3	100	75 - 125
Boron	0.95	493 ug/g	508	103	75 - 125
Lead	14.9	49.3 ug/g	66.2	104	75 - 125
Mercury	694	2.46 ug/g	701	296 *	50 - 150
Silver	0.046	49.3 ug/g	47.7	96.7	50 - 150
Thallium	0	49.3 ug/g	51	104	75 - 125
Tin	10.9	49.3 ug/g	60.8	101	75 - 125
Zinc	133	49.3 ug/g	180	95.3	50 - 150

MSD Lab ID: 4248 | Original Lab ID: 030004-043-01 | Prep Batch: 6601
Matrix: Solid | Analytical: 8606

AM118 Metals in Sld HD by ICP	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits
Antimony	49.7 ug/g	50.9	98.8	75 - 125	7.97	0 - 25
Beryllium	49.7 ug/g	50.8	102	75 - 125	1.98	0 - 25
Boron	497 ug/g	473	95	75 - 125	8.08	0 - 25
Lead	49.7 ug/g	64.8	101	75 - 125	2.93	0 - 25
Mercury	2.48 ug/g	536	-6360 *	50 - 150	-220 *	0 - 25
Silver	49.7 ug/g	49.8	100	50 - 150	3.36	0 - 25
Thallium	49.7 ug/g	53.8	108	75 - 125	3.77	0 - 25

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

MSD Lab ID: 4248 | Original Lab ID: 030004-043-01 | Prep Batch: 6601
Matrix: Solid | Analytical: 8606

AM118 Metals in Sld HD by ICP	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits
Tin	49.7 ug/g	57.7	94.2	75 - 125	6.97	0 - 25
Zinc	49.7 ug/g	140	13.5 *	50 - 150	150 *	0 - 25

LCS Lab ID: 4249 | Original Lab ID: | Prep Batch: 6601
Matrix: Solid | Analytical: 8606

AM118 Metals in Sld HD by ICP	Expected	Result	Recovery	Rec Limits
Lead	5.73 ug/g	5.83	102	75 - 125
Zinc	249 ug/g	220	88.3	75 - 125

LCSD Lab ID: 4250 | Original Lab ID: 4244 | Prep Batch: 6601
Matrix: Solid | Analytical: 8606

AM118 Metals in Sld HD by ICP	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits
Lead	5.73 ug/g	5.8	101	75 - 125	0.985	0 - 25
Zinc	249 ug/g	227	90.7	75 - 125	2.68	0 - 25

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

QC Summary

LCS Lab ID: 4218 — **Original Lab ID:** — **Matrix:** Liquid — **Prep Batch:** 6306 — **Analytical:** 6905

AM100 Non-Vols in HD by GC	Expected	Result	Recovery	Rec Limits
Thiodiglycol (TDG)	1020 ug/g	977	95.8	50 - 150

DUP Lab ID: 4219 — **Original Lab ID:** 030004-041-01 — **Matrix:** Liquid — **Prep Batch:** 6306 — **Analytical:** 6905

AM100 Non-Vols in HD by GC	Original Result	Result	RPD	RPD Limits
Thiodiglycol (TDG)	0	0	0	0 - 25

MS Lab ID: 4220 — **Original Lab ID:** 030004-041-01 — **Matrix:** Liquid — **Prep Batch:** 6306 — **Analytical:** 6905

AM100 Non-Vols in HD by GC	Original Result	Expected	Result	Recovery	Rec Limits
Thiodiglycol (TDG)	0	1040 ug/g	1140	110	50 - 150

MSD Lab ID: 4221 — **Original Lab ID:** 030004-041-01 — **Matrix:** Liquid — **Prep Batch:** 6306 — **Analytical:** 6905

AM100 Non-Vols in HD by GC	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits
Thiodiglycol (TDG)	1090 ug/g	435	39.9 *	50 - 150	93.5 *	0 - 25

LCS Lab ID: 4222 — **Original Lab ID:** — **Matrix:** Liquid — **Prep Batch:** 6306 — **Analytical:** 6905

AM100 Non-Vols in HD by GC	Expected	Result	Recovery	Rec Limits
Thiodiglycol (TDG)	1020 ug/g	969	95	50 - 150

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

QC Summary

LCS Lab ID: 4290 | Original Lab ID: | Prep Batch: 7002
Matrix: Liquid | Analytical: 7104

AM117 Semi-Vols Liq HD by GC	Expected	Result	Recovery	Rec Limits
Hexachloroethane	950 ug/g	973	102	50 - 150
Q	9950 ug/g	11400	114	50 - 150
T	9120 ug/g	10200	112	50 - 150

DUP Lab ID: 4291 | Original Lab ID: 030004-041-01 | Prep Batch: 7002
Matrix: Liquid | Analytical: 7104

AM117 Semi-Vols Liq HD by GC	Original Result	Result	RPD	RPD Limits
Hexachloroethane	0	0	0	0 - 25
Q	42900	42800	0.163	0 - 25
T	1670	1580	5.62	0 - 25

MS Lab ID: 4292 | Original Lab ID: 030004-041-01 | Prep Batch: 7002
Matrix: Liquid | Analytical: 7104

AM117 Semi-Vols Liq HD by GC	Original Result	Expected	Result	Recovery	Rec Limits
Hexachloroethane	0	974 ug/g	816	83.8	50 - 150
Q	42900	10200 ug/g	51700	86	50 - 150
T	1670	9350 ug/g	7010	57	50 - 150

MSD Lab ID: 4293 | Original Lab ID: 030004-041-01 | Prep Batch: 7002
Matrix: Liquid | Analytical: 7104

AM117 Semi-Vols Liq HD by GC	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits
Hexachloroethane	983 ug/g	789	80.2	50 - 150	4.39	0 - 25
Q	10300 ug/g	50200	70.9	50 - 150	19.2	0 - 25
T	9440 ug/g	7010	56.6	50 - 150	0.704	0 - 25

LCS Lab ID: 4294 | Original Lab ID: | Prep Batch: 7002
Matrix: Liquid | Analytical: 7104

AM117 Semi-Vols Liq HD by GC	Expected	Result	Recovery	Rec Limits
Hexachloroethane	950 ug/g	734	77.3	50 - 150
Q	9950 ug/g	9890	99.3	50 - 150
T	9120 ug/g	7580	83.1	50 - 150

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

QC Summary

LCS Lab ID: 4197 | Original Lab ID: | Prep Batch: 6304
Matrix: Liquid | Analytical: 6702

AM101 Vols in Liquid HD by GC	Expected	Result	Recovery	Rec Limits
1,2-Dichloroethane	9880 ug/g	9670	97.8	50 - 150
Tetrachloroethylene	10100 ug/g	10100	99.2	50 - 150
1,1,2,2-Tetrachloroethane	10400 ug/g	10200	98.1	50 - 150

DUP Lab ID: 4198 | Original Lab ID: 030004-041-01 | Prep Batch: 6304
Matrix: Liquid | Analytical: 6702

AM101 Vols in Liquid HD by GC	Original Result	Result	RPD	RPD Limits
1,2-Dichloroethane	5820	5880	1.04	0 - 25
Tetrachloroethylene	0	0	0	0 - 25
1,1,2,2-Tetrachloroethane	0	0	0	0 - 25

MS Lab ID: 4199 | Original Lab ID: 030004-041-01 | Prep Batch: 6304
Matrix: Liquid | Analytical: 6702

AM101 Vols in Liquid HD by GC	Original Result	Expected	Result	Recovery	Rec Limits
1,2-Dichloroethane	5820	10000 ug/g	14300	84.6	50 - 150
Tetrachloroethylene	0	10300 ug/g	10100	98.1	50 - 150
1,1,2,2-Tetrachloroethane	0	10500 ug/g	9750	92.6	50 - 150

MSD Lab ID: 4200 | Original Lab ID: 030004-041-01 | Prep Batch: 6304
Matrix: Liquid | Analytical: 6702

AM101 Vols in Liquid HD by GC	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits
1,2-Dichloroethane	10200 ug/g	14100	80.8	50 - 150	4.59	0 - 25
Tetrachloroethylene	10500 ug/g	9680	92.3	50 - 150	6.09	0 - 25
1,1,2,2-Tetrachloroethane	10700 ug/g	9530	88.9	50 - 150	4.08	0 - 25

LCS Lab ID: 4201 | Original Lab ID: | Prep Batch: 6304
Matrix: Liquid | Analytical: 6702

AM101 Vols in Liquid HD by GC	Expected	Result	Recovery	Rec Limits
1,2-Dichloroethane	9880 ug/g	9320	94.3	50 - 150
Tetrachloroethylene	10100 ug/g	10100	99.7	50 - 150
1,1,2,2-Tetrachloroethane	10400 ug/g	9640	92.9	50 - 150

Appendix C-6

Analytical Test Report
Sample Set #6

U.S. Army Research, Development and Engineering Command
Edgewood Chemical Biological Center
ATTN: Edgewood Chemical Biological
Forensic Analytical Center
Aberdeen Proving Ground, MD 21010-5424
Phone: (410) 436-8600
Fax: (410) 436-3384

ANALYTICAL TEST REPORT

Report Date: 14 November 2003

Project/Event Title: Analysis of HD Sample Collected From Ton Containers Stored at the Deseret Chemical Depot – Sample Set 6

Project/Event Number: 97P-0033-46

Report Number: 0033-46-011143B6

Report Prepared for:

EG&G Defense Materials Division
Attn.: Mr. Don Milton
11600 Stark Rd
Tooele, UT 84074

NOTE: This report replaces Analytical Test Report Numbered 0033-46-071803B6.

This report shall not be reproduced except in full, without the written approval of the laboratory. Test results reported herein refer only to samples tested.

CASE NARRATIVE

Tooele Samples (Set 6)
Project/Event # 97P-0033-46

Receiving Notes

All sample containers were visually checked and compared to sample transfer form 1911. The containers were noted to be in satisfactory condition and all samples were received intact.

Sample Preparatory Notes

No discrepancies.

Analytical Notes:

Organic Compounds Anaylsis

VOLATILE ORGANIC COMPOUNDS

Volatile Organic Compounds (VOCs) were extracted on 16-May-03 and analyzed 20-May-03 through 21-May-03 by method AM-101.

The bromofluorobenzene (BFB) tune and the tune evaluation and performance standard both passed acceptance criteria.

The calibration curves for the target compounds along with the surrogate resulted in correlation coefficient (r^2) of 1.000 for Linear / (0, 0) curve fits for all compounds. The individual calibration curve recovery values for all compounds of interest were within the acceptance criteria of ±15%. All levels had recovery values between 93% and 105% for all compounds.

The Continuing Calibration Verification (CCV) samples were all within acceptance criteria (±25%).

The Surrogate (1,4-difluorobenzene) was present and fulfilled the recovery criteria (50%-150%) in all samples.

The Matrix Spike (MS) and Matrix Spike Duplicate (MSD) fulfilled the recovery criteria (50%-150%) in all analytes of interest. Recovery values for the surrogate, 1,2-Dichloroethane (1,2-DCE), Tetrachloroethylene (TCE) and 1,1,2,2-TCE were 90.3% to 106%. The Relative Percent Difference (RPD) for the MS and the MSD for 1,2-DCE, TCE, and 1,1,2,2-TCE were 1.9 to 5.4% with acceptance criteria (±25%) for all analytes of interest.

The Blank Spike (BS) and Blank Spike Duplicate (BSD) fulfilled the recovery criteria (50%-150%) for all analytes of interest. The BS/BSD are identified in the report as the Laboratory Control Sample (LCS).

Results showed that target compounds were not detected in either the Method Blank (MB) or the Reagent Blanks (RB).

The RPD values for the sample and sample duplicate met the specification required in AM-101 of $\leq$25%.

Sample holding time of 28 days from collection to analysis was met for all samples. Samples were collected starting 28-Apr-03 through 3-May-03 and analyzed on 20-May-03 through 21-May-03.

SEMI-VOLATILE ORGANIC COMPOUNDS

Semi-Volatiles Organic Compounds (SVOCs) were extracted on 20-May-03 and analyzed on 22-May-03 by method AM-117.

The decafluorotriphenylphosphine (DFTPP) tune and the tune evaluation and performance standard both passed acceptance criteria.

The calibration curves for the target compounds along with the surrogate resulted in correlation coefficient (r^2) of 1.000 for 1,4-dithiane-d4 and 1.000 for Hexachloroethane (HCE) for a Linear / (0, 0) curve fit. Compound Q had an r^2 of 1.000 for a linear / (0, 0) curve with a Practical Quantitation Limit (PQL) of 25 µg/ml. T had an r^2 of 0.999 for a linear curve with a PQL of 25 µg/ml.

All analytes in the calibration curve standards were within the method criteria (±15%).

The CCV recovery values for HCE, Q and T, were within the method criteria of ±25%.

The MS/MSD values for the surrogate and HCE were within criteria of 50% to 150% and ±25% for the RPD.

It has been shown that the ton container samples contain native Q at approximately 300µg/mL to 350 µg/mL. The original spiking level for Q was 100µg/mL; however, it was determined through low spike recoveries that this amount was insufficient when compared to the native concentration of Q. To compensate for the elevated Q levels in the native samples, the spiking level of Q was raised by a factor of five. Due to the higher spike amount, the samples were diluted to 25 mL (10mL previously) to be within the range of the calibration curve. See Table 1 for the results.

Table-1. Quality Control Samples for Q (25-mL Dilution)

Quality Control Sample	Recovery, %
Blank Spike	118
Blank Spike Duplicate	107
Matrix Spike	79.5
Matrix Spike Duplicate	73.1
RPD (MS/MSD)	8.39

The MS/MSD recoveries for T were 43.8% and 42.4%. Low recoveries have been consistent throughout this project.

The BS recovery values for the surrogate, HCE, Q and T were within acceptance levels.

When duplicate samples were analyzed, the RPDs for all analytes were below the method criteria of ±25%. HCE was not detected in the sample or sample duplicate.

Results showed that target compounds were not detected in either the MB or RB.

Sample holding time of 28 days from collection to analysis was met for all of the submitted samples. Samples were collected starting 28-Apr-03 through 3-May-03 and analyzed on 22-May-03.

THIODIGLYCOL

Samples for the non-volatile organic compound, thiodiglycol (TDG), were extracted 16-May-03 and analyzed on 29-May-03 through 30-May-03 by method AM-100.

The decafluorotriphenylphosphine (DFTPP) tune and the tune evaluation and performance standard both passed acceptance criteria.

The calibration curves for the surrogate (TDG_{d8}) resulted in correlation coefficient (r^2) of 0.996 and for TDG an (r^2) of 0.998 for Linear / (0, 0) curves.

The individual calibration curve levels for TDG were within the acceptance criteria of ±15% except for the 5 µg/mL (125%) and the 10 µg/mL (117%) levels.

All CCV samples passed acceptance criteria of ±25% for TDG and the surrogate.

When duplicate samples were analyzed, the RPDs for all analytes were below the method criteria of ±25% (<2%). TDG was not detected in the sample or sample duplicate.

The MS/MSD for all target compounds passed criteria. Recovery values were 122% and 131% for TDG and 108% and 114% for the surrogate. The RPD for the TDG MS and the MSD passed acceptance criteria (7.11%).

The BS/BSD fulfilled the acceptance criteria.

Results showed that target compounds were not detected in either the Method or the Reagent Blanks.

Sample holding time of 28 days from collection to analysis was not met for all samples. Samples that were collected before 1-May-03 (21-03-213, 214, 219, 222, 225 and 228) did not meet the 28-day limit. The analysis dates were 29-May-03 through 30-May-03.

LEWISITE

Lewisite was extracted on 22-May-03 and analyzed on 29-May-03 through 30-May-03 by method AM-126.

The decafluorotriphenylphosphine (DFTPP) tune and the tune evaluation and performance standard both passed acceptance criteria.

The calibration curve for the target compound (L) resulted in a correlation coefficient (r^2) of 1.000 for a quadratic (not forced through 0, 0) curve fit for Lewisite. A quadratic fit was used to determine the calibration curve. Calibration curves behave differently for compounds over large orders of magnitude as well as for instrumental conditions and column types. After investigation, it was determined that a quadratic curve best represented the existing data. Six concentration levels were used in this curve. This meets the minimal requirements specified in EPA SW846 method 8000b. The individual calibration curve levels for Lewisite were within the acceptance criteria of ±15% except for the lowest level standard of 50 ng/ml (131%).

The CCV samples (86% to 104%) were all within acceptance criteria (±25%).

The MS/MSD and BS/BSD recovery values were within acceptance limits.

Results showed that lewisite was not detected in either the Method or the Reagent Blanks.

Sample holding time of 28 days from collection to analysis was not met for all samples. Samples collected starting 28-Apr-03 through 30-Apr-03 (21-03-213, 214, 219, 222, 225 and 228) did not meet the holding time. The analysis date was 29-May-03.

PURITY

Purity samples were extracted on 20-May-03 and analyzed on 21-May-03 by method AM-098.

The decafluorotriphenylphosphine (DFTPP) tune passed acceptance criteria.

The calibration curve for the target compound (HD) resulted in a correlation coefficient (r^2) of 1.000 for a Linear / (0, 0) curve fit. All individual points of the curve were between 99% and 111%.

The CCV standards all passed the acceptance criteria of ±15%.

The CASARM grade (HD) Laboratory Control Sample (LCS) results showed a purity that was 103.3% of its true value.

When duplicate samples were analyzed, the RPD for the purity was <8.0%, well below the method criteria of ±25%.

Results showed that HD was not detected in either the Method or the Reagent Blanks.

Samples were collected starting 28-Apr-03 through 3-May-03 and analyzed on 21-May-03. Sample holding time of 28 days from collection to analysis was met for all samples.

METALS ANALYSIS

***Liquids*:**
All undiluted samples were analyzed on 22-May-03. All samples were analyzed by Method AM-118.

All elements were in acceptable limits for both CCV's run on 22-May-03; however selenium did fail the ICV (86% recovery) before analysis of the samples. Since selenium did pass both CCV's no corrective action was taken.

Nickel and selenium were found in the method blank at a level above the MDL, but below the PQL when analyzed on 22-May-03. No corrective action was taken.

The percent recovery (%R) for the MS/MSD, blank spike (BS), lab control spike (LCS), and lab control spike duplicate (LCSD) indicated that all elements met the acceptance criteria of 75%-125%. The MS/MSD RPD met the criterion.

The %R for the Post Digestion Spike Addition Sample (PDSA) indicated that all elements except for silver meet the acceptance criteria. The PDSA was re-

prepared and reanalyzed on 27-May-03. Upon reanalysis silver had an acceptable recovery.

Copper, the only element that had a result above 100 times the Instrument Detection Limit (IDL) had an acceptable RPD for the sample duplicate. The criteria for the sample/sample duplicate RPD is ≤20% for any elements at a level of at least 100 times the IDL.

All liquid samples were analyzed within the 28-day holding period.

***Non-Cohesive Solids*:**
All undiluted samples were analyzed on 19-May-03. Dilutions and reruns were analyzed on 20-May-03. All samples were analyzed by Method AM-118.

Aluminum and boron were outside the acceptance limits of 90% to 110% for the CCV when analyzed on 19-May-03. Upon reanalysis on 20-May-03, all were within the acceptable limits.

Cadmium and barium was found in all reagent blanks at a level above the MDL, but below the PQL when analyzed on 19-May-03. No corrective action was taken. Antimony was found in the last reagent blank at a level above the MDL, but below the PQL when analyzed on 19-May-03. No corrective action was taken. Barium and cadmium were found in the method blank at a level above the MDL, but below the PQL when analyzed on 19-May-03. Aluminum was found in the method blank at a level above the MDL, but below the PQL when analyzed on 20-May-03. No corrective action was taken.

The percent recovery (%R) for the MS/MSD, blank spike (BS), Certified Reference Material (CRM)/Certified Reference Material Duplicate (CRMD), and Post Digestion Spike Addition Sample (PDSA) indicated that all elements met the acceptance criteria of 75%-125%. The MS/MSD and CRM/CRMD RPD met the criterion.

Sample 030004-051-04 was diluted and reanalyzed for arsenic on 20-May-03. The batch QC for that day is as follows: Method Blank (ND), Blank Spike, (106%), PDSA (112%), MS (105%), MSD (107%), MS/MSD RPD (1.75%), CRM (106%), CRMD (103%), and CRM/CRMD RPD (3.24%).

Sample 030004-051-05 was diluted and reanalyzed for mercury on 20-May-03. The batch QC for that day is as follows: Method Blank (ND), Blank Spike, (103%), PDSA (106%), MS (107%), MSD (108%), and MS/MSD RPD (1.19%).

Copper had an acceptable RPD for the sample duplicate.

All the Non-Cohesive samples were analyzed within the 28-day hold time,

Solids:
All undiluted samples were analyzed on 21-May-03. Reruns were analyzed on 27-May-03. All samples were analyzed by Method AM-118.

Aluminum was outside the acceptance limits of 90% to 110% for the CCV when analyzed on 21-May-03. Upon reanalysis on 27-May-03, all were within the acceptable limits. Selenium did not pass the ICV (87% recovery) before analysis of the samples on 21-May-03, although selenium did pass both CCV's so no corrective action was taken.

Cadmium and Barium were detected in all reagent blanks at a level above the MDL, but below the PQL when analyzed on 21-May-03. No corrective action was taken. Cadmium and barium were found in the method blank at a level above the MDL, but below the PQL when analyzed on 21-May-03. No corrective action was taken.

The sample used for the MS (4388) and MSD (4389) had high levels of copper, manganese, lead, and zinc. Since the spike levels were not sufficiently high when compared to the native levels in the sample, the MS/MSD could not be properly evaluated for those elements. The recovery data for the MS (4388) indicated that manganese was outside the acceptable limits of 75%-125% when analyzed on 21-May-03. The data for the MSD (4248) indicated that copper, manganese, lead, and zinc were outside the acceptable limits of 75%-125% when analyzed on 21-May-03. The RPD and %R for the MS and MSD were within acceptable limits for all elements except for those elements at high concentrations in the native sample.

The %R for the BS, PDSA, CRM and CRM duplicate indicated that all elements met the acceptance criteria of 75%-125%. The CRM/CRMD RPD met the criterion.

Copper, lead, manganese, mercury, nickel and zinc had an acceptable RPD for the sample duplicate

All the solid samples were analyzed within the 28-day hold time with the exception of aluminum for samples 21-03-217, 21-03-218 and 21-03-221 which were analyzed on the 29th day.

Analyst(s) of Record Thomas Rusek (Signature) 12-17-03 (Date) **Thomas Rusek** **Principal Investigator, Battelle Memorial Institute**	**Analyst(s) of Record** Brian L. Boyd (Signature) 12/17/03 (Date) **Brian L. Boyd** **Researcher, Battelle Memorial Institute**
Analyst(s) of Record Robert L. Calloway (Signature) 17 Dec 03 (Date) **Robert L. Calloway** **Physical Science Technican, Edgewood Chemical & Biological Forensic Analytical Center**	**Analyst(s) of Record** James H. Newman (Signature) 12-17-03 (Date) for **Stephen S. Houck** **Researcher, Battelle Memorial Institute**
Analyst(s) of Record James H. Newman (Signature) 12-17-03 (Date) for **Doug S. Nichols** **Researcher, Battelle Memorial Institute**	**Analyst(s) of Record** Michael W. Wensing (Signature) 12-17-03 (Date) **Michael W. Wensing, Ph.D.** **Principal Research Scientist, Battelle Memorial Institute**
Analyst(s) of Record James W. Roelke (Signature) 12-17-03 (Date) **James Roelke** **Researcher, Battelle Memorial Institute**	**Report Reviewed by** T. Kehring (Signature) 12/16/03 (Date) **Timothy L. Kehring** **LIMS Technologist, Battelle Memorial Institute**
Report Reviewed by James H. Newman (Signature) 12-17-03 (Date) for **Audrey J. Raunig** **Principal Research Scientist, Battelle Memorial Institute**	**Report Reviewed by** James H. Newman (Signature) 12-17-03 (Date) **James H. Newman** **Laboratory Manager, Battelle Memorial Institute**

Report Reviewed by

Robert L. Calloway (Signature)

17 Dec 03 (Date)

Robert L. Calloway
Designated Authority, Edgewood C/B Forensic Analytical Center

Report Approved by

Dennis J. Reutter (Signature)

[illegible] (Date)

Dennis J. Reutter, Ph.D.
Chief, Edgewood C/B Forensic Analytical Center

Appendix A

LIMS DATA REPORT

This appendix contains the 73-page data report produced from the LIMS system. It contains a summary of sample numbers, sample results, method blank results and results of QC samples analyzed. Since the report is generated by the LIMS, the page numbers will begin again at 1, but each page has been identified as part of the appendix so that it may be distinguishable from the main report

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

ANALYTICAL RESULTS

Report Date: 11/14/2003

Work Order: Tooele HD/TC 05/13/2003

Deliver To: Don Milton
EG&G Defense Materials Div.
11600 Stark Road
Tooele, UT 84074

James Newman
Project Manager

The following represents qualifications to the associated analytical reports.

1. These descriptors will help identify the specific sample and clarify the report.

   DUP - Matrix Duplicate
   MS - Matrix Spike
   MSD - Matrix Spike Duplicate
   RPD - Relative Percent Difference
   PQL - Practical Quantitiation Limit
   MDL - Method Detection Limit
   ND - Not Detected at the PQL
   * - Indicates a limit was exceeded

   Surrogate - Organic compounds which are similar to analytes of interest in chemical composition, extraction, and chromotography, but which are not normally found in the samples.

2. Qualifier keys - These descriptors will follow individual results for a specific sample and a specific analyte and will help qualify the data.

   J - Indicates an estimated value between the PQL and MDL

NOTE: This document is included as part of the Analytical Report for the above referenced and should be retained as a permanent record thereof.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Client
EG&G Defense Materials Division

Work ID
Tooele HD/TC 05/13/2003

Workorder Sample Summary

Lab ID	Sample ID	Matrix	Collect Date/Time	Receive Date/Time
03-0004-050-01	21-03-213	Liquid	4/28/2003 14:19	5/12/2003 14:18
03-0004-050-02	21-03-214	Liquid	4/28/2003 14:19	5/12/2003 14:18
03-0004-050-03	21-03-219	Liquid	4/28/2003 14:19	5/12/2003 14:18
03-0004-050-04	21-03-222	Liquid	4/29/2003 16:19	5/12/2003 16:18
03-0004-050-05	21-03-225	Liquid	4/29/2003 14:19	5/12/2003 14:18
03-0004-050-06	21-03-228	Liquid	4/30/2003 14:19	5/12/2003 14:18
03-0004-050-07	21-03-231	Liquid	5/1/2003 14:19	5/12/2003 14:18
03-0004-050-08	21-03-234	Liquid	5/1/2003 14:19	5/12/2003 14:18
03-0004-050-09	21-03-238	Liquid	5/2/2003 14:19	5/12/2003 14:18
03-0004-050-10	21-03-241	Liquid	5/3/2003 14:19	5/12/2003 14:18
03-0004-050-11	21-03-244	Liquid	5/3/2003 14:19	5/12/2003 14:18
03-0004-050-12	21-03-247	Liquid	5/3/2003 14:19	5/12/2003 14:18
03-0004-051-01	21-03-215	Non-cohesive Solid	4/28/2003 14:19	5/12/2003 14:18
03-0004-051-02	21-03-216	Non-cohesive Solid	4/28/2003 14:19	5/12/2003 14:18
03-0004-051-03	21-03-220	Non-cohesive Solid	4/28/2003 14:19	5/12/2003 14:18
03-0004-051-04	21-03-223	Non-cohesive Solid	4/29/2003 14:19	5/12/2003 14:18
03-0004-051-05	21-03-226	Non-cohesive Solid	4/29/2003 14:19	5/12/2003 14:18
03-0004-051-06	21-03-229	Non-cohesive Solid	4/30/2003 14:19	5/12/2003 14:18
03-0004-051-07	21-03-232	Non-cohesive Solid	5/1/2003 14:19	5/12/2003 14:18
03-0004-051-08	21-03-235	Non-cohesive Solid	5/1/2003 14:19	5/12/2003 14:18
03-0004-051-09	21-03-239	Non-cohesive Solid	5/2/2003 14:19	5/12/2003 14:18
03-0004-051-10	21-03-242	Non-cohesive Solid	5/3/2003 14:19	5/12/2003 14:18
03-0004-051-11	21-03-245	Non-cohesive Solid	5/3/2003 14:19	5/12/2003 14:18
03-0004-051-12	21-03-248	Non-cohesive Solid	5/3/2003 14:19	5/12/2003 14:18
03-0004-052-01	21-03-217	Solid	4/28/2003 14:19	5/12/2003 14:18
03-0004-052-02	21-03-218	Solid	4/28/2003 14:19	5/12/2003 14:18
03-0004-052-03	21-03-221	Solid	4/28/2003 14:19	5/12/2003 14:18
03-0004-052-04	21-03-224	Solid	4/29/2003 14:19	5/12/2003 14:18
03-0004-052-05	21-03-227	Solid	4/29/2003 14:19	5/12/2003 14:18
03-0004-052-06	21-03-230	Solid	4/30/2003 14:19	5/12/2003 14:18
03-0004-052-07	21-03-233	Solid	5/1/2003 14:19	5/12/2003 14:18
03-0004-052-08	21-03-236	Solid	5/1/2003 14:19	5/12/2003 14:18
03-0004-052-09	21-03-240	Solid	5/2/2003 14:19	5/12/2003 14:18
03-0004-052-10	21-03-243	Solid	5/3/2003 14:19	5/12/2003 14:18
03-0004-052-11	21-03-246	Solid	5/3/2003 14:19	5/12/2003 14:18
03-0004-052-12	21-03-249	Solid	5/3/2003 14:19	5/12/2003 14:18

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
03-0004-050-01	21-03-213	4/28/2003 14:19	5/12/2003 14:18	7/23/2003 14:09	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/20/2003 08:22	7502	AM098 HD Purity by GC	1	5/21/2003 13:53	tfr	7602

Parameter	Result	MDL	PQL	Units
bis-(2-Chloroethyl)sulfide	89.0			%

AM100 Non-Vols in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 17:38	7203	AM100 Non-Vols in HD by GC	1	5/29/2003 16:40	ssh	7504

Parameter	Result	MDL	PQL	Units
Thiodiglycol (TDG)	ND	217	258	ug/g

Surrogates	Expected	Result	Recovery	Limits
Thiodiglycol-d8 (TDG-d8)	1030	1230 ug/g	119	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 10:13	7202	AM101 Vols in Liquid HD by GC	1	5/20/2003 17:24	ssh	7205

Parameter	Result	MDL	PQL	Units
1,2-Dichloroethane	6900	277	532	ug/g
Tetrachloroethylene	ND	106	532	ug/g
1,1,2,2-Tetrachloroethane	ND	160	532	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Difluorobenzene	11000	11700 ug/g	106	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/21/2003 08:10	7611	AM118 Metals in Liq HD by ICP	1	5/22/2003 13:08	blb	7702

Parameter	Result	MDL	PQL	Units
Aluminum	14.8 J	10.7	53.3	ug/g
Antimony	ND	0.672	5.33	ug/g
Arsenic	ND	1.30	5.33	ug/g
Barium	ND	0.458	5.33	ug/g
Beryllium	ND	0.959	5.33	ug/g
Boron	4.87 J	3.99	10.7	ug/g
Cadmium	ND	0.437	5.33	ug/g
Chromium	5.16 J	1.38	5.33	ug/g
Cobalt	ND	0.288	1.07	ug/g
Copper	45.4	2.59	5.33	ug/g
Lead	ND	0.437	5.33	ug/g
Manganese	0.707 J	0.341	1.07	ug/g
Mercury	ND	0.0533	0.533	ug/g
Nickel	ND	0.373	5.33	ug/g
Selenium	ND	1.25	10.7	ug/g
Silver	ND	0.501	5.33	ug/g

Report of Analysis

Thallium	ND	1.04	5.33	ug/g
Tin	ND	2.65	10.7	ug/g
Vanadium	1.36 J	1.07	5.33	ug/g
Zinc	ND	3.33	10.7	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/20/2003 11:34	7503	AM117 Semi-Vols Liq HD by GC	1	5/22/2003 0:00	ssh	7606

Parameter	Result	MDL	PQL	Units
Hexachloroethane	ND	83.7	2620	ug/g
Q	49300	53.3	2620	ug/g
T	1090 J	73.2	2620	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Dithiane-d4	1050	1280 ug/g	123	50 - 150

AM126 Lewisite in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/22/2003 08:54	7703	AM126 Lewisite in HD by GC	1	5/29/2003 15:25	ssh	7705

Parameter	Result	MDL	PQL	Units
Lewisite	ND	2.16	5.55	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
03-0004-050-02	21-03-214	4/28/2003 14:19	5/12/2003 14:18	7/23/2003 14:09	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/20/2003 08:22	7502	AM098 HD Purity by GC	1	5/21/2003 14:31	tfr	7602

Parameter	Result	MDL	PQL	Units
bis-(2-Chloroethyl)sulfide	95.3			%

AM100 Non-Vols in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 17:38	7203	AM100 Non-Vols in HD by GC	1	5/29/2003 18:07	ssh	7504

Parameter	Result	MDL	PQL	Units
Thiodiglycol (TDG)	ND	217	258	ug/g

Surrogates	Expected	Result	Recovery	Limits
Thiodiglycol-d8 (TDG-d8)	1030	1180 ug/g	114	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 10:13	7202	AM101 Vols in Liquid HD by GC	1	5/20/2003 18:36	ssh	7205

Parameter	Result	MDL	PQL	Units
1,2-Dichloroethane	6710	264	508	ug/g
Tetrachloroethylene	ND	102	508	ug/g
1,1,2,2-Tetrachloroethane	ND	152	508	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Difluorobenzene	10500	10800 ug/g	103	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/21/2003 08:10	7611	AM118 Metals in Liq HD by ICP	1	5/22/2003 13:48	blb	7702

Parameter	Result	MDL	PQL	Units
Aluminum	23.1 J	10.2	50.8	ug/g
Antimony	0.668 J	0.640	5.08	ug/g
Arsenic	ND	1.24	5.08	ug/g
Barium	ND	0.437	5.08	ug/g
Beryllium	ND	0.915	5.08	ug/g
Boron	8.91 J	3.80	10.2	ug/g
Cadmium	ND	0.417	5.08	ug/g
Chromium	5.56	1.31	5.08	ug/g
Cobalt	ND	0.274	1.02	ug/g
Copper	45.7	2.47	5.08	ug/g
Lead	ND	0.417	5.08	ug/g
Manganese	ND	0.325	1.02	ug/g
Mercury	ND	0.0508	0.508	ug/g
Nickel	ND	0.356	5.08	ug/g
Selenium	ND	1.19	10.2	ug/g
Silver	ND	0.478	5.08	ug/g

Report of Analysis

Thallium	ND	0.996	5.08	ug/g
Tin	ND	2.53	10.2	ug/g
Vanadium	1.44 J	1.02	5.08	ug/g
Zinc	ND	3.17	10.2	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/20/2003 11:34	7503	AM117 Semi-Vols Liq HD by GC	1	5/22/2003 0:00	ssh	7606

Parameter	Result	MDL	PQL	Units
Hexachloroethane	ND	82.5	2580	ug/g
Q	47500	52.6	2580	ug/g
T	976 J	72.2	2580	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Dithiane-d4	1030	1090 ug/g	105	50 - 150

AM126 Lewisite in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/22/2003 08:54	7703	AM126 Lewisite in HD by GC	1	5/29/2003 16:34	ssh	7705

Parameter	Result	MDL	PQL	Units
Lewisite	ND	2.07	5.32	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
03-0004-050-03	21-03-219	4/28/2003 14:19	5/12/2003 14:18	7/23/2003 14:09	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/20/2003 08:22	7502	AM098 HD Purity by GC	1	5/21/2003 14:50	tfr	7602

Parameter	Result	MDL	PQL	Units
bis-(2-Chloroethyl)sulfide	90.4			%

AM100 Non-Vols in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 17:38	7203	AM100 Non-Vols in HD by GC	1	5/29/2003 18:51	ssh	7504

Parameter	Result	MDL	PQL	Units
Thiodiglycol (TDG)	ND	213	253	ug/g

Surrogates	Expected	Result	Recovery	Limits
Thiodiglycol-d8 (TDG-d8)	1010	1140 ug/g	112	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 10:13	7202	AM101 Vols in Liquid HD by GC	1	5/20/2003 19:13	ssh	7205

Parameter	Result	MDL	PQL	Units
1,2-Dichloroethane	6280	278	535	ug/g
Tetrachloroethylene	ND	107	535	ug/g
1,1,2,2-Tetrachloroethane	ND	161	535	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Difluorobenzene	11100	11800 ug/g	106	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/21/2003 08:10	7611	AM118 Metals in Liq HD by ICP	1	5/22/2003 13:53	blb	7702

Parameter	Result	MDL	PQL	Units
Aluminum	ND	10.2	51.1	ug/g
Antimony	ND	0.644	5.11	ug/g
Arsenic	1.29 J	1.25	5.11	ug/g
Barium	ND	0.440	5.11	ug/g
Beryllium	ND	0.920	5.11	ug/g
Boron	ND	3.82	10.2	ug/g
Cadmium	ND	0.419	5.11	ug/g
Chromium	5.23	1.32	5.11	ug/g
Cobalt	ND	0.276	1.02	ug/g
Copper	32.0	2.48	5.11	ug/g
Lead	ND	0.419	5.11	ug/g
Manganese	3.32	0.327	1.02	ug/g
Mercury	ND	0.0511	0.511	ug/g
Nickel	1.93 J	0.358	5.11	ug/g
Selenium	ND	1.20	10.2	ug/g
Silver	ND	0.481	5.11	ug/g

Report of Analysis

Thallium	ND	1.00	5.11	ug/g
Tin	ND	2.55	10.2	ug/g
Vanadium	1.18 J	1.02	5.11	ug/g
Zinc	ND	3.19	10.2	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/20/2003 11:34	7503	AM117 Semi-Vols Liq HD by GC	1	5/22/2003 0:00	ssh	7606

Parameter	Result	MDL	PQL	Units
Hexachloroethane	ND	81.8	2560	ug/g
Q	30900	52.1	2560	ug/g
T	1180 J	71.6	2560	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Dithiane-d4	1020	1080 ug/g	105	50 - 150

AM126 Lewisite in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/22/2003 08:54	7703	AM126 Lewisite in HD by GC	1	5/29/2003 17:09	ssh	7705

Parameter	Result	MDL	PQL	Units
Lewisite	ND	1.98	5.08	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
03-0004-050-04	21-03-222	4/29/2003 16:19	5/12/2003 16:18	5/26/2003 16:19	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/20/2003 08:22	7502	AM098 HD Purity by GC	1	5/21/2003 15:10	tfr	7602

Parameter	Result	MDL	PQL	Units
bis-(2-Chloroethyl)sulfide	93.2			%

AM100 Non-Vols in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 17:38	7203	AM100 Non-Vols in HD by GC	1	5/30/2003 0:00	ssh	7504

Parameter	Result	MDL	PQL	Units
Thiodiglycol (TDG)	ND	205	244	ug/g

Surrogates	Expected	Result	Recovery	Limits
Thiodiglycol-d8 (TDG-d8)	978	1130 ug/g	116	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 10:13	7202	AM101 Vols in Liquid HD by GC	1	5/21/2003 0:00	ssh	7205

Parameter	Result	MDL	PQL	Units
1,2-Dichloroethane	6290	259	499	ug/g
Tetrachloroethylene	ND	99.7	499	ug/g
1,1,2,2-Tetrachloroethane	ND	150	499	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Difluorobenzene	10300	11100 ug/g	108	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/21/2003 08:10	7611	AM118 Metals in Liq HD by ICP	1	5/22/2003 13:58	blb	7702

Parameter	Result	MDL	PQL	Units
Aluminum	ND	10.2	51.1	ug/g
Antimony	ND	0.644	5.11	ug/g
Arsenic	ND	1.25	5.11	ug/g
Barium	ND	0.440	5.11	ug/g
Beryllium	ND	0.920	5.11	ug/g
Boron	ND	3.82	10.2	ug/g
Cadmium	ND	0.419	5.11	ug/g
Chromium	4.96 J	1.32	5.11	ug/g
Cobalt	ND	0.276	1.02	ug/g
Copper	26.4	2.48	5.11	ug/g
Lead	ND	0.419	5.11	ug/g
Manganese	2.02	0.327	1.02	ug/g
Mercury	ND	0.0511	0.511	ug/g
Nickel	ND	0.358	5.11	ug/g
Selenium	ND	1.20	10.2	ug/g
Silver	ND	0.481	5.11	ug/g

Report of Analysis

Thallium	ND	1.00	5.11	ug/g
Tin	ND	2.55	10.2	ug/g
Vanadium	1.21 J	1.02	5.11	ug/g
Zinc	ND	3.19	10.2	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/20/2003 11:34	7503	AM117 Semi-Vols Liq HD by GC	1	5/22/2003 0:00	ssh	7606

Parameter	*Result*	*MDL*	*PQL*	*Units*
Hexachloroethane	ND	84.0	2630	ug/g
Q	32900	53.6	2630	ug/g
T	920 J	73.5	2630	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Dithiane-d4	1050	1120 ug/g	107	50 - 150

AM126 Lewisite in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/22/2003 08:54	7703	AM126 Lewisite in HD by GC	1	5/29/2003 17:44	ssh	7705

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lewisite	ND	2.02	5.18	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
03-0004-050-05	21-03-225	4/29/2003 14:19	5/12/2003 14:18	7/23/2003 14:09	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/20/2003 08:22	7502	AM098 HD Purity by GC	1	5/21/2003 15:29	tfr	7602

Parameter	Result	MDL	PQL	Units
bis-(2-Chloroethyl)sulfide	90.7			%

AM100 Non-Vols in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 17:38	7203	AM100 Non-Vols in HD by GC	1	5/29/2003 19:35	ssh	7504

Parameter	Result	MDL	PQL	Units
Thiodiglycol (TDG)	ND	219	260	ug/g

Surrogates	Expected	Result	Recovery	Limits
Thiodiglycol-d8 (TDG-d8)	1040	1060 ug/g	102	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 10:13	7202	AM101 Vols in Liquid HD by GC	1	5/20/2003 19:49	ssh	7205

Parameter	Result	MDL	PQL	Units
1,2-Dichloroethane	8280	269	517	ug/g
Tetrachloroethylene	ND	103	517	ug/g
1,1,2,2-Tetrachloroethane	ND	155	517	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Difluorobenzene	10700	11400 ug/g	107	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/21/2003 08:10	7611	AM118 Metals in Liq HD by ICP	1	5/22/2003 14:03	blb	7702

Parameter	Result	MDL	PQL	Units
Aluminum	ND	10.4	51.9	ug/g
Antimony	ND	0.654	5.19	ug/g
Arsenic	ND	1.27	5.19	ug/g
Barium	ND	0.446	5.19	ug/g
Beryllium	ND	0.934	5.19	ug/g
Boron	ND	3.88	10.4	ug/g
Cadmium	ND	0.425	5.19	ug/g
Chromium	9.69	1.34	5.19	ug/g
Cobalt	ND	0.280	1.04	ug/g
Copper	52.8	2.52	5.19	ug/g
Lead	ND	0.425	5.19	ug/g
Manganese	0.444 J	0.332	1.04	ug/g
Mercury	1.62	0.0519	0.519	ug/g
Nickel	0.427 J	0.363	5.19	ug/g
Selenium	ND	1.21	10.4	ug/g
Silver	ND	0.488	5.19	ug/g

Report of Analysis

Thallium	ND	1.02	5.19	ug/g
Tin	ND	2.58	10.4	ug/g
Vanadium	1.25 J	1.04	5.19	ug/g
Zinc	ND	3.24	10.4	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/20/2003 11:34	7503	AM117 Semi-Vols Liq HD by GC	1	5/22/2003 0:00	ssh	7606

Parameter	Result	MDL	PQL	Units
Hexachloroethane	ND	85.4	2670	ug/g
Q	47100	54.4	2670	ug/g
T	986 J	74.7	2670	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Dithiane-d4	1070	1120 ug/g	105	50 - 150

AM126 Lewisite in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/22/2003 08:54	7703	AM126 Lewisite in HD by GC	1	5/29/2003 18:18	ssh	7705

Parameter	Result	MDL	PQL	Units
Lewisite	ND	1.99	5.10	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
03-0004-050-06	21-03-228	4/30/2003 14:19	5/12/2003 14:18	7/23/2003 14:09	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/20/2003 08:22	7502	AM098 HD Purity by GC	1	5/21/2003 15:48	tfr	7602

Parameter	Result	MDL	PQL	Units
bis-(2-Chloroethyl)sulfide	90.2			%

AM100 Non-Vols in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 17:38	7203	AM100 Non-Vols in HD by GC	1	5/29/2003 20:18	ssh	7504

Parameter	Result	MDL	PQL	Units
Thiodiglycol (TDG)	ND	216	257	ug/g

Surrogates	Expected	Result	Recovery	Limits
Thiodiglycol-d8 (TDG-d8)	1030	1020 ug/g	99.6	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 10:13	7202	AM101 Vols in Liquid HD by GC	1	5/20/2003 20:25	ssh	7205

Parameter	Result	MDL	PQL	Units
1,2-Dichloroethane	6600	265	510	ug/g
Tetrachloroethylene	ND	102	510	ug/g
1,1,2,2-Tetrachloroethane	ND	153	510	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Difluorobenzene	10500	10900 ug/g	104	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/21/2003 08:10	7611	AM118 Metals in Liq HD by ICP	1	5/22/2003 14:08	blb	7702

Parameter	Result	MDL	PQL	Units
Aluminum	27.7 J	10.4	51.9	ug/g
Antimony	ND	0.654	5.19	ug/g
Arsenic	6.82	1.27	5.19	ug/g
Barium	ND	0.446	5.19	ug/g
Beryllium	ND	0.934	5.19	ug/g
Boron	ND	3.88	10.4	ug/g
Cadmium	ND	0.425	5.19	ug/g
Chromium	6.46	1.34	5.19	ug/g
Cobalt	ND	0.280	1.04	ug/g
Copper	59.0	2.52	5.19	ug/g
Lead	ND	0.425	5.19	ug/g
Manganese	0.344 J	0.332	1.04	ug/g
Mercury	ND	0.0519	0.519	ug/g
Nickel	2.63 J	0.363	5.19	ug/g
Selenium	ND	1.21	10.4	ug/g
Silver	ND	0.488	5.19	ug/g

Report of Analysis

Thallium	ND	1.02	5.19	ug/g
Tin	ND	2.58	10.4	ug/g
Vanadium	1.48 J	1.04	5.19	ug/g
Zinc	ND	3.24	10.4	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/20/2003 11:34	7503	AM117 Semi-Vols Liq HD by GC	1	5/22/2003 0:00	ssh	7606

Parameter	Result	MDL	PQL	Units
Hexachloroethane	ND	82.3	2570	ug/g
Q	29800	52.5	2570	ug/g
T	533 J	72.0	2570	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Dithiane-d4	1030	1090 ug/g	106	50 - 150

AM126 Lewisite in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/22/2003 08:54	7703	AM126 Lewisite in HD by GC	1	5/29/2003 18:52	ssh	7705

Parameter	Result	MDL	PQL	Units
Lewisite	2.82 J	1.98	5.09	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
03-0004-050-07	21-03-231	5/1/2003 14:19	5/12/2003 14:18	7/23/2003 14:09	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/20/2003 08:22	7502	AM098 HD Purity by GC	1	5/21/2003 16:07	tfr	7602

Parameter	Result	MDL	PQL	Units
bis-(2-Chloroethyl)sulfide	89.6			%

AM100 Non-Vols in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 17:38	7203	AM100 Non-Vols in HD by GC	1	5/29/2003 21:02	ssh	7504

Parameter	Result	MDL	PQL	Units
Thiodiglycol (TDG)	ND	210	250	ug/g

Surrogates	Expected	Result	Recovery	Limits
Thiodiglycol-d8 (TDG-d8)	998	1070 ug/g	107	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 10:13	7202	AM101 Vols in Liquid HD by GC	1	5/20/2003 21:01	ssh	7205

Parameter	Result	MDL	PQL	Units
1,2-Dichloroethane	6760	269	518	ug/g
Tetrachloroethylene	ND	104	518	ug/g
1,1,2,2-Tetrachloroethane	ND	155	518	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Difluorobenzene	10700	10800 ug/g	101	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/21/2003 08:10	7611	AM118 Metals in Liq HD by ICP	1	5/22/2003 14:13	blb	7702

Parameter	Result	MDL	PQL	Units
Aluminum	ND	10.2	51.2	ug/g
Antimony	ND	0.645	5.12	ug/g
Arsenic	ND	1.25	5.12	ug/g
Barium	ND	0.440	5.12	ug/g
Beryllium	ND	0.921	5.12	ug/g
Boron	ND	3.83	10.2	ug/g
Cadmium	ND	0.420	5.12	ug/g
Chromium	5.77	1.32	5.12	ug/g
Cobalt	ND	0.276	1.02	ug/g
Copper	43.3	2.49	5.12	ug/g
Lead	ND	0.420	5.12	ug/g
Manganese	0.564 J	0.328	1.02	ug/g
Mercury	ND	0.0512	0.512	ug/g
Nickel	0.544 J	0.358	5.12	ug/g
Selenium	ND	1.20	10.2	ug/g
Silver	ND	0.481	5.12	ug/g

Report of Analysis

Thallium	ND	1.00	5.12	ug/g
Tin	ND	2.55	10.2	ug/g
Vanadium	1.52 J	1.02	5.12	ug/g
Zinc	ND	3.19	10.2	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/20/2003 11:34	7503	AM117 Semi-Vols Liq HD by GC	1	5/22/2003 0:00	ssh	7606

Parameter	Result	MDL	PQL	Units
Hexachloroethane	ND	83.2	2600	ug/g
Q	48400	53.1	2600	ug/g
T	848 J	72.8	2600	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Dithiane-d4	1040	1070 ug/g	103	50 - 150

AM126 Lewisite in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/22/2003 08:54	7703	AM126 Lewisite in HD by GC	1	5/29/2003 19:27	ssh	7705

Parameter	Result	MDL	PQL	Units
Lewisite	ND	2.03	5.20	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
03-0004-050-08	21-03-234	5/1/2003 14:19	5/12/2003 14:18	7/23/2003 14:09	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/20/2003 08:22	7502	AM098 HD Purity by GC	1	5/21/2003 16:26	tfr	7602

Parameter	Result	MDL	PQL	Units
bis-(2-Chloroethyl)sulfide	86.2			%

AM100 Non-Vols in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 17:38	7203	AM100 Non-Vols in HD by GC	1	5/29/2003 21:45	ssh	7504

Parameter	Result	MDL	PQL	Units
Thiodiglycol (TDG)	ND	217	258	ug/g

Surrogates	Expected	Result	Recovery	Limits
Thiodiglycol-d8 (TDG-d8)	1030	1180 ug/g	114	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 10:13	7202	AM101 Vols in Liquid HD by GC	1	5/20/2003 21:36	ssh	7205

Parameter	Result	MDL	PQL	Units
1,2-Dichloroethane	5970	270	520	ug/g
Tetrachloroethylene	ND	104	520	ug/g
1,1,2,2-Tetrachloroethane	ND	156	520	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Difluorobenzene	10800	11400 ug/g	106	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/21/2003 08:10	7611	AM118 Metals in Liq HD by ICP	1	5/22/2003 14:18	blb	7702

Parameter	Result	MDL	PQL	Units
Aluminum	ND	10.2	50.8	ug/g
Antimony	ND	0.640	5.08	ug/g
Arsenic	ND	1.24	5.08	ug/g
Barium	ND	0.437	5.08	ug/g
Beryllium	ND	0.915	5.08	ug/g
Boron	ND	3.80	10.2	ug/g
Cadmium	ND	0.417	5.08	ug/g
Chromium	5.58	1.31	5.08	ug/g
Cobalt	ND	0.274	1.02	ug/g
Copper	18.6	2.47	5.08	ug/g
Lead	ND	0.417	5.08	ug/g
Manganese	3.17	0.325	1.02	ug/g
Mercury	ND	0.0508	0.508	ug/g
Nickel	ND	0.356	5.08	ug/g
Selenium	ND	1.19	10.2	ug/g
Silver	ND	0.478	5.08	ug/g

Report of Analysis

Thallium	ND	0.996	5.08	ug/g
Tin	ND	2.53	10.2	ug/g
Vanadium	1.21 J	1.02	5.08	ug/g
Zinc	ND	3.17	10.2	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/20/2003 11:34	7503	AM117 Semi-Vols Liq HD by GC	1	5/22/2003 10:15	ssh	7606

Parameter	Result	MDL	PQL	Units
Hexachloroethane	ND	82.8	2590	ug/g
Q	30000	52.8	2590	ug/g
T	895 J	72.5	2590	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Dithiane-d4	1040	1060 ug/g	102	50 - 150

AM126 Lewisite in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/22/2003 08:54	7703	AM126 Lewisite in HD by GC	1	5/29/2003 20:01	ssh	7705

Parameter	Result	MDL	PQL	Units
Lewisite	ND	2.00	5.12	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
03-0004-050-09	21-03-238	5/2/2003 14:19	5/12/2003 14:18	7/23/2003 14:09	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/20/2003 08:22	7502	AM098 HD Purity by GC	1	5/21/2003 16:45	tfr	7602

Parameter	Result	MDL	PQL	Units
bis-(2-Chloroethyl)sulfide	92.9			%

AM100 Non-Vols in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 17:38	7203	AM100 Non-Vols in HD by GC	1	5/29/2003 22:29	ssh	7504

Parameter	Result	MDL	PQL	Units
Thiodiglycol (TDG)	ND	212	252	ug/g

Surrogates	Expected	Result	Recovery	Limits
Thiodiglycol-d8 (TDG-d8)	1010	1100 ug/g	109	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 10:13	7202	AM101 Vols in Liquid HD by GC	1	5/20/2003 22:12	ssh	7205

Parameter	Result	MDL	PQL	Units
1,2-Dichloroethane	6190	262	504	ug/g
Tetrachloroethylene	386 J	101	504	ug/g
1,1,2,2-Tetrachloroethane	ND	151	504	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Difluorobenzene	10400	8800 ug/g	84.5	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/21/2003 08:10	7611	AM118 Metals in Liq HD by ICP	1	5/22/2003 14:23	blb	7702

Parameter	Result	MDL	PQL	Units
Aluminum	ND	10.6	52.9	ug/g
Antimony	ND	0.667	5.29	ug/g
Arsenic	ND	1.29	5.29	ug/g
Barium	ND	0.455	5.29	ug/g
Beryllium	ND	0.952	5.29	ug/g
Boron	ND	3.96	10.6	ug/g
Cadmium	ND	0.434	5.29	ug/g
Chromium	5.47	1.37	5.29	ug/g
Cobalt	ND	0.286	1.06	ug/g
Copper	47.0	2.57	5.29	ug/g
Lead	ND	0.434	5.29	ug/g
Manganese	ND	0.339	1.06	ug/g
Mercury	ND	0.0529	0.529	ug/g
Nickel	1.24 J	0.370	5.29	ug/g
Selenium	ND	1.24	10.6	ug/g
Silver	ND	0.497	5.29	ug/g

Report of Analysis

Thallium	ND	1.04	5.29	ug/g
Tin	ND	2.63	10.6	ug/g
Vanadium	1.33 J	1.06	5.29	ug/g
Zinc	ND	3.30	10.6	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/20/2003 11:34	7503	AM117 Semi-Vols Liq HD by GC	1	5/22/2003 10:53	ssh	7606

Parameter	*Result*	*MDL*	*PQL*	*Units*
Hexachloroethane	ND	81.3	2540	ug/g
Q	39100	51.8	2540	ug/g
T	409 J	71.1	2540	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Dithiane-d4	1020	1100 ug/g	108	50 - 150

AM126 Lewisite in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/22/2003 08:54	7703	AM126 Lewisite in HD by GC	1	5/29/2003 20:35	ssh	7705

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lewisite	ND	2.00	5.12	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
03-0004-050-10	21-03-241	5/3/2003 14:19	5/12/2003 14:18	7/23/2003 14:09	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/20/2003 08:22	7502	AM098 HD Purity by GC	1	5/21/2003 17:04	tfr	7602

Parameter	Result	MDL	PQL	Units
bis-(2-Chloroethyl)sulfide	93.6			%

AM100 Non-Vols in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 17:38	7203	AM100 Non-Vols in HD by GC	1	5/29/2003 23:12	ssh	7504

Parameter	Result	MDL	PQL	Units
Thiodiglycol (TDG)	ND	213	254	ug/g

Surrogates	Expected	Result	Recovery	Limits
Thiodiglycol-d8 (TDG-d8)	1020	1040 ug/g	103	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 10:13	7202	AM101 Vols in Liquid HD by GC	1	5/20/2003 22:48	ssh	7205

Parameter	Result	MDL	PQL	Units
1,2-Dichloroethane	5920	267	514	ug/g
Tetrachloroethylene	268 J	103	514	ug/g
1,1,2,2-Tetrachloroethane	ND	154	514	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Difluorobenzene	10600	10700 ug/g	101	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/21/2003 08:10	7611	AM118 Metals in Liq HD by ICP	1	5/22/2003 14:28	blb	7702

Parameter	Result	MDL	PQL	Units
Aluminum	ND	10.3	51.7	ug/g
Antimony	ND	0.651	5.17	ug/g
Arsenic	1.98 J	1.26	5.17	ug/g
Barium	ND	0.444	5.17	ug/g
Beryllium	ND	0.930	5.17	ug/g
Boron	ND	3.86	10.3	ug/g
Cadmium	ND	0.424	5.17	ug/g
Chromium	8.11	1.33	5.17	ug/g
Cobalt	ND	0.279	1.03	ug/g
Copper	70.7	2.51	5.17	ug/g
Lead	ND	0.424	5.17	ug/g
Manganese	0.544 J	0.331	1.03	ug/g
Mercury	ND	0.0517	0.517	ug/g
Nickel	5.50	0.362	5.17	ug/g
Selenium	ND	1.21	10.3	ug/g
Silver	ND	0.486	5.17	ug/g

Report of Analysis

Thallium	ND	1.01	5.17	ug/g
Tin	ND	2.57	10.3	ug/g
Vanadium	1.08 J	1.03	5.17	ug/g
Zinc	3.24 J	3.22	10.3	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/20/2003 11:34	7503	AM117 Semi-Vols Liq HD by GC	1	5/22/2003 17:18	tlk	7606

Parameter	Result	MDL	PQL	Units
Hexachloroethane	ND	81.5	2550	ug/g
Q	26100	52.0	2550	ug/g
T	ND	71.4	2550	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Dithiane-d4	1020	1060 ug/g	104	50 - 150

AM126 Lewisite in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/22/2003 08:54	7703	AM126 Lewisite in HD by GC	1	5/29/2003 21:09	ssh	7705

Parameter	Result	MDL	PQL	Units
Lewisite	ND	2.00	5.12	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
03-0004-050-11	21-03-244	5/3/2003 14:19	5/12/2003 14:18	7/23/2003 14:09	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/20/2003 08:22	7502	AM098 HD Purity by GC	1	5/21/2003 18:02	tfr	7602

Parameter	Result	MDL	PQL	Units
bis-(2-Chloroethyl)sulfide	85.2			%

AM100 Non-Vols in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 17:38	7203	AM100 Non-Vols in HD by GC	1	5/29/2003 23:55	ssh	7504

Parameter	Result	MDL	PQL	Units
Thiodiglycol (TDG)	ND	212	252	ug/g

Surrogates	Expected	Result	Recovery	Limits
Thiodiglycol-d8 (TDG-d8)	1010	1130 ug/g	113	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 10:13	7202	AM101 Vols in Liquid HD by GC	1	5/20/2003 23:24	ssh	7205

Parameter	Result	MDL	PQL	Units
1,2-Dichloroethane	5980	268	516	ug/g
Tetrachloroethylene	550	103	516	ug/g
1,1,2,2-Tetrachloroethane	ND	155	516	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Difluorobenzene	10700	10800 ug/g	101	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/21/2003 08:10	7611	AM118 Metals in Liq HD by ICP	1	5/22/2003 14:43	blb	7702

Parameter	Result	MDL	PQL	Units
Aluminum	ND	10.5	52.6	ug/g
Antimony	ND	0.662	5.26	ug/g
Arsenic	ND	1.28	5.26	ug/g
Barium	ND	0.452	5.26	ug/g
Beryllium	ND	0.946	5.26	ug/g
Boron	4.15 J	3.93	10.5	ug/g
Cadmium	ND	0.431	5.26	ug/g
Chromium	8.20	1.36	5.26	ug/g
Cobalt	ND	0.284	1.05	ug/g
Copper	58.3	2.56	5.26	ug/g
Lead	ND	0.431	5.26	ug/g
Manganese	0.617 J	0.336	1.05	ug/g
Mercury	ND	0.0526	0.526	ug/g
Nickel	2.77 J	0.368	5.26	ug/g
Selenium	ND	1.23	10.5	ug/g
Silver	ND	0.494	5.26	ug/g

Report of Analysis

Thallium	ND	1.03	5.26	ug/g
Tin	ND	2.62	10.5	ug/g
Vanadium	1.36 J	1.05	5.26	ug/g
Zinc	ND	3.28	10.5	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/20/2003 11:34	7503	AM117 Semi-Vols Liq HD by GC	1	5/22/2003 14:44	ssh	7606

Parameter	Result	MDL	PQL	Units
Hexachloroethane	ND	79.2	2480	ug/g
Q	36300	50.5	2480	ug/g
T	533 J	69.3	2480	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Dithiane-d4	990	1060 ug/g	107	50 - 150

AM126 Lewisite in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/22/2003 08:54	7703	AM126 Lewisite in HD by GC	1	5/29/2003 22:52	ssh	7705

Parameter	Result	MDL	PQL	Units
Lewisite	ND	2.00	5.12	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
03-0004-050-12	21-03-247	5/3/2003 14:19	5/12/2003 14:18	7/23/2003 14:09	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/20/2003 08:22	7502	AM098 HD Purity by GC	1	5/21/2003 18:21	tfr	7602

Parameter	Result	MDL	PQL	Units
bis-(2-Chloroethyl)sulfide	94.4			%

AM100 Non-Vols in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 17:38	7203	AM100 Non-Vols in HD by GC	1	5/30/2003 0:00	ssh	7504

Parameter	Result	MDL	PQL	Units
Thiodiglycol (TDG)	ND	216	257	ug/g

Surrogates	Expected	Result	Recovery	Limits
Thiodiglycol-d8 (TDG-d8)	1030	1200 ug/g	117	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 10:13	7202	AM101 Vols in Liquid HD by GC	1	5/21/2003 0:00	ssh	7205

Parameter	Result	MDL	PQL	Units
1,2-Dichloroethane	5710	269	517	ug/g
Tetrachloroethylene	ND	103	517	ug/g
1,1,2,2-Tetrachloroethane	ND	155	517	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Difluorobenzene	10700	10500 ug/g	98.5	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/21/2003 08:10	7611	AM118 Metals in Liq HD by ICP	1	5/22/2003 14:48	blb	7702

Parameter	Result	MDL	PQL	Units
Aluminum	24.6 J	10.4	51.9	ug/g
Antimony	ND	0.654	5.19	ug/g
Arsenic	ND	1.27	5.19	ug/g
Barium	ND	0.446	5.19	ug/g
Beryllium	ND	0.934	5.19	ug/g
Boron	6.01 J	3.88	10.4	ug/g
Cadmium	ND	0.425	5.19	ug/g
Chromium	29.9	1.34	5.19	ug/g
Cobalt	ND	0.280	1.04	ug/g
Copper	8.50	2.52	5.19	ug/g
Lead	ND	0.425	5.19	ug/g
Manganese	5.84	0.332	1.04	ug/g
Mercury	ND	0.0519	0.519	ug/g
Nickel	15.7	0.363	5.19	ug/g
Selenium	ND	1.21	10.4	ug/g
Silver	ND	0.488	5.19	ug/g

Report of Analysis

Thallium	ND	1.02	5.19	ug/g
Tin	ND	2.58	10.4	ug/g
Vanadium	1.34 J	1.04	5.19	ug/g
Zinc	29.4	3.24	10.4	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/20/2003 11:34	7503	AM117 Semi-Vols Liq HD by GC	1	5/22/2003 15:22	ssh	7606

Parameter	*Result*	*MDL*	*PQL*	*Units*
Hexachloroethane	ND	83.2	2600	ug/g
Q	31200	53.0	2600	ug/g
T	660 J	72.8	2600	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Dithiane-d4	1040	1120 ug/g	108	50 - 150

AM126 Lewisite in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/22/2003 08:54	7703	AM126 Lewisite in HD by GC	1	5/29/2003 23:26	ssh	7705

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lewisite	ND	1.94	4.99	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
03-0004-051-01	21-03-215	4/28/2003 14:19	5/12/2003 14:18	7/23/2003 14:09	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 11:03	7201	AM118 Metals in NCS HD by ICP	1	5/19/2003 14:59	blb	7302

Parameter	Result	MDL	PQL	Units
Antimony	ND	0.136	5.24	ug/g
Arsenic	ND	0.597	5.24	ug/g
Barium	0.0747 J	0.0419	5.24	ug/g
Beryllium	ND	0.0524	5.24	ug/g
Cadmium	0.176 J	0.0210	5.24	ug/g
Chromium	2.89 J	1.05	5.24	ug/g
Cobalt	ND	0.126	1.05	ug/g
Copper	48.4	3.39	10.5	ug/g
Lead	ND	1.98	10.5	ug/g
Manganese	ND	3.46	10.5	ug/g
Mercury	ND	0.0734	0.524	ug/g
Nickel	1.84 J	0.650	5.24	ug/g
Selenium	ND	0.744	26.2	ug/g
Silver	ND	0.0629	5.24	ug/g
Thallium	ND	0.346	5.24	ug/g
Tin	ND	0.461	10.5	ug/g
Vanadium	ND	1.05	5.24	ug/g
Zinc	ND	2.31	10.5	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 11:03	7201	AM118 Metals in NCS HD by ICP	1	5/20/2003 15:55	blb	8802

Parameter	Result	MDL	PQL	Units
Aluminum	12.4 J	10.5	52.4	ug/g
Boron	ND	4.19	10.5	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
03-0004-051-02	21-03-216	4/28/2003 14:19	5/12/2003 14:18	7/23/2003 14:09	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 11:03	7201	AM118 Metals in NCS HD by ICP	1	5/19/2003 15:27	blb	7302

Parameter	Result	MDL	PQL	Units
Antimony	0.377 J	0.128	4.94	ug/g
Arsenic	ND	0.563	4.94	ug/g
Barium	0.0801 J	0.0395	4.94	ug/g
Beryllium	ND	0.0494	4.94	ug/g
Cadmium	0.158 J	0.0198	4.94	ug/g
Chromium	3.53 J	0.988	4.94	ug/g
Cobalt	ND	0.119	0.988	ug/g
Copper	26.2	3.19	9.88	ug/g
Lead	ND	1.87	9.88	ug/g
Manganese	ND	3.26	9.88	ug/g
Mercury	ND	0.0692	0.494	ug/g
Nickel	ND	0.613	4.94	ug/g
Selenium	ND	0.702	24.7	ug/g
Silver	0.0873 J	0.0593	4.94	ug/g
Thallium	ND	0.326	4.94	ug/g
Tin	ND	0.435	9.88	ug/g
Vanadium	1.08 J	0.988	4.94	ug/g
Zinc	ND	2.17	9.88	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 11:03	7201	AM118 Metals in NCS HD by ICP	1	5/20/2003 16:20	blb	8802

Parameter	Result	MDL	PQL	Units
Aluminum	10.4 J	9.88	49.4	ug/g
Boron	ND	3.95	9.88	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
03-0004-051-03	21-03-220	4/28/2003 14:19	5/12/2003 14:18	7/23/2003 14:09	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 11:03	7201	AM118 Metals in NCS HD by ICP	1	5/19/2003 15:33	blb	7302

Parameter	Result	MDL	PQL	Units
Antimony	0.953 J	0.144	5.54	ug/g
Arsenic	9.47	0.631	5.54	ug/g
Barium	0.475 J	0.0443	5.54	ug/g
Beryllium	ND	0.0554	5.54	ug/g
Cadmium	0.280 J	0.0221	5.54	ug/g
Chromium	27.6	1.11	5.54	ug/g
Cobalt	5.70	0.133	1.11	ug/g
Copper	25.3	3.58	11.1	ug/g
Lead	27.9	2.09	11.1	ug/g
Manganese	456	3.65	11.1	ug/g
Mercury	0.749	0.0775	0.554	ug/g
Nickel	60.9	0.687	5.54	ug/g
Selenium	ND	0.786	27.7	ug/g
Silver	ND	0.0664	5.54	ug/g
Thallium	ND	0.365	5.54	ug/g
Tin	5.08 J	0.487	11.1	ug/g
Vanadium	ND	1.11	5.54	ug/g
Zinc	109	2.44	11.1	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 11:03	7201	AM118 Metals in NCS HD by ICP	1	5/20/2003 16:25	blb	8802

Parameter	Result	MDL	PQL	Units
Aluminum	11.6 J	11.1	55.4	ug/g
Boron	ND	4.43	11.1	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
03-0004-051-04	21-03-223	4/29/2003 14:19	5/12/2003 14:18	7/23/2003 14:09	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 11:03	7201	AM118 Metals in NCS HD by ICP	1	5/19/2003 15:38	blb	7302

Parameter	Result	MDL	PQL	Units
Antimony	1.05 J	0.127	4.88	ug/g
Arsenic	788	0.556	4.88	ug/g
Barium	0.497 J	0.0390	4.88	ug/g
Beryllium	ND	0.0488	4.88	ug/g
Cadmium	0.226 J	0.0195	4.88	ug/g
Chromium	22.1	0.976	4.88	ug/g
Cobalt	5.01	0.117	0.976	ug/g
Copper	29.8	3.15	9.76	ug/g
Lead	32.3	1.84	9.76	ug/g
Manganese	323	3.22	9.76	ug/g
Mercury	0.215 J	0.0683	0.488	ug/g
Nickel	13.9	0.605	4.88	ug/g
Selenium	ND	0.693	24.4	ug/g
Silver	ND	0.0585	4.88	ug/g
Thallium	ND	0.322	4.88	ug/g
Tin	4.68 J	0.429	9.76	ug/g
Vanadium	1.11 J	0.976	4.88	ug/g
Zinc	85.5	2.15	9.76	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 11:03	7201	AM118 Metals in NCS HD by ICP	1	5/20/2003 17:30	blb	8802

Parameter	Result	MDL	PQL	Units
Aluminum	17.1 J	9.76	48.8	ug/g
Boron	ND	3.90	9.76	ug/g

Comments: Sample reanalyzed for arsenic on May 20th, 2003 with appropriate batch QC. Result shown is for the May 20th reanalysis for arsenic.
Sample diluted an additional 2 fold for arsenic.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
03-0004-051-05	21-03-226	4/29/2003 14:19	5/12/2003 14:18	7/23/2003 14:09	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 11:03	7201	AM118 Metals in NCS HD by ICP	1	5/19/2003 15:44	blb	7302

Parameter	Result	MDL	PQL	Units
Antimony	0.854 J	0.127	4.90	ug/g
Arsenic	67.9	0.559	4.90	ug/g
Barium	0.146 J	0.0392	4.90	ug/g
Beryllium	ND	0.0490	4.90	ug/g
Cadmium	0.214 J	0.0196	4.90	ug/g
Chromium	12.4	0.980	4.90	ug/g
Cobalt	3.14	0.118	0.980	ug/g
Copper	89.9	3.17	9.80	ug/g
Lead	9.76 J	1.85	9.80	ug/g
Manganese	197	3.24	9.80	ug/g
Mercury	343	0.0686	0.490	ug/g
Nickel	11.6	0.608	4.90	ug/g
Selenium	ND	0.696	24.5	ug/g
Silver	ND	0.0588	4.90	ug/g
Thallium	ND	0.324	4.90	ug/g
Tin	3.22 J	0.431	9.80	ug/g
Vanadium	1.32 J	0.980	4.90	ug/g
Zinc	56.7	2.16	9.80	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 11:03	7201	AM118 Metals in NCS HD by ICP	1	5/20/2003 17:25	blb	8802

Parameter	Result	MDL	PQL	Units
Aluminum	23.8 J	9.80	49.0	ug/g
Boron	ND	3.92	9.80	ug/g

Comments: Sample reanalyzed for mercury on May 20th, 2003 with appropriate batch QC. Result shown is for the May 20th reanalysis for mercury.
Sample diluted an additional 100 fold for mercury.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
03-0004-051-06	21-03-229	4/30/2003 14:19	5/12/2003 14:18	7/23/2003 14:09	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 11:03	7201	AM118 Metals in NCS HD by ICP	1	5/19/2003 15:49	blb	7302

Parameter	Result	MDL	PQL	Units
Antimony	1.43 J	0.128	4.91	ug/g
Arsenic	372	0.559	4.91	ug/g
Barium	0.146 J	0.0393	4.91	ug/g
Beryllium	ND	0.0491	4.91	ug/g
Cadmium	0.252 J	0.0196	4.91	ug/g
Chromium	9.14	0.981	4.91	ug/g
Cobalt	2.95	0.118	0.981	ug/g
Copper	62.0	3.17	9.81	ug/g
Lead	16.0	1.85	9.81	ug/g
Manganese	182	3.24	9.81	ug/g
Mercury	0.407 J	0.0687	0.491	ug/g
Nickel	12.5	0.608	4.91	ug/g
Selenium	ND	0.697	24.5	ug/g
Silver	ND	0.0589	4.91	ug/g
Thallium	ND	0.324	4.91	ug/g
Tin	7.13 J	0.432	9.81	ug/g
Vanadium	ND	0.981	4.91	ug/g
Zinc	68.5	2.16	9.81	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 11:03	7201	AM118 Metals in NCS HD by ICP	1	5/20/2003 16:40	blb	8802

Parameter	Result	MDL	PQL	Units
Aluminum	21.0 J	9.81	49.1	ug/g
Boron	ND	3.93	9.81	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
03-0004-051-07	21-03-232	5/1/2003 14:19	5/12/2003 14:18	7/23/2003 14:09	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 11:03	7201	AM118 Metals in NCS HD by ICP	1	5/19/2003 15:55	blb	7302

Parameter	Result	MDL	PQL	Units
Antimony	ND	0.144	5.56	ug/g
Arsenic	0.831 J	0.633	5.56	ug/g
Barium	0.101 J	0.0444	5.56	ug/g
Beryllium	ND	0.0556	5.56	ug/g
Cadmium	0.199 J	0.0222	5.56	ug/g
Chromium	4.39 J	1.11	5.56	ug/g
Cobalt	ND	0.133	1.11	ug/g
Copper	42.5	3.59	11.1	ug/g
Lead	ND	2.10	11.1	ug/g
Manganese	ND	3.67	11.1	ug/g
Mercury	0.0990 J	0.0778	0.556	ug/g
Nickel	2.38 J	0.689	5.56	ug/g
Selenium	ND	0.789	27.8	ug/g
Silver	ND	0.0667	5.56	ug/g
Thallium	ND	0.367	5.56	ug/g
Tin	ND	0.489	11.1	ug/g
Vanadium	1.18 J	1.11	5.56	ug/g
Zinc	ND	2.44	11.1	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 11:03	7201	AM118 Metals in NCS HD by ICP	1	5/20/2003 16:45	blb	8802

Parameter	Result	MDL	PQL	Units
Aluminum	18.9 J	11.1	55.6	ug/g
Boron	ND	4.44	11.1	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
03-0004-051-08	21-03-235	5/1/2003 14:19	5/12/2003 14:18	7/23/2003 14:09	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 11:03	7201	AM118 Metals in NCS HD by ICP	1	5/19/2003 16:00	blb	7302

Parameter	Result	MDL	PQL	Units
Antimony	0.686 J	0.123	4.71	ug/g
Arsenic	7.17	0.537	4.71	ug/g
Barium	0.256 J	0.0377	4.71	ug/g
Beryllium	ND	0.0471	4.71	ug/g
Cadmium	0.195 J	0.0189	4.71	ug/g
Chromium	24.6	0.943	4.71	ug/g
Cobalt	5.01	0.113	0.943	ug/g
Copper	15.4	3.04	9.43	ug/g
Lead	19.2	1.78	9.43	ug/g
Manganese	310	3.11	9.43	ug/g
Mercury	0.337 J	0.0660	0.471	ug/g
Nickel	35.5	0.584	4.71	ug/g
Selenium	ND	0.669	23.6	ug/g
Silver	ND	0.0566	4.71	ug/g
Thallium	ND	0.311	4.71	ug/g
Tin	2.89 J	0.415	9.43	ug/g
Vanadium	1.20 J	0.943	4.71	ug/g
Zinc	38.5	2.07	9.43	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 11:03	7201	AM118 Metals in NCS HD by ICP	1	5/20/2003 16:50	blb	8802

Parameter	Result	MDL	PQL	Units
Aluminum	45.9 J	9.43	47.1	ug/g
Boron	ND	3.77	9.43	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
03-0004-051-09	21-03-239	5/2/2003 14:19	5/12/2003 14:18	7/23/2003 14:09	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 11:03	7201	AM118 Metals in NCS HD by ICP	1	5/19/2003 16:06	blb	7302

Parameter	Result	MDL	PQL	Units
Antimony	0.526 J	0.142	5.45	ug/g
Arsenic	30.8	0.621	5.45	ug/g
Barium	0.110 J	0.0436	5.45	ug/g
Beryllium	ND	0.0545	5.45	ug/g
Cadmium	0.223 J	0.0218	5.45	ug/g
Chromium	9.46	1.09	5.45	ug/g
Cobalt	2.00	0.131	1.09	ug/g
Copper	42.2	3.52	10.9	ug/g
Lead	10.8 J	2.06	10.9	ug/g
Manganese	149	3.59	10.9	ug/g
Mercury	0.0862 J	0.0763	0.545	ug/g
Nickel	15.1	0.675	5.45	ug/g
Selenium	ND	0.773	27.2	ug/g
Silver	ND	0.0654	5.45	ug/g
Thallium	ND	0.359	5.45	ug/g
Tin	2.05 J	0.479	10.9	ug/g
Vanadium	ND	1.09	5.45	ug/g
Zinc	43.1	2.40	10.9	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 11:03	7201	AM118 Metals in NCS HD by ICP	1	5/20/2003 16:55	blb	8802

Parameter	Result	MDL	PQL	Units
Aluminum	18.0 J	10.9	54.5	ug/g
Boron	ND	4.36	10.9	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
03-0004-051-10	21-03-242	5/3/2003 14:19	5/12/2003 14:18	7/23/2003 14:09	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 11:03	7201	AM118 Metals in NCS HD by ICP	1	5/19/2003 16:12	blb	7302

Parameter	Result	MDL	PQL	Units
Antimony	0.636 J	0.132	5.09	ug/g
Arsenic	25.0	0.580	5.09	ug/g
Barium	0.176 J	0.0407	5.09	ug/g
Beryllium	ND	0.0509	5.09	ug/g
Cadmium	0.231 J	0.0203	5.09	ug/g
Chromium	24.7	1.02	5.09	ug/g
Cobalt	6.86	0.122	1.02	ug/g
Copper	85.1	3.29	10.2	ug/g
Lead	19.4	1.92	10.2	ug/g
Manganese	204	3.36	10.2	ug/g
Mercury	ND	0.0712	0.509	ug/g
Nickel	8.46	0.631	5.09	ug/g
Selenium	ND	0.722	25.4	ug/g
Silver	ND	0.0610	5.09	ug/g
Thallium	ND	0.336	5.09	ug/g
Tin	3.03 J	0.448	10.2	ug/g
Vanadium	1.62 J	1.02	5.09	ug/g
Zinc	103	2.24	10.2	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 11:03	7201	AM118 Metals in NCS HD by ICP	1	5/20/2003 17:00	blb	8802

Parameter	Result	MDL	PQL	Units
Aluminum	34.0 J	10.2	50.9	ug/g
Boron	ND	4.07	10.2	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
03-0004-051-11	21-03-245	5/3/2003 14:19	5/12/2003 14:18	7/23/2003 14:09	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 11:03	7201	AM118 Metals in NCS HD by ICP	1	5/19/2003 16:28	blb	7302

Parameter	Result	MDL	PQL	Units
Antimony	0.514 J	0.142	5.46	ug/g
Arsenic	39.5	0.623	5.46	ug/g
Barium	47.1	0.0437	5.46	ug/g
Beryllium	ND	0.0546	5.46	ug/g
Cadmium	0.255 J	0.0219	5.46	ug/g
Chromium	56.0	1.09	5.46	ug/g
Cobalt	2.14	0.131	1.09	ug/g
Copper	62.9	3.53	10.9	ug/g
Lead	92.0	2.07	10.9	ug/g
Manganese	117	3.61	10.9	ug/g
Mercury	ND	0.0765	0.546	ug/g
Nickel	12.5	0.678	5.46	ug/g
Selenium	ND	0.776	27.3	ug/g
Silver	ND	0.0656	5.46	ug/g
Thallium	ND	0.361	5.46	ug/g
Tin	2.64 J	0.481	10.9	ug/g
Vanadium	ND	1.09	5.46	ug/g
Zinc	113	2.40	10.9	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 11:03	7201	AM118 Metals in NCS HD by ICP	1	5/20/2003 17:15	blb	8802

Parameter	Result	MDL	PQL	Units
Aluminum	183	10.9	54.6	ug/g
Boron	ND	4.37	10.9	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
03-0004-051-12	21-03-248	5/3/2003 14:19	5/12/2003 14:18	7/23/2003 14:09	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 11:03	7201	AM118 Metals in NCS HD by ICP	1	5/19/2003 16:34	blb	7302

Parameter	Result	MDL	PQL	Units
Antimony	0.579 J	0.127	4.89	ug/g
Arsenic	6.70	0.557	4.89	ug/g
Barium	0.384 J	0.0391	4.89	ug/g
Beryllium	ND	0.0489	4.89	ug/g
Cadmium	0.201 J	0.0196	4.89	ug/g
Chromium	64.7	0.978	4.89	ug/g
Cobalt	4.19	0.117	0.978	ug/g
Copper	11.1	3.16	9.78	ug/g
Lead	8.75 J	1.85	9.78	ug/g
Manganese	316	3.23	9.78	ug/g
Mercury	0.597	0.0684	0.489	ug/g
Nickel	22.1	0.606	4.89	ug/g
Selenium	ND	0.694	24.4	ug/g
Silver	ND	0.0587	4.89	ug/g
Thallium	ND	0.323	4.89	ug/g
Tin	2.63 J	0.430	9.78	ug/g
Vanadium	ND	0.978	4.89	ug/g
Zinc	2.95 J	2.15	9.78	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 11:03	7201	AM118 Metals in NCS HD by ICP	1	5/20/2003 17:20	blb	8802

Parameter	Result	MDL	PQL	Units
Aluminum	19.2 J	9.78	48.9	ug/g
Boron	ND	3.91	9.78	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
03-0004-052-01	21-03-217	4/28/2003 14:19	5/12/2003 14:18	7/23/2003 14:09	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/20/2003 16:22	7501	AM118 Metals in Sld HD by ICP	1	5/21/2003 15:01	blb	7608

Parameter	Result	MDL	PQL	Units
Antimony	1.39 J	0.133	5.10	ug/g
Arsenic	2.35 J	0.581	5.10	ug/g
Barium	0.117 J	0.0408	5.10	ug/g
Beryllium	ND	0.0510	5.10	ug/g
Boron	ND	4.08	10.2	ug/g
Cadmium	0.257 J	0.0204	5.10	ug/g
Chromium	17.0	1.02	5.10	ug/g
Cobalt	3.86	0.122	1.02	ug/g
Copper	115	3.29	10.2	ug/g
Lead	35.4	1.93	10.2	ug/g
Manganese	298	3.36	10.2	ug/g
Mercury	0.893	0.0714	0.510	ug/g
Nickel	17.5	0.632	5.10	ug/g
Selenium	ND	0.724	25.5	ug/g
Silver	ND	0.0612	5.10	ug/g
Thallium	ND	0.336	5.10	ug/g
Tin	13.4	0.449	10.2	ug/g
Vanadium	ND	1.02	5.10	ug/g
Zinc	69.5	2.24	10.2	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/20/2003 16:22	7501	AM118 Metals in Sld HD by ICP	1	5/27/2003 16:55	blb	8901

Parameter	Result	MDL	PQL	Units
Aluminum	ND	10.2	51.0	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
03-0004-052-02	21-03-218	4/28/2003 14:19	5/12/2003 14:18	7/23/2003 14:09	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/20/2003 16:22	7501	AM118 Metals in Sld HD by ICP	1	5/21/2003 15:28	blb	7608

Parameter	Result	MDL	PQL	Units
Antimony	1.90 J	0.145	5.57	ug/g
Arsenic	1.62 J	0.635	5.57	ug/g
Barium	0.332 J	0.0445	5.57	ug/g
Beryllium	ND	0.0557	5.57	ug/g
Boron	ND	4.45	11.1	ug/g
Cadmium	0.282 J	0.0223	5.57	ug/g
Chromium	15.6	1.11	5.57	ug/g
Cobalt	4.09	0.134	1.11	ug/g
Copper	114	3.60	11.1	ug/g
Lead	30.8	2.10	11.1	ug/g
Manganese	317	3.67	11.1	ug/g
Mercury	0.684	0.0780	0.557	ug/g
Nickel	17.7	0.690	5.57	ug/g
Selenium	ND	0.791	27.8	ug/g
Silver	0.0838 J	0.0668	5.57	ug/g
Thallium	ND	0.367	5.57	ug/g
Tin	12.3	0.490	11.1	ug/g
Vanadium	ND	1.11	5.57	ug/g
Zinc	63.9	2.45	11.1	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/20/2003 16:22	7501	AM118 Metals in Sld HD by ICP	1	5/27/2003 17:20	blb	8901

Parameter	Result	MDL	PQL	Units
Aluminum	12.4 J	11.1	55.7	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
03-0004-052-03	21-03-221	4/28/2003 14:19	5/12/2003 14:18	7/23/2003 14:09	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/20/2003 16:22	7501	AM118 Metals in Sld HD by ICP	1	5/21/2003 15:39	blb	7608

Parameter	Result	MDL	PQL	Units
Antimony	2.23 J	0.140	5.40	ug/g
Arsenic	10.3	0.616	5.40	ug/g
Barium	1.85 J	0.0432	5.40	ug/g
Beryllium	ND	0.0540	5.40	ug/g
Boron	ND	4.32	10.8	ug/g
Cadmium	0.224 J	0.0216	5.40	ug/g
Chromium	105	1.08	5.40	ug/g
Cobalt	10.1	0.130	1.08	ug/g
Copper	20.3	3.49	10.8	ug/g
Lead	73.1	2.04	10.8	ug/g
Manganese	564	3.56	10.8	ug/g
Mercury	0.661	0.0756	0.540	ug/g
Nickel	446	0.670	5.40	ug/g
Selenium	ND	0.767	27.0	ug/g
Silver	ND	0.0648	5.40	ug/g
Thallium	ND	0.356	5.40	ug/g
Tin	7.71 J	0.475	10.8	ug/g
Vanadium	1.23 J	1.08	5.40	ug/g
Zinc	59.4	2.38	10.8	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/20/2003 16:22	7501	AM118 Metals in Sld HD by ICP	1	5/27/2003 17:25	blb	8901

Parameter	Result	MDL	PQL	Units
Aluminum	21.7 J	10.8	54.0	ug/g

Comments: Sample diluted an additional 2 fold for manganese.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
03-0004-052-04	21-03-224	4/29/2003 14:19	5/12/2003 14:18	7/23/2003 14:09	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/20/2003 16:22	7501	AM118 Metals in Sld HD by ICP	1	5/21/2003 15:45	blb	7608

Parameter	Result	MDL	PQL	Units
Antimony	0.590 J	0.133	5.10	ug/g
Arsenic	371	0.581	5.10	ug/g
Barium	0.519 J	0.0408	5.10	ug/g
Beryllium	ND	0.0510	5.10	ug/g
Boron	4.92 J	4.08	10.2	ug/g
Cadmium	0.256 J	0.0204	5.10	ug/g
Chromium	18.9	1.02	5.10	ug/g
Cobalt	3.12	0.122	1.02	ug/g
Copper	100.0	3.29	10.2	ug/g
Lead	24.6	1.93	10.2	ug/g
Manganese	219	3.36	10.2	ug/g
Mercury	0.133 J	0.0714	0.510	ug/g
Nickel	12.9	0.632	5.10	ug/g
Selenium	ND	0.724	25.5	ug/g
Silver	ND	0.0612	5.10	ug/g
Thallium	ND	0.336	5.10	ug/g
Tin	3.36 J	0.449	10.2	ug/g
Vanadium	ND	1.02	5.10	ug/g
Zinc	136	2.24	10.2	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/20/2003 16:22	7501	AM118 Metals in Sld HD by ICP	1	5/27/2003 17:30	blb	8901

Parameter	Result	MDL	PQL	Units
Aluminum	28.8 J	10.2	51.0	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
03-0004-052-05	21-03-227	4/29/2003 14:19	5/12/2003 14:18	7/23/2003 14:09	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/20/2003 16:22	7501	AM118 Metals in Sld HD by ICP	1	5/21/2003 16:51	blb	7608

Parameter	Result	MDL	PQL	Units
Antimony	1.18 J	0.137	5.25	ug/g
Arsenic	63.6	0.599	5.25	ug/g
Barium	0.509 J	0.0420	5.25	ug/g
Beryllium	0.0669 J	0.0525	5.25	ug/g
Boron	ND	4.20	10.5	ug/g
Cadmium	0.381 J	0.0210	5.25	ug/g
Chromium	17.2	1.05	5.25	ug/g
Cobalt	3.70	0.126	1.05	ug/g
Copper	292	3.39	10.5	ug/g
Lead	39.1	1.99	10.5	ug/g
Manganese	208	3.47	10.5	ug/g
Mercury	95.0	0.0735	0.525	ug/g
Nickel	17.5	0.651	5.25	ug/g
Selenium	ND	0.746	26.3	ug/g
Silver	0.0902 J	0.0630	5.25	ug/g
Thallium	ND	0.347	5.25	ug/g
Tin	2.08 J	0.462	10.5	ug/g
Vanadium	1.24 J	1.05	5.25	ug/g
Zinc	265	2.31	10.5	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/20/2003 16:22	7501	AM118 Metals in Sld HD by ICP	1	5/27/2003 17:35	blb	8901

Parameter	Result	MDL	PQL	Units
Aluminum	2930	10.5	52.5	ug/g

Comments: Sample diluted an additional 100 fold for mercury.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
03-0004-052-06	21-03-230	4/30/2003 14:19	5/12/2003 14:18	7/23/2003 14:09	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/20/2003 16:22	7501	AM118 Metals in Sld HD by ICP	1	5/21/2003 15:56	blb	7608

Parameter	Result	MDL	PQL	Units
Antimony	1.22 J	0.125	4.79	ug/g
Arsenic	561	0.546	4.79	ug/g
Barium	ND	0.0383	4.79	ug/g
Beryllium	ND	0.0479	4.79	ug/g
Boron	ND	3.83	9.58	ug/g
Cadmium	0.222 J	0.0192	4.79	ug/g
Chromium	10.4	0.958	4.79	ug/g
Cobalt	2.84	0.115	0.958	ug/g
Copper	118	3.09	9.58	ug/g
Lead	18.5	1.81	9.58	ug/g
Manganese	193	3.16	9.58	ug/g
Mercury	0.190 J	0.0670	0.479	ug/g
Nickel	12.9	0.594	4.79	ug/g
Selenium	ND	0.680	23.9	ug/g
Silver	ND	0.0575	4.79	ug/g
Thallium	ND	0.316	4.79	ug/g
Tin	6.17 J	0.421	9.58	ug/g
Vanadium	ND	0.958	4.79	ug/g
Zinc	101	2.11	9.58	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/20/2003 16:22	7501	AM118 Metals in Sld HD by ICP	1	5/27/2003 17:40	blb	8901

Parameter	Result	MDL	PQL	Units
Aluminum	10.9 J	9.58	47.9	ug/g

Comments: Sample diluted an additional 2 fold for arsenic.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
03-0004-052-07	21-03-233	5/1/2003 14:19	5/12/2003 14:18	7/23/2003 14:09	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/20/2003 16:22	7501	AM118 Metals in Sld HD by ICP	1	5/21/2003 16:02	blb	7608

Parameter	Result	MDL	PQL	Units
Antimony	0.518 J	0.127	4.89	ug/g
Arsenic	1.36 J	0.558	4.89	ug/g
Barium	0.184 J	0.0391	4.89	ug/g
Beryllium	ND	0.0489	4.89	ug/g
Boron	ND	3.91	9.78	ug/g
Cadmium	0.259 J	0.0196	4.89	ug/g
Chromium	13.6	0.978	4.89	ug/g
Cobalt	3.42	0.117	0.978	ug/g
Copper	58.3	3.16	9.78	ug/g
Lead	13.2	1.85	9.78	ug/g
Manganese	312	3.23	9.78	ug/g
Mercury	1.18	0.0685	0.489	ug/g
Nickel	10.0	0.607	4.89	ug/g
Selenium	ND	0.695	24.5	ug/g
Silver	ND	0.0587	4.89	ug/g
Thallium	ND	0.323	4.89	ug/g
Tin	1.45 J	0.431	9.78	ug/g
Vanadium	ND	0.978	4.89	ug/g
Zinc	93.5	2.15	9.78	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/20/2003 16:22	7501	AM118 Metals in Sld HD by ICP	1	5/27/2003 17:45	blb	8901

Parameter	Result	MDL	PQL	Units
Aluminum	12.0 J	9.78	48.9	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
03-0004-052-08	21-03-236	5/1/2003 14:19	5/12/2003 14:18	7/23/2003 14:09	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/20/2003 16:22	7501	AM118 Metals in Sld HD by ICP	1	5/21/2003 16:24	blb	7608

Parameter	Result	MDL	PQL	Units
Antimony	1.71 J	0.143	5.51	ug/g
Arsenic	9.77	0.628	5.51	ug/g
Barium	0.161 J	0.0441	5.51	ug/g
Beryllium	ND	0.0551	5.51	ug/g
Boron	ND	4.41	11.0	ug/g
Cadmium	0.255 J	0.0221	5.51	ug/g
Chromium	55.1	1.10	5.51	ug/g
Cobalt	10.1	0.132	1.10	ug/g
Copper	13.8	3.56	11.0	ug/g
Lead	51.3	2.08	11.0	ug/g
Manganese	503	3.64	11.0	ug/g
Mercury	0.245 J	0.0772	0.551	ug/g
Nickel	90.4	0.684	5.51	ug/g
Selenium	ND	0.783	27.6	ug/g
Silver	ND	0.0662	5.51	ug/g
Thallium	ND	0.364	5.51	ug/g
Tin	6.39 J	0.485	11.0	ug/g
Vanadium	1.24 J	1.10	5.51	ug/g
Zinc	59.6	2.43	11.0	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/20/2003 16:22	7501	AM118 Metals in Sld HD by ICP	1	5/27/2003 17:50	blb	8901

Parameter	Result	MDL	PQL	Units
Aluminum	22.8 J	11.0	55.1	ug/g

Comments: Sample diluted an additional 2 fold for manganese.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
03-0004-052-09	21-03-240	5/2/2003 14:19	5/12/2003 14:18	7/23/2003 14:09	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/20/2003 16:22	7501	AM118 Metals in Sld HD by ICP	1	5/21/2003 16:29	blb	7608

Parameter	Result	MDL	PQL	Units
Antimony	1.72 J	0.128	4.93	ug/g
Arsenic	28.1	0.562	4.93	ug/g
Barium	ND	0.0394	4.93	ug/g
Beryllium	ND	0.0493	4.93	ug/g
Boron	ND	3.94	9.85	ug/g
Cadmium	0.584 J	0.0197	4.93	ug/g
Chromium	9.87	0.985	4.93	ug/g
Cobalt	3.39	0.118	0.985	ug/g
Copper	231	3.18	9.85	ug/g
Lead	46.9	1.86	9.85	ug/g
Manganese	307	3.25	9.85	ug/g
Mercury	0.114 J	0.0690	0.493	ug/g
Nickel	28.8	0.611	4.93	ug/g
Selenium	ND	0.700	24.6	ug/g
Silver	ND	0.0591	4.93	ug/g
Thallium	ND	0.325	4.93	ug/g
Tin	7.80 J	0.433	9.85	ug/g
Vanadium	ND	0.985	4.93	ug/g
Zinc	276	2.17	9.85	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/20/2003 16:22	7501	AM118 Metals in Sld HD by ICP	1	5/27/2003 17:55	blb	8901

Parameter	Result	MDL	PQL	Units
Aluminum	ND	9.85	49.3	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
03-0004-052-10	21-03-243	5/3/2003 14:19	5/12/2003 14:18	7/23/2003 14:09	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/20/2003 16:22	7501	AM118 Metals in Sld HD by ICP	1	5/21/2003 16:35	blb	7608

Parameter	Result	MDL	PQL	Units
Antimony	1.12 J	0.140	5.38	ug/g
Arsenic	42.6	0.614	5.38	ug/g
Barium	0.0753 J	0.0431	5.38	ug/g
Beryllium	ND	0.0538	5.38	ug/g
Boron	ND	4.31	10.8	ug/g
Cadmium	0.428 J	0.0215	5.38	ug/g
Chromium	27.8	1.08	5.38	ug/g
Cobalt	11.3	0.129	1.08	ug/g
Copper	212	3.48	10.8	ug/g
Lead	368	2.03	10.8	ug/g
Manganese	377	3.55	10.8	ug/g
Mercury	0.0836 J	0.0753	0.538	ug/g
Nickel	19.3	0.667	5.38	ug/g
Selenium	ND	0.764	26.9	ug/g
Silver	ND	0.0646	5.38	ug/g
Thallium	ND	0.355	5.38	ug/g
Tin	3.51 J	0.474	10.8	ug/g
Vanadium	ND	1.08	5.38	ug/g
Zinc	405	2.37	10.8	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/20/2003 16:22	7501	AM118 Metals in Sld HD by ICP	1	5/27/2003 18:00	blb	8901

Parameter	Result	MDL	PQL	Units
Aluminum	ND	10.8	53.8	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
03-0004-052-11	21-03-246	5/3/2003 14:19	5/12/2003 14:18	7/23/2003 14:09	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/20/2003 16:22	7501	AM118 Metals in Sld HD by ICP	1	5/21/2003 16:40	blb	7608

Parameter	Result	MDL	PQL	Units
Antimony	0.509 J	0.132	5.08	ug/g
Arsenic	10.1	0.579	5.08	ug/g
Barium	ND	0.0407	5.08	ug/g
Beryllium	ND	0.0508	5.08	ug/g
Boron	ND	4.07	10.2	ug/g
Cadmium	0.294 J	0.0203	5.08	ug/g
Chromium	9.53	1.02	5.08	ug/g
Cobalt	3.36	0.122	1.02	ug/g
Copper	231	3.28	10.2	ug/g
Lead	10.1 J	1.92	10.2	ug/g
Manganese	391	3.35	10.2	ug/g
Mercury	0.163 J	0.0711	0.508	ug/g
Nickel	51.7	0.630	5.08	ug/g
Selenium	ND	0.722	25.4	ug/g
Silver	ND	0.0610	5.08	ug/g
Thallium	ND	0.335	5.08	ug/g
Tin	1.72 J	0.447	10.2	ug/g
Vanadium	ND	1.02	5.08	ug/g
Zinc	81.4	2.24	10.2	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/20/2003 16:22	7501	AM118 Metals in Sld HD by ICP	1	5/27/2003 18:15	blb	8901

Parameter	Result	MDL	PQL	Units
Aluminum	ND	10.2	50.8	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
03-0004-052-12	21-03-249	5/3/2003 14:19	5/12/2003 14:18	7/23/2003 14:09	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/20/2003 16:22	7501	AM118 Metals in Sld HD by ICP	1	5/21/2003 16:46	blb	7608

Parameter	Result	MDL	PQL	Units
Antimony	0.458 J	0.138	5.31	ug/g
Arsenic	2.68 J	0.606	5.31	ug/g
Barium	0.409 J	0.0425	5.31	ug/g
Beryllium	ND	0.0531	5.31	ug/g
Boron	4.92 J	4.25	10.6	ug/g
Cadmium	0.180 J	0.0213	5.31	ug/g
Chromium	397	1.06	5.31	ug/g
Cobalt	2.13	0.128	1.06	ug/g
Copper	16.1	3.43	10.6	ug/g
Lead	26.5	2.01	10.6	ug/g
Manganese	193	3.51	10.6	ug/g
Mercury	0.445 J	0.0744	0.531	ug/g
Nickel	75.2	0.659	5.31	ug/g
Selenium	ND	0.755	26.6	ug/g
Silver	ND	0.0638	5.31	ug/g
Thallium	ND	0.351	5.31	ug/g
Tin	1.02 J	0.468	10.6	ug/g
Vanadium	ND	1.06	5.31	ug/g
Zinc	8.52 J	2.34	10.6	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/20/2003 16:22	7501	AM118 Metals in Sld HD by ICP	1	5/27/2003 18:20	blb	8901

Parameter	Result	MDL	PQL	Units
Aluminum	23.8 J	10.6	53.1	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Method Blank

Lab ID	Sample ID	Reported
4356	MB for HBN 7202 [PREP/1449] *(Results reported on a wet weight basis)*	6/10/2003 17:00

AM101 Vols in Liquid HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 10:13	7202	AM101 Vols in Liquid HD by GC	1	5/20/2003 16:10	ssh	7205

Surrogates	Expected	Result	Recover	Limits
1,4-Difluorobenzene	103	111 ug/mL	107	50 - 150

Method Blank

Lab ID	Sample ID	Reported
4362	MB for HBN 7203 [PREP/1450] *(Results reported on a wet weight basis)*	6/10/2003 17:00

AM100 Non-Vols in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 17:38	7203	AM100 Non-Vols in HD by GC	1	5/29/2003 15:12	ssh	7504

Surrogates	Expected	Result	Recover	Limits
Thiodiglycol-d8 (TDG-d8)	10	11.7 ug/mL	117	50 - 150

Method Blank

Lab ID	Sample ID	Reported
4395	MB for HBN 7503 [PREP/1453] *(Results reported on a wet weight basis)*	3/5/2003 17:00

AM117 Semi-Vols Liq HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/20/2003 11:34	7503	AM117 Semi-Vols Liq HD by GC	1	5/22/2003 0:00	ssh	7606

Surrogates	Expected	Result	Recover	Limits
1,4-Dithiane-d4	1000	10800 ug/mL	1080 *	50 - 150

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Method Blank

Lab ID	Sample ID	Reported
4392	MB for HBN 7502 [PREP/1452] *(Results reported on a wet weight basis)*	3/5/2003 17:00

AM098 HD Purity by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/20/2003 08:22	7502	AM098 HD Purity by GC	1	5/21/2003 13:15	tfr	7602

Parameter	Result	MDL	PQL	Units
bis-(2-Chloroethyl)sulfide	0.00			%

Method Blank

Lab ID	Sample ID	Reported
4487	MB for HBN 7703 [PREP/1457] *(Results reported on a wet weight basis)*	6/10/2003 17:00

AM126 Lewisite in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/22/2003 08:54	7703	AM126 Lewisite in HD by GC	1	5/29/2003 14:16	ssh	7705

Parameter	Result	MDL	PQL	Units
Lewisite	ND	1.95	5.00	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Method Blank

Lab ID	Sample ID	Reported
4349	MB for HBN 7201 [PREP/1448]	6/10/2003 17:00
	(Results reported on a wet weight basis)	

AM118 Metals in NCS HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 11:03	7201	AM118 Metals in NCS HD by ICP	1	5/19/2003 14:43	blb	7302

Parameter	Result	MDL	PQL	Units
Antimony	ND	0.130	5.00	ug/g
Arsenic	ND	0.570	5.00	ug/g
Barium	0.0667 J	0.0400	5.00	ug/g
Beryllium	ND	0.0500	5.00	ug/g
Cadmium	0.150 J	0.0200	5.00	ug/g
Chromium	ND	1.00	5.00	ug/g
Cobalt	ND	0.120	1.00	ug/g
Copper	ND	3.23	10.0	ug/g
Lead	ND	1.89	10.0	ug/g
Manganese	ND	3.30	10.0	ug/g
Mercury	ND	0.0700	0.500	ug/g
Nickel	ND	0.620	5.00	ug/g
Selenium	ND	0.710	25.0	ug/g
Silver	ND	0.0600	5.00	ug/g
Thallium	ND	0.330	5.00	ug/g
Tin	ND	0.440	10.0	ug/g
Vanadium	ND	1.00	5.00	ug/g
Zinc	ND	2.20	10.0	ug/g

Method Blank

Lab ID	Sample ID	Reported
4385	MB for HBN 7501 [PREP/1451]	6/10/2003 17:00
	(Results reported on a wet weight basis)	

AM118 Metals in Sld HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/20/2003 16:22	7501	AM118 Metals in Sld HD by ICP	1	5/21/2003 14:38	blb	7608

Parameter	Result	MDL	PQL	Units
Antimony	ND	0.130	5.00	ug/g
Arsenic	ND	0.570	5.00	ug/g
Barium	0.0708 J	0.0400	5.00	ug/g
Beryllium	ND	0.0500	5.00	ug/g
Boron	ND	4.00	10.0	ug/g
Cadmium	0.153 J	0.0200	5.00	ug/g
Chromium	ND	1.00	5.00	ug/g
Cobalt	ND	0.120	1.00	ug/g
Copper	ND	3.23	10.0	ug/g
Lead	ND	1.89	10.0	ug/g
Manganese	ND	3.30	10.0	ug/g
Mercury	ND	0.0700	0.500	ug/g

Report of Analysis

7501 7608 Method Blank

Nickel	ND	0.620	5.00	ug/g
Selenium	ND	0.710	25.0	ug/g
Silver	ND	0.0600	5.00	ug/g
Thallium	ND	0.330	5.00	ug/g
Tin	ND	0.440	10.0	ug/g
Vanadium	ND	1.00	5.00	ug/g
Zinc	ND	2.20	10.0	ug/g

Method Blank

Lab ID	Sample ID	Reported
4472	MB for HBN 7611 [PREP/1456]	6/10/2003 17:00
	(Results reported on a wet weight basis)	

AM118 Metals in Liq HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/21/2003 08:10	7611	AM118 Metals in Liq HD by ICP	1	5/22/2003 12:53	blb	7702

Parameter	Result	MDL	PQL	Units
Aluminum	ND	10.0	50.0	ug/g
Antimony	ND	0.630	5.00	ug/g
Arsenic	ND	1.22	5.00	ug/g
Barium	ND	0.430	5.00	ug/g
Beryllium	ND	0.900	5.00	ug/g
Boron	ND	3.74	10.0	ug/g
Cadmium	ND	0.410	5.00	ug/g
Chromium	ND	1.29	5.00	ug/g
Cobalt	ND	0.270	1.00	ug/g
Copper	ND	2.43	5.00	ug/g
Lead	ND	0.410	5.00	ug/g
Manganese	ND	0.320	1.00	ug/g
Mercury	ND	0.0500	0.500	ug/g
Nickel	0.543 J	0.350	5.00	ug/g
Selenium	6.03 J	1.17	10.0	ug/g
Silver	ND	0.470	5.00	ug/g
Thallium	ND	0.980	5.00	ug/g
Tin	ND	2.49	10.0	ug/g
Vanadium	ND	1.00	5.00	ug/g
Zinc	ND	3.12	10.0	ug/g

Method Blank

Lab ID	Sample ID	Reported
4349	MB for HBN 7201 [PREP/1448]	7/16/2003 14:42
	(Results reported on a wet weight basis)	

AM118 Metals in NCS HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 11:03	7201	AM118 Metals in NCS HD by ICP	1	5/20/2003 15:40	blb	8802

Parameter	Result	MDL	PQL	Units
Aluminum	11.4 J	10.0	50.0	ug/g
Boron	ND	4.00	10.0	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Method Blank

Lab ID	Sample ID	Reported
4385	MB for HBN 7501 [PREP/1451] *(Results reported on a wet weight basis)*	7/15/2003 10:02

AM118 Metals in Sld HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/20/2003 16:22	7501	AM118 Metals in Sld HD by ICP	1	5/27/2003 16:40	blb	8901

Parameter	Result	MDL	PQL	Units
Aluminum	ND	10.0	50.0	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Method Blank

Lab ID	Sample ID	Reported
4362	MB for HBN 7203 [PREP/1450] *(Results reported on a wet weight basis)*	6/10/2003 17:00

AM100 Non-Vols in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 17:38	7203	AM100 Non-Vols in HD by GC	1	5/29/2003 15:12	ssh	7504

Parameter	Result	MDL	PQL	Units
Thiodiglycol (TDG)	ND	210	250	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Method Blank

Lab ID	Sample ID	Reported
4395	MB for HBN 7503 [PREP/1453] *(Results reported on a wet weight basis)*	3/5/2003 17:00

AM117 Semi-Vols Liq HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/20/2003 11:34	7503	AM117 Semi-Vols Liq HD by GC	1	5/22/2003 0:00	ssh	7606

Parameter	Result	MDL	PQL	Units
Hexachloroethane	ND	800	25000	ug/g
Q	ND	510	25000	ug/g
T	ND	700	25000	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Method Blank

Lab ID	Sample ID	Reported
4356	MB for HBN 7202 [PREP/1449] *(Results reported on a wet weight basis)*	6/10/2003 17:00

AM101 Vols in Liquid HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/16/2003 10:13	7202	AM101 Vols in Liquid HD by GC	1	5/20/2003 16:10	ssh	7205

Parameter	Result	MDL	PQL	Units
1,2-Dichloroethane	ND	260	500	ug/g
Tetrachloroethylene	ND	100	500	ug/g
1,1,2,2-Tetrachloroethane	ND	150	500	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

QC Summary

LCS Lab ID: 4393 | Original Lab ID: | Prep Batch: 7502
Matrix: Liquid | Analytical: 7602

AM098 HD Purity by GC	Expected	Result	Recovery	Rec Limits
bis-(2-Chloroethyl)sulfide	98.2 %	101	103	85 - 115

DUP Lab ID: 4394 | Original Lab ID: 03-0004-050-01 | Prep Batch: 7502
Matrix: Liquid | Analytical: 7602

AM098 HD Purity by GC	Original Result	Result	RPD	RPD Limits
bis-(2-Chloroethyl)sulfide	89	95.6	7.12	0 - 25

LCS Lab ID: 4488 | Original Lab ID: | Prep Batch: 7703
Matrix: Liquid | Analytical: 7705

AM126 Lewisite in HD by GC	Expected	Result	Recovery	Rec Limits
Lewisite	25.2 ug/g	37.3	148	50 - 150

DUP Lab ID: 4489 | Original Lab ID: 03-0004-050-01 | Prep Batch: 7703
Matrix: Liquid | Analytical: 7705

AM126 Lewisite in HD by GC	Original Result	Result	RPD	RPD Limits
Lewisite	0	0	0	0 - 25

MS Lab ID: 4490 | Original Lab ID: 03-0004-050-01 | Prep Batch: 7703
Matrix: Liquid | Analytical: 7705

AM126 Lewisite in HD by GC	Original Result	Expected	Result	Recovery	Rec Limits
Lewisite	0	26 ug/g	30	115	50 - 150

MSD Lab ID: 4491 | Original Lab ID: 03-0004-050-01 | Prep Batch: 7703
Matrix: Liquid | Analytical: 7705

AM126 Lewisite in HD by GC	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits
Lewisite	25.7 ug/g	28.8	112	50 - 150	2.64	0 - 25

LCS Lab ID: 4492 | Original Lab ID: | Prep Batch: 7703
Matrix: Liquid | Analytical: 7705

AM126 Lewisite in HD by GC	Expected	Result	Recovery	Rec Limits
Lewisite	25.2 ug/g	32.1	127	50 - 150

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

QC Summary

LCS Lab ID: 4350 | Original Lab ID: 4349 | Prep Batch: 7201
Matrix: Non-cohesive Solid | Analytical: 7302

AM118 Metals in NCS HD by ICP	Expected	Result	Recovery	Rec Limits
Antimony	50 ug/g	44.1	88.3	75 - 125
Arsenic	50 ug/g	53.5	107	75 - 125
Barium	50 ug/g	50.6	101	75 - 125
Beryllium	50 ug/g	49.5	99	75 - 125
Cadmium	50 ug/g	51	102	75 - 125
Chromium	50 ug/g	49.1	98.2	75 - 125
Cobalt	50 ug/g	48.7	97.3	75 - 125
Copper	50 ug/g	50.8	101	75 - 125
Lead	50 ug/g	51.9	104	75 - 125
Manganese	50 ug/g	49.8	99.6	75 - 125
Mercury	2.5 ug/g	2.6	103	75 - 125
Nickel	50 ug/g	48	95.9	75 - 125
Selenium	50 ug/g	52.6	105	75 - 125
Silver	50 ug/g	52.4	105	75 - 125
Thallium	50 ug/g	52.6	105	75 - 125
Tin	50 ug/g	49	98	75 - 125
Vanadium	50 ug/g	49.2	98.5	75 - 125
Zinc	50 ug/g	51.9	103	75 - 125

DUP Lab ID: 4351 | Original Lab ID: 03-0004-051-01 | Prep Batch: 7201
Matrix: Non-cohesive Solid | Analytical: 7302

AM118 Metals in NCS HD by ICP	Original Result	Result	RPD		RPD Limits
Antimony	0.136	0.0526	88.5	*	0 - 20
Arsenic	0.26	0.524	67.4	*	0 - 20
Barium	0.0747	0.0753	0.681		0 - 20
Beryllium	0	0.0026	200	*	0 - 20
Cadmium	0.176	0.152	14.1		0 - 20
Chromium	2.89	3.65	23.2	*	0 - 20
Cobalt	0.0301	0.031	2.98		0 - 20
Copper	48.4	48.3	0.366		0 - 20
Lead	0.354	0.394	10.6		0 - 20
Manganese	1.04	1.03	0.881		0 - 20
Mercury	0.0147	0.0191	26.3	*	0 - 20
Nickel	1.84	1.94	5.4		0 - 20
Selenium	0	0	0		0 - 20
Silver	0.00741	0.00532	32.8	*	0 - 20
Thallium	0.0712	0.0558	24.3	*	0 - 20
Tin	0.0451	0.049	8.31		0 - 20
Vanadium	0.911	1.01	10.2		0 - 20
Zinc	1.25	1.4	10.7		0 - 20

MS Lab ID: 4352 | Original Lab ID: 03-0004-051-01 | Prep Batch: 7201
Matrix: Non-cohesive Solid | Analytical: 7302

AM118 Metals in NCS HD by ICP	Original Result	Expected	Result	Recovery	Rec Limits
Antimony	0.136	48.1 ug/g	44.6	92.3	75 - 125

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

MS Lab ID: 4352 | Original Lab ID: 03-0004-051-01 | Prep Batch: 7201
Matrix: Non-cohesive Solid | Analytical: 7302

AM118 Metals in NCS HD by ICP	Original Result	Expected	Result	Recovery	Rec Limits
Arsenic	0.26	48.1 ug/g	49.8	103	50 - 150
Barium	0.0747	48.1 ug/g	46.9	97.3	75 - 125
Beryllium	0	48.1 ug/g	44.3	92	75 - 125
Cadmium	0.176	48.1 ug/g	44.6	92.4	75 - 125
Chromium	2.89	48.1 ug/g	56.1	111	75 - 125
Cobalt	0.0301	48.1 ug/g	45.9	95.4	75 - 125
Copper	48.4	48.1 ug/g	96.1	99	75 - 125
Lead	0.354	48.1 ug/g	48.8	101	75 - 125
Manganese	1.04	48.1 ug/g	48.9	99.5	75 - 125
Mercury	0.0147	2.41 ug/g	2.42	100	50 - 150
Nickel	1.84	48.1 ug/g	54.7	110	75 - 125
Selenium	0	48.1 ug/g	47.9	99.5	50 - 150
Silver	0.00741	48.1 ug/g	47.5	98.6	50 - 150
Thallium	0.0712	48.1 ug/g	49.9	103	75 - 125
Tin	0.0451	48.1 ug/g	46.2	95.8	75 - 125
Vanadium	0.911	48.1 ug/g	47.9	97.6	75 - 125
Zinc	1.25	48.1 ug/g	47.8	96.8	50 - 150

MSD Lab ID: 4353 | Original Lab ID: 03-0004-051-01 | Prep Batch: 7201
Matrix: Non-cohesive Solid | Analytical: 7302

AM118 Metals in NCS HD by ICP	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits
Antimony	52.6 ug/g	49.2	93.2	75 - 125	0.97	0 - 25
Arsenic	52.6 ug/g	53.7	101	50 - 150	1.96	0 - 25
Barium	52.6 ug/g	51.9	98.4	75 - 125	1.12	0 - 25
Beryllium	52.6 ug/g	48.9	93	75 - 125	1.08	0 - 25
Cadmium	52.6 ug/g	49.6	93.9	75 - 125	1.61	0 - 25
Chromium	52.6 ug/g	54.6	98.3	75 - 125	12.1	0 - 25
Cobalt	52.6 ug/g	50.4	95.7	75 - 125	0.314	0 - 25
Copper	52.6 ug/g	101	99.6	75 - 125	0.604	0 - 25
Lead	52.6 ug/g	53.3	101	75 - 125	0	0 - 25
Manganese	52.6 ug/g	52.4	97.7	75 - 125	1.83	0 - 25
Mercury	2.63 ug/g	2.63	99.5	50 - 150	0.501	0 - 25
Nickel	52.6 ug/g	51.8	95	75 - 125	14.6	0 - 25
Selenium	52.6 ug/g	50.6	96.1	50 - 150	3.48	0 - 25
Silver	52.6 ug/g	51.7	98.2	50 - 150	0.407	0 - 25
Thallium	52.6 ug/g	55	104	75 - 125	0.966	0 - 25
Tin	52.6 ug/g	51.3	97.4	75 - 125	1.66	0 - 25
Vanadium	52.6 ug/g	52.4	97.8	75 - 125	0.205	0 - 25
Zinc	52.6 ug/g	52.2	96.9	50 - 150	0.103	0 - 25

LCS Lab ID: 4354 | Original Lab ID: | Prep Batch: 7201
Matrix: Non-cohesive Solid | Analytical: 7302

AM118 Metals in NCS HD by ICP	Expected	Result	Recovery	Rec Limits
Arsenic	137 ug/g	142	104	75 - 125
Barium	56.4 ug/g	58.8	104	75 - 125
Chromium	108 ug/g	101	93.7	75 - 125

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

LCS Lab ID: 4354 | Original Lab ID: | Prep Batch: 7201
Matrix: Non-cohesive Solid | Analytical: 7302

AM118 Metals in NCS HD by ICP	Expected	Result	Recovery	Rec Limits
Cobalt	10.8 ug/g	10.2	95.2	75 - 125
Copper	386 ug/g	339	87.9	75 - 125
Lead	5.55 ug/g	5.81	105	75 - 125
Manganese	465 ug/g	428	92.1	75 - 125
Nickel	189 ug/g	172	91.3	75 - 125
Vanadium	11.5 ug/g	12.9	112	75 - 125
Zinc	241 ug/g	216	89.6	75 - 125

LCSD Lab ID: 4355 | Original Lab ID: 4349 | Prep Batch: 7201
Matrix: Non-cohesive Solid | Analytical: 7302

AM118 Metals in NCS HD by ICP	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits
Arsenic	139 ug/g	139	100	75 - 125	3.92	0 - 25
Barium	57.6 ug/g	57.7	100	75 - 125	3.92	0 - 25
Chromium	110 ug/g	102	92.8	75 - 125	0.965	0 - 25
Cobalt	11 ug/g	10.3	94	75 - 125	1.27	0 - 25
Copper	394 ug/g	333	84.6	75 - 125	3.83	0 - 25
Lead	5.67 ug/g	5.44	95.5	75 - 125	9.48	0 - 25
Manganese	475 ug/g	422	88.9	75 - 125	3.54	0 - 25
Nickel	193 ug/g	170	88.2	75 - 125	3.45	0 - 25
Vanadium	11.8 ug/g	12.7	108	75 - 125	3.64	0 - 25
Zinc	246 ug/g	213	86.2	75 - 125	3.87	0 - 25

LCS Lab ID: 4386 | Original Lab ID: 4385 | Prep Batch: 7501
Matrix: Solid | Analytical: 7608

AM118 Metals in Sld HD by ICP	Expected	Result	Recovery	Rec Limits
Antimony	50 ug/g	41.9	83.7	75 - 125
Arsenic	50 ug/g	52	104	75 - 125
Barium	50 ug/g	51.7	103	75 - 125
Beryllium	50 ug/g	47.6	95.1	75 - 125
Boron	500 ug/g	438	87.2	75 - 125
Cadmium	50 ug/g	52.2	104	75 - 125
Chromium	50 ug/g	49.5	98.9	75 - 125
Cobalt	50 ug/g	49.5	98.9	75 - 125
Copper	50 ug/g	51.3	102	75 - 125
Lead	50 ug/g	50.2	100	75 - 125
Manganese	50 ug/g	50.3	101	75 - 125
Mercury	2.5 ug/g	2.53	101	75 - 125
Nickel	50 ug/g	49.2	98.5	75 - 125
Selenium	50 ug/g	50	99.9	75 - 125
Silver	50 ug/g	54.5	109	75 - 125
Thallium	50 ug/g	50.1	100	75 - 125
Tin	50 ug/g	48.6	97.1	75 - 125
Vanadium	50 ug/g	49.5	98.9	75 - 125
Zinc	50 ug/g	52	103	75 - 125

DUP Lab ID: 4387 | Original Lab ID: 03-0004-052-01 | Prep Batch: 7501
Matrix: Solid | Analytical: 7608

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

DUP Lab ID: 4387 | Original Lab ID: 03-0004-052-01 | Prep Batch: 7501
Matrix: Solid | Analytical: 7608

AM118 Metals in Sld HD by ICP	Original Result	Result	RPD		RPD Limits
Antimony	1.39	1.25	11		0 - 20
Arsenic	2.35	3.09	27.1	*	0 - 20
Barium	0.117	0.14	18		0 - 20
Beryllium	0.0077	0.0062	21.6	*	0 - 20
Boron	2.59	8.48	106	*	0 - 20
Cadmium	0.257	0.271	5.21		0 - 20
Chromium	17	17	0.27		0 - 20
Cobalt	3.86	3.83	0.839		0 - 20
Copper	115	127	10.1		0 - 20
Lead	35.4	38.9	9.38		0 - 20
Manganese	298	295	0.958		0 - 20
Mercury	0.893	0.836	6.51		0 - 20
Nickel	17.5	16.7	4.35		0 - 20
Selenium	0	0	0		0 - 20
Silver	0.0597	0.057	4.68		0 - 20
Thallium	0.0664	0.0598	10.4		0 - 20
Tin	13.4	11.3	16.8		0 - 20
Vanadium	0.719	0.999	32.5	*	0 - 20
Zinc	69.5	75.3	8.01		0 - 20

MS Lab ID: 4388 | Original Lab ID: 03-0004-052-01 | Prep Batch: 7501
Matrix: Solid | Analytical: 7608

AM118 Metals in Sld HD by ICP	Original Result	Expected	Result	Recovery		Rec Limits
Antimony	1.39	54.3 ug/g	48.9	87.4		75 - 125
Arsenic	2.35	54.3 ug/g	57.6	102		50 - 150
Barium	0.117	54.3 ug/g	55.5	102		75 - 125
Beryllium	0.0077	54.3 ug/g	53.2	97.9		75 - 125
Boron	2.59	543 ug/g	501	91.7		75 - 125
Cadmium	0.257	54.3 ug/g	52.8	96.7		75 - 125
Chromium	17	54.3 ug/g	70.5	98.4		75 - 125
Cobalt	3.86	54.3 ug/g	59.1	102		75 - 125
Copper	115	54.3 ug/g	179	118		75 - 125
Lead	35.4	54.3 ug/g	84.9	91		75 - 125
Manganese	298	54.3 ug/g	367	128	*	75 - 125
Mercury	0.893	2.72 ug/g	3.59	99.4		50 - 150
Nickel	17.5	54.3 ug/g	74.9	106		75 - 125
Selenium	0	54.3 ug/g	51.8	95.2		50 - 150
Silver	0.0597	54.3 ug/g	55.7	102		50 - 150
Thallium	0.0664	54.3 ug/g	57.8	106		75 - 125
Tin	13.4	54.3 ug/g	62.5	90.3		75 - 125
Vanadium	0.719	54.3 ug/g	57.6	105		75 - 125
Zinc	69.5	54.3 ug/g	115	84.1		50 - 150

MSD Lab ID: 4389 | Original Lab ID: 03-0004-052-01 | Prep Batch: 7501
Matrix: Solid | Analytical: 7608

AM118 Metals in Sld HD by ICP	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

MSD Lab ID: 4389 | Original Lab ID: 03-0004-052-01 | Prep Batch: 7501
Matrix: Solid | Analytical: 7608

AM118 Metals in Sld HD by ICP	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits
Antimony	53.8 ug/g	49.8	89.9	75 - 125	2.82	0 - 25
Arsenic	53.8 ug/g	57.4	102	50 - 150	0	0 - 25
Barium	53.8 ug/g	54.8	102	75 - 125	0	0 - 25
Beryllium	53.8 ug/g	55.5	103	75 - 125	5.08	0 - 25
Boron	538 ug/g	537	99.3	75 - 125	7.96	0 - 25
Cadmium	53.8 ug/g	52.6	97.2	75 - 125	0.516	0 - 25
Chromium	53.8 ug/g	74.2	106	75 - 125	7.44	0 - 25
Cobalt	53.8 ug/g	59.7	104	75 - 125	1.94	0 - 25
Copper	53.8 ug/g	276	298 *	75 - 125	86.5 *	0 - 25
Lead	53.8 ug/g	113	144 *	75 - 125	45.1 *	0 - 25
Manganese	53.8 ug/g	397	185 *	75 - 125	36.4 *	0 - 25
Mercury	2.69 ug/g	3.42	94	50 - 150	5.58	0 - 25
Nickel	53.8 ug/g	75.6	108	75 - 125	1.87	0 - 25
Selenium	53.8 ug/g	51.6	95.9	50 - 150	0.733	0 - 25
Silver	53.8 ug/g	55.6	103	50 - 150	0.976	0 - 25
Thallium	53.8 ug/g	56.8	105	75 - 125	0.948	0 - 25
Tin	53.8 ug/g	66.3	98.2	75 - 125	8.38	0 - 25
Vanadium	53.8 ug/g	56.7	104	75 - 125	0.957	0 - 25
Zinc	53.8 ug/g	184	213 *	50 - 150	86.8 *	0 - 25

LCS Lab ID: 4390 | Original Lab ID: | Prep Batch: 7501
Matrix: Solid | Analytical: 7608

AM118 Metals in Sld HD by ICP	Expected	Result	Recovery	Rec Limits
Arsenic	141 ug/g	142	101	75 - 125
Barium	58.2 ug/g	60.5	104	75 - 125
Chromium	111 ug/g	106	95.8	75 - 125
Cobalt	11.1 ug/g	10.8	97.5	75 - 125
Copper	398 ug/g	353	88.8	75 - 125
Lead	5.73 ug/g	6	105	75 - 125
Manganese	480 ug/g	452	94.1	75 - 125
Nickel	195 ug/g	184	94.1	75 - 125
Vanadium	11.9 ug/g	13.2	111	75 - 125
Zinc	249 ug/g	223	89.6	75 - 125

LCSD Lab ID: 4391 | Original Lab ID: 4385 | Prep Batch: 7501
Matrix: Solid | Analytical: 7608

AM118 Metals in Sld HD by ICP	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits
Arsenic	141 ug/g	139	98.7	75 - 125	2.3	0 - 25
Barium	58.2 ug/g	59.6	102	75 - 125	1.94	0 - 25
Chromium	111 ug/g	106	95.4	75 - 125	0.418	0 - 25
Cobalt	11.1 ug/g	10.8	97.4	75 - 125	0.103	0 - 25
Copper	398 ug/g	351	88.1	75 - 125	0.791	0 - 25
Lead	5.73 ug/g	5.72	99.4	75 - 125	5.48	0 - 25
Manganese	480 ug/g	444	92.4	75 - 125	1.82	0 - 25
Nickel	195 ug/g	181	93.1	75 - 125	1.07	0 - 25
Vanadium	11.9 ug/g	12.8	107	75 - 125	3.67	0 - 25

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

LCSD Lab ID: 4391 | Original Lab ID: 4385 | Matrix: Solid | Prep Batch: 7501 | Analytical: 7608

AM118 Metals in Sld HD by ICP	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits
Zinc	249 ug/g	219	87.8	75 - 125	2.03	0 - 25

LCS Lab ID: 4473 | Original Lab ID: | Matrix: Liquid | Prep Batch: 7611 | Analytical: 7702

AM118 Metals in Liq HD by ICP	Expected	Result	Recovery	Rec Limits
Aluminum	500 ug/g	534	107	75 - 125
Antimony	50 ug/g	42	84	75 - 125
Arsenic	50 ug/g	50.8	102	75 - 125
Barium	50 ug/g	50.5	101	75 - 125
Beryllium	50 ug/g	46.6	93.2	75 - 125
Boron	500 ug/g	458	91.6	75 - 125
Cadmium	50 ug/g	50.8	102	75 - 125
Chromium	50 ug/g	49.2	98.4	75 - 125
Cobalt	50 ug/g	48.7	97.3	75 - 125
Copper	50 ug/g	49.9	99.8	75 - 125
Lead	50 ug/g	50	100	75 - 125
Manganese	50 ug/g	49.2	98.5	75 - 125
Mercury	2.5 ug/g	2.53	101	75 - 125
Nickel	50 ug/g	48.5	97	75 - 125
Selenium	50 ug/g	49.1	98.2	75 - 125
Silver	50 ug/g	53.7	107	75 - 125
Thallium	50 ug/g	51	102	75 - 125
Tin	50 ug/g	49.2	98.4	75 - 125
Vanadium	50 ug/g	49	97.9	75 - 125
Zinc	50 ug/g	50.5	101	75 - 125

DUP Lab ID: 4474 | Original Lab ID: 03-0004-050-01 | Matrix: Liquid | Prep Batch: 7611 | Analytical: 7702

AM118 Metals in Liq HD by ICP	Original Result	Result	RPD		RPD Limits
Aluminum	14.8	3.71	120	*	0 - 20
Antimony	0.274	0.0966	95.7	*	0 - 20
Arsenic	0	0	0		0 - 20
Barium	0.11	0.0328	108	*	0 - 20
Beryllium	0.0222	0.00506	126	*	0 - 20
Boron	4.87	1.83	90.7	*	0 - 20
Cadmium	0.196	0.196	0.0063		0 - 20
Chromium	5.16	5.18	0.42		0 - 20
Cobalt	0.0464	0.0269	53.2	*	0 - 20
Copper	45.4	44	3.01		0 - 20
Lead	0.189	0.131	36.3	*	0 - 20
Manganese	0.707	0.657	7.23		0 - 20
Mercury	0.0203	0.0207	2.09		0 - 20
Nickel	0.163	0.136	18.3		0 - 20
Selenium	0	0	0		0 - 20
Silver	0.0369	0.00677	138	*	0 - 20
Thallium	0.137	0.0801	52.6	*	0 - 20

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

DUP Lab ID: 4474 | Original Lab ID: 03-0004-050-01 | Prep Batch: 7611
Matrix: Liquid | Analytical: 7702

AM118 Metals in Liq HD by ICP	Original Result	Result	RPD	RPD Limits
Tin	0.126	0.0887	35.1 *	0 - 20
Vanadium	1.36	1.32	2.79	0 - 20
Zinc	1.38	1.16	16.6	0 - 20

MS Lab ID: 4475 | Original Lab ID: 03-0004-050-01 | Prep Batch: 7611
Matrix: Liquid | Analytical: 7702

AM118 Metals in Liq HD by ICP	Original Result	Expected	Result	Recovery	Rec Limits
Aluminum	14.8	518 ug/g	542	102	75 - 125
Antimony	0.274	51.8 ug/g	46.3	88.9	75 - 125
Arsenic	0	51.8 ug/g	51.2	98.9	50 - 150
Barium	0.11	51.8 ug/g	51.2	98.8	75 - 125
Beryllium	0.0222	51.8 ug/g	46.7	90.1	75 - 125
Boron	4.87	518 ug/g	472	90.3	75 - 125
Cadmium	0.196	51.8 ug/g	48.3	93	75 - 125
Chromium	5.16	51.8 ug/g	55.9	98	75 - 125
Cobalt	0.0464	51.8 ug/g	50.8	98	75 - 125
Copper	45.4	51.8 ug/g	98.6	103	75 - 125
Lead	0.189	51.8 ug/g	52.3	101	75 - 125
Manganese	0.707	51.8 ug/g	52.2	99.4	75 - 125
Mercury	0.0203	2.59 ug/g	2.65	102	50 - 150
Nickel	0.163	51.8 ug/g	51.1	98.3	75 - 125
Selenium	0	51.8 ug/g	49.4	95.5	50 - 150
Silver	0.0369	51.8 ug/g	52.8	102	50 - 150
Thallium	0.137	51.8 ug/g	54	104	75 - 125
Tin	0.126	51.8 ug/g	50.2	96.8	75 - 125
Vanadium	1.36	51.8 ug/g	52.9	99.6	75 - 125
Zinc	1.38	51.8 ug/g	49.9	93.7	50 - 150

MSD Lab ID: 4476 | Original Lab ID: 03-0004-050-01 | Prep Batch: 7611
Matrix: Liquid | Analytical: 7702

AM118 Metals in Liq HD by ICP	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits
Aluminum	514 ug/g	532	101	75 - 125	0.985	0 - 25
Antimony	51.4 ug/g	43.3	83.7	75 - 125	6.03	0 - 25
Arsenic	51.4 ug/g	51.7	101	50 - 150	2.1	0 - 25
Barium	51.4 ug/g	50.2	97.4	75 - 125	1.43	0 - 25
Beryllium	51.4 ug/g	48.2	93.7	75 - 125	3.92	0 - 25
Boron	514 ug/g	486	93.7	75 - 125	3.7	0 - 25
Cadmium	51.4 ug/g	47.4	91.8	75 - 125	1.3	0 - 25
Chromium	51.4 ug/g	56.9	101	75 - 125	3.02	0 - 25
Cobalt	51.4 ug/g	49.9	96.9	75 - 125	1.13	0 - 25
Copper	51.4 ug/g	96.4	99.2	75 - 125	3.76	0 - 25
Lead	51.4 ug/g	51.2	99.3	75 - 125	1.7	0 - 25
Manganese	51.4 ug/g	51	97.9	75 - 125	1.52	0 - 25
Mercury	2.57 ug/g	2.47	95.2	50 - 150	6.9	0 - 25
Nickel	51.4 ug/g	50.1	97.2	75 - 125	1.13	0 - 25
Selenium	51.4 ug/g	50.3	97.9	50 - 150	2.48	0 - 25

Report of Analysis

MSD Lab ID: 4476 | Original Lab ID: 03-0004-050-01 | Prep Batch: 7611
Matrix: Liquid | Analytical: 7702

AM118 Metals in Liq HD by ICP	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits
Silver	51.4 ug/g	51.9	101	50 - 150	0.985	0 - 25
Thallium	51.4 ug/g	52.9	103	75 - 125	0.966	0 - 25
Tin	51.4 ug/g	47.9	93	75 - 125	4	0 - 25
Vanadium	51.4 ug/g	52.8	100	75 - 125	0.401	0 - 25
Zinc	51.4 ug/g	48.8	92.2	50 - 150	1.61	0 - 25

LCS Lab ID: 4350 | Original Lab ID: 4349 | Prep Batch: 7201
Matrix: Non-cohesive Solid | Analytical: 8802

AM118 Metals in NCS HD by ICP	Expected	Result	Recovery	Rec Limits
Aluminum	500 ug/g	502	98.1	75 - 125
Boron	500 ug/g	424	84.4	75 - 125

DUP Lab ID: 4351 | Original Lab ID: 03-0004-051-01 | Prep Batch: 7201
Matrix: Non-cohesive Solid | Analytical: 8802

AM118 Metals in NCS HD by ICP	Original Result	Result	RPD	RPD Limits
Aluminum	12.4	14.4	14.8	0 - 20
Boron	2.3	2.61	12.4	0 - 20

MS Lab ID: 4352 | Original Lab ID: 03-0004-051-01 | Prep Batch: 7201
Matrix: Non-cohesive Solid | Analytical: 8802

AM118 Metals in NCS HD by ICP	Original Result	Expected	Result	Recovery	Rec Limits
Aluminum	12.4	481 ug/g	487	98.6	75 - 125
Boron	2.3	481 ug/g	432	89.3	75 - 125

MSD Lab ID: 4353 | Original Lab ID: 03-0004-051-01 | Prep Batch: 7201
Matrix: Non-cohesive Solid | Analytical: 8802

AM118 Metals in NCS HD by ICP	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits
Aluminum	526 ug/g	607	113	75 - 125	13.6	0 - 25
Boron	526 ug/g	448	84.8	75 - 125	5.17	0 - 25

LCS Lab ID: 4354 | Original Lab ID: | Prep Batch: 7201
Matrix: Non-cohesive Solid | Analytical: 8802

AM118 Metals in NCS HD by ICP	Expected	Result	Recovery	Rec Limits
Aluminum	5810 ug/g	4980	85.7	75 - 125

LCSD Lab ID: 4355 | Original Lab ID: 4349 | Prep Batch: 7201
Matrix: Non-cohesive Solid | Analytical: 8802

AM118 Metals in NCS HD by ICP	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits
Aluminum	5930 ug/g	4920	82.6	75 - 125	3.68	0 - 25

LCS Lab ID: 4386 | Original Lab ID: 4385 | Prep Batch: 7501
Matrix: Solid | Analytical: 8901

AM118 Metals in Sld HD by ICP	Expected	Result	Recovery	Rec Limits
Aluminum	500 ug/g	508	100	75 - 125

DUP Lab ID: 4387 | Original Lab ID: 03-0004-052-01 | Prep Batch: 7501
Matrix: Solid | Analytical: 8901

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

DUP Lab ID: 4387 | Original Lab ID: 03-0004-052-01 | Prep Batch: 7501
Matrix: Solid | Analytical: 8901

AM118 Metals in Sld HD by ICP	Original Result	Result	RPD	RPD Limits
Aluminum	9.76	33.2	109 *	0 - 20

MS Lab ID: 4388 | Original Lab ID: 03-0004-052-01 | Prep Batch: 7501
Matrix: Solid | Analytical: 8901

AM118 Metals in Sld HD by ICP	Original Result	Expected	Result	Recovery	Rec Limits
Aluminum	9.76	543 ug/g	563	102	75 - 125

MSD Lab ID: 4389 | Original Lab ID: 03-0004-052-01 | Prep Batch: 7501
Matrix: Solid | Analytical: 8901

AM118 Metals in Sld HD by ICP	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits
Aluminum	538 ug/g	557	102	75 - 125	0	0 - 25

LCS Lab ID: 4390 | Original Lab ID: | Prep Batch: 7501
Matrix: Solid | Analytical: 8901

AM118 Metals in Sld HD by ICP	Expected	Result	Recovery	Rec Limits
Aluminum	6000 ug/g	5210	86.9	75 - 125

LCSD Lab ID: 4391 | Original Lab ID: 4385 | Prep Batch: 7501
Matrix: Solid | Analytical: 8901

AM118 Metals in Sld HD by ICP	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits
Aluminum	6000 ug/g	5100	84.9	75 - 125	2.33	0 - 25

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

QC Summary

LCS Lab ID: 4363 | Original Lab ID: | Prep Batch: 7203
Matrix: Liquid | Analytical: 7504

AM100 Non-Vols in HD by GC	Expected	Result	Recovery	Rec Limits
Thiodiglycol (TDG)	1020 ug/g	1230	120	50 - 150

DUP Lab ID: 4364 | Original Lab ID: 03-0004-050-01 | Prep Batch: 7203
Matrix: Liquid | Analytical: 7504

AM100 Non-Vols in HD by GC	Original Result	Result	RPD	RPD Limits
Thiodiglycol (TDG)	0	0	0	0 - 25

MS Lab ID: 4365 | Original Lab ID: 03-0004-050-01 | Prep Batch: 7203
Matrix: Liquid | Analytical: 7504

AM100 Non-Vols in HD by GC	Original Result	Expected	Result	Recovery	Rec Limits
Thiodiglycol (TDG)	0	1060 ug/g	1300	122	50 - 150

MSD Lab ID: 4366 | Original Lab ID: 03-0004-050-01 | Prep Batch: 7203
Matrix: Liquid | Analytical: 7504

AM100 Non-Vols in HD by GC	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits
Thiodiglycol (TDG)	1040 ug/g	1370	131	50 - 150	7.11	0 - 25

LCS Lab ID: 4367 | Original Lab ID: | Prep Batch: 7203
Matrix: Liquid | Analytical: 7504

AM100 Non-Vols in HD by GC	Expected	Result	Recovery	Rec Limits
Thiodiglycol (TDG)	1020 ug/g	1160	114	50 - 150

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

QC Summary

LCS Lab ID: 4396 | Original Lab ID: | Prep Batch: 7503
Matrix: Liquid | Analytical: 7606

AM117 Semi-Vols Liq HD by GC	Expected	Result	Recovery	Rec Limits
Hexachloroethane	950 ug/g	1070	113	50 - 150
Q	9950 ug/g	12100	121	50 - 150
T	9120 ug/g	10900	120	50 - 150

DUP Lab ID: 4397 | Original Lab ID: 03-0004-050-01 | Prep Batch: 7503
Matrix: Liquid | Analytical: 7606

AM117 Semi-Vols Liq HD by GC	Original Result	Result	RPD	RPD Limits
Hexachloroethane	0	0	0	0 - 25
Q	49300	50000	1.49	0 - 25
T	1090	1100	0.41	0 - 25

MS Lab ID: 4398 | Original Lab ID: 03-0004-050-01 | Prep Batch: 7503
Matrix: Liquid | Analytical: 7606

AM117 Semi-Vols Liq HD by GC	Original Result	Expected	Result	Recovery	Rec Limits
Hexachloroethane	0	967 ug/g	1040	107	50 - 150
Q	49300	10100 ug/g	52400	30.8 *	50 - 150
T	1090	9290 ug/g	5160	43.8 *	50 - 150

MSD Lab ID: 4399 | Original Lab ID: 03-0004-050-01 | Prep Batch: 7503
Matrix: Liquid | Analytical: 7606

AM117 Semi-Vols Liq HD by GC	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits
Hexachloroethane	1010 ug/g	1090	108	50 - 150	0.93	0 - 25
Q	10600 ug/g	52300	28.3 *	50 - 150	8.46	0 - 25
T	9700 ug/g	5200	42.4 *	50 - 150	3.25	0 - 25

LCS Lab ID: 4400 | Original Lab ID: | Prep Batch: 7503
Matrix: Liquid | Analytical: 7606

AM117 Semi-Vols Liq HD by GC	Expected	Result	Recovery	Rec Limits
Hexachloroethane	950 ug/g	1030	108	50 - 150
Q	9950 ug/g	10700	107	50 - 150
T	9120 ug/g	8900	97.5	50 - 150

LCS Lab ID: 4410 | Original Lab ID: | Prep Batch: 7503
Matrix: Liquid | Analytical: 7606

AM117 Semi-Vols Liq HD by GC	Expected	Result	Recovery	Rec Limits
Q	50300 ug/g	59500	118	50 - 150

MS Lab ID: 4412 | Original Lab ID: 4411 | Prep Batch: 7503
Matrix: Liquid | Analytical: 7606

AM117 Semi-Vols Liq HD by GC	Original Result	Expected	Result	Recovery	Rec Limits
Q	58500	53600 ug/g	101000	79.5	50 - 150

MSD Lab ID: 4413 | Original Lab ID: 4411 | Prep Batch: 7503
Matrix: Liquid | Analytical: 7606

AM117 Semi-Vols Liq HD by GC	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

MSD Lab ID: 4413 | Original Lab ID: 4411 | Prep Batch: 7503
Matrix: Liquid | Analytical: 7606

AM117 Semi-Vols Liq HD by GC	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits
Q	51400 ug/g	96100	73.1	50 - 150	8.39	0 - 25

LCS Lab ID: 4414 | Original Lab ID: | Prep Batch: 7503
Matrix: Liquid | Analytical: 7606

AM117 Semi-Vols Liq HD by GC	Expected	Result	Recovery	Rec Limits
Q	50300 ug/g	54000	107	50 - 150

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

QC Summary

LCS Lab ID: 4357 | Original Lab ID: | Prep Batch: 7202
Matrix: Liquid | Analytical: 7205

AM101 Vols in Liquid HD by GC	Expected	Result	Recovery	Rec Limits
1,2-Dichloroethane	9880 ug/g	9390	95.1	50 - 150
Tetrachloroethylene	10100 ug/g	10800	107	50 - 150
1,1,2,2-Tetrachloroethane	10400 ug/g	11000	106	50 - 150

DUP Lab ID: 4358 | Original Lab ID: 03-0004-050-01 | Prep Batch: 7202
Matrix: Liquid | Analytical: 7205

AM101 Vols in Liquid HD by GC	Original Result	Result	RPD	RPD Limits
1,2-Dichloroethane	6900	6870	0.441	0 - 25
Tetrachloroethylene	0	0	0	0 - 25
1,1,2,2-Tetrachloroethane	0	0	0	0 - 25

MS Lab ID: 4359 | Original Lab ID: 03-0004-050-01 | Prep Batch: 7202
Matrix: Liquid | Analytical: 7205

AM101 Vols in Liquid HD by GC	Original Result	Expected	Result	Recovery	Rec Limits
1,2-Dichloroethane	6900	10300 ug/g	16200	90.3	50 - 150
Tetrachloroethylene	0	10600 ug/g	11000	104	50 - 150
1,1,2,2-Tetrachloroethane	0	10800 ug/g	11000	102	50 - 150

MSD Lab ID: 4360 | Original Lab ID: 03-0004-050-01 | Prep Batch: 7202
Matrix: Liquid | Analytical: 7205

AM101 Vols in Liquid HD by GC	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits
1,2-Dichloroethane	10800 ug/g	17200	95.3	50 - 150	5.39	0 - 25
Tetrachloroethylene	11000 ug/g	11700	106	50 - 150	1.9	0 - 25
1,1,2,2-Tetrachloroethane	11300 ug/g	11800	104	50 - 150	1.94	0 - 25

LCS Lab ID: 4361 | Original Lab ID: | Prep Batch: 7202
Matrix: Liquid | Analytical: 7205

AM101 Vols in Liquid HD by GC	Expected	Result	Recovery	Rec Limits
1,2-Dichloroethane	9880 ug/g	9460	95.8	50 - 150
Tetrachloroethylene	10100 ug/g	10900	108	50 - 150
1,1,2,2-Tetrachloroethane	10400 ug/g	10900	105	50 - 150

Appendix C-7

Analytical Test Report
Sample Set #7

U.S. Army Soldier and Biological Chemical Command
Edgewood Chemical Biological Center
ATTN: Edgewood Chemical Biological
Forensic Analytical Center
Aberdeen Proving Ground, MD 21010-5424
Phone: (410) 436-8600
Fax: (410) 436-3384

ANALYTICAL TEST REPORT
FINAL

Report Date: 6 August 2003

Project/Event Title: Analysis of HD Sample Collected From Ton Containers Stored at the Deseret Chemical Depot – Sample Set 7 – FINAL REPORT

Project/Event Number: 97P-0033-46

Report Number: 0033-46-080603B7

Report Prepare d for:

EG&G Defense Materials Division
Attn.: Mr. Don Milton
11600 Stark Rd
Tooele, UT 84074

This report shall not be reproduced except in full, without the written approval of the laboratory. Test results reported herein refer only to samples tested.

CASE NARRATIVE

Toocle Samples (Set 7)
Project/Event # 97P-0033-46

Receiving Notes

All sample containers were visually checked and compared to sample transfer form 1911. The containers were noted to be in satisfactory condition and all samples were received intact.

Sample Preparatory Notes

No discrepancies.

Analytical Notes:

Organic Compounds Analysis

VOLATILE ORGANIC COMPOUNDS

Volatile Organic Compounds (VOCs) were extracted on 2-June-03 and analyzed 2-June-03 through 3-June-03 by method AM-101.

The bromofluorobenzene (BFB) tune and the tune evaluation and performance standard both passed acceptance criteria.

The calibration curves for the target compounds along with the surrogate resulted in correlation coefficient (r^2) of 1.000 for Linear / (0, 0) curve fits for all compounds. The individual calibration curve recovery values for all compounds of interest were within the acceptance criteria of ±15%. All levels had recovery values between 94% and 110% for all compounds.

The Continuing Calibration Verification (CCV) samples were all within acceptance criteria (±25%).

The Surrogate (1,4-difluorobenzene) was present and fulfilled the recovery criteria (50%-150%) in all samples.

The Matrix Spike (MS) and Matrix Spike Duplicate (MSD) fulfilled the recovery criteria (50%-150%) in all analytes of interest. Recovery values for 1,2-Dichloroethane (1,2-DCE), Tetrachloroethylene (TCE), and 1,1,2,2-TCE were 108% to 120%. The Relative Percent Difference (RPD) for the MS and the MSD for 1,2-DCE, TCE, and 1,1,2,2-TCE were 2.5 to 8% with acceptance criteria (±25%) for all analytes of interest.

The Blank Spike (BS) and Blank Spike Duplicate (BSD) fulfilled the recovery criteria (50%-150%) for all analytes of interest. The BS/BSD are identified in the report as the Laboratory Control Sample (LCS).

The three target compounds were not detected in either the Method Blank (MB) or the Reagent Blanks (RB).

The RPD values for the sample and sample duplicate met the specification required in AM-101 of ≤25%.

Sample holding time of 28 days from collection to analysis was met for all samples. Samples were collected starting 12-May-03 through 17-May-03 and analyzed 2-June-03 through 3-June-03.

SEMI-VOLATILE ORGANIC COMPOUNDS

Semi-Volatiles Organic Compounds (SVOCs) were extracted on 2-June-03 and analyzed 4 June-03 through 6-June-03 by method AM-117.

The decafluorotriphenylphosphine (DFTPP) tune and the tune evaluation and performance standard both passed acceptance criteria.

The calibration curves for the target compounds along with the surrogate resulted in correlation coefficient (r^2) of 1.000 for 1,4-dithiane-d4 and 1.000 for Hexachloroethane (HCE) for a Linear / (0, 0) curve fit. Compound Q had an r^2 of 1.000 for a linear / (0, 0) curve with a Practical Quantitation Limit (PQL) of 25 µg/ml. T had an r^2 of 1.000 for a linear curve with a PQL of 25 µg/ml.

All analytes in the calibration curve standards were within the method criteria (±15%).

The CCV recovery values for HCE, Q and T were within the method criteria of ±25%.

The surrogate (1,4-Dithiane-d4) recoveries for samples 030004-58-04 and 030004-58-09 were outside of limits (0% and 221%). The first sample may not have been spiked whereas the second may have been doubly spiked.

It has been shown that the ton container samples contain native Q at approximately 300 µg/mL to 350 µg/mL. The original spiking level for Q was 100 µg/mL; however, it was determined through low spike recoveries that this amount was insufficient when compared to the native concentration of Q. To compensate for the elevated Q levels in the native samples, the spiking level of Q was raised by a factor of five. Due to the higher spiking amount, the samples were diluted to 25 mL (10 mL previously) to be within the range of the calibration curve. See Table 1 for the results.

Table-1. Quality Control Samples for Q (25-mL Dilution)

Quality Control Sample	Recovery, %
Blank Spike	104
Blank Spike Duplicate	75.8
Matrix Spike	60.8
Matrix Spike Duplicate	56.4
RPD (MS/MSD)	7.51

The MS/MSD (10 mL dilution) values for the surrogate, HCE, and T were within criteria of 50% to 150% and ±25% for the RPD. The MS/MSD values for Q at the 25 mL dilution were within criteria.

The BS recovery values for the surrogate, HCE, Q, and T were within acceptance levels.

When duplicate samples were analyzed, the RPDs for HCE, Q, and T were below the method criteria of ±25%. HCE was not detected in the sample or sample duplicate.

Results showed that target compounds were not detected in either the MB or RB.

Sample holding time of 28 days from collection to analysis was met for all of the submitted samples. Samples were collected starting 12-May-03 through 17-May-03 and analyzed on 5 June-03.

THIODIGLYCOL

Samples for the non-volatile organic compound, thiodiglycol (TDG), were extracted 2-June-03 and analyzed on 4-June-03 through 6-June-03 by method AM-100.

The decafluorotriphenylphosphine (DFTPP) tune and the tune evaluation and performance standard both passed acceptance criteria.

The calibration curves for the surrogate (TDG_{d8}) resulted in correlation coefficient (r^2) of 1.000 and for TDG an (r^2) of 0.997 for Linear / (0, 0) curves.

The individual calibration curve levels for TDG (98% to 108%) were within the acceptance criteria of ±15%. Calibration levels for TDG-d8 were within limits.

All CCV samples passed acceptance criteria of ±25% for TDG.

When duplicate samples were analyzed, the RPDs for all analytes were below the method criteria of ±25%. TDG was not detected in the sample or sample duplicate.

The MS/MSD for all target compounds passed criteria. Recovery values were 97% and 88% for TDG and 84% and 77% for the surrogate. The RPD for the MS and the MSD passed acceptance criteria.

The BS/BSD fulfilled the acceptance criteria.

Results showed that target compounds were not detected in either the MB or RB.

Sample holding time of 28 days from collection to analysis was met for all samples. Samples were collected from 12-May-03 to 17-May-03 and analyzed 5-June-03.

LEWISITE

Lewisite was extracted on 3-June-03 and analyzed on 11-June-03 through 12-June-03 by method AM-126.

The decafluorotriphenylphosphine (DFTPP) tune and the tune evaluation and performance standard both passed acceptance criteria.

The calibration curve for the target compound (L) resulted in a correlation coefficient (r^2) of 1.000 for a quadratic (not forced through 0, 0) curve fit for Lewisite. A quadratic fit was used to determine the calibration curve. Calibration curves behave differently for compounds over large orders of magnitude as well as for instrumental conditions and column types. After investigation, it was determined that a quadratic curve best represented the existing data. Six concentration levels were used in this curve. This meets the minimal requirements specified in EPA SW846 method 8000b. The individual calibration curve levels for Lewisite were within the acceptance criteria of ±15%.

The CCV samples (91% to 100%) were all within acceptance criteria (±25%).

The MS/MSD and BS/BSD recovery values were within acceptance limits.

Results showed that lewisite was not detected in either the Method or the Reagent Blanks.

Sample holding time of 28 days from collection to analysis was not met for all samples. Samples collected 12-May-03 through 14-May-03 (030004-58-01 through 030004-58-12) did not meet the holding time criteria.

PURITY

Purity samples were extracted on 2-June-03 and analyzed on 3-June-03 by method AM-098.

The decafluorotriphenylphosphine (DFTPP) tune passed acceptance criteria.

The calibration curve for the target compound (HD) resulted in a correlation coefficient (r^2) of 0.998 for a linear curve fit. All individual points of the curve were between 91% and 103%.

The CCV standards all passed the acceptance criteria of ±15%.

The CASARM grade (HD) Laboratory Control Sample (LCS) results showed a purity that was 100% of its true value.

When duplicate samples were analyzed, the RPD for the purity was <2.0%, well below the method criteria of ±25%.

Results showed that HD was not detected in either the MB or RB.

Samples were collected starting 12-May-03 through 17-May-03 and analyzed on 3-June-03. Sample holding time of 28 days from collection to analysis was met for all samples.

METALS ANALYSIS

Liquids:
All undiluted and diluted samples were analyzed on 09-June-03. All samples were analyzed following Method AM-118.

The percent recovery (%R) for the MS, MSD, BS, and Lab Control Spike Duplicate (LCSD) indicated that all elements met the acceptance criteria of 75%-125%. The MS/MSD and LCS/LCSD RPD values also met the criterium

The %R for the Lab Control Spike (LCS) indicated that all elements except for mercury (140%) met the acceptance criteria of 75%-125%. No corrective action was taken due to mercury meeting the acceptance criteria for all other QC samples.

The %R for the Post Digestion Spike Addition Sample (PDSA) indicated that all elements except for silver (62.4%) met the acceptance criteria of 75%-125%. This was due to silver falling out of solution.

Copper, the only element that had a result above 100 times the Instrument Detection Limit (IDL) had an acceptable RPD for the sample duplicate.

All liquid samples were analyzed within the 28-day holding period.

Non-Cohesive Solids:
All undiluted samples were analyzed on 02-June-03. Dilutions and reruns were analyzed on 02-June-03, 03-June-03, and 04-June-03. All samples were analyzed following Method AM-118.

Antimony, cadmium, lead, mercury, silver, thallium, and tin were outside the acceptance limits of 90% to 110% for the CCV when analyzed on 02-June-03. Upon reanalysis on 03-June-03, lead, mercury, silver, and thallium were within the acceptable limits; however antimony, cadmium, and tin were outside the acceptance limits. Upon reanalysis on 04-June-03, all elements were within the acceptable limits.

Cadmium was found in all reagent blanks at a level above the MDL, but below the PQL when analyzed on 04-June-03. No corrective action was taken. Antimony was found in the first reagent blank at a level above the MDL, but below the PQL when analyzed on 04-June-03. No corrective action was taken. Arsenic was found in the fourth and fifth reagent blank at a level above the MDL, but below the PQL when analyzed on 02-June-03. No corrective action was taken. Cadmium was found in the method blank at a level above the MDL, but below the PQL when analyzed on 04-June-03. No corrective action was taken.

The native sample used for the MS (4563) and the MSD (4564) had high levels of chromium, copper, manganese, nickel, lead, and zinc. Since the spike level was considerably less than the original levels in the sample, the MS and the MSD could not be properly evaluated for those elements. The RPD for the MS and MSD were within acceptable limits for all elements that could be properly evaluated except for arsenic (25.8%). All other elements gave acceptable recoveries and RPD's for the MS and MSD.

Copper and manganese had an acceptable RPD for the sample duplicate. However chromium (143%), nickel (108%), lead (193%), and zinc (35.9%) failed RPD criteria. The failure was attributed to the sample being non-homogenous.

The %R for the BS, CRM/CRMD, and PDSA indicated that all elements met the acceptance criteria of 75%-125%. The CRM/CRMD RPD met the criterium

All the Non-Cohesive samples were analyzed within the 28-day hold time.

Solids:
All undiluted samples were analyzed on 04-June-03. Dilutions and reruns were analyzed on 04-June-03 and 10-June-03. All samples were analyzed following Method AM-118.

Aluminum, antimony, beryllium, and boron were outside the acceptance limits of 90% to 110% for the CCV when analyzed on 04-June-03. All samples will be slightly underestimated for antimony which had recoveries of 89.1%, 88.7%, 90.7%, and 89.1% on the CCV's. Upon reanalysis on 10-June-03, aluminum, antimony, and boron were outside the acceptance limits of 90% to 110% for the CCV. All samples will be slightly overestimated for aluminum which had recoveries of 113% on both CCV's. Samples 030004-60-01 to 60-06, 60-08, and 60-11 will be slightly overestimated for boron which had a recovery of 113% on the first CCV.

Cadmium was detected in all reagent blanks at a level above the MDL, but below the PQL when analyzed on 04-June-03. No corrective action was taken. Arsenic was detected in all reagent blanks except the third at a level above the MDL, but below the PQL when analyzed on 04-June-03. Cadmium and barium were found in the method blank at a level above the MDL, but below the PQL when analyzed on 04-June-03. No corrective action was taken. Aluminum and boron were found in the method blank at a level above the MDL and PQL when analyzed on 10-June-03. In the analysis on 04-June-03, aluminum and boron were both detected in the method blank a level above the MDL, but below the PQL. Since aluminum and boron were not detected in any reagent blank above the MDL, the method blank was determined to be contaminated with a very small amount of aluminum and boron.

The native sample used for the MS (4618) and MSD (4619) had high levels of copper, lead and zinc. Since the spike level was considerably less than the original levels in the sample, the MS/MSD could not be properly evaluated for those elements. All other elements gave acceptable recoveries and RPD's for the MS and MSD.

Sample 030004-60-16 was diluted and reanalyzed for arsenic on 10-June-03. Sample 030004-60-18 was reanalyzed for arsenic on 10-June-03. The batch QC for that day is as follows: Method Blank (ND), Blank Spike (107%), PDSA (108%), MS (130%), MSD (116%), MS/MSD RPD (11.4%), CRM (99.4%), CRMD (100%), and CRM/CRMD RPD (0.64%).

The %R for the BS, PDSA, CRM and CRM duplicate indicated that all elements met the acceptance criteria of 75%-125%. The CRM/CRMD RPD met the criterium

Copper, manganese, nickel, and zinc had an acceptable RPD for the sample duplicate. However arsenic (36.5%) and lead (29%) failed RPD criteria. The failure was attributed to the sample being non-homogenous.

All the solid samples were initially analyzed within the 28-day hold time; however some samples were reanalyzed past the hold time. Samples 030004-60-01 to 030004-60-07 were analyzed for aluminum, beryllium, and boron past the hold time.

Analyst(s) of Record (Signature) 6 Aug 03 (Date) **Thomas Rusek** **Principal Investigator, Battelle Memorial Institute**	**Analyst(s) of Record** (Signature) 6 Aug 03 (Date) **Brian L. Boyd** **Researcher, Battelle Memorial Institute**
Analyst(s) of Record (Signature) 06 Aug 03 (Date) **Robert L. Calloway** **Physical Science Technican, Edgewood Chemical & Biological Forensic Analytical Center**	**Analyst(s) of Record** (Signature) 6 Aug 03 (Date) **Stephen S. Houck** **Researcher, Battelle Memorial Institute**
Analyst(s) of Record (Signature) 6 Aug 03 (Date) **Doug S. Nichols** **Researcher, Battelle Memorial Institute**	**Analyst(s) of Record** (Signature) 6 Aug 03 (Date) **Michael W. Wensing, Ph.D.** **Principal Research Scientist, Battelle Memorial Institute**
Analyst(s) of Record (Signature) 8/6/03 (Date) **James Roelke** **Researcher, Battelle Memorial Institute**	**Analyst(s) of Record** (Signature) 6 Aug 03 (Date) **Michele A. Maas** **Technician, Battelle Memorial Institute**
Report Reviewed by (Signature) Aug 6, 2003 (Date) **Timothy L. Kehring** **LIMS Technologist, Battelle Memorial Institute**	**Report Reviewed by** (Signature) 6 Aug 03 (Date) **Audrey J. Rausig** **Principal Research Scientist, Battelle Memorial Institute**
Report Reviewed by (Signature) 6 Aug 03 (Date) **James H. Newman** **Laboratory Manager, Battelle Memorial Institute**	

Report Reviewed by

(Signature)

06 Aug 03 (Date)

Robert L. Calloway

Designated Authority, Edgewood C/B Forensic Analytical Center

Report Approved by

(Signature)

8.6.03 (Date)

(or) **Dennis J. Reutter, Ph.D.**

Chief, Edgewood C/B Forensic Analytical Center

Report Number 0033-46-080603B7 FINAL Project/Event No. 97P-0033-46

Report Number 0033-46-080603B7 FINAL Project/Event No. 97P-0033-46

Appendix A

LIMS DATA REPORT

This appendix contains the 104-page data report produced from the LIMS system. It contains a summary of sample numbers, sample results, method blank results and results of QC samples analyzed. Since the report is generated by the LIMS, the page numbers will begin again at 1, but each page has been identified as part of the appendix so that it may be distinguishable from 3the main report.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

ANALYTICAL RESULTS

Report Date: 8/6/2003

Work Order: Tooele HD/TC 05/27/2003

Deliver To: Don Milton
EG&G Defense Materials Div.
11600 Stark Road
Tooele, UT 84074

James Newman
Project Manager

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

The following represents qualifications to the associated analytical reports.

1. These descriptors will help identify the specific sample and clarify the report.

   DUP - Matrix Duplicate
   MS - Matrix Spike
   MSD - Matrix Spike Duplicate
   RPD - Relative Percent Difference
   PQL - Practical Quantitiation Limit
   MDL - Method Detection Limit
   ND - Not Detected at the PQL
   * - Indicates a limit was exceeded

   Surrogate - Organic compounds which are similar to analytes of interest in chemical composition, extraction, and chromotography, but which are not normally found in the samples.

2. Qualifier keys - These descriptors will follow individual results for a specific sample and a specific analyte and will help qualify the data.

   J - Indicates an estimated value between the PQL and MDL

NOTE: This document is included as part of the Analytical Report for the above referenced and should be retained as a permanent record thereof.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Client
EG&G Defense Materials Division

Work ID
Tooele HD/TC 05/27/2003

Workorder Sample Summary

Lab ID	*Sample ID*	*Matrix*	*Collect Date/Time*	*Receive Date/Time*
030004-58-01	21-03-251A	Liquid	5/12/2003 13:45	5/27/2003 13:44
030004-58-02	21-03-251B	Liquid	5/12/2003 13:45	5/27/2003 13:44
030004-58-03	21-03-251C	Liquid	5/12/2003 13:45	5/27/2003 13:44
030004-58-04	21-03-251D	Liquid	5/12/2003 14:01	5/27/2003 14:00
030004-58-05	21-03-251E	Liquid	5/12/2003 14:01	5/27/2003 14:00
030004-58-06	21-03-254	Liquid	5/12/2003 10:51	5/27/2003 10:51
030004-58-07	21-03-255	Liquid	5/12/2003 10:51	5/27/2003 10:51
030004-58-08	21-03-262	Liquid	5/12/2003 10:51	5/27/2003 10:51
030004-58-09	21-03-265	Liquid	5/13/2003 10:51	5/27/2003 10:51
030004-58-10	21-03-269	Liquid	5/13/2003 10:51	5/27/2003 10:51
030004-58-11	21-03-273	Liquid	5/14/2003 10:51	5/27/2003 10:51
030004-58-12	21-03-276	Liquid	5/14/2003 10:51	5/27/2003 10:51
030004-58-13	21-03-279	Liquid	5/15/2003 10:51	5/27/2003 10:51
030004-58-14	21-03-282	Liquid	5/15/2003 10:51	5/27/2003 10:51
030004-58-15	21-03-286	Liquid	5/16/2003 10:51	5/27/2003 10:51
030004-58-16	21-03-290	Liquid	5/16/2003 10:51	5/27/2003 10:51
030004-58-17	21-03-294	Liquid	5/16/2003 10:51	5/27/2003 10:51
030004-58-18	21-03-298	Liquid	5/16/2003 10:51	5/27/2003 10:51
030004-58-19	21-03-301	Liquid	5/17/2003 10:51	5/27/2003 10:51
030004-58-20	21-03-304	Liquid	5/17/2003 10:51	5/27/2003 10:51
030004-59-01	21-03-252A	Non-cohesive Solid	5/12/2003 13:45	5/27/2003 13:44
030004-59-02	21-03-252B	Non-cohesive Solid	5/12/2003 13:45	5/27/2003 13:44
030004-59-03	21-03-252C	Non-cohesive Solid	5/12/2003 13:45	5/27/2003 13:44
030004-59-04	21-03-252D	Non-cohesive Solid	5/12/2003 13:45	5/27/2003 13:44
030004-59-05	21-03-256	Non-cohesive Solid	5/12/2003 10:41	5/27/2003 10:40
030004-59-06	21-03-257	Non-cohesive Solid	5/12/2003 10:41	5/27/2003 10:40
030004-59-07	21-03-263	Non-cohesive Solid	5/12/2003 9:19	5/27/2003 9:18
030004-59-08	21-03-266	Non-cohesive Solid	5/13/2003 9:19	5/27/2003 9:18
030004-59-09	21-03-270	Non-cohesive Solid	5/13/2003 9:19	5/27/2003 9:18
030004-59-10	21-03-274	Non-cohesive Solid	5/14/2003 9:19	5/27/2003 9:18
030004-59-11	21-03-277	Non-cohesive Solid	5/14/2003 9:19	5/27/2003 9:18
030004-59-12	21-03-280	Non-cohesive Solid	5/15/2003 9:19	5/27/2003 9:18
030004-59-13	21-03-283	Non-cohesive Solid	5/15/2003 9:19	5/27/2003 9:18
030004-59-14	21-03-287	Non-cohesive Solid	5/16/2003 9:19	5/27/2003 9:18
030004-59-15	21-03-291	Non-cohesive Solid	5/16/2003 9:19	5/27/2003 9:18
030004-59-16	21-03-295	Non-cohesive Solid	5/16/2003 9:19	5/27/2003 9:18
030004-59-17	21-03-299	Non-cohesive Solid	5/16/2003 9:19	5/27/2003 9:18
030004-59-18	21-03-302	Non-cohesive Solid	5/17/2003 9:19	5/27/2003 9:18
030004-59-19	21-03-305	Non-cohesive Solid	5/17/2003 9:19	5/27/2003 9:18
030004-60-01	21-03-253A	Solid	5/12/2003 14:01	5/27/2003 14:00
030004-60-02	21-03-253B	Solid	5/12/2003 14:01	5/27/2003 14:00
030004-60-03	21-03-253C	Solid	5/12/2003 14:01	5/27/2003 14:00
030004-60-04	21-03-253D	Solid	5/12/2003 14:01	5/27/2003 14:00
030004-60-05	21-03-258	Solid	5/12/2003 14:01	5/27/2003 14:00
030004-60-06	21-03-259	Solid	5/12/2003 14:01	5/27/2003 14:00

Report of Analysis

030004-60-07	21-03-264	Solid	5/12/2003 14:01	5/27/2003 14:00
030004-60-08	21-03-267	Solid	5/13/2003 14:01	5/27/2003 14:00
030004-60-09	21-03-271	Solid	5/13/2003 14:01	5/27/2003 14:00
030004-60-10	21-03-275	Solid	5/14/2003 14:01	5/27/2003 14:00
030004-60-11	21-03-278	Solid	5/14/2003 14:01	5/27/2003 14:00
030004-60-12	21-03-281	Solid	5/15/2003 14:01	5/27/2003 14:00
030004-60-13	21-03-284	Solid	5/15/2003 14:01	5/27/2003 14:00
030004-60-14	21-03-288	Solid	5/16/2003 14:01	5/27/2003 14:00
030004-60-15	21-03-292	Solid	5/16/2003 14:01	5/27/2003 14:00
030004-60-16	21-03-296	Solid	5/16/2003 14:01	5/27/2003 14:00
030004-60-17	21-03-300	Solid	5/16/2003 14:01	5/27/2003 14:00
030004-60-18	21-03-303	Solid	5/17/2003 14:01	5/27/2003 14:00
030004-60-19	21-03-306	Solid	5/17/2003 14:01	5/27/2003 14:00

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-58-01	21-03-251A	5/12/2003 13:45	5/27/2003 13:44	8/6/2003 15:42	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 08:54	7909	AM098 HD Purity by GC	1	6/3/2003 19:53	tfr	8003

Parameter	*Result*	*MDL*	*PQL*	*Units*
bis-(2-Chloroethyl)sulfide	84.5			%

AM100 Non-Vols in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 18:20	7906	AM100 Non-Vols in HD by GC	1	6/5/2003 0:00	ssh	8007

Parameter	*Result*	*MDL*	*PQL*	*Units*
Thiodiglycol (TDG)	ND	225	268	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
Thiodiglycol-d8 (TDG-d8)	1070	1010 ug/g	94.3	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 14:44	7901	AM101 Vols in Liquid HD by GC	1	6/3/2003 10:06	ssh	7908

Parameter	*Result*	*MDL*	*PQL*	*Units*
1,2-Dichloroethane	4020	279	536	ug/g
Tetrachloroethylene	ND	107	536	ug/g
1,1,2,2-Tetrachloroethane	ND	161	536	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Difluorobenzene	11100	11100 ug/g	99.9	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/4/2003 14:41	8201	AM118 Metals in Liq HD by ICP	1	6/9/2003 18:51	blb	8302

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	10.9	54.3	ug/g
Antimony	ND	0.684	5.43	ug/g
Arsenic	16.2	1.32	5.43	ug/g
Barium	ND	0.467	5.43	ug/g
Beryllium	ND	0.977	5.43	ug/g
Boron	7.03 J	4.06	10.9	ug/g
Cadmium	ND	0.445	5.43	ug/g
Chromium	2.97 J	1.40	5.43	ug/g
Cobalt	ND	0.293	1.09	ug/g
Copper	5.86	2.64	5.43	ug/g
Lead	ND	0.445	5.43	ug/g
Manganese	ND	0.347	1.09	ug/g
Mercury	ND	0.0543	0.543	ug/g
Nickel	ND	0.380	5.43	ug/g
Selenium	ND	1.27	10.9	ug/g
Silver	ND	0.510	5.43	ug/g

Report of Analysis

Thallium	ND	1.06	5.43	ug/g
Tin	ND	2.70	10.9	ug/g
Vanadium	ND	1.09	5.43	ug/g
Zinc	ND	3.39	10.9	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 09:01	7910	AM117 Semi-Vols Liq HD by GC	1	6/5/2003 0:00	ssh	8005

Parameter	*Result*	*MDL*	*PQL*	*Units*
Hexachloroethane	ND	87.5	274	ug/g
Q	27900	55.8	2740	ug/g
T	4890	76.6	2740	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Dithiane-d4	1090	1230 ug/g	112	50 - 150

AM126 Lewisite in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 09:09	8101	AM126 Lewisite in HD by GC	1	6/11/2003 20:46	ssh	8304

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lewisite	ND	2.08	5.34	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-58-02	21-03-251B	5/12/2003 13:45	5/27/2003 13:44	8/6/2003 15:42	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 08:54	7909	AM098 HD Purity by GC	1	6/3/2003 20:12	tfr	8003

Parameter	*Result*	*MDL*	*PQL*	*Units*
bis-(2-Chloroethyl)sulfide	72.8			%

AM100 Non-Vols in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 18:20	7906	AM100 Non-Vols in HD by GC	1	6/5/2003 0:00	ssh	8007

Parameter	*Result*	*MDL*	*PQL*	*Units*
Thiodiglycol (TDG)	ND	231	275	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
Thiodiglycol-d8 (TDG-d8)	1100	947 ug/g	86.1	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 14:44	7901	AM101 Vols in Liquid HD by GC	1	6/3/2003 10:42	ssh	7908

Parameter	*Result*	*MDL*	*PQL*	*Units*
1,2-Dichloroethane	3770	244	470	ug/g
Tetrachloroethylene	ND	94.0	470	ug/g
1,1,2,2-Tetrachloroethane	ND	141	470	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Difluorobenzene	9720	9880 ug/g	102	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/4/2003 14:41	8201	AM118 Metals in Liq HD by ICP	1	6/9/2003 20:11	blb	8302

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	11.9 J	11.0	54.8	ug/g
Antimony	ND	0.691	5.48	ug/g
Arsenic	2.20 J	1.34	5.48	ug/g
Barium	ND	0.471	5.48	ug/g
Beryllium	ND	0.987	5.48	ug/g
Boron	6.07 J	4.10	11.0	ug/g
Cadmium	ND	0.450	5.48	ug/g
Chromium	3.61 J	1.41	5.48	ug/g
Cobalt	ND	0.296	1.10	ug/g
Copper	8.93	2.66	5.48	ug/g
Lead	300	0.450	5.48	ug/g
Manganese	0.377 J	0.351	1.10	ug/g
Mercury	871	0.0548	0.548	ug/g
Nickel	0.578 J	0.384	5.48	ug/g
Selenium	ND	1.28	11.0	ug/g
Silver	ND	0.515	5.48	ug/g

Report of Analysis

Thallium	ND	1.07	5.48	ug/g
Tin	ND	2.73	11.0	ug/g
Vanadium	ND	1.10	5.48	ug/g
Zinc	6.02 J	3.42	11.0	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 09:01	7910	AM117 Semi-Vols Liq HD by GC	1	6/5/2003 0:00	ssh	8005

Parameter	*Result*	*MDL*	*PQL*	*Units*
Hexachloroethane	969	79.1	247	ug/g
Q	28800	50.4	2470	ug/g
T	9360	69.2	2470	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Dithiane-d4	989	1040 ug/g	105	50 - 150

AM126 Lewisite in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 09:09	8101	AM126 Lewisite in HD by GC	1	6/11/2003 21:22	ssh	8304

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lewisite	ND	2.05	5.26	ug/g

Comments: Sample diluted an additional 200 fold for mercury.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-58-03	21-03-251C	5/12/2003 13:45	5/27/2003 13:44	8/6/2003 15:42	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 08:54	7909	AM098 HD Purity by GC	1	6/3/2003 20:31	tfr	8003

Parameter	*Result*	*MDL*	*PQL*	*Units*
bis-(2-Chloroethyl)sulfide	85.5			%

AM100 Non-Vols in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 18:20	7906	AM100 Non-Vols in HD by GC	1	6/5/2003 0:00	ssh	8007

Parameter	*Result*	*MDL*	*PQL*	*Units*
Thiodiglycol (TDG)	ND	214	255	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
Thiodiglycol-d8 (TDG-d8)	1020	915 ug/g	89.7	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 14:44	7901	AM101 Vols in Liquid HD by GC	1	6/3/2003 11:17	ssh	7908

Parameter	*Result*	*MDL*	*PQL*	*Units*
1,2-Dichloroethane	4240	277	532	ug/g
Tetrachloroethylene	ND	106	532	ug/g
1,1,2,2-Tetrachloroethane	ND	160	532	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Difluorobenzene	11000	11000 ug/g	100	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/4/2003 14:41	8201	AM118 Metals in Liq HD by ICP	1	6/9/2003 18:55	blb	8302

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	10.4	51.9	ug/g
Antimony	ND	0.654	5.19	ug/g
Arsenic	2.03 J	1.27	5.19	ug/g
Barium	ND	0.447	5.19	ug/g
Beryllium	ND	0.935	5.19	ug/g
Boron	4.81 J	3.88	10.4	ug/g
Cadmium	ND	0.426	5.19	ug/g
Chromium	2.89 J	1.34	5.19	ug/g
Cobalt	ND	0.280	1.04	ug/g
Copper	12.3	2.52	5.19	ug/g
Lead	ND	0.426	5.19	ug/g
Manganese	ND	0.332	1.04	ug/g
Mercury	ND	0.0519	0.519	ug/g
Nickel	ND	0.363	5.19	ug/g
Selenium	ND	1.21	10.4	ug/g
Silver	ND	0.488	5.19	ug/g

Report of Analysis

Thallium	ND	1.02	5.19	ug/g
Tin	ND	2.59	10.4	ug/g
Vanadium	ND	1.04	5.19	ug/g
Zinc	4.87 J	3.24	10.4	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 09:01	7910	AM117 Semi-Vols Liq HD by GC	1	6/5/2003 0:00	ssh	8005

Parameter	*Result*	*MDL*	*PQL*	*Units*
Hexachloroethane	ND	83.8	262	ug/g
Q	26200	53.4	2620	ug/g
T	4000	73.3	2620	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Dithiane-d4	1050	1150 ug/g	110	50 - 150

AM126 Lewisite in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 09:09	8101	AM126 Lewisite in HD by GC	1	6/11/2003 21:58	ssh	8304

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lewisite	ND	2.01	5.15	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-58-04	21-03-251D	5/12/2003 14:01	5/27/2003 14:00	8/6/2003 15:42	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
6/2/2003 08:54	7909	AM098 HD Purity by GC	1	6/3/2003 21:09	tfr	8003

Parameter	Result	MDL	PQL	Units
bis-(2-Chloroethyl)sulfide	0.212			%

AM100 Non-Vols in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
6/2/2003 18:20	7906	AM100 Non-Vols in HD by GC	1	6/5/2003 0:00	ssh	8007

Parameter	Result	MDL	PQL	Units
Thiodiglycol (TDG)	ND	230	274	ug/g

Surrogates	Expected	Result	Recovery	Limits
Thiodiglycol-d8 (TDG-d8)	1100	985 ug/g	89.8	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
6/2/2003 14:44	7901	AM101 Vols in Liquid HD by GC	1	6/3/2003 12:28	ssh	7908

Parameter	Result	MDL	PQL	Units
1,2-Dichloroethane	ND	273	525	ug/g
Tetrachloroethylene	ND	105	525	ug/g
1,1,2,2-Tetrachloroethane	ND	157	525	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Difluorobenzene	10900	10400 ug/g	95.7	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
6/4/2003 14:41	8201	AM118 Metals in Liq HD by ICP	1	6/9/2003 19:00	blb	8302

Parameter	Result	MDL	PQL	Units
Aluminum	10.6 J	10.4	52.0	ug/g
Antimony	ND	0.656	5.20	ug/g
Arsenic	ND	1.27	5.20	ug/g
Barium	ND	0.447	5.20	ug/g
Beryllium	ND	0.937	5.20	ug/g
Boron	7.18 J	3.89	10.4	ug/g
Cadmium	ND	0.427	5.20	ug/g
Chromium	ND	1.34	5.20	ug/g
Cobalt	ND	0.281	1.04	ug/g
Copper	ND	2.53	5.20	ug/g
Lead	ND	0.427	5.20	ug/g
Manganese	ND	0.333	1.04	ug/g
Mercury	ND	0.0520	0.520	ug/g
Nickel	0.420 J	0.364	5.20	ug/g
Selenium	ND	1.22	10.4	ug/g
Silver	ND	0.489	5.20	ug/g

Report of Analysis

Thallium	ND	1.02	5.20	ug/g
Tin	ND	2.59	10.4	ug/g
Vanadium	ND	1.04	5.20	ug/g
Zinc	4.49 J	3.25	10.4	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 09:01	7910	AM117 Semi-Vols Liq HD by GC	1	6/5/2003 0:00	ssh	8005

Parameter	*Result*	*MDL*	*PQL*	*Units*
Hexachloroethane	2870	84.5	264	ug/g
Q	956 J	53.9	2640	ug/g
T	322 J	73.9	2640	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Dithiane-d4	1060	0 ug/g	0 *	50 - 150

AM126 Lewisite in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 09:09	8101	AM126 Lewisite in HD by GC	1	6/11/2003 22:34	ssh	8304

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lewisite	ND	2.06	5.29	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-58-05	21-03-251E	5/12/2003 14:01	5/27/2003 14:00	8/6/2003 15:42	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 08:54	7909	AM098 HD Purity by GC	1	6/3/2003 20:50	tfr	8003

Parameter	*Result*	*MDL*	*PQL*	*Units*
bis-(2-Chloroethyl)sulfide	84.9			%

AM100 Non-Vols in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 18:20	7906	AM100 Non-Vols in HD by GC	1	6/5/2003 0:00	ssh	8007

Parameter	*Result*	*MDL*	*PQL*	*Units*
Thiodiglycol (TDG)	ND	226	269	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
Thiodiglycol-d8 (TDG-d8)	1070	915 ug/g	85.2	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 14:44	7901	AM101 Vols in Liquid HD by GC	1	6/3/2003 11:53	ssh	7908

Parameter	*Result*	*MDL*	*PQL*	*Units*
1,2-Dichloroethane	3860	277	532	ug/g
Tetrachloroethylene	ND	106	532	ug/g
1,1,2,2-Tetrachloroethane	ND	160	532	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Difluorobenzene	11000	10700 ug/g	96.9	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/4/2003 14:41	8201	AM118 Metals in Liq HD by ICP	1	6/9/2003 20:16	blb	8302

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	29.7 J	10.6	53.1	ug/g
Antimony	ND	0.670	5.31	ug/g
Arsenic	9.55	1.30	5.31	ug/g
Barium	ND	0.457	5.31	ug/g
Beryllium	ND	0.956	5.31	ug/g
Boron	8.59 J	3.97	10.6	ug/g
Cadmium	ND	0.436	5.31	ug/g
Chromium	2.92 J	1.37	5.31	ug/g
Cobalt	ND	0.287	1.06	ug/g
Copper	8.21	2.58	5.31	ug/g
Lead	46.6	0.436	5.31	ug/g
Manganese	ND	0.340	1.06	ug/g
Mercury	158	0.0531	0.531	ug/g
Nickel	ND	0.372	5.31	ug/g
Selenium	ND	1.24	10.6	ug/g
Silver	ND	0.499	5.31	ug/g

Report of Analysis

Thallium	ND	1.04	5.31	ug/g
Tin	ND	2.65	10.6	ug/g
Vanadium	ND	1.06	5.31	ug/g
Zinc	ND	3.32	10.6	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 09:01	7910	AM117 Semi-Vols Liq HD by GC	1	6/5/2003 0:00	ssh	8005

Parameter	*Result*	*MDL*	*PQL*	*Units*
Hexachloroethane	ND	84.8	265	ug/g
Q	25600	54.1	2650	ug/g
T	3750	74.2	2650	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Dithiane-d4	1060	1170 ug/g	110	50 - 150

AM126 Lewisite in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 09:09	8101	AM126 Lewisite in HD by GC	1	6/11/2003 23:10	ssh	8304

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lewisite	ND	2.07	5.30	ug/g

Comments: Sample diluted an additional 40 fold for mercury.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-58-06	21-03-254	5/12/2003 10:51	5/27/2003 10:51	8/6/2003 15:42	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 08:54	7909	AM098 HD Purity by GC	1	6/3/2003 14:46	tfr	8003

Parameter	*Result*	*MDL*	*PQL*	*Units*
bis-(2-Chloroethyl)sulfide	85.4			%

AM100 Non-Vols in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 18:20	7906	AM100 Non-Vols in HD by GC	1	6/5/2003 0:00	ssh	8007

Parameter	*Result*	*MDL*	*PQL*	*Units*
Thiodiglycol (TDG)	ND	210	250	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
Thiodiglycol-d8 (TDG-d8)	998	900 ug/g	90.2	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 14:44	7901	AM101 Vols in Liquid HD by GC	1	6/3/2003 0:42	ssh	7908

Parameter	*Result*	*MDL*	*PQL*	*Units*
1,2-Dichloroethane	3910	277	534	ug/g
Tetrachloroethylene	ND	107	534	ug/g
1,1,2,2-Tetrachloroethane	ND	160	534	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Difluorobenzene	11000	10900 ug/g	98.4	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/4/2003 14:41	8201	AM118 Metals in Liq HD by ICP	1	6/9/2003 19:29	blb	8302

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	10.5	52.5	ug/g
Antimony	ND	0.661	5.25	ug/g
Arsenic	2.22 J	1.28	5.25	ug/g
Barium	ND	0.451	5.25	ug/g
Beryllium	ND	0.944	5.25	ug/g
Boron	ND	3.92	10.5	ug/g
Cadmium	ND	0.430	5.25	ug/g
Chromium	2.85 J	1.35	5.25	ug/g
Cobalt	ND	0.283	1.05	ug/g
Copper	7.53	2.55	5.25	ug/g
Lead	ND	0.430	5.25	ug/g
Manganese	ND	0.336	1.05	ug/g
Mercury	ND	0.0525	0.525	ug/g
Nickel	ND	0.367	5.25	ug/g
Selenium	ND	1.23	10.5	ug/g
Silver	ND	0.493	5.25	ug/g

Report of Analysis

Thallium	ND	1.03	5.25	ug/g
Tin	ND	2.61	10.5	ug/g
Vanadium	ND	1.05	5.25	ug/g
Zinc	ND	3.27	10.5	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 09:01	7910	AM117 Semi-Vols Liq HD by GC	1	6/5/2003 0:00	ssh	8005

Parameter	*Result*	*MDL*	*PQL*	*Units*
Hexachloroethane	ND	83.5	261	ug/g
Q	25500	53.2	2610	ug/g
T	3550	73.1	2610	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Dithiane-d4	1040	1160 ug/g	111	50 - 150

AM126 Lewisite in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 09:09	8101	AM126 Lewisite in HD by GC	1	6/11/2003 23:46	ssh	8304

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lewisite	ND	1.98	5.08	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-58-07	21-03-255	5/12/2003 10:51	5/27/2003 10:51	8/6/2003 15:42	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 08:54	7909	AM098 HD Purity by GC	1	6/3/2003 15:05	tfr	8003

Parameter	*Result*	*MDL*	*PQL*	*Units*
bis-(2-Chloroethyl)sulfide	88.1			%

AM100 Non-Vols in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 18:20	7906	AM100 Non-Vols in HD by GC	1	6/5/2003 0:00	ssh	8007

Parameter	*Result*	*MDL*	*PQL*	*Units*
Thiodiglycol (TDG)	ND	221	263	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
Thiodiglycol-d8 (TDG-d8)	1050	929 ug/g	88.2	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 14:44	7901	AM101 Vols in Liquid HD by GC	1	6/3/2003 0:00	ssh	7908

Parameter	*Result*	*MDL*	*PQL*	*Units*
1,2-Dichloroethane	3690	267	514	ug/g
Tetrachloroethylene	ND	103	514	ug/g
1,1,2,2-Tetrachloroethane	ND	154	514	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Difluorobenzene	10600	9910 ug/g	93.2	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/4/2003 14:41	8201	AM118 Metals in Liq HD by ICP	1	6/9/2003 19:43	blb	8302

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	10.4	52.0	ug/g
Antimony	ND	0.656	5.20	ug/g
Arsenic	2.40 J	1.27	5.20	ug/g
Barium	ND	0.447	5.20	ug/g
Beryllium	ND	0.937	5.20	ug/g
Boron	ND	3.89	10.4	ug/g
Cadmium	ND	0.427	5.20	ug/g
Chromium	3.07 J	1.34	5.20	ug/g
Cobalt	ND	0.281	1.04	ug/g
Copper	8.87	2.53	5.20	ug/g
Lead	ND	0.427	5.20	ug/g
Manganese	ND	0.333	1.04	ug/g
Mercury	ND	0.0520	0.520	ug/g
Nickel	ND	0.364	5.20	ug/g
Selenium	ND	1.22	10.4	ug/g
Silver	ND	0.489	5.20	ug/g

Report of Analysis

Thallium	ND	1.02	5.20	ug/g
Tin	ND	2.59	10.4	ug/g
Vanadium	ND	1.04	5.20	ug/g
Zinc	5.22 J	3.25	10.4	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 09:01	7910	AM117 Semi-Vols Liq HD by GC	1	6/5/2003 0:00	ssh	8005

Parameter	*Result*	*MDL*	*PQL*	*Units*
Hexachloroethane	ND	83.3	260	ug/g
Q	25200	53.1	2600	ug/g
T	3530	72.9	2600	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Dithiane-d4	1040	1120 ug/g	108	50 - 150

AM126 Lewisite in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 09:09	8101	AM126 Lewisite in HD by GC	1	6/12/2003 0:21	ssh	8304

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lewisite	ND	1.97	5.04	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-58-08	21-03-262	5/12/2003 10:51	5/27/2003 10:51	8/6/2003 15:42	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 08:54	7909	AM098 HD Purity by GC	1	6/3/2003 14:08	tfr	8003

Parameter	*Result*	*MDL*	*PQL*	*Units*
bis-(2-Chloroethyl)sulfide	92.3			%

AM100 Non-Vols in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 18:20	7906	AM100 Non-Vols in HD by GC	1	6/5/2003 0:00	ssh	8007

Parameter	*Result*	*MDL*	*PQL*	*Units*
Thiodiglycol (TDG)	ND	217	259	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
Thiodiglycol-d8 (TDG-d8)	1040	924 ug/g	89.3	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 14:44	7901	AM101 Vols in Liquid HD by GC	1	6/2/2003 23:31	ssh	7908

Parameter	*Result*	*MDL*	*PQL*	*Units*
1,2-Dichloroethane	8580	271	522	ug/g
Tetrachloroethylene	ND	104	522	ug/g
1,1,2,2-Tetrachloroethane	ND	157	522	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Difluorobenzene	10800	10400 ug/g	96.8	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/4/2003 14:41	8201	AM118 Metals in Liq HD by ICP	1	6/9/2003 17:40	blb	8302

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	10.5	52.4	ug/g
Antimony	ND	0.660	5.24	ug/g
Arsenic	1.45 J	1.28	5.24	ug/g
Barium	ND	0.450	5.24	ug/g
Beryllium	ND	0.942	5.24	ug/g
Boron	ND	3.92	10.5	ug/g
Cadmium	ND	0.429	5.24	ug/g
Chromium	2.46 J	1.35	5.24	ug/g
Cobalt	ND	0.283	1.05	ug/g
Copper	61.7	2.54	5.24	ug/g
Lead	0.836 J	0.429	5.24	ug/g
Manganese	ND	0.335	1.05	ug/g
Mercury	ND	0.0524	0.524	ug/g
Nickel	ND	0.366	5.24	ug/g
Selenium	ND	1.23	10.5	ug/g
Silver	ND	0.492	5.24	ug/g

Report of Analysis

Thallium	ND	1.03	5.24	ug/g
Tin	ND	2.61	10.5	ug/g
Vanadium	ND	1.05	5.24	ug/g
Zinc	5.39 J	3.27	10.5	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 09:01	7910	AM117 Semi-Vols Liq HD by GC	1	6/5/2003 0:31	ssh	8005

Parameter	*Result*	*MDL*	*PQL*	*Units*
Hexachloroethane	ND	81.1	253	ug/g
Q	33900	51.7	2530	ug/g
T	1080 J	70.9	2530	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Dithiane-d4	1010	1110 ug/g	110	50 - 150

AM126 Lewisite in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 09:09	8101	AM126 Lewisite in HD by GC	1	6/11/2003 19:33	ssh	8304

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lewisite	ND	2.01	5.17	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-58-09	21-03-265	5/13/2003 10:51	5/27/2003 10:51	8/6/2003 15:42	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 08:54	7909	AM098 HD Purity by GC	1	6/3/2003 15:25	tfr	8003

Parameter	*Result*	*MDL*	*PQL*	*Units*
bis-(2-Chloroethyl)sulfide	93.2			%

AM100 Non-Vols in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 18:20	7906	AM100 Non-Vols in HD by GC	1	6/5/2003 0:00	ssh	8007

Parameter	*Result*	*MDL*	*PQL*	*Units*
Thiodiglycol (TDG)	ND	222	265	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
Thiodiglycol-d8 (TDG-d8)	1060	976 ug/g	92.1	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 14:44	7901	AM101 Vols in Liquid HD by GC	1	6/3/2003 0:00	ssh	7908

Parameter	*Result*	*MDL*	*PQL*	*Units*
1,2-Dichloroethane	5510	273	525	ug/g
Tetrachloroethylene	ND	105	525	ug/g
1,1,2,2-Tetrachloroethane	ND	157	525	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Difluorobenzene	10900	10800 ug/g	99.4	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/4/2003 14:41	8201	AM118 Metals in Liq HD by ICP	1	6/9/2003 19:52	blb	8302

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	10.3	51.4	ug/g
Antimony	ND	0.647	5.14	ug/g
Arsenic	1.33 J	1.25	5.14	ug/g
Barium	ND	0.442	5.14	ug/g
Beryllium	ND	0.925	5.14	ug/g
Boron	ND	3.84	10.3	ug/g
Cadmium	ND	0.421	5.14	ug/g
Chromium	2.65 J	1.33	5.14	ug/g
Cobalt	ND	0.277	1.03	ug/g
Copper	38.9	2.50	5.14	ug/g
Lead	ND	0.421	5.14	ug/g
Manganese	ND	0.329	1.03	ug/g
Mercury	ND	0.0514	0.514	ug/g
Nickel	ND	0.360	5.14	ug/g
Selenium	ND	1.20	10.3	ug/g
Silver	ND	0.483	5.14	ug/g

Report of Analysis

Thallium	ND	1.01	5.14	ug/g
Tin	ND	2.56	10.3	ug/g
Vanadium	ND	1.03	5.14	ug/g
Zinc	ND	3.21	10.3	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 09:01	7910	AM117 Semi-Vols Liq HD by GC	1	6/5/2003 0:00	ssh	8005

Parameter	*Result*	*MDL*	*PQL*	*Units*
Hexachloroethane	ND	85.2	266	ug/g
Q	46900	54.3	2660	ug/g
T	1090 J	74.5	2660	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Dithiane-d4	1060	2360 ug/g	221 *	50 - 150

AM126 Lewisite in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 09:09	8101	AM126 Lewisite in HD by GC	1	6/12/2003 0:56	ssh	8304

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lewisite	ND	1.99	5.09	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-58-10	21-03-269	5/13/2003 10:51	5/27/2003 10:51	8/6/2003 15:42	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 08:54	7909	AM098 HD Purity by GC	1	6/3/2003 15:44	tfr	8003

Parameter	*Result*	*MDL*	*PQL*	*Units*
bis-(2-Chloroethyl)sulfide	86.6			%

AM100 Non-Vols in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 18:20	7906	AM100 Non-Vols in HD by GC	1	6/5/2003 0:00	ssh	8007

Parameter	*Result*	*MDL*	*PQL*	*Units*
Thiodiglycol (TDG)	ND	223	266	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
Thiodiglycol-d8 (TDG-d8)	1060	918 ug/g	86.4	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 14:44	7901	AM101 Vols in Liquid HD by GC	1	6/3/2003 0:00	ssh	7908

Parameter	*Result*	*MDL*	*PQL*	*Units*
1,2-Dichloroethane	10200	275	529	ug/g
Tetrachloroethylene	ND	106	529	ug/g
1,1,2,2-Tetrachloroethane	ND	159	529	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Difluorobenzene	10900	10400 ug/g	94.8	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/4/2003 14:41	8201	AM118 Metals in Liq HD by ICP	1	6/9/2003 20:21	blb	8302

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	14.5 J	10.4	52.2	ug/g
Antimony	ND	0.658	5.22	ug/g
Arsenic	5.90	1.27	5.22	ug/g
Barium	ND	0.449	5.22	ug/g
Beryllium	ND	0.939	5.22	ug/g
Boron	4.11 J	3.90	10.4	ug/g
Cadmium	ND	0.428	5.22	ug/g
Chromium	2.73 J	1.35	5.22	ug/g
Cobalt	ND	0.282	1.04	ug/g
Copper	36.1	2.54	5.22	ug/g
Lead	ND	0.428	5.22	ug/g
Manganese	1.96	0.334	1.04	ug/g
Mercury	27.4	0.0522	0.522	ug/g
Nickel	ND	0.365	5.22	ug/g
Selenium	ND	1.22	10.4	ug/g
Silver	ND	0.491	5.22	ug/g

Report of Analysis

Thallium	ND	1.02	5.22	ug/g
Tin	ND	2.60	10.4	ug/g
Vanadium	ND	1.04	5.22	ug/g
Zinc	ND	3.26	10.4	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 09:01	7910	AM117 Semi-Vols Liq HD by GC	1	6/5/2003 0:00	ssh	8005

Parameter	*Result*	*MDL*	*PQL*	*Units*
Hexachloroethane	ND	84.9	265	ug/g
Q	34400	54.1	2650	ug/g
T	1430 J	74.3	2650	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Dithiane-d4	1060	1200 ug/g	113	50 - 150

AM126 Lewisite in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 09:09	8101	AM126 Lewisite in HD by GC	1	6/12/2003 0:00	ssh	8304

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lewisite	ND	1.97	5.06	ug/g

Comments: Sample diluted an additional 10 fold for mercury.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-58-11	21-03-273	5/14/2003 10:51	5/27/2003 10:51	8/6/2003 15:42	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 08:54	7909	AM098 HD Purity by GC	1	6/3/2003 16:03	tfr	8003

Parameter	*Result*	*MDL*	*PQL*	*Units*
bis-(2-Chloroethyl)sulfide	82.2			%

AM100 Non-Vols in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 18:20	7906	AM100 Non-Vols in HD by GC	1	6/5/2003 12:04	ssh	8007

Parameter	*Result*	*MDL*	*PQL*	*Units*
Thiodiglycol (TDG)	ND	211	252	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
Thiodiglycol-d8 (TDG-d8)	1010	847 ug/g	84.1	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 14:44	7901	AM101 Vols in Liquid HD by GC	1	6/3/2003 0:00	ssh	7908

Parameter	*Result*	*MDL*	*PQL*	*Units*
1,2-Dichloroethane	7180	274	526	ug/g
Tetrachloroethylene	ND	105	526	ug/g
1,1,2,2-Tetrachloroethane	ND	158	526	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Difluorobenzene	10900	10500 ug/g	96.8	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/4/2003 14:41	8201	AM118 Metals in Liq HD by ICP	1	6/9/2003 19:14	blb	8302

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	10.5	52.6	ug/g
Antimony	ND	0.663	5.26	ug/g
Arsenic	1.68 J	1.28	5.26	ug/g
Barium	ND	0.453	5.26	ug/g
Beryllium	ND	0.947	5.26	ug/g
Boron	ND	3.94	10.5	ug/g
Cadmium	ND	0.432	5.26	ug/g
Chromium	3.06 J	1.36	5.26	ug/g
Cobalt	ND	0.284	1.05	ug/g
Copper	29.2	2.56	5.26	ug/g
Lead	ND	0.432	5.26	ug/g
Manganese	3.23	0.337	1.05	ug/g
Mercury	5.75	0.0526	0.526	ug/g
Nickel	0.921 J	0.368	5.26	ug/g
Selenium	ND	1.23	10.5	ug/g
Silver	ND	0.495	5.26	ug/g

Report of Analysis

Thallium	ND	1.03	5.26	ug/g
Tin	ND	2.62	10.5	ug/g
Vanadium	ND	1.05	5.26	ug/g
Zinc	ND	3.28	10.5	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 09:01	7910	AM117 Semi-Vols Liq HD by GC	1	6/5/2003 14:42	ssh	8005

Parameter	*Result*	*MDL*	*PQL*	*Units*
Hexachloroethane	ND	79.4	248	ug/g
Q	24800	50.6	2480	ug/g
T	1020 J	69.4	2480	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Dithiane-d4	992	950 ug/g	95.8	50 - 150

AM126 Lewisite in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 09:09	8101	AM126 Lewisite in HD by GC	1	6/12/2003 0:00	ssh	8304

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lewisite	ND	1.95	5.01	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-58-12	21-03-276	5/14/2003 10:51	5/27/2003 10:51	8/6/2003 15:42	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 08:54	7909	AM098 HD Purity by GC	1	6/3/2003 16:22	tfr	8003

Parameter	*Result*	*MDL*	*PQL*	*Units*
bis-(2-Chloroethyl)sulfide	95.5			%

AM100 Non-Vols in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 18:20	7906	AM100 Non-Vols in HD by GC	1	6/5/2003 12:49	ssh	8007

Parameter	*Result*	*MDL*	*PQL*	*Units*
Thiodiglycol(TDG)	ND	227	270	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
Thiodiglycol-d8 (TDG-d8)	1080	929 ug/g	86.1	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 14:44	7901	AM101 Vols in Liquid HD by GC	1	6/3/2003 0:00	ssh	7908

Parameter	*Result*	*MDL*	*PQL*	*Units*
1,2-Dichloroethane	5680	268	515	ug/g
Tetrachloroethylene	ND	103	515	ug/g
1,1,2,2-Tetrachloroethane	ND	154	515	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Difluorobenzene	10700	10400 ug/g	98	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/4/2003 14:41	8201	AM118 Metals in Liq HD by ICP	1	6/9/2003 19:19	blb	8302

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	39.4 J	10.6	53.0	ug/g
Antimony	ND	0.667	5.30	ug/g
Arsenic	15.3	1.29	5.30	ug/g
Barium	ND	0.456	5.30	ug/g
Beryllium	ND	0.953	5.30	ug/g
Boron	9.20 J	3.96	10.6	ug/g
Cadmium	ND	0.434	5.30	ug/g
Chromium	3.69 J	1.37	5.30	ug/g
Cobalt	ND	0.286	1.06	ug/g
Copper	63.6	2.57	5.30	ug/g
Lead	ND	0.434	5.30	ug/g
Manganese	ND	0.339	1.06	ug/g
Mercury	ND	0.0530	0.530	ug/g
Nickel	1.39 J	0.371	5.30	ug/g
Selenium	ND	1.24	10.6	ug/g
Silver	ND	0.498	5.30	ug/g

Report of Analysis

Thallium	ND	1.04	5.30	ug/g
Tin	ND	2.64	10.6	ug/g
Vanadium	ND	1.06	5.30	ug/g
Zinc	3.66 J	3.31	10.6	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 09:01	7910	AM117 Semi-Vols Liq HD by GC	1	6/5/2003 15:21	ssh	8005

Parameter	*Result*	*MDL*	*PQL*	*Units*
Hexachloroethane	ND	85.5	267	ug/g
Q	36000	54.5	2670	ug/g
T	795 J	74.8	2670	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Dithiane-d4	1070	1000 ug/g	94	50 - 150

AM126 Lewisite in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 09:09	8101	AM126 Lewisite in HD by GC	1	6/12/2003 0:00	ssh	8304

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lewisite	ND	2.01	5.17	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-58-13	21-03-279	5/15/2003 10:51	5/27/2003 10:51	8/6/2003 15:42	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 08:54	7909	AM098 HD Purity by GC	1	6/3/2003 16:41	tfr	8003

Parameter	*Result*	*MDL*	*PQL*	*Units*
bis-(2-Chloroethyl)sulfide	86.7			%

AM100 Non-Vols in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 18:20	7906	AM100 Non-Vols in HD by GC	1	6/5/2003 13:35	ssh	8007

Parameter	*Result*	*MDL*	*PQL*	*Units*
Thiodiglycol (TDG)	ND	213	254	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
Thiodiglycol-d8 (TDG-d8)	1010	863 ug/g	85.1	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 14:44	7901	AM101 Vols in Liquid HD by GC	1	6/3/2003 0:00	ssh	7908

Parameter	*Result*	*MDL*	*PQL*	*Units*
1,2-Dichloroethane	7410	255	491	ug/g
Tetrachloroethylene	ND	98.2	491	ug/g
1,1,2,2-Tetrachloroethane	ND	147	491	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Difluorobenzene	10200	9730 ug/g	95.7	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/4/2003 14:41	8201	AM118 Metals in Liq HD by ICP	1	6/9/2003 19:24	blb	8302

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	10.6	52.8	ug/g
Antimony	ND	0.665	5.28	ug/g
Arsenic	ND	1.29	5.28	ug/g
Barium	ND	0.454	5.28	ug/g
Beryllium	ND	0.950	5.28	ug/g
Boron	ND	3.95	10.6	ug/g
Cadmium	ND	0.433	5.28	ug/g
Chromium	4.25 J	1.36	5.28	ug/g
Cobalt	ND	0.285	1.06	ug/g
Copper	28.6	2.57	5.28	ug/g
Lead	ND	0.433	5.28	ug/g
Manganese	2.58	0.338	1.06	ug/g
Mercury	ND	0.0528	0.528	ug/g
Nickel	1.01 J	0.370	5.28	ug/g
Selenium	ND	1.24	10.6	ug/g
Silver	ND	0.496	5.28	ug/g

Report of Analysis

Thallium	ND	1.03	5.28	ug/g
Tin	ND	2.63	10.6	ug/g
Vanadium	ND	1.06	5.28	ug/g
Zinc	ND	3.29	10.6	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 09:01	7910	AM117 Semi-Vols Liq HD by GC	1	6/5/2003 16:01	ssh	8005

Parameter	*Result*	*MDL*	*PQL*	*Units*
Hexachloroethane	ND	83.4	261	ug/g
Q	23400	53.2	2610	ug/g
T	1030 J	73.0	2610	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Dithiane-d4	1040	1010 ug/g	96.4	50 - 150

AM126 Lewisite in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 09:09	8101	AM126 Lewisite in HD by GC	1	6/12/2003 0:00	ssh	8304

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lewisite	ND	1.97	5.05	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-58-14	21-03-282	5/15/2003 10:51	5/27/2003 10:51	8/6/2003 15:42	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 08:54	7909	AM098 HD Purity by GC	1	6/3/2003 17:00	tfr	8003

Parameter	*Result*	*MDL*	*PQL*	*Units*
bis-(2-Chloroethyl)sulfide	87.5			%

AM100 Non-Vols in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 18:20	7906	AM100 Non-Vols in HD by GC	1	6/5/2003 14:20	ssh	8007

Parameter	*Result*	*MDL*	*PQL*	*Units*
Thiodiglycol (TDG)	ND	222	264	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
Thiodiglycol-d8 (TDG-d8)	1050	848 ug/g	80.4	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 14:44	7901	AM101 Vols in Liquid HD by GC	1	6/3/2003 0:00	ssh	7908

Parameter	*Result*	*MDL*	*PQL*	*Units*
1,2-Dichloroethane	8950	259	499	ug/g
Tetrachloroethylene	ND	99.7	499	ug/g
1,1,2,2-Tetrachloroethane	ND	150	499	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Difluorobenzene	10300	9910 ug/g	96.1	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/4/2003 14:41	8201	AM118 Metals in Liq HD by ICP	1	6/9/2003 20:25	blb	8302

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	10.6	53.1	ug/g
Antimony	ND	0.669	5.31	ug/g
Arsenic	14.1	1.30	5.31	ug/g
Barium	ND	0.456	5.31	ug/g
Beryllium	ND	0.955	5.31	ug/g
Boron	ND	3.97	10.6	ug/g
Cadmium	ND	0.435	5.31	ug/g
Chromium	3.49 J	1.37	5.31	ug/g
Cobalt	ND	0.287	1.06	ug/g
Copper	40.0	2.58	5.31	ug/g
Lead	ND	0.435	5.31	ug/g
Manganese	2.93	0.340	1.06	ug/g
Mercury	17.1	0.0531	0.531	ug/g
Nickel	ND	0.372	5.31	ug/g
Selenium	ND	1.24	10.6	ug/g
Silver	ND	0.499	5.31	ug/g

Report of Analysis

Thallium	ND	1.04	5.31	ug/g
Tin	ND	2.64	10.6	ug/g
Vanadium	ND	1.06	5.31	ug/g
Zinc	ND	3.31	10.6	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 09:01	7910	AM117 Semi-Vols Liq HD by GC	1	6/5/2003 16:40	ssh	8005

Parameter	*Result*	*MDL*	*PQL*	*Units*
Hexachloroethane	ND	83.1	260	ug/g
Q	25800	53.0	2600	ug/g
T	1130 J	72.7	2600	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Dithiane-d4	1040	1010 ug/g	96.9	50 - 150

AM126 Lewisite in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 09:09	8101	AM126 Lewisite in HD by GC	1	6/12/2003 10:01	ssh	8304

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lewisite	ND	1.94	4.99	ug/g

Comments: Sample diluted an additional 5 fold for mercury.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-58-15	21-03-286	5/16/2003 10:51	5/27/2003 10:51	8/6/2003 15:42	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 08:54	7909	AM098 HD Purity by GC	1	6/3/2003 17:20	tfr	8003

Parameter	*Result*	*MDL*	*PQL*	*Units*
bis-(2-Chloroethyl)sulfide	93.2			%

AM100 Non-Vols in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 18:20	7906	AM100 Non-Vols in HD by GC	1	6/5/2003 15:05	ssh	8007

Parameter	*Result*	*MDL*	*PQL*	*Units*
Thiodiglycol (TDG)	ND	214	254	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
Thiodiglycol-d8 (TDG-d8)	1020	807 ug/g	79.3	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 14:44	7901	AM101 Vols in Liquid HD by GC	1	6/3/2003 0:00	ssh	7908

Parameter	*Result*	*MDL*	*PQL*	*Units*
1,2-Dichloroethane	5830	272	523	ug/g
Tetrachloroethylene	155 J	105	523	ug/g
1,1,2,2-Tetrachloroethane	ND	157	523	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Difluorobenzene	10800	10400 ug/g	96	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/4/2003 14:41	8201	AM118 Metals in Liq HD by ICP	1	6/9/2003 19:33	blb	8302

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	13.4 J	10.7	53.6	ug/g
Antimony	ND	0.675	5.36	ug/g
Arsenic	3.00 J	1.31	5.36	ug/g
Barium	ND	0.461	5.36	ug/g
Beryllium	ND	0.965	5.36	ug/g
Boron	ND	4.01	10.7	ug/g
Cadmium	ND	0.439	5.36	ug/g
Chromium	3.66 J	1.38	5.36	ug/g
Cobalt	ND	0.289	1.07	ug/g
Copper	68.2	2.60	5.36	ug/g
Lead	ND	0.439	5.36	ug/g
Manganese	0.362 J	0.343	1.07	ug/g
Mercury	ND	0.0536	0.536	ug/g
Nickel	0.456 J	0.375	5.36	ug/g
Selenium	ND	1.25	10.7	ug/g
Silver	ND	0.504	5.36	ug/g

Report of Analysis

Thallium	ND	1.05	5.36	ug/g
Tin	ND	2.67	10.7	ug/g
Vanadium	ND	1.07	5.36	ug/g
Zinc	3.68 J	3.34	10.7	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 09:01	7910	AM117 Semi-Vols Liq HD by GC	1	6/5/2003 17:20	ssh	8005

Parameter	*Result*	*MDL*	*PQL*	*Units*
Hexachloroethane	ND	83.6	261	ug/g
Q	24700	53.3	2610	ug/g
T	538 J	73.1	2610	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Dithiane-d4	1040	986 ug/g	94.4	50 - 150

AM126 Lewisite in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 09:09	8101	AM126 Lewisite in HD by GC	1	6/12/2003 10:37	ssh	8304

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lewisite	ND	1.98	5.08	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-58-16	21-03-290	5/16/2003 10:51	5/27/2003 10:51	8/6/2003 15:42	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 08:54	7909	AM098 HD Purity by GC	1	6/3/2003 18:17	tfr	8003

Parameter	*Result*	*MDL*	*PQL*	*Units*
bis-(2-Chloroethyl)sulfide	89.9			%

AM100 Non-Vols in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 18:20	7906	AM100 Non-Vols in HD by GC	1	6/5/2003 15:51	ssh	8007

Parameter	*Result*	*MDL*	*PQL*	*Units*
Thiodiglycol (TDG)	ND	220	262	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
Thiodiglycol-d8 (TDG-d8)	1050	812 ug/g	77.5	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 14:44	7901	AM101 Vols in Liquid HD by GC	1	6/3/2003 0:00	ssh	7908

Parameter	*Result*	*MDL*	*PQL*	*Units*
1,2-Dichloroethane	6690	271	522	ug/g
Tetrachloroethylene	ND	104	522	ug/g
1,1,2,2-Tetrachloroethane	ND	157	522	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Difluorobenzene	10800	11000 ug/g	102	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/4/2003 14:41	8201	AM118 Metals in Liq HD by ICP	1	6/9/2003 19:38	blb	8302

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	10.4	51.9	ug/g
Antimony	ND	0.654	5.19	ug/g
Arsenic	13.4	1.27	5.19	ug/g
Barium	ND	0.446	5.19	ug/g
Beryllium	ND	0.934	5.19	ug/g
Boron	ND	3.88	10.4	ug/g
Cadmium	ND	0.425	5.19	ug/g
Chromium	3.20 J	1.34	5.19	ug/g
Cobalt	ND	0.280	1.04	ug/g
Copper	50.1	2.52	5.19	ug/g
Lead	ND	0.425	5.19	ug/g
Manganese	ND	0.332	1.04	ug/g
Mercury	ND	0.0519	0.519	ug/g
Nickel	2.84 J	0.363	5.19	ug/g
Selenium	ND	1.21	10.4	ug/g
Silver	ND	0.488	5.19	ug/g

Report of Analysis

Thallium	ND	1.02	5.19	ug/g
Tin	ND	2.58	10.4	ug/g
Vanadium	ND	1.04	5.19	ug/g
Zinc	ND	3.24	10.4	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 09:01	7910	AM117 Semi-Vols Liq HD by GC	1	6/5/2003 17:59	ssh	8005

Parameter	*Result*	*MDL*	*PQL*	*Units*
Hexachloroethane	ND	81.9	256	ug/g
Q	30400	52.2	2560	ug/g
T	800 J	71.6	2560	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Dithiane-d4	1020	961 ug/g	93.9	50 - 150

AM126 Lewisite in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 09:09	8101	AM126 Lewisite in HD by GC	1	6/12/2003 11:12	ssh	8304

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lewisite	ND	2.00	5.12	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-58-17	21-03-294	5/16/2003 10:51	5/27/2003 10:51	8/6/2003 15:42	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 08:54	7909	AM098 HD Purity by GC	1	6/3/2003 18:36	tfr	8003

Parameter	*Result*	*MDL*	*PQL*	*Units*
bis-(2-Chloroethyl)sulfide	86.1			%

AM100 Non-Vols in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 18:20	7906	AM100 Non-Vols in HD by GC	1	6/5/2003 16:36	ssh	8007

Parameter	*Result*	*MDL*	*PQL*	*Units*
Thiodiglycol (TDG)	ND	218	259	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
Thiodiglycol-d8 (TDG-d8)	1040	864 ug/g	83.4	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 14:44	7901	AM101 Vols in Liquid HD by GC	1	6/3/2003 0:00	ssh	7908

Parameter	*Result*	*MDL*	*PQL*	*Units*
1,2-Dichloroethane	7160	272	523	ug/g
Tetrachloroethylene	ND	105	523	ug/g
1,1,2,2-Tetrachloroethane	ND	157	523	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Difluorobenzene	10800	10400 ug/g	96.6	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/4/2003 14:41	8201	AM118 Metals in Liq HD by ICP	1	6/9/2003 20:35	blh	8302

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	10.5	52.7	ug/g
Antimony	ND	0.664	5.27	ug/g
Arsenic	5.68	1.29	5.27	ug/g
Barium	ND	0.453	5.27	ug/g
Beryllium	ND	0.948	5.27	ug/g
Boron	ND	3.94	10.5	ug/g
Cadmium	ND	0.432	5.27	ug/g
Chromium	1.56 J	1.36	5.27	ug/g
Cobalt	ND	0.285	1.05	ug/g
Copper	34.5	2.56	5.27	ug/g
Lead	ND	0.432	5.27	ug/g
Manganese	4.12	0.337	1.05	ug/g
Mercury	16.3	0.0527	0.527	ug/g
Nickel	0.520 J	0.369	5.27	ug/g
Selenium	ND	1.23	10.5	ug/g
Silver	ND	0.495	5.27	ug/g

Report of Analysis

Thallium	ND	1.03	5.27	ug/g
Tin	ND	2.62	10.5	ug/g
Vanadium	ND	1.05	5.27	ug/g
Zinc	ND	3.29	10.5	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 09:01	7910	AM117 Semi-Vols Liq HD by GC	1	6/5/2003 18:38	ssh	8005

Parameter	*Result*	*MDL*	*PQL*	*Units*
Hexachloroethane	ND	81.3	254	ug/g
Q	21800	51.8	2540	ug/g
T	1200 J	71.1	2540	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Dithiane-d4	1020	972 ug/g	95.6	50 - 150

AM126 Lewisite in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 09:09	8101	AM126 Lewisite in HD by GC	1	6/12/2003 11:48	ssh	8304

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lewisite	ND	1.99	5.10	ug/g

Comments: Sample diluted an additional 5 fold for mercury.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-58-18	21-03-298	5/16/2003 10:51	5/27/2003 10:51	8/6/2003 15:42	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 08:54	7909	AM098 HD Purity by GC	1	6/3/2003 18:55	tfr	8003

Parameter	*Result*	*MDL*	*PQL*	*Units*
bis-(2-Chloroethyl)sulfide	88.8			%

AM100 Non-Vols in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 18:20	7906	AM100 Non-Vols in HD by GC	1	6/5/2003 17:22	ssh	8007

Parameter	*Result*	*MDL*	*PQL*	*Units*
Thiodiglycol (TDG)	ND	221	263	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
Thiodiglycol-d8 (TDG-d8)	1050	878 ug/g	83.5	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 14:44	7901	AM101 Vols in Liquid HD by GC	1	6/3/2003 0:00	ssh	7908

Parameter	*Result*	*MDL*	*PQL*	*Units*
1,2-Dichloroethane	7000	273	524	ug/g
Tetrachloroethylene	ND	105	524	ug/g
1,1,2,2-Tetrachloroethane	ND	157	524	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Difluorobenzene	10800	10600 ug/g	98	50 - 150

AM118 Metals in LiqHD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/4/2003 14:41	8201	AM118 Metals in Liq HD by ICP	1	6/9/2003 19:47	blb	8302

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	18.7 J	10.8	54.0	ug/g
Antimony	ND	0.680	5.40	ug/g
Arsenic	2.78 J	1.32	5.40	ug/g
Barium	ND	0.464	5.40	ug/g
Beryllium	ND	0.972	5.40	ug/g
Boron	4.14 J	4.04	10.8	ug/g
Cadmium	ND	0.443	5.40	ug/g
Chromium	2.69 J	1.39	5.40	ug/g
Cobalt	ND	0.292	1.08	ug/g
Copper	51.7	2.62	5.40	ug/g
Lead	ND	0.443	5.40	ug/g
Manganese	ND	0.346	1.08	ug/g
Mercury	0.0956 J	0.0540	0.540	ug/g
Nickel	ND	0.378	5.40	ug/g
Selenium	ND	1.26	10.8	ug/g
Silver	ND	0.508	5.40	ug/g

Report of Analysis

Thallium	ND	1.06	5.40	ug/g
Tin	ND	2.69	10.8	ug/g
Vanadium	ND	1.08	5.40	ug/g
Zinc	3.67 J	3.37	10.8	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 09:01	7910	AM117 Semi-Vols Liq HD by GC	1	6/5/2003 19:17	ssh	8005

Parameter	*Result*	*MDL*	*PQL*	*Units*
Hexachloroethane	ND	81.8	256	ug/g
Q	36900	52.1	2560	ug/g
T	982 J	71.6	2560	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Dithiane-d4	1020	966 ug/g	94.5	50 - 150

AM126 Lewisite in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 09:09	8101	AM126 Lewisite in HD by GC	1	6/12/2003 12:24	ssh	8304

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lewisite	ND	1.98	5.07	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-58-19	21-03-301	5/17/2003 10:51	5/27/2003 10:51	8/6/2003 15:43	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 08:54	7909	AM098 HD Purity by GC	1	6/3/2003 19:14	tfr	8003

Parameter	*Result*	*MDL*	*PQL*	*Units*
bis-(2-Chloroethyl)sulfide	83.7			%

AM100 Non-Vols in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 18:20	7906	AM100 Non-Vols in HD by GC	1	6/5/2003 18:07	ssh	8007

Parameter	*Result*	*MDL*	*PQL*	*Units*
Thiodiglycol (TDG)	ND	215	256	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
Thiodiglycol-d8 (TDG-d8)	1030	833 ug/g	81.2	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 14:44	7901	AM101 Vols in Liquid HD by GC	1	6/3/2003 0:00	ssh	7908

Parameter	*Result*	*MDL*	*PQL*	*Units*
1,2-Dichloroethane	8500	258	496	ug/g
Tetrachloroethylene	ND	99.2	496	ug/g
1,1,2,2-Tetrachloroethane	ND	149	496	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Difluorobenzene	10300	10100 ug/g	98.1	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/4/2003 14:41	8201	AM118 Metals in Liq HD by ICP	1	6/9/2003 20:30	blb	8302

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	9.98	49.9	ug/g
Antimony	ND	0.629	4.99	ug/g
Arsenic	10.9	1.22	4.99	ug/g
Barium	ND	0.429	4.99	ug/g
Beryllium	ND	0.898	4.99	ug/g
Boron	ND	3.73	9.98	ug/g
Cadmium	ND	0.409	4.99	ug/g
Chromium	2.92 J	1.29	4.99	ug/g
Cobalt	ND	0.269	0.998	ug/g
Copper	36.0	2.43	4.99	ug/g
Lead	0.537 J	0.409	4.99	ug/g
Manganese	2.91	0.319	0.998	ug/g
Mercury	65.0	0.0499	0.499	ug/g
Nickel	0.779 J	0.349	4.99	ug/g
Selenium	ND	1.17	9.98	ug/g
Silver	ND	0.469	4.99	ug/g

Report of Analysis

Thallium	ND	0.978	4.99	ug/g
Tin	ND	2.49	9.98	ug/g
Vanadium	ND	0.998	4.99	ug/g
Zinc	ND	3.11	9.98	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 09:01	7910	AM117 Semi-Vols Liq HD by GC	1	6/5/2003 19:56	ssh	8005

Parameter	*Result*	*MDL*	*PQL*	*Units*
Hexachloroethane	ND	80.1	250	ug/g
Q	19700	51.1	2500	ug/g
T	1120 J	70.1	2500	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Dithiane-d4	1000	923 ug/g	92.2	50 - 150

AM126 Lewisite in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 09:09	8101	AM126 Lewisite in HD by GC	1	6/12/2003 13:00	ssh	8304

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lewisite	ND	1.98	5.08	ug/g

Comments: Sample diluted an additional 20 fold for mercury.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-58-20	21-03-304	5/17/2003 10:51	5/27/2003 10:51	8/6/2003 15:43	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 08:54	7909	AM098 HD Purity by GC	1	6/3/2003 19:33	tfr	8003

Parameter	*Result*	*MDL*	*PQL*	*Units*
bis-(2-Chloroethyl)sulfide	86.2			%

AM100 Non-Vols in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 18:20	7906	AM100 Non-Vols in HD by GC	1	6/5/2003 18:52	ssh	8007

Parameter	*Result*	*MDL*	*PQL*	*Units*
Thiodiglycol (TDG)	ND	207	247	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
Thiodiglycol-d8 (TDG-d8)	987	776 ug/g	78.6	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 14:44	7901	AM101 Vols in Liquid HD by GC	1	6/3/2003 0:00	ssh	7908

Parameter	*Result*	*MDL*	*PQL*	*Units*
1,2-Dichloroethane	7920	269	518	ug/g
Tetrachloroethylene	ND	104	518	ug/g
1,1,2,2-Tetrachloroethane	ND	155	518	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Difluorobenzene	10700	10900 ug/g	102	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/4/2003 14:41	8201	AM118 Metals in Liq HD by ICP	1	6/9/2003 19:57	blb	8302

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	12.1 J	10.6	53.2	ug/g
Antimony	ND	0.670	5.32	ug/g
Arsenic	ND	1.30	5.32	ug/g
Barium	ND	0.457	5.32	ug/g
Beryllium	ND	0.957	5.32	ug/g
Boron	ND	3.98	10.6	ug/g
Cadmium	ND	0.436	5.32	ug/g
Chromium	1.69 J	1.37	5.32	ug/g
Cobalt	ND	0.287	1.06	ug/g
Copper	26.8	2.59	5.32	ug/g
Lead	ND	0.436	5.32	ug/g
Manganese	3.37	0.340	1.06	ug/g
Mercury	ND	0.0532	0.532	ug/g
Nickel	ND	0.372	5.32	ug/g
Selenium	ND	1.24	10.6	ug/g
Silver	ND	0.500	5.32	ug/g

Report of Analysis

Thallium	ND	1.04	5.32	ug/g
Tin	ND	2.65	10.6	ug/g
Vanadium	ND	1.06	5.32	ug/g
Zinc	3.69 J	3.32	10.6	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 09:01	7910	AM117 Semi-Vols Liq HD by GC	1	6/5/2003 20:35	ssh	8005

Parameter	*Result*	*MDL*	*PQL*	*Units*
Hexachloroethane	ND	81.3	254	ug/g
Q	21100	51.8	2540	ug/g
T	917 J	71.1	2540	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Dithiane-d4	1020	965 ug/g	95	50 - 150

AM126 Lewisite in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 09:09	8101	AM126 Lewisite in HD by GC	1	6/12/2003 13:37	ssh	8304

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lewisite	ND	1.92	4.94	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-59-01	21-03-252A	5/12/2003 13:45	5/27/2003 13:44	8/6/2003 15:43	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/2/2003 22:08	blb	7902

Parameter	Result	MDL	PQL	Units
Aluminum	13.8 J	9.05	45.2	ug/g
Arsenic	5700	0.516	4.52	ug/g
Barium	0.490 J	0.0362	4.52	ug/g
Beryllium	ND	0.0452	4.52	ug/g
Boron	ND	3.62	9.05	ug/g
Chromium	2.29 J	0.905	4.52	ug/g
Cobalt	ND	0.109	0.905	ug/g
Copper	11.3	2.92	9.05	ug/g
Manganese	ND	2.99	9.05	ug/g
Nickel	0.622 J	0.561	4.52	ug/g
Selenium	ND	0.643	22.6	ug/g
Vanadium	ND	0.905	4.52	ug/g
Zinc	5.57 J	1.99	9.05	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/3/2003 15:13	blb	9001

Parameter	Result	MDL	PQL	Units
Lead	ND	1.71	9.05	ug/g
Mercury	ND	0.0633	0.452	ug/g
Silver	ND	0.0543	4.52	ug/g
Thallium	ND	0.299	4.52	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/4/2003 15:03	blb	9002

Parameter	Result	MDL	PQL	Units
Antimony	0.183 J	0.118	4.52	ug/g
Cadmium	0.239 J	0.0181	4.52	ug/g
Tin	ND	0.398	9.05	ug/g

Comments: Sample diluted an additional 20 fold for arsenic.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-59-02	21-03-252B	5/12/2003 13:45	5/27/2003 13:44	8/6/2003 15:43	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/2/2003 21:13	blb	7902

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	117	10.1	50.4	ug/g
Arsenic	2.44 J	0.575	5.04	ug/g
Barium	0.668 J	0.0403	5.04	ug/g
Beryllium	ND	0.0504	5.04	ug/g
Boron	ND	4.03	10.1	ug/g
Chromium	5.70	1.01	5.04	ug/g
Cobalt	0.205 J	0.121	1.01	ug/g
Copper	13.3	3.26	10.1	ug/g
Manganese	ND	3.33	10.1	ug/g
Nickel	1.23 J	0.625	5.04	ug/g
Selenium	ND	0.716	25.2	ug/g
Vanadium	1.11 J	1.01	5.04	ug/g
Zinc	3.68 J	2.22	10.1	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/3/2003 14:51	blb	9001

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lead	4.70 J	1.91	10.1	ug/g
Mercury	ND	0.0706	0.504	ug/g
Silver	ND	0.0605	5.04	ug/g
Thallium	ND	0.333	5.04	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/4/2003 15:58	blb	9002

Parameter	*Result*	*MDL*	*PQL*	*Units*
Antimony	ND	0.131	5.04	ug/g
Cadmium	0.350 J	0.0202	5.04	ug/g
Tin	ND	0.444	10.1	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-59-03	21-03-252C	5/12/2003 13:45	5/27/2003 13:44	8/6/2003 15:43	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/3/2003 0:22	blb	7902

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	7.89	39.4	ug/g
Arsenic	2.60 J	0.450	3.94	ug/g
Barium	0.145 J	0.0315	3.94	ug/g
Beryllium	ND	0.0394	3.94	ug/g
Boron	ND	3.15	7.89	ug/g
Chromium	11.1	0.789	3.94	ug/g
Cobalt	0.101 J	0.0946	0.789	ug/g
Copper	10.8	2.55	7.89	ug/g
Manganese	ND	2.60	7.89	ug/g
Nickel	5.30	0.489	3.94	ug/g
Selenium	ND	0.560	19.7	ug/g
Vanadium	ND	0.789	3.94	ug/g
Zinc	2.98 J	1.74	7.89	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/3/2003 18:11	blb	9001

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lead	1810	1.49	7.89	ug/g
Mercury	2000	0.0552	0.394	ug/g
Silver	ND	0.0473	3.94	ug/g
Thallium	ND	0.260	3.94	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/4/2003 16:03	blb	9002

Parameter	*Result*	*MDL*	*PQL*	*Units*
Antimony	ND	0.103	3.94	ug/g
Cadmium	0.213 J	0.0158	3.94	ug/g
Tin	ND	0.347	7.89	ug/g

Comments: Sample diluted an additional 20 fold for lead.
Sample diluted an additional 1000 fold for mercury.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-59-04	21-03-252D	5/12/2003 13:45	5/27/2003 13:44	8/6/2003 15:43	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/3/2003 0:28	blb	7902

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	10.8	53.8	ug/g
Arsenic	8.09	0.613	5.38	ug/g
Barium	ND	0.0430	5.38	ug/g
Beryllium	ND	0.0538	5.38	ug/g
Boron	ND	4.30	10.8	ug/g
Chromium	3.63 J	1.08	5.38	ug/g
Cobalt	ND	0.129	1.08	ug/g
Copper	10.2 J	3.47	10.8	ug/g
Manganese	ND	3.55	10.8	ug/g
Nickel	ND	0.667	5.38	ug/g
Selenium	ND	0.763	26.9	ug/g
Vanadium	ND	1.08	5.38	ug/g
Zinc	ND	2.37	10.8	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/3/2003 18:17	blb	9001

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lead	88.5	2.03	10.8	ug/g
Mercury	170	0.0753	0.538	ug/g
Silver	ND	0.0645	5.38	ug/g
Thallium	ND	0.355	5.38	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/4/2003 16:08	blb	9002

Parameter	*Result*	*MDL*	*PQL*	*Units*
Antimony	ND	0.140	5.38	ug/g
Cadmium	0.171 J	0.0215	5.38	ug/g
Tin	ND	0.473	10.8	ug/g

Comments: Sample diluted an additional 100 fold for mercury.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-59-05	21-03-256	5/12/2003 10:41	5/27/2003 10:40	8/6/2003 15:43	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/2/2003 22:20	blb	7902

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	9.81	49.1	ug/g
Arsenic	5.99	0.559	4.91	ug/g
Barium	0.863 J	0.0393	4.91	ug/g
Beryllium	ND	0.0491	4.91	ug/g
Boron	ND	3.93	9.81	ug/g
Chromium	127	0.981	4.91	ug/g
Cobalt	18.0	0.118	0.981	ug/g
Copper	195	3.17	9.81	ug/g
Manganese	777	3.24	9.81	ug/g
Nickel	301	0.608	4.91	ug/g
Selenium	ND	0.697	24.5	ug/g
Vanadium	ND	0.981	4.91	ug/g
Zinc	53.9	2.16	9.81	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/3/2003 14:56	blb	9001

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lead	91.7	1.85	9.81	ug/g
Mercury	0.808	0.0687	0.491	ug/g
Silver	ND	0.0589	4.91	ug/g
Thallium	ND	0.324	4.91	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/4/2003 16:13	blb	9002

Parameter	*Result*	*MDL*	*PQL*	*Units*
Antimony	3.31 J	0.128	4.91	ug/g
Cadmium	0.225 J	0.0196	4.91	ug/g
Tin	26.2	0.432	9.81	ug/g

Comments: Sample diluted an additional 2 fold for manganese.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-59-06	21-03-257	5/12/2003 10:41	5/27/2003 10:40	8/6/2003 15:43	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/2/2003 22:25	blb	7902

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	10.4	52.2	ug/g
Arsenic	8.19	0.595	5.22	ug/g
Barium	0.528 J	0.0418	5.22	ug/g
Beryllium	ND	0.0522	5.22	ug/g
Boron	ND	4.18	10.4	ug/g
Chromium	76.6	1.04	5.22	ug/g
Cobalt	10.7	0.125	1.04	ug/g
Copper	111	3.37	10.4	ug/g
Manganese	492	3.44	10.4	ug/g
Nickel	213	0.647	5.22	ug/g
Selenium	ND	0.741	26.1	ug/g
Vanadium	ND	1.04	5.22	ug/g
Zinc	32.5	2.30	10.4	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/3/2003 15:19	blb	9001

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lead	55.1	1.97	10.4	ug/g
Mercury	0.446 J	0.0731	0.522	ug/g
Silver	ND	0.0626	5.22	ug/g
Thallium	ND	0.344	5.22	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/4/2003 15:08	blb	9002

Parameter	*Result*	*MDL*	*PQL*	*Units*
Antimony	2.03 J	0.136	5.22	ug/g
Cadmium	0.226 J	0.0209	5.22	ug/g
Tin	15.4	0.459	10.4	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-59-07	21-03-263	5/12/2003 09:19	5/27/2003 09:18	8/6/2003 15:43	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/2/2003 20:05	blb	7902

Parameter	Result	MDL	PQL	Units
Aluminum	16.3 J	10.9	54.3	ug/g
Arsenic	74.9	0.619	5.43	ug/g
Barium	0.395 J	0.0434	5.43	ug/g
Beryllium	ND	0.0543	5.43	ug/g
Boron	ND	4.34	10.9	ug/g
Chromium	77.3	1.09	5.43	ug/g
Cobalt	2.41	0.130	1.09	ug/g
Copper	109	3.51	10.9	ug/g
Manganese	145	3.58	10.9	ug/g
Nickel	47.2	0.673	5.43	ug/g
Selenium	1.12 J	0.771	27.1	ug/g
Vanadium	1.17 J	1.09	5.43	ug/g
Zinc	136	2.39	10.9	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/3/2003 13:44	blb	9001

Parameter	Result	MDL	PQL	Units
Lead	1340	2.05	10.9	ug/g
Mercury	ND	0.0760	0.543	ug/g
Silver	ND	0.0651	5.43	ug/g
Thallium	ND	0.358	5.43	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/4/2003 14:37	blb	9002

Parameter	Result	MDL	PQL	Units
Antimony	0.505 J	0.141	5.43	ug/g
Cadmium	0.301 J	0.0217	5.43	ug/g
Tin	2.57 J	0.478	10.9	ug/g

Comments: Sample diluted an additional 10 fold for lead.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-59-08	21-03-266	5/13/2003 09:19	5/27/2003 09:18	8/6/2003 15:43	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/2/2003 22:31	blb	7902

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	37.9 J	9.71	48.5	ug/g
Arsenic	36.7	0.553	4.85	ug/g
Barium	ND	0.0388	4.85	ug/g
Beryllium	ND	0.0485	4.85	ug/g
Boron	ND	3.88	9.71	ug/g
Chromium	9.61	0.971	4.85	ug/g
Cobalt	2.00	0.117	0.971	ug/g
Copper	39.2	3.14	9.71	ug/g
Manganese	110	3.20	9.71	ug/g
Nickel	16.9	0.602	4.85	ug/g
Selenium	ND	0.689	24.3	ug/g
Vanadium	ND	0.971	4.85	ug/g
Zinc	33.1	2.14	9.71	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/3/2003 15:24	blb	9001

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lead	9.47 J	1.83	9.71	ug/g
Mercury	ND	0.0680	0.485	ug/g
Silver	ND	0.0583	4.85	ug/g
Thallium	ND	0.320	4.85	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/4/2003 15:13	blb	9002

Parameter	*Result*	*MDL*	*PQL*	*Units*
Antimony	1.33 J	0.126	4.85	ug/g
Cadmium	0.231 J	0.0194	4.85	ug/g
Tin	4.21 J	0.427	9.71	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-59-09	21-03-270	5/13/2003 09:19	5/27/2003 09:18	8/6/2003 15:43	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/3/2003 0:33	blb	7902

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	9.75	48.7	ug/g
Arsenic	267	0.556	4.87	ug/g
Barium	ND	0.0390	4.87	ug/g
Beryllium	ND	0.0487	4.87	ug/g
Boron	ND	3.90	9.75	ug/g
Chromium	9.91	0.975	4.87	ug/g
Cobalt	2.47	0.117	0.975	ug/g
Copper	50.5	3.15	9.75	ug/g
Manganese	176	3.22	9.75	ug/g
Nickel	22.6	0.604	4.87	ug/g
Selenium	ND	0.692	24.4	ug/g
Vanadium	ND	0.975	4.87	ug/g
Zinc	39.8	2.14	9.75	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/3/2003 18:23	blb	9001

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lead	7.81 J	1.84	9.75	ug/g
Mercury	2910	0.0682	0.487	ug/g
Silver	ND	0.0585	4.87	ug/g
Thallium	ND	0.322	4.87	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/30/2003 08:35	7801	AM118 Metals in NCS HD.by ICP	1	6/4/2003 16:18	blb	9002

Parameter	*Result*	*MDL*	*PQL*	*Units*
Antimony	0.220 J	0.127	4.87	ug/g
Cadmium	0.200 J	0.0195	4.87	ug/g
Tin	1.11 J	0.429	9.75	ug/g

Comments: Sample diluted an additional 2000 fold for mercury.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-59-10	21-03-274	5/14/2003 09:19	5/27/2003 09:18	8/6/2003 15:43	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/3/2003 0:39	blb	7902

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	10.0	50.2	ug/g
Arsenic	14.1	0.572	5.02	ug/g
Barium	0.0878 J	0.0401	5.02	ug/g
Beryllium	0.0543 J	0.0502	5.02	ug/g
Boron	ND	4.01	10.0	ug/g
Chromium	6.98	1.00	5.02	ug/g
Cobalt	0.878 J	0.120	1.00	ug/g
Copper	33.8	3.24	10.0	ug/g
Manganese	46.0	3.31	10.0	ug/g
Nickel	9.72	0.622	5.02	ug/g
Selenium	ND	0.712	25.1	ug/g
Vanadium	ND	1.00	5.02	ug/g
Zinc	12.7	2.21	10.0	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/3/2003 18:28	blb	9001

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lead	4.46 J	1.90	10.0	ug/g
Mercury	87.3	0.0702	0.502	ug/g
Silver	ND	0.0602	5.02	ug/g
Thallium	ND	0.331	5.02	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/4/2003 16:23	blb	9002

Parameter	*Result*	*MDL*	*PQL*	*Units*
Antimony	0.141 J	0.130	5.02	ug/g
Cadmium	0.165 J	0.0201	5.02	ug/g
Tin	0.670 J	0.441	10.0	ug/g

Comments: Sample diluted an additional 50 fold for mercury.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-59-11	21-03-277	5/14/2003 09:19	5/27/2003 09:18	8/6/2003 15:43	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/2/2003 22:36	blb	7902

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	9.67	48.4	ug/g
Arsenic	311	0.551	4.84	ug/g
Barium	ND	0.0387	4.84	ug/g
Beryllium	ND	0.0484	4.84	ug/g
Boron	ND	3.87	9.67	ug/g
Chromium	19.9	0.967	4.84	ug/g
Cobalt	1.38	0.116	0.967	ug/g
Copper	124	3.12	9.67	ug/g
Manganese	89.8	3.19	9.67	ug/g
Nickel	27.8	0.600	4.84	ug/g
Selenium	ND	0.687	24.2	ug/g
Vanadium	ND	0.967	4.84	ug/g
Zinc	54.4	2.13	9.67	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/3/2003 15:30	blb	9001

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lead	15.4	1.83	9.67	ug/g
Mercury	ND	0.0677	0.484	ug/g
Silver	ND	0.0580	4.84	ug/g
Thallium	ND	0.319	4.84	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/4/2003 15:18	blb	9002

Parameter	*Result*	*MDL*	*PQL*	*Units*
Antimony	0.162 J	0.126	4.84	ug/g
Cadmium	0.238 J	0.0193	4.84	ug/g
Tin	1.52 J	0.426	9.67	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-59-12	21-03-280	5/15/2003 09:19	5/27/2003 09:18	8/6/2003 15:43	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/2/2003 23:21	blb	7902

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	9.69	48.4	ug/g
Arsenic	5.84	0.552	4.84	ug/g
Barium	2.51 J	0.0388	4.84	ug/g
Beryllium	ND	0.0484	4.84	ug/g
Boron	ND	3.88	9.69	ug/g
Chromium	31.7	0.969	4.84	ug/g
Cobalt	10.0	0.116	0.969	ug/g
Copper	55.9	3.13	9.69	ug/g
Manganese	303	3.20	9.69	ug/g
Nickel	58.0	0.601	4.84	ug/g
Selenium	ND	0.688	24.2	ug/g
Vanadium	1.08 J	0.969	4.84	ug/g
Zinc	1430	2.13	9.69	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/3/2003 15:35	blb	9001

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lead	63.3	1.83	9.69	ug/g
Mercury	0.270 J	0.0678	0.484	ug/g
Silver	0.0602 J	0.0581	4.84	ug/g
Thallium	ND	0.320	4.84	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/4/2003 15:23	blb	9002

Parameter	*Result*	*MDL*	*PQL*	*Units*
Antimony	0.819 J	0.126	4.84	ug/g
Cadmium	0.402 J	0.0194	4.84	ug/g
Tin	13.5	0.426	9.69	ug/g

Comments: Sample diluted an additional 10 fold for zinc.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-59-13	21-03-283	5/15/2003 09:19	5/27/2003 09:18	8/6/2003 15:43	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/2/2003 22:47	blb	7902

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	10.3	51.3	ug/g
Arsenic	15.3	0.585	5.13	ug/g
Barium	ND	0.0410	5.13	ug/g
Beryllium	ND	0.0513	5.13	ug/g
Boron	ND	4.10	10.3	ug/g
Chromium	1.98 J	1.03	5.13	ug/g
Cobalt	ND	0.123	1.03	ug/g
Copper	45.3	3.31	10.3	ug/g
Manganese	3.45 J	3.38	10.3	ug/g
Nickel	1.22 J	0.636	5.13	ug/g
Selenium	ND	0.728	25.6	ug/g
Vanadium	ND	1.03	5.13	ug/g
Zinc	ND	2.26	10.3	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/3/2003 15:41	blb	9001

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lead	ND	1.94	10.3	ug/g
Mercury	17.2	0.0718	0.513	ug/g
Silver	ND	0.0615	5.13	ug/g
Thallium	ND	0.338	5.13	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/30/2003 0835	7801	AM118 Metals in NCS HD by ICP	1	6/4/2003 16:28	blb	9002

Parameter	*Result*	*MDL*	*PQL*	*Units*
Antimony	ND	0.133	5.13	ug/g
Cadmium	0.179 J	0.0205	5.13	ug/g
Tin	ND	0.451	10.3	ug/g

Comments: Sample diluted an additional 10 fold for mercury.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-59-14	21-03-287	5/16/2003 09:19	5/27/2003 09:18	8/6/2003 15:43	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/2/2003 22:53	blb	7902

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	9.88	49.4	ug/g
Arsenic	152	0.563	4.94	ug/g
Barium	0.0467 J	0.0395	4.94	ug/g
Beryllium	ND	0.0494	4.94	ug/g
Boron	ND	3.95	9.88	ug/g
Chromium	20.0	0.988	4.94	ug/g
Cobalt	2.67	0.119	0.988	ug/g
Copper	79.7	3.19	9.88	ug/g
Manganese	199	3.26	9.88	ug/g
Nickel	14.0	0.613	4.94	ug/g
Selenium	ND	0.702	24.7	ug/g
Vanadium	ND	0.988	4.94	ug/g
Zinc	92.5	2.17	9.88	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/3/2003 15:47	blb	9001

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lead	35.8	1.87	9.88	ug/g
Mercury	ND	0.0692	0.494	ug/g
Silver	ND	0.0593	4.94	ug/g
Thallium	ND	0.326	4.94	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/4/2003 15:28	blb	9002

Parameter	*Result*	*MDL*	*PQL*	*Units*
Antimony	0.347 J	0.128	4.94	ug/g
Cadmium	0.237 J	0.0198	4.94	ug/g
Tin	4.12 J	0.435	9.88	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-59-15	21-03-291	5/16/2003 09:19	5/27/2003 09:18	8/6/2003 15:43	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/2/2003 22:59	blb	7902

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	10.4	52.0	ug/g
Arsenic	316	0.593	5.20	ug/g
Barium	ND	0.0416	5.20	ug/g
Beryllium	ND	0.0520	5.20	ug/g
Boron	ND	4.16	10.4	ug/g
Chromium	11.7	1.04	5.20	ug/g
Cobalt	2.38	0.125	1.04	ug/g
Copper	56.2	3.36	10.4	ug/g
Manganese	139	3.43	10.4	ug/g
Nickel	7.52	0.645	5.20	ug/g
Selenium	ND	0.739	26.0	ug/g
Vanadium	ND	1.04	5.20	ug/g
Zinc	66.0	2.29	10.4	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/3/2003 15:52	blb	9001

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lead	7.64 J	1.97	10.4	ug/g
Mercury	0.139 J	0.0728	0.520	ug/g
Silver	ND	0.0624	5.20	ug/g
Thallium	ND	0.343	5.20	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/4/2003 15:33	blb	9002

Parameter	*Result*	*MDL*	*PQL*	*Units*
Antimony	0.356 J	0.135	5.20	ug/g
Cadmium	0.255 J	0.0208	5.20	ug/g
Tin	1.07 J	0.458	10.4	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-59-16	21-03-295	5/16/2003 09:19	5/27/2003 09:18	8/6/2003 15:43	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/3/2003 0:45	blb	7902

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	10.6	53.2	ug/g
Arsenic	361	0.606	5.32	ug/g
Barium	0.204 J	0.0426	5.32	ug/g
Beryllium	ND	0.0532	5.32	ug/g
Boron	ND	4.26	10.6	ug/g
Chromium	43.5	1.06	5.32	ug/g
Cobalt	6.05	0.128	1.06	ug/g
Copper	29.2	3.44	10.6	ug/g
Manganese	383	3.51	10.6	ug/g
Nickel	123	0.660	5.32	ug/g
Selenium	ND	0.755	26.6	ug/g
Vanadium	ND	1.06	5.32	ug/g
Zinc	63.0	2.34	10.6	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/3/2003 18:34	blb	9001

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lead	14.1	2.01	10.6	ug/g
Mercury	1210	0.0745	0.532	ug/g
Silver	ND	0.0638	5.32	ug/g
Thallium	ND	0.351	5.32	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/4/2003 16:33	blb	9002

Parameter	*Result*	*MDL*	*PQL*	*Units*
Antimony	2.95 J	0.138	5.32	ug/g
Cadmium	0.289 J	0.0213	5.32	ug/g
Tin	8.89 J	0.468	10.6	ug/g

Comments: Sample diluted an additional 500 fold for mercury.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-59-17	21-03-299	5/16/2003 09:19	5/27/2003 09:18	8/6/2003 15:43	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/2/2003 23:26	blb	7902

Parameter	Result	MDL	PQL	Units
Aluminum	ND	10.7	53.6	ug/g
Arsenic	220	0.612	5.36	ug/g
Barium	ND	0.0429	5.36	ug/g
Beryllium	ND	0.0536	5.36	ug/g
Boron	ND	4.29	10.7	ug/g
Chromium	19.8	1.07	5.36	ug/g
Cobalt	4.43	0.129	1.07	ug/g
Copper	54.9	3.47	10.7	ug/g
Manganese	193	3.54	10.7	ug/g
Nickel	12.2	0.665	5.36	ug/g
Selenium	ND	0.762	26.8	ug/g
Vanadium	ND	1.07	5.36	ug/g
Zinc	71.7	2.36	10.7	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/3/2003 15:58	blb	9001

Parameter	Result	MDL	PQL	Units
Lead	6.13 J	2.03	10.7	ug/g
Mercury	0.197 J	0.0751	0.536	ug/g
Silver	ND	0.0644	5.36	ug/g
Thallium	ND	0.354	5.36	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/4/2003 15:38	blb	9002

Parameter	Result	MDL	PQL	Units
Antimony	0.307 J	0.139	5.36	ug/g
Cadmium	0.223 J	0.0215	5.36	ug/g
Tin	1.52 J	0.472	10.7	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-59-18	21-03-302	5/17/2003 09:19	5/27/2003 09:18	8/6/2003 15:43	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/3/2003 0:50	blb	7902

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	11.0	54.8	ug/g
Arsenic	1170	0.624	5.48	ug/g
Barium	ND	0.0438	5.48	ug/g
Beryllium	ND	0.0548	5.48	ug/g
Boron	ND	4.38	11.0	ug/g
Chromium	36.6	1.10	5.48	ug/g
Cobalt	3.71	0.131	1.10	ug/g
Copper	29.8	3.54	11.0	ug/g
Manganese	258	3.61	11.0	ug/g
Nickel	62.8	0.679	5.48	ug/g
Selenium	ND	0.778	27.4	ug/g
Vanadium	ND	1.10	5.48	ug/g
Zinc	40.7	2.41	11.0	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/3/2003 18:39	blb	9001

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lead	16.6	2.07	11.0	ug/g
Mercury	1810	0.0767	0.548	ug/g
Silver	ND	0.0657	5.48	ug/g
Thallium	ND	0.361	5.48	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/4/2003 16:38	blb	9002

Parameter	*Result*	*MDL*	*PQL*	*Units*
Antimony	1.53 J	0.142	5.48	ug/g
Cadmium	0.225 J	0.0219	5.48	ug/g
Tin	6.13 J	0.482	11.0	ug/g

Comments: Sample diluted an additional 4 fold for arsenic.
Sample diluted an additional 1000 fold for mercury.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-59-19	21-03-305	5/17/2003 09:19	5/27/2003 09:18	8/6/2003 15:43	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/2/2003 23:32	blb	7902

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	10.0	50.1	ug/g
Arsenic	6.43	0.571	5.01	ug/g
Barium	1.53 J	0.0400	5.01	ug/g
Beryllium	ND	0.0501	5.01	ug/g
Boron	ND	4.00	10.0	ug/g
Chromium	18.7	1.00	5.01	ug/g
Cobalt	6.02	0.120	1.00	ug/g
Copper	34.4	3.23	10.0	ug/g
Manganese	268	3.30	10.0	ug/g
Nickel	35.6	0.621	5.01	ug/g
Selenium	ND	0.711	25.0	ug/g
Vanadium	ND	1.00	5.01	ug/g
Zinc	67.8	2.20	10.0	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/3/2003 16:03	blb	9001

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lead	9.02 J	1.89	10.0	ug/g
Mercury	0.408 J	0.0701	0.501	ug/g
Silver	ND	0.0601	5.01	ug/g
Thallium	ND	0.330	5.01	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/4/2003 15:43	blb	9002

Parameter	*Result*	*MDL*	*PQL*	*Units*
Antimony	0.673 J	0.130	5.01	ug/g
Cadmium	0.213 J	0.0200	5.01	ug/g
Tin	9.02 J	0.440	10.0	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-60-01	21-03-253A	5/12/2003 14:01	5/27/2003 14:00	8/6/2003 15:43	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 14:45	8001	AM118 Metals in Sld HD by ICP	1	6/4/2003 20:34	blb	8104

Parameter	*Result*	*MDL*	*PQL*	*Units*
Antimony	2.61	0.0353	1.36	ug/g
Arsenic	1770	0.155	1.36	ug/g
Barium	9.46	0.0109	1.36	ug/g
Cadmium	0.0988 J	0.00543	1.36	ug/g
Chromium	89.4	0.272	1.36	ug/g
Cobalt	20.9	0.0326	0.272	ug/g
Copper	137	0.877	2.72	ug/g
Lead	79.0	0.513	2.72	ug/g
Manganese	1070	0.896	2.72	ug/g
Mercury	0.965	0.0190	0.136	ug/g
Nickel	554	0.168	1.36	ug/g
Selenium	ND	0.193	6.79	ug/g
Silver	0.0281 J	0.0163	1.36	ug/g
Thallium	ND	0.0896	1.36	ug/g
Tin	20.5	0.120	2.72	ug/g
Vanadium	ND	0.272	1.36	ug/g
Zinc	28.2	0.598	2.72	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 14:45	8001	AM118 Metals in Sld HD by ICP	1	6/10/2003 17:38	blb	9003

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	12.3 J	2.72	13.6	ug/g
Beryllium	ND	0.0136	1.36	ug/g
Boron	1.77 J	1.09	2.72	ug/g

Comments: Sample diluted an additional 20 fold for arsenic.
Sample diluted an additional 20 fold for manganese.
Sample diluted an additional 20 fold for nickel.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-60-02	21-03-253B	5/12/2003 14:01	5/27/2003 14:00	8/6/2003 15:43	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
6/3/2003 14:45	8001	AM118 Metals in Sld HD by ICP	1	6/4/2003 22:00	blb	8104

Parameter	Result	MDL	PQL	Units
Antimony	2.59	0.0188	0.722	ug/g
Arsenic	7.18	0.0823	0.722	ug/g
Barium	9.38	0.00578	0.722	ug/g
Cadmium	0.0977 J	0.00289	0.722	ug/g
Chromium	80.9	0.144	0.722	ug/g
Cobalt	20.1	0.0173	0.144	ug/g
Copper	142	0.467	1.44	ug/g
Lead	90.3	0.273	1.44	ug/g
Manganese	1130	0.477	1.44	ug/g
Mercury	1.17	0.0101	0.0722	ug/g
Nickel	633	0.0896	0.722	ug/g
Selenium	ND	0.103	3.61	ug/g
Silver	0.0292 J	0.00867	0.722	ug/g
Thallium	ND	0.0477	0.722	ug/g
Tin	20.5	0.0636	1.44	ug/g
Vanadium	ND	0.144	0.722	ug/g
Zinc	33.4	0.318	1.44	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
6/3/2003 14:45	8001	AM118 Metals in Sld HD by ICP	1	6/10/2003 17:43	blb	9003

Parameter	Result	MDL	PQL	Units
Aluminum	16.6	1.44	7.22	ug/g
Beryllium	ND	0.00722	0.722	ug/g
Boron	0.947 J	0.578	1.44	ug/g

Comments:
Sample diluted an additional 5 fold for chromium.
Sample diluted an additional 5 fold for copper.
Sample diluted an additional 5 fold for lead.
Sample diluted an additional 20 fold for manganese.
Sample diluted an additional 20 fold for nickel.
Sample diluted an additional 5 fold for mercury.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-60-03	21-03-253C	5/12/2003 14:01	5/27/2003 14:00	8/6/2003 15:43	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 14:45	8001	AM118 Metals in Sld HD by ICP	1	6/4/2003 23:01	blb	8104

Parameter	*Result*	*MDL*	*PQL*	*Units*
Antimony	2.40	0.0420	1.62	ug/g
Arsenic	6.40	0.184	1.62	ug/g
Barium	7.48	0.0129	1.62	ug/g
Cadmium	0.101 J	0.00647	1.62	ug/g
Chromium	88.3	0.323	1.62	ug/g
Cobalt	20.3	0.0388	0.323	ug/g
Copper	132	1.04	3.23	ug/g
Lead	821	0.611	3.23	ug/g
Manganese	1050	1.07	3.23	ug/g
Mercury	820	0.0226	0.162	ug/g
Nickel	567	0.201	1.62	ug/g
Selenium	ND	0.230	8.09	ug/g
Silver	0.0255 J	0.0194	1.62	ug/g
Thallium	ND	0.107	1.62	ug/g
Tin	19.0	0.142	3.23	ug/g
Vanadium	0.404 J	0.323	1.62	ug/g
Zinc	26.4	0.712	3.23	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 14:45	8001	AM118 Metals in Sld HD by ICP	1	6/10/2003 17:47	blb	9003

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	8.08 J	3.23	16.2	ug/g
Beryllium	ND	0.0162	1.62	ug/g
Boron	ND	1.29	3.23	ug/g

Comments: Sample diluted an additional 20 fold for lead.
Sample diluted an additional 20 fold for manganese.
Sample diluted an additional 20 fold for nickel.
Sample diluted an additional 1000 fold for mercury.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-60-04	21-03-253D	5/12/2003 14:01	5/27/2003 14:00	8/6/2003 15:43	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 14:45	8001	AM118 Metals in Sld HD by ICP	1	6/4/2003 23:06	blb	8104

Parameter	*Result*	*MDL*	*PQL*	*Units*
Antimony	5.72	0.134	5.15	ug/g
Arsenic	436	0.588	5.15	ug/g
Barium	8.00	0.0412	5.15	ug/g
Cadmium	0.191 J	0.0206	5.15	ug/g
Chromium	58.6	1.03	5.15	ug/g
Cobalt	15.6	0.124	1.03	ug/g
Copper	108	3.33	10.3	ug/g
Lead	467	1.95	10.3	ug/g
Manganese	706	3.40	10.3	ug/g
Mercury	594	0.0722	0.515	ug/g
Nickel	366	0.639	5.15	ug/g
Selenium	ND	0.732	25.8	ug/g
Silver	ND	0.0619	5.15	ug/g
Thallium	ND	0.340	5.15	ug/g
Tin	15.0	0.454	10.3	ug/g
Vanadium	ND	1.03	5.15	ug/g
Zinc	26.1	2.27	10.3	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 14:45	8001	AM118 Metals in Sld HD by ICP	1	6/10/2003 17:52	blb	9003

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	10.3	51.5	ug/g
Beryllium	ND	0.0515	5.15	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 14:45	8001	AM118 Metals in Sld HD by ICP	1	6/10/2003 17:52	blb	9003

Parameter	*Result*	*MDL*	*PQL*	*Units*
Boron	ND	4.12	10.3	ug/g

Comments: Sample diluted an additional 5 fold for manganese.
Sample diluted an additional 200 fold for mercury.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-60-05	21-03-258	5/12/2003 14:01	5/27/2003 14:00	8/6/2003 15:43	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 14:45	8001	AM118 Metals in Sld HD by ICP	1	6/4/2003 20:44	blb	8104

Parameter	*Result*	*MDL*	*PQL*	*Units*
Antimony	3.07 J	0.142	5.45	ug/g
Arsenic	5.94	0.621	5.45	ug/g
Barium	5.35 J	0.0436	5.45	ug/g
Cadmium	0.222 J	0.0218	5.45	ug/g
Chromium	78.2	1.09	5.45	ug/g
Cobalt	16.6	0.131	1.09	ug/g
Copper	131	3.52	10.9	ug/g
Lead	81.6	2.06	10.9	ug/g
Manganese	789	3.59	10.9	ug/g
Mercury	0.747	0.0763	0.545	ug/g
Nickel	376	0.675	5.45	ug/g
Selenium	ND	0.773	27.2	ug/g
Silver	ND	0.0654	5.45	ug/g
Thallium	ND	0.359	5.45	ug/g
Tin	16.8	0.479	10.9	ug/g
Vanadium	ND	1.09	5.45	ug/g
Zinc	32.6	2.40	10.9	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 14:45	8001	AM118 Metals in Sld HD by ICP	1	6/10/2003 17:57	blb	9003

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	13.8 J	10.9	54.5	ug/g
Beryllium	ND	0.0545	5.45	ug/g
Boron	ND	4.36	10.9	ug/g

Comments: Sample diluted an additional 2 fold for manganese.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-60-06	21-03-259	5/12/2003 14:01	5/27/2003 14:00	8/6/2003 15:43	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 14:45	8001	AM118 Metals in Sld HD by ICP	1	6/4/2003 21:05	blb	8104

Parameter	*Result*	*MDL*	*PQL*	*Units*
Antimony	2.48 J	0.123	4.72	ug/g
Arsenic	6.44	0.538	4.72	ug/g
Barium	6.55	0.0378	4.72	ug/g
Cadmium	0.208 J	0.0189	4.72	ug/g
Chromium	79.6	0.944	4.72	ug/g
Cobalt	17.5	0.113	0.944	ug/g
Copper	125	3.05	9.44	ug/g
Lead	67.4	1.78	9.44	ug/g
Manganese	808	3.12	9.44	ug/g
Mercury	0.832	0.0661	0.472	ug/g
Nickel	385	0.585	4.72	ug/g
Selenium	ND	0.670	23.6	ug/g
Silver	ND	0.0567	4.72	ug/g
Thallium	ND	0.312	4.72	ug/g
Tin	17.3	0.415	9.44	ug/g
Vanadium	ND	0.944	4.72	ug/g
Zinc	25.9	2.08	9.44	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 14:45	8001	AM118 Metals in Sld HD by ICP	1	6/10/2003 18:02	blb	9003

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	9.44	47.2	ug/g
Beryllium	ND	0.0472	4.72	ug/g
Boron	ND	3.78	9.44	ug/g

Comments: Sample diluted an additional 2 fold for manganese.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-60-07	21-03-264	5/12/2003 14:01	5/27/2003 14:00	8/6/2003 15:43	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 14:45	8001	AM118 Metals in Sld HD by ICP	1	6/4/2003 19:09	blb	8104

Parameter	*Result*	*MDL*	*PQL*	*Units*
Antimony	2.08 J	0.132	5.09	ug/g
Arsenic	58.2	0.580	5.09	ug/g
Barium	0.0657 J	0.0407	5.09	ug/g
Cadmium	0.305 J	0.0203	5.09	ug/g
Chromium	9.28	1.02	5.09	ug/g
Cobalt	3.22	0.122	1.02	ug/g
Copper	315	3.29	10.2	ug/g
Lead	12.5	1.92	10.2	ug/g
Manganese	289	3.36	10.2	ug/g
Mercury	0.165 J	0.0712	0.509	ug/g
Nickel	33.0	0.631	5.09	ug/g
Selenium	ND	0.722	25.4	ug/g
Silver	ND	0.0610	5.09	ug/g
Thallium	ND	0.336	5.09	ug/g
Tin	2.57 J	0.448	10.2	ug/g
Vanadium	ND	1.02	5.09	ug/g
Zinc	153	2.24	10.2	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 14:45	8001	AM118 Metals in Sld HD by ICP	1	6/10/2003 17:10	blb	9003

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	10.2	50.9	ug/g
Beryllium	ND	0.0509	5.09	ug/g
Boron	ND	4.07	10.2	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-60-08	21-03-267	5/13/2003 14:01	5/27/2003 14:00	8/6/2003 15:43	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 14:45	8001	AM118 Metals in Sld HD by ICP	1	6/4/2003 21:35	blb	8104

Parameter	*Result*	*MDL*	*PQL*	*Units*
Antimony	1.84 J	0.129	4.98	ug/g
Arsenic	34.5	0.568	4.98	ug/g
Barium	ND	0.0398	4.98	ug/g
Cadmium	0.207 J	0.0199	4.98	ug/g
Chromium	17.7	0.996	4.98	ug/g
Cobalt	4.06	0.120	0.996	ug/g
Copper	51.5	3.22	9.96	ug/g
Lead	16.4	1.88	9.96	ug/g
Manganese	208	3.29	9.96	ug/g
Mercury	0.0963 J	0.0697	0.498	ug/g
Nickel	8.99	0.618	4.98	ug/g
Selenium	ND	0.707	24.9	ug/g
Silver	ND	0.0598	4.98	ug/g
Thallium	ND	0.329	4.98	ug/g
Tin	8.20 J	0.438	9.96	ug/g
Vanadium	ND	0.996	4.98	ug/g
Zinc	61.5	2.19	9.96	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 14:45	8001	AM118 Metals in Sld HD by ICP	1	6/10/2003 18:07	blb	9003

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	9.96	49.8	ug/g
Beryllium	ND	0.0498	4.98	ug/g
Boron	ND	3.98	9.96	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-60-09	21-03-271	5/13/2003 14:01	5/27/2003 14:00	8/6/2003 15:43	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 14:45	8001	AM118 Metals in Sld HD by ICP	1	6/4/2003 23:11	blb	8104

Parameter	*Result*	*MDL*	*PQL*	*Units*
Antimony	1.84 J	0.131	5.04	ug/g
Arsenic	1770	0.574	5.04	ug/g
Barium	ND	0.0403	5.04	ug/g
Cadmium	0.223 J	0.0201	5.04	ug/g
Chromium	26.3	1.01	5.04	ug/g
Cobalt	6.24	0.121	1.01	ug/g
Copper	135	3.25	10.1	ug/g
Lead	27.6	1.90	10.1	ug/g
Manganese	365	3.32	10.1	ug/g
Mercury	5590	0.0705	0.504	ug/g
Nickel	33.8	0.624	5.04	ug/g
Selenium	ND	0.715	25.2	ug/g
Silver	ND	0.0604	5.04	ug/g
Thallium	ND	0.332	5.04	ug/g
Tin	3.02 J	0.443	10.1	ug/g
Vanadium	ND	1.01	5.04	ug/g
Zinc	149	2.22	10.1	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 14:45	8001	AM118 Metals in Sld HD by ICP	1	6/10/2003 18:30	blb	9003

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	10.1	50.4	ug/g
Beryllium	ND	0.0504	5.04	ug/g
Boron	ND	4.03	10.1	ug/g

Comments: Sample diluted an additional 10 fold for arsenic.
Sample diluted an additional 2000 fold for mercury.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-60-10	21-03-275	5/14/2003 14:01	5/27/2003 14:00	8/6/2003 15:43	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 14:45	8001	AM118 Metals in Sld HD by ICP	1	6/4/2003 23:16	blb	8104

Parameter	*Result*	*MDL*	*PQL*	*Units*
Antimony	1.17 J	0.123	4.72	ug/g
Arsenic	89.4	0.538	4.72	ug/g
Barium	0.0619 J	0.0377	4.72	ug/g
Cadmium	0.256 J	0.0189	4.72	ug/g
Chromium	31.3	0.943	4.72	ug/g
Cobalt	5.54	0.113	0.943	ug/g
Copper	80.3	3.05	9.43	ug/g
Lead	64.2	1.78	9.43	ug/g
Manganese	352	3.11	9.43	ug/g
Mercury	996	0.0660	0.472	ug/g
Nickel	39.1	0.585	4.72	ug/g
Selenium	ND	0.670	23.6	ug/g
Silver	ND	0.0566	4.72	ug/g
Thallium	ND	0.311	4.72	ug/g
Tin	4.04 J	0.415	9.43	ug/g
Vanadium	ND	0.943	4.72	ug/g
Zinc	94.3	2.08	9.43	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 14:45	8001	AM118 Metals in Sld HD by ICP	1	6/10/2003 18:35	blb	9003

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	51.1	9.43	47.2	ug/g
Beryllium	ND	0.0472	4.72	ug/g
Boron	ND	3.77	9.43	ug/g

Comments: Sample diluted an additional 400 fold for mercury.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-60-11	21-03-278	5/14/2003 14:01	5/27/2003 14:00	8/6/2003 15:43	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 14:45	8001	AM118 Metals in Sld HD by ICP	1	6/4/2003 21:40	blb	8104

Parameter	*Result*	*MDL*	*PQL*	*Units*
Antimony	0.246 J	0.135	5.20	ug/g
Arsenic	226	0.593	5.20	ug/g
Barium	ND	0.0416	5.20	ug/g
Cadmium	0.335 J	0.0208	5.20	ug/g
Chromium	10.3	1.04	5.20	ug/g
Cobalt	2.59	0.125	1.04	ug/g
Copper	168	3.36	10.4	ug/g
Lead	127	1.96	10.4	ug/g
Manganese	218	3.43	10.4	ug/g
Mercury	ND	0.0728	0.520	ug/g
Nickel	10.5	0.644	5.20	ug/g
Selenium	ND	0.738	26.0	ug/g
Silver	ND	0.0624	5.20	ug/g
Thallium	ND	0.343	5.20	ug/g
Tin	2.73 J	0.457	10.4	ug/g
Vanadium	ND	1.04	5.20	ug/g
Zinc	290	2.29	10.4	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 14:45	8001	AM118 Metals in Sld HD by ICP	1	6/10/2003 18:11	blb	9003

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	14.3 J	10.4	52.0	ug/g
Beryllium	ND	0.0520	5.20	ug/g
Boron	ND	4.16	10.4	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-60-12	21-03-281	5/15/2003 14:01	5/27/2003 14:00	8/6/2003 15:43	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 14:45	8001	AM118 Metals in Sld HD by ICP	1	6/4/2003 21:45	blb	8104

Parameter	*Result*	*MDL*	*PQL*	*Units*
Antimony	0.867 J	0.128	4.92	ug/g
Arsenic	10.0	0.560	4.92	ug/g
Barium	0.353 J	0.0393	4.92	ug/g
Cadmium	0.242 J	0.0197	4.92	ug/g
Chromium	67.5	0.983	4.92	ug/g
Cobalt	21.0	0.118	0.983	ug/g
Copper	75.7	3.18	9.83	ug/g
Lead	18.8	1.86	9.83	ug/g
Manganese	566	3.24	9.83	ug/g
Mercury	0.760	0.0688	0.492	ug/g
Nickel	88.8	0.610	4.92	ug/g
Selenium	ND	0.698	24.6	ug/g
Silver	ND	0.0590	4.92	ug/g
Thallium	ND	0.324	4.92	ug/g
Tin	5.05 J	0.433	9.83	ug/g
Vanadium	1.53 J	0.983	4.92	ug/g
Zinc	133	2.16	9.83	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 14:45	8001	AM118 Metals in Sld HD by ICP	1	6/10/2003 18:40	blb	9003

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	11.7 J	9.83	49.2	ug/g
Beryllium	ND	0.0492	4.92	ug/g
Boron	ND	3.93	9.83	ug/g

Comments: Sample diluted an additional 2 fold for manganese.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-60-13	21-03-284	5/15/2003 14:01	5/27/2003 14:00	8/6/2003 15:43	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 14:45	8001	AM118 Metals in Sld HD by ICP	1	6/4/2003 23:21	blb	8104

Parameter	*Result*	*MDL*	*PQL*	*Units*
Antimony	1.53 J	0.139	5.34	ug/g
Arsenic	478	0.608	5.34	ug/g
Barium	0.424 J	0.0427	5.34	ug/g
Cadmium	0.318 J	0.0213	5.34	ug/g
Chromium	32.5	1.07	5.34	ug/g
Cobalt	4.72	0.128	1.07	ug/g
Copper	129	3.45	10.7	ug/g
Lead	37.5	2.02	10.7	ug/g
Manganese	307	3.52	10.7	ug/g
Mercury	1600	0.0747	0.534	ug/g
Nickel	36.8	0.662	5.34	ug/g
Selenium	ND	0.758	26.7	ug/g
Silver	ND	0.0640	5.34	ug/g
Thallium	ND	0.352	5.34	ug/g
Tin	7.97 J	0.470	10.7	ug/g
Vanadium	ND	1.07	5.34	ug/g
Zinc	104	2.35	10.7	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 14:45	8001	AM118 Metals in Sld HD by ICP	1	6/10/2003 18:44	blb	9003

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	10.7	53.4	ug/g
Beryllium	ND	0.0534	5.34	ug/g
Boron	ND	4.27	10.7	ug/g

Comments: Sample diluted an additional 800 fold for mercury.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-60-14	21-03-288	5/16/2003 14:01	5/27/2003 14:00	8/6/2003 15:43	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 14:45	8001	AM118 Metals in Sld HD by ICP	1	6/4/2003 21:50	blb	8104

Parameter	*Result*	*MDL*	*PQL*	*Units*
Antimony	ND	0.132	5.09	ug/g
Arsenic	56.0	0.580	5.09	ug/g
Barium	ND	0.0407	5.09	ug/g
Cadmium	0.209 J	0.0203	5.09	ug/g
Chromium	25.6	1.02	5.09	ug/g
Cobalt	2.57	0.122	1.02	ug/g
Copper	146	3.29	10.2	ug/g
Lead	34.0	1.92	10.2	ug/g
Manganese	209	3.36	10.2	ug/g
Mercury	ND	0.0712	0.509	ug/g
Nickel	22.9	0.631	5.09	ug/g
Selenium	ND	0.722	25.4	ug/g
Silver	ND	0.0610	5.09	ug/g
Thallium	ND	0.336	5.09	ug/g
Tin	4.62 J	0.448	10.2	ug/g
Vanadium	ND	1.02	5.09	ug/g
Zinc	79.2	2.24	10.2	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 14:45	8001	AM118 Metals in Sld HD by ICP	1	6/10/2003 18:49	blb	9003

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	48.3 J	10.2	50.9	ug/g
Beryllium	ND	0.0509	5.09	ug/g
Boron	5.85 J	4.07	10.2	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-60-15	21-03-292	5/16/2003 1401	5/27/2003 14:00	8/6/2003 15:43	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 14:45	8001	AM118 Metals in Sld HD by ICP	1	6/4/2003 21:30	blb	8104

Parameter	*Result*	*MDL*	*PQL*	*Units*
Antimony	1.25 J	0.123	4.73	ug/g
Arsenic	1430	0.539	4.73	ug/g
Barium	ND	0.0378	4.73	ug/g
Cadmium	0.373 J	0.0189	4.73	ug/g
Chromium	24.1	0.945	4.73	ug/g
Cobalt	6.57	0.113	0.945	ug/g
Copper	100	3.05	9.45	ug/g
Lead	71.5	1.79	9.45	ug/g
Manganese	371	3.12	9.45	ug/g
Mercury	0.561	0.0662	0.473	ug/g
Nickel	14.8	0.586	4.73	ug/g
Selenium	ND	0.671	23.6	ug/g
Silver	ND	0.0567	4.73	ug/g
Thallium	ND	0.312	4.73	ug/g
Tin	3.60 J	0.416	9.45	ug/g
Vanadium	ND	0.945	4.73	ug/g
Zinc	368	2.08	9.45	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 14:45	8001	AM118 Metals in Sld HD by ICP	1	6/10/2003 19:13	blb	9003

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	12.1 J	9.45	47.3	ug/g
Beryllium	ND	0.0473	4.73	ug/g
Boron	ND	3.78	9.45	ug/g

Comments: Sample diluted an additional 10 fold for arsenic.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-60-16	21-03-296	5/16/2003 14:01	5/27/2003 14:00	8/6/2003 15:43	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 14:45	8001	AM118 Metals in Sld HD by ICP	1	6/4/2003 23:26	blb	8104

Parameter	*Result*	*MDL*	*PQL*	*Units*
Antimony	1.72 J	0.144	5.54	ug/g
Arsenic	545	0.631	5.54	ug/g
Barium	0.0580 J	0.0443	5.54	ug/g
Cadmium	0.279 J	0.0221	5.54	ug/g
Chromium	28.8	1.11	5.54	ug/g
Cobalt	7.07	0.133	1.11	ug/g
Copper	68.0	3.58	11.1	ug/g
Lead	31.8	2.09	11.1	ug/g
Manganese	504	3.65	11.1	ug/g
Mercury	1740	0.0775	0.554	ug/g
Nickel	62.4	0.687	5.54	ug/g
Selenium	ND	0.786	27.7	ug/g
Silver	ND	0.0664	5.54	ug/g
Thallium	ND	0.365	5.54	ug/g
Tin	8.29 J	0.487	11.1	ug/g
Vanadium	ND	1.11	5.54	ug/g
Zinc	83.5	2.44	11.1	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 14:45	8001	AM118 Metals in Sld HD by ICP	1	6/10/2003 18:59	blb	9003

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	11.1	55.4	ug/g
Beryllium	ND	0.0554	5.54	ug/g
Boron	ND	4.43	11.1	ug/g

Comments: Sample reanalyzed for arsenic on June 10th, 2003 with appropriate batch QC. Result shown is for the June 10th reanalysis for arsenic.
Sample diluted an additional 500 fold for mercury.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-60-17	21-03-300	5/16/2003 14:01	5/27/2003 14:00	8/6/2003 15:43	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 14:45	8001	AM118 Metals in Sld HD by ICP	1	6/4/2003 20:54	blb	8104

Parameter	*Result*	*MDL*	*PQL*	*Units*
Antimony	0.965 J	0.124	4.78	ug/g
Arsenic	1850	0.545	4.78	ug/g
Barium	0.0565 J	0.0382	4.78	ug/g
Cadmium	0.259 J	0.0191	4.78	ug/g
Chromium	41.8	0.956	4.78	ug/g
Cobalt	10.8	0.115	0.956	ug/g
Copper	132	3.09	9.56	ug/g
Lead	27.4	1.81	9.56	ug/g
Manganese	459	3.15	9.56	ug/g
Mercury	1.18	0.0669	0.478	ug/g
Nickel	15.9	0.593	4.78	ug/g
Selenium	ND	0.679	23.9	ug/g
Silver	ND	0.0574	4.78	ug/g
Thallium	ND	0.315	4.78	ug/g
Tin	3.65 J	0.421	9.56	ug/g
Vanadium	ND	0.956	4.78	ug/g
Zinc	213	2.10	9.56	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 14:45	8001	AM118 Metals in Sld HD by ICP	1	6/10/2003 19:04	blb	9003

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	9.56	47.8	ug/g
Beryllium	ND	0.0478	4.78	ug/g
Boron	ND	3.82	9.56	ug/g

Comments: Sample diluted an additional 10 fold for arsenic.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-60-18	21-03-303	5/17/2003 14:01	5/27/2003 14:00	8/6/2003 15:43	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 14:45	8001	AM118 Metals in Sld HD by ICP	1	6/4/2003 23:31	blb	8104

Parameter	*Result*	*MDL*	*PQL*	*Units*
Antimony	1.24 J	0.130	5.00	ug/g
Arsenic	961	0.569	5.00	ug/g
Barium	ND	0.0400	5.00	ug/g
Cadmium	0.204 J	0.0200	5.00	ug/g
Chromium	42.4	0.999	5.00	ug/g
Cobalt	3.72	0.120	0.999	ug/g
Copper	49.7	3.23	9.99	ug/g
Lead	19.6	1.89	9.99	ug/g
Manganese	267	3.30	9.99	ug/g
Mercury	1960	0.0699	0.500	ug/g
Nickel	39.1	0.619	5.00	ug/g
Selenium	ND	0.709	25.0	ug/g
Silver	ND	0.0599	5.00	ug/g
Thallium	ND	0.330	5.00	ug/g
Tin	7.12 J	0.440	9.99	ug/g
Vanadium	ND	0.999	5.00	ug/g
Zinc	32.3	2.20	9.99	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 14:45	8001	AM118 Metals in Sld HD by ICP	1	6/10/2003 19:08	blb	9003

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	9.99	50.0	ug/g
Beryllium	ND	0.0500	5.00	ug/g
Boron	ND	4.00	9.99	ug/g

Comments: Sample reanalyzed for arsenic on June 10th, 2003 with appropriate batch QC. Result shown is for the June 10th reanalysis for arsenic.
Sample diluted an additional 2 fold for arsenic.
Sample diluted an additional 500 fold for mercury.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
030004-60-19	21-03-306	5/17/2003 14:01	5/27/2003 14:00	8/6/2003 15:43	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 14:45	8001	AM118 Metals in Sld HD by ICP	1	6/4/2003 21:55	blb	8104

Parameter	*Result*	*MDL*	*PQL*	*Units*
Antimony	1.44 J	0.136	5.24	ug/g
Arsenic	12.2	0.597	5.24	ug/g
Barium	2.91 J	0.0419	5.24	ug/g
Cadmium	0.253 J	0.0210	5.24	ug/g
Chromium	45.2	1.05	5.24	ug/g
Cobalt	9.40	0.126	1.05	ug/g
Copper	78.4	3.39	10.5	ug/g
Lead	41.7	1.98	10.5	ug/g
Manganese	521	3.46	10.5	ug/g
Mercury	1.48	0.0734	0.524	ug/g
Nickel	54.5	0.650	5.24	ug/g
Selenium	ND	0.744	26.2	ug/g
Silver	ND	0.0629	5.24	ug/g
Thallium	ND	0.346	5.24	ug/g
Tin	16.8	0.461	10.5	ug/g
Vanadium	1.42 J	1.05	5.24	ug/g
Zinc	103	2.31	10.5	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 14:45	8001	AM118 Metals in Sld HD by ICP	1	6/10/2003 18:54	blb	9003

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	25.6 J	10.5	52.4	ug/g
Beryllium	ND	0.0524	5.24	ug/g
Boron	5.95 J	4.19	10.5	ug/g

Report of Analysis

Method Blank

Lab ID	*Sample ID*	*Reported*
4567	MB for HBN 7901 [PREP/1459]	6/24/2003 17:00
	(Results reported on a wet weight basis)	

AM101 Vols in Liquid HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 14:44	7901	AM101 Vols in Liquid HD by GC	1	6/2/2003 22:20	ssh	7908

Surrogates	*Expected*	*Result*	*Recover*	*Limits*
1,4-Difluorobenzene	103	102 ug/mL	98.8	50 - 150

Method Blank

Lab ID	*Sample ID*	*Reported*
4604	MB for HBN 7910 [PREP/1465]	6/24/2003 17:00
	(Results reported on a wet weight basis)	

AM117 Semi-Vols Liq HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 08:55	7910	AM117 Semi-Vols Liq HD by GC	1	6/4/2003 22:37	ssh	8005

Surrogates	*Expected*	*Result*	*Recover*	*Limits*
1,4-Dithiane-d4	1000	1080 ug/mL	108	50 - 150

Method Blank

Lab ID	*Sample ID*	*Reported*
4588	MB for HBN 7906 [PREP/1463]	6/24/2003 17:00
	(Results reported on a wet weight basis)	

AM100 Non-Vols in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 18:20	7906	AM100 Non-Vols in HD by GC	1	6/4/2003 23:45	ssh	8007

Surrogates	*Expected*	*Result*	*Recover*	*Limits*
Thiodiglycol-d8 (TDG-d8)	10	9.08 ug/mL	90.8	50 - 150

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Method Blank

Lab ID	*Sample ID*	*Reported*
4601	MB for HBN 7909 [PREP/1464] ***(Results reported on a wet weight basis)***	6/24/2003 17:00

AM098 HD Purity by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 08:54	7909	AM098 HD Purity by GC	1	6/3/2003 13:30	tfr	8003

Parameter	*Result*	*MDL*	*PQL*	*Units*
bis-(2-Chloroethyl)sulfide	0.00			%

Method Blank

Lab ID	*Sample ID*	*Reported*
4649	MB for HBN 8101 [PREP/1467] ***(Results reported on a wet weight basis)***	6/24/2003 1700

AM126 Lewisite in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 09:09	8101	AM126 Lewisite in HD by GC	1	6/11/2003 18:20	ssh	8304

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lewisite	ND	1.95	5.00	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Method Blank

Lab ID	*Sample ID*	*Reported*
4560	MB for HBN 7801 [PREP/1458]	6/24/2003 17:00
	(Results reported on a wet weight basis)	

AM118 Metals in NCS HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/2/2003 19:49	blb	7902

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	10.0	50.0	ug/g
Arsenic	ND	0.570	5.00	ug/g
Barium	ND	0.0400	5.00	ug/g
Beryllium	ND	0.0500	5.00	ug/g
Boron	ND	4.00	10.0	ug/g
Chromium	ND	1.00	5.00	ug/g
Cobalt	ND	0.120	1.00	ug/g
Copper	ND	3.23	10.0	ug/g
Manganese	ND	3.30	10.0	ug/g
Nickel	ND	0.620	5.00	ug/g
Selenium	ND	0.710	25.0	ug/g
Vanadium	ND	1.00	5.00	ug/g
Zinc	ND	2.20	10.0	ug/g

Method Blank

Lab ID	*Sample ID*	*Reported*
4615	MB for HBN 8001 [PREP/1466]	6/24/2003 17:00
	(Results reported on a wet weight basis)	

AM118 Metals in Sld HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 14:45	8001	AM118 Metals in Sld HD by ICP	1	6/4/2003 18:54	blb	8104

Parameter	*Result*	*MDL*	*PQL*	*Units*
Antimony	ND	0.130	5.00	ug/g
Arsenic	ND	0.570	5.00	ug/g
Barium	0.0428 J	0.0400	5.00	ug/g
Cadmium	0.136 J	0.0200	5.00	ug/g
Chromium	ND	1.00	5.00	ug/g
Cobalt	ND	0.120	1.00	ug/g
Copper	ND	3.23	10.0	ug/g
Lead	ND	1.89	10.0	ug/g
Manganese	ND	3.30	10.0	ug/g
Mercury	ND	0.0700	0.500	ug/g
Nickel	ND	0.620	5.00	ug/g
Selenium	ND	0.710	25.0	ug/g
Silver	ND	0.0600	5.00	ug/g
Thallium	ND	0.330	5.00	ug/g
Tin	ND	0.440	10.0	ug/g
Vanadium	ND	1.00	5.00	ug/g
Zinc	ND	2.20	10.0	ug/g

Report of Analysis

Method Blank

Lab ID	*Sample ID*	*Reported*
4662	MB for HBN 8201 [PREP/1468]	6/24/2003 17:00

(Results reported on a wet weight basis)

AM118 Metals in Liq HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/4/2003 14:41	8201	AM118 Metals in Liq HD by ICP	1	6/9/2003 17:26	blb	8302

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	10.0	50.0	ug/g
Antimony	ND	0.630	5.00	ug/g
Arsenic	ND	1.22	5.00	ug/g
Barium	ND	0.430	5.00	ug/g
Beryllium	ND	0.900	5.00	ug/g
Boron	ND	3.74	10.0	ug/g
Cadmium	ND	0.410	5.00	ug/g
Chromium	ND	1.29	5.00	ug/g
Cobalt	ND	0.270	1.00	ug/g
Copper	ND	2.43	5.00	ug/g
Lead	ND	0.410	5.00	ug/g
Manganese	ND	0.320	1.00	ug/g
Mercury	ND	0.0500	0.500	ug/g
Nickel	ND	0.350	5.00	ug/g
Selenium	ND	1.17	10.0	ug/g
Silver	ND	0.470	5.00	ug/g
Thallium	ND	0.980	5.00	ug/g
Tin	ND	2.49	10.0	ug/g
Vanadium	ND	1.00	5.00	ug/g
Zinc	ND	3.12	10.0	ug/g

Method Blank

Lab ID	*Sample ID*	*Reported*
4560	MB for HBN 7801 [PREP/1458]	7/19/2003 20:13

(Results reported on a wet weight basis)

AM118 Metals in NCS HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/3/2003 13:28	blb	9001

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lead	ND	1.89	10.0	ug/g
Mercury	ND	0.0700	0.500	ug/g
Silver	ND	0.0600	5.00	ug/g
Thallium	ND	0.330	5.00	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Method Blank

Lab ID	*Sample ID*	*Reported*
4560	MB for HBN 7801 [PREP/1458]	7/19/2003 20:49
	(Results reported on a wet weight basis)	

AM118 Metals in NCS HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
5/30/2003 08:35	7801	AM118 Metals in NCS HD by ICP	1	6/4/2003 14:22	blb	9002

Parameter	*Result*	*MDL*	*PQL*	*Units*
Antimony	ND	0.130	5.00	ug/g
Cadmium	0.194 J	0.0200	5.00	ug/g
Tin	ND	0.440	10.0	ug/g

Method Blank

Lab ID	*Sample ID*	*Reported*
4615	MB for HBN 8001 [PREP/1466]	7/21/2003 10:59
	(Results reported on a wet weight basis)	

AM118 Metals in Sld HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/3/2003 14:45	8001	AM118 Metals in Sld HD by ICP	1	6/10/2003 16:55	blb	9003

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	58.4	10.0	50.0	ug/g
Beryllium	ND	0.0500	5.00	ug/g
Boron	14.3	4.00	10.0	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Method Blank

Lab ID	*Sample ID*	*Reported*
4588	MB for HBN 7906 [PREP/1463]	6/24/2003 17:00
	(Results reported on a wet weight basis)	

AM100 Non-Vols in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 18:20	7906	AM100 Non-Vols in HD by GC	1	6/4/2003 23:45	ssh	8007

Parameter	*Result*	*MDL*	*PQL*	*Units*
Thiodiglycol (TDG)	ND	210	250	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Method Blank

Lab ID	*Sample ID*	*Reported*
4604	MB for HBN 7910 [PREP/1465]	6/24/2003 17:00
	(Results reported on a wet weight basis)	

AM117 Semi-Vols Liq HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 08:55	7910	AM117 Semi-Vols Liq HD by GC	1	6/4/2003 22:37	ssh	8005

Parameter	*Result*	*MDL*	*PQL*	*Units*
Hexachloroethane	ND	80.0	250	ug/g
Q	ND	51.0	2500	ug/g
T	ND	70.0	2500	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Method Blank

Lab ID	*Sample ID*	*Reported*
4567	MB for HBN 7901 [PREP/1459]	6/24/2003 17:00
	(Results reported on a wet weight basis)	

AM101 Vols in Liquid HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/2/2003 14:44	7901	AM101 Vols in Liquid HD by GC	1	6/2/2003 22:20	ssh	7908

Parameter	*Result*	*MDL*	*PQL*	*Units*
1,2-Dichloroethane	ND	260	500	ug/g
Tetrachloroethylene	ND	100	500	ug/g
1,1,2,2-Tetrachloroethane	ND	150	500	ug/g

Report of Analysis

QC Summary

LCS Lab ID: 4602 — **Original Lab ID:** — **Matrix:** Liquid — **Prep Batch:** 7909 — **Analytical:** 8003

AM098 HD Purity by GC	*Expected*	*Result*	*Recovery*	*Rec Limits*
bis-(2-Chloroethyl)sulfide	98.2 %	98.4	100	85 - 115

DUP Lab ID: 4603 — **Original Lab ID:** 030004-58-07 — **Matrix:** Liquid — **Prep Batch:** 7909 — **Analytical:** 8003

AM098 HD Purity by GC	*Original Result*	*Result*	*RPD*	*RPD Limits*
bis-(2-Chloroethyl)sulfide	88.1	89.8	1.89	0 - 25

LCS Lab ID: 4650 — **Original Lab ID:** — **Matrix:** Liquid — **Prep Batch:** 8101 — **Analytical:** 8304

AM126 Lewisite in HD by GC	*Expected*	*Result*	*Recovery*	*Rec Limits*
Lewisite	25.2 ug/g	26.9	107	50 - 150

DUP Lab ID: 4651 — **Original Lab ID:** 030004-58-08 — **Matrix:** Liquid — **Prep Batch:** 8101 — **Analytical:** 8304

AM126 Lewisite in HD by GC	*Original Result*	*Result*	*RPD*	*RPD Limits*
Lewisite	0	0	0	0 - 25

MS Lab ID: 4652 — **Original Lab ID:** 030004-58-08 — **Matrix:** Liquid — **Prep Batch:** 8101 — **Analytical:** 8304

AM126 Lewisite in HD by GC	*Original Result*	*Expected*	*Result*	*Recovery*	*Rec Limits*
Lewisite	0	25.7 ug/g	27.2	106	50 - 150

MSD Lab ID: 4653 — **Original Lab ID:** 030004-58-08 — **Matrix:** Liquid — **Prep Batch:** 8101 — **Analytical:** 8304

AM126 Lewisite in HD by GC	*Expected*	*Result*	*Recovery*	*Rec Limits*	*RPD*	*RPD Limits*
Lewisite	25.7 ug/g	27	105	50 - 150	0.948	0 - 25

LCS Lab ID: 4654 — **Original Lab ID:** — **Matrix:** Liquid — **Prep Batch:** 8101 — **Analytical:** 8304

AM126 Lewisite in HD by GC	*Expected*	*Result*	*Recovery*	*Rec Limits*
Lewisite	25.2 ug/g	32.2	128	50 - 150

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

QC Summary

LCS Lab ID: 4561 | Original Lab ID: 4560 | Prep Batch: 7801
Matrix: Non-cohesive Solid | Analytical: 7902

AM118 Metals in NCS HD by ICP	Expected	Result	Recovery	Rec Limits
Aluminum	500 ug/g	487	97.2	75 - 125
Arsenic	50 ug/g	53.4	107	75 - 125
Barium	50 ug/g	51.7	103	75 - 125
Beryllium	50 ug/g	44	87.9	75 - 125
Boron	500 ug/g	409	81.8	75 - 125
Chromium	50 ug/g	50.8	102	75 - 125
Cobalt	50 ug/g	50.5	101	75 - 125
Copper	50 ug/g	52.4	104	75 - 125
Manganese	50 ug/g	51.3	102	75 - 125
Nickel	50 ug/g	50.4	101	75 - 125
Selenium	50 ug/g	52.4	105	75 - 125
Vanadium	50 ug/g	50	99.9	75 - 125
Zinc	50 ug/g	53.1	105	75 - 125

DUP Lab ID: 4562 | Original Lab ID: 030004-59-07 | Prep Batch: 7801
Matrix: Non-cohesive Solid | Analytical: 7902

AM118 Metals in NCS HD by ICP	Original Result	Result	RPD	RPD Limits
Aluminum	16.3	11	38.5 *	0 - 20
Arsenic	74.9	74.4	0.707	0 - 20
Barium	0.395	0.306	25.5 *	0 - 20
Beryllium	0.0317	0.0194	48.1 *	0 - 20
Boron	0.858	0.382	76.9 *	0 - 20
Chromium	77.3	13	143 *	0 - 20
Cobalt	2.41	2.02	17.2	0 - 20
Copper	109	99.7	8.54	0 - 20
Manganese	145	138	5.39	0 - 20
Nickel	47.2	14.2	108 *	0 - 20
Selenium	1.12	0.0659	178 *	0 - 20
Vanadium	1.17	1.07	9.09	0 - 20
Zinc	136	203	39.5 *	0 - 20

MS Lab ID: 4563 | Original Lab ID: 030004-59-07 | Prep Batch: 7801
Matrix: Non-cohesive Solid | Analytical: 7902

AM118 Metals in NCS HD by ICP	Original Result	Expected	Result	Recovery	Rec Limits
Aluminum	16.3	493 ug/g	481	94.3	75 - 125
Arsenic	74.9	49.3 ug/g	119	90	50 - 150
Barium	0.395	49.3 ug/g	48.4	97.4	75 - 125
Beryllium	0.0317	49.3 ug/g	44.7	90.8	75 - 125
Boron	0.858	493 ug/g	442	89.6	75 - 125
Chromium	77.3	49.3 ug/g	60	-35 *	75 - 125
Cobalt	2.41	49.3 ug/g	52.8	102	75 - 125
Copper	109	49.3 ug/g	131	45.6 *	75 - 125
Manganese	145	49.3 ug/g	162	32.6 *	75 - 125
Nickel	47.2	49.3 ug/g	65	36.1 *	75 - 125
Selenium	1.12	49.3 ug/g	50.9	101	50 - 150

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

MS Lab ID: 4563 — Original Lab ID: 030004-59-07 — Matrix: Non-cohesive Solid — Prep Batch: 7801 — Analytical: 7902

AM118 Metals in NCS HD by ICP	*Original Result*	*Expected*	*Result*	*Recovery*	*Rec Limits*
Vanadium	1.17	49.3 ug/g	51.6	102	75 - 125
Zinc	136	49.3 ug/g	110	-51.5 *	50 - 150

MSD Lab ID: 4564 — Original Lab ID: 030004-59-07 — Matrix: Non-cohesive Solid — Prep Batch: 7801 — Analytical: 7902

AM118 Metals in NCS HD by ICP	*Expected*	*Result*	*Recovery*	*Rec Limits*	*RPD*	*RPD Limits*
Aluminum	491 ug/g	493	97.1	75 - 125	2.93	0 - 25
Arsenic	49.1 ug/g	109	69.4	50 - 150	25.8 *	0 - 25
Barium	49.1 ug/g	48.3	97.7	75 - 125	0.308	0 - 25
Beryllium	49.1 ug/g	45.9	93.4	75 - 125	2.82	0 - 25
Boron	491 ug/g	455	92.6	75 - 125	3.29	0 - 25
Chromium	49.1 ug/g	61.1	-32.9 *	75 - 125	-6.19 *	0 - 25
Cobalt	49.1 ug/g	52.8	103	75 - 125	0.976	0 - 25
Copper	49.1 ug/g	129	40.7 *	75 - 125	11.4	0 - 25
Manganese	49.1 ug/g	184	77.5	75 - 125	81.6 *	0 - 25
Nickel	49.1 ug/g	61.8	29.7 *	75 - 125	19.5	0 - 25
Selenium	49.1 ug/g	53.6	107	50 - 150	5.77	0 - 25
Vanadium	49.1 ug/g	51.8	103	75 - 125	0.976	0 - 25
Zinc	49.1 ug/g	109	-54.6 *	50 - 150	-5.84 *	0 - 25

LCS Lab ID: 4565 — Original Lab ID: 4560 — Matrix: Non-cohesive Solid — Prep Batch: 7801 — Analytical: 7902

AM118 Metals in NCS HD by ICP	*Expected*	*Result*	*Recovery*	*Rec Limits*
Aluminum	6000 ug/g	5110	85.1	75 - 125
Arsenic	141 ug/g	145	102	75 - 125
Barium	58.2 ug/g	58.7	101	75 - 125
Chromium	111 ug/g	109	98.6	75 - 125
Cobalt	11.1 ug/g	11.3	102	75 - 125
Copper	398 ug/g	373	93.7	75 - 125
Manganese	480 ug/g	471	98.1	75 - 125
Nickel	195 ug/g	192	98.6	75 - 125
Vanadium	11.9 ug/g	13.2	111	75 - 125
Zinc	249 ug/g	251	100	75 - 125

LCSD Lab ID: 4566 — Original Lab ID: 4560 — Matrix: Non-cohesive Solid — Prep Batch: 7801 — Analytical: 7902

AM118 Metals in NCS HD by ICP	*Expected*	*Result*	*Recovery*	*Rec Limits*	*RPD*	*RPD Limits*
Aluminum	6000 ug/g	5100	85	75 - 125	0.118	0 - 25
Arsenic	141 ug/g	143	101	75 - 125	0.985	0 - 25
Barium	58.2 ug/g	57.7	99.1	75 - 125	1.9	0 - 25
Chromium	111 ug/g	109	97.8	75 - 125	0.815	0 - 25
Cobalt	11.1 ug/g	11.4	103	75 - 125	0.976	0 - 25
Copper	398 ug/g	375	94.1	75 - 125	0.426	0 - 25
Manganese	480 ug/g	472	98.3	75 - 125	0.204	0 - 25
Nickel	195 ug/g	192	98.5	75 - 125	0.101	0 - 25
Vanadium	11.9 ug/g	13.4	113	75 - 125	1.79	0 - 25

Report of Analysis

LCSD Lab ID: 4566 | Original Lab ID: 4560 | Prep Batch: 7801
Matrix: Non-cohesive Solid | Analytical: 7902

AM118 Metals in NCS HD by ICP	*Expected*	*Result*	*Recovery*	*Rec Limits*	*RPD*	*RPD Limits*
Zinc	249 ug/g	236	94.5	75 - 125	5.66	0 - 25

LCS Lab ID: 4616 | Original Lab ID: 4615 | Prep Batch: 8001
Matrix: Solid | Analytical: 8104

AM118 Metals in Sld HD by ICP	*Expected*	*Result*	*Recovery*	*Rec Limits*
Antimony	50 ug/g	41	82.1	75 - 125
Arsenic	50 ug/g	51.4	103	75 - 125
Barium	50 ug/g	48	95.8	75 - 125
Cadmium	50 ug/g	46.9	93.5	75 - 125
Chromium	50 ug/g	48.4	99.2	75 - 125
Cobalt	50 ug/g	47.8	95.6	75 - 125
Copper	50 ug/g	49.1	97.9	75 - 125
Lead	50 ug/g	50.1	100	75 - 125
Manganese	50 ug/g	48.9	97.8	75 - 125
Mercury	2.5 ug/g	2.69	106	75 - 125
Nickel	50 ug/g	47.5	95	75 - 125
Selenium	50 ug/g	50.8	102	75 - 125
Silver	50 ug/g	47.4	94.7	75 - 125
Thallium	50 ug/g	48.6	97.3	75 - 125
Tin	50 ug/g	45.3	90.5	75 - 125
Vanadium	50 ug/g	48.8	97.6	75 - 125
Zinc	50 ug/g	49.7	98.9	75 - 125

DUP Lab ID: 4617 | Original Lab ID: 030004-60-07 | Prep Batch: 8001
Matrix: Solid | Analytical: 8104

AM118 Metals in Sld HD by ICP	*Original Result*	*Result*	*RPD*	*RPD Limits*
Antimony	2.08	1.19	54.5 *	0 - 20
Arsenic	58.2	84.1	36.5 *	0 - 20
Barium	0.0657	0.0619	5.94	0 - 20
Cadmium	0.305	0.328	7.18	0 - 20
Chromium	9.28	12.6	30.1 *	0 - 20
Cobalt	3.22	3.41	5.56	0 - 20
Copper	315	293	7.21	0 - 20
Lead	12.5	16.7	29 *	0 - 20
Manganese	289	293	1.54	0 - 20
Mercury	0.165	0.16	2.9	0 - 20
Nickel	33	31.4	4.97	0 - 20
Selenium	-0.959	-0.448	-72.7 *	0 - 20
Silver	0.0576	0.0519	10.4	0 - 20
Thallium	0.0228	0.0135	51.1 *	0 - 20
Tin	2.57	3.97	42.8 *	0 - 20
Vanadium	0.246	0.658	91.3 *	0 - 20
Zinc	153	179	15.7	0 - 20

MS Lab ID: 4618 | Original Lab ID: 030004-60-07 | Prep Batch: 8001
Matrix: Solid | Analytical: 8104

Report of Analysis

MS Lab ID: 4618 | Original Lab ID: 030004-60-07 | Matrix: Solid | Prep Batch: 8001 | Analytical: 8104

AM118 Metals in Sld HD by ICP	*Original Result*	*Expected*	*Result*	*Recovery*	*Rec Limits*
Antimony	2.08	51 ug/g	43.3	80.8	75 - 125
Arsenic	58.2	51 ug/g	121	124	50 - 150
Barium	0.0657	51 ug/g	46.5	91.1	75 - 125
Cadmium	0.305	51 ug/g	44.2	86.2	75 - 125
Chromium	9.28	51 ug/g	57.2	94	75 - 125
Cobalt	3.22	51 ug/g	50	91.7	75 - 125
Copper	315	51 ug/g	347	61.3 *	75 - 125
Lead	12.5	51 ug/g	65	103	75 - 125
Manganese	289	51 ug/g	338	97.2	75 - 125
Mercury	0.165	2.55 ug/g	2.8	103	50 - 150
Nickel	33	51 ug/g	75.1	82.7	75 - 125
Selenium	-0.959	51 ug/g	48.8	97.6	50 - 150
Silver	0.0576	51 ug/g	45.1	88.3	50 - 150
Thallium	0.0228	51 ug/g	47.7	93.6	75 - 125
Tin	2.57	51 ug/g	49.4	92	75 - 125
Vanadium	0.246	51 ug/g	48.5	94.7	75 - 125
Zinc	153	51 ug/g	234	161 *	50 - 150

MSD Lab ID: 4619 | Original Lab ID: 030004-60-07 | Matrix: Solid | Prep Batch: 8001 | Analytical: 8104

AM118 Metals in Sld HD by ICP	*Expected*	*Result*	*Recovery*	*Rec Limits*	*RPD*	*RPD Limits*
Antimony	54.2 ug/g	46	81	75 - 125	0.247	0 - 25
Arsenic	54.2 ug/g	124	121	50 - 150	2.45	0 - 25
Barium	54.2 ug/g	51.8	95.4	75 - 125	4.61	0 - 25
Cadmium	54.2 ug/g	48.9	89.7	75 - 125	3.98	0 - 25
Chromium	54.2 ug/g	64	101	75 - 125	7.18	0 - 25
Cobalt	54.2 ug/g	55.2	95.8	75 - 125	4.37	0 - 25
Copper	54.2 ug/g	370	100	75 - 125	48 *	0 - 25
Lead	54.2 ug/g	99.5	160 *	75 - 125	43.3 *	0 - 25
Manganese	54.2 ug/g	331	77.2	75 - 125	22.9	0 - 25
Mercury	2.71 ug/g	2.9	101	50 - 150	1.96	0 - 25
Nickel	54.2 ug/g	80.7	88	75 - 125	6.21	0 - 25
Selenium	54.2 ug/g	55.3	104	50 - 150	6.35	0 - 25
Silver	54.2 ug/g	49.5	91.1	50 - 150	3.12	0 - 25
Thallium	54.2 ug/g	53	97.7	75 - 125	4.29	0 - 25
Tin	54.2 ug/g	53.2	93.4	75 - 125	1.51	0 - 25
Vanadium	54.2 ug/g	54	99.1	75 - 125	4.54	0 - 25
Zinc	54.2 ug/g	433	517 *	50 - 150	105 *	0 - 25

LCS Lab ID: 4620 | Original Lab ID: 4615 | Matrix: Solid | Prep Batch: 8001 | Analytical: 8104

AM118 Metals in Sld HD by ICP	*Expected*	*Result*	*Recovery*	*Rec Limits*
Arsenic	141 ug/g	139	98.6	75 - 125
Barium	58.2 ug/g	53.5	91.8	75 - 125
Chromium	111 ug/g	134	122	75 - 125
Cobalt	11.1 ug/g	10.7	96.3	75 - 125

Report of Analysis

LCS Lab ID: 4620 | Original Lab ID: 4615 | Matrix: Solid | Prep Batch: 8001 | Analytical: 8104

AM118 Metals in Sld HD by ICP	*Expected*	*Result*	*Recovery*	*Rec Limits*
Copper	398 ug/g	338	84.8	75 - 125
Lead	5.73 ug/g	5.6	96.6	75 - 125
Manganese	480 ug/g	436	90.9	75 - 125
Nickel	195 ug/g	187	95.8	75 - 125
Vanadium	11.9 ug/g	12.6	106	75 - 125
Zinc	249 ug/g	218	87.3	75 - 125

LCSD Lab ID: 4621 | Original Lab ID: 4615 | Matrix: Solid | Prep Batch: 8001 | Analytical: 8104

AM118 Metals in Sld HD by ICP	*Expected*	*Result*	*Recovery*	*Rec Limits*	*RPD*	*RPD Limits*
Arsenic	141 ug/g	139	98.5	75 - 125	0.101	0 - 25
Barium	58.2 ug/g	57.6	98.9	75 - 125	7.45	0 - 25
Chromium	111 ug/g	106	96.7	75 - 125	23.1	0 - 25
Cobalt	11.1 ug/g	10.4	93.9	75 - 125	2.52	0 - 25
Copper	398 ug/g	343	86.1	75 - 125	1.52	0 - 25
Lead	5.73 ug/g	6.16	106	75 - 125	9.28	0 - 25
Manganese	480 ug/g	443	92.4	75 - 125	1.64	0 - 25
Nickel	195 ug/g	178	91.5	75 - 125	4.59	0 - 25
Vanadium	11.9 ug/g	12.4	105	75 - 125	0.948	0 - 25
Zinc	249 ug/g	215	86.2	75 - 125	1.27	0 - 25

LCS Lab ID: 4663 | Original Lab ID: 4662 | Matrix: Liquid | Prep Batch: 8201 | Analytical: 8302

AM118 Metals in Liq HD by ICP	*Expected*	*Result*	*Recovery*	*Rec Limits*
Aluminum	500 ug/g	505	99.5	75 - 125
Antimony	50 ug/g	48.7	97.4	75 - 125
Arsenic	50 ug/g	50.6	101	75 - 125
Barium	50 ug/g	52.5	105	75 - 125
Beryllium	50 ug/g	47.1	94.2	75 - 125
Boron	500 ug/g	414	82.4	75 - 125
Cadmium	50 ug/g	51.3	102	75 - 125
Chromium	50 ug/g	50.4	101	75 - 125
Cobalt	50 ug/g	49.4	98.7	75 - 125
Copper	50 ug/g	50.7	101	75 - 125
Lead	50 ug/g	50.3	100	75 - 125
Manganese	50 ug/g	50.3	101	75 - 125
Mercury	2.5 ug/g	2.68	107	75 - 125
Nickel	50 ug/g	49	97.9	75 - 125
Selenium	50 ug/g	47.6	95.3	75 - 125
Silver	50 ug/g	46	92	75 - 125
Thallium	50 ug/g	46.6	93.1	75 - 125
Tin	50 ug/g	51.2	102	75 - 125
Vanadium	50 ug/g	50	100	75 - 125
Zinc	50 ug/g	52.5	104	75 - 125

DUP Lab ID: 4664 | Original Lab ID: 030004-58-08 | Matrix: Liquid | Prep Batch: 8201 | Analytical: 8302

Report of Analysis

DUP Lab ID: 4664 | Original Lab ID: 030004-58-08 | Prep Batch: 8201
Matrix: Liquid | Analytical: 8302

AM118 Metals in Liq HD by ICP	*Original Result*	*Result*	*RPD*	*RPD Limits*
Aluminum	2.34	5.94	87.1 *	0 - 20
Antimony	0.00961	0.0271	95.4 *	0 - 20
Arsenic	1.45	0.954	41.2 *	0 - 20
Barium	0.0707	0.0503	33.8 *	0 - 20
Beryllium	0.021	0.013	47.2 *	0 - 20
Boron	1.39	2.02	36.9 *	0 - 20
Cadmium	0.192	0.182	4.83	0 - 20
Chromium	2.46	3.59	37.4 *	0 - 20
Cobalt	0.0199	0.0128	43.7 *	0 - 20
Copper	61.7	61.7	0.0792	0 - 20
Lead	0.836	0.861	2.97	0 - 20
Manganese	0.0368	0.0436	16.8	0 - 20
Mercury	0	0.00961	200 *	0 - 20
Nickel	0.127	0.315	85 *	0 - 20
Selenium	0	0	0	0 - 20
Silver	0.0222	0.0202	9.05	0 - 20
Thallium	0.123	0.0871	34.3 *	0 - 20
Tin	0.0659	0.0575	13.6	0 - 20
Vanadium	0.729	0.992	30.5 *	0 - 20
Zinc	5.39	3.75	35.7 *	0 - 20

MS Lab ID: 4665 | Original Lab ID: 030004-58-08 | Prep Batch: 8201
Matrix: Liquid | Analytical: 8302

AM118 Metals in Liq HD by ICP	*Original Result*	*Expected*	*Result*	*Recovery*	*Rec Limits*
Aluminum	2.34	515 ug/g	489	94.3	75 - 125
Antimony	0.00961	51.5 ug/g	50.4	97.7	75 - 125
Arsenic	1.45	51.5 ug/g	53.8	102	50 - 150
Barium	0.0707	51.5 ug/g	54.9	106	75 - 125
Beryllium	0.021	51.5 ug/g	45.7	88.6	75 - 125
Boron	1.39	515 ug/g	452	87.3	75 - 125
Cadmium	0.192	51.5 ug/g	51	98.5	75 - 125
Chromium	2.46	51.5 ug/g	54.3	101	75 - 125
Cobalt	0.0199	51.5 ug/g	49.8	96.6	75 - 125
Copper	61.7	51.5 ug/g	111	96.3	75 - 125
Lead	0.836	51.5 ug/g	56.4	108	75 - 125
Manganese	0.0368	51.5 ug/g	50.4	97.6	75 - 125
Mercury	0	2.58 ug/g	2.84	110	50 - 150
Nickel	0.127	51.5 ug/g	50.2	97.2	75 - 125
Selenium	0	51.5 ug/g	53.6	104	50 - 150
Silver	0.0222	51.5 ug/g	48.7	94.4	50 - 150
Thallium	0.123	51.5 ug/g	54.7	106	75 - 125
Tin	0.0659	51.5 ug/g	52.8	102	75 - 125
Vanadium	0.729	51.5 ug/g	51.6	98.8	75 - 125
Zinc	5.39	51.5 ug/g	54.1	94.5	50 - 150

MSD Lab ID: 4666 | Original Lab ID: 030004-58-08 | Prep Batch: 8201
Matrix: Liquid | Analytical: 8302

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

MSD Lab ID: 4666 | Original Lab ID: 030004-58-08 | Prep Batch: 8201
Matrix: Liquid | Analytical: 8302

AM118 Metals in Liq HD by ICP	*Expected*	*Result*	*Recovery*	*Rec Limits*	*RPD*	*RPD Limits*
Aluminum	524 ug/g	507	96.4	75 - 125	2.2	0 - 25
Antimony	52.4 ug/g	51.2	97.7	75 - 125	0	0 - 25
Arsenic	52.4 ug/g	56.1	104	50 - 150	1.94	0 - 25
Barium	52.4 ug/g	55.9	107	75 - 125	0.939	0 - 25
Beryllium	52.4 ug/g	47.6	90.8	75 - 125	2.45	0 - 25
Boron	524 ug/g	467	88.9	75 - 125	1.82	0 - 25
Cadmium	52.4 ug/g	52.8	100	75 - 125	1.51	0 - 25
Chromium	52.4 ug/g	55.6	101	75 - 125	0	0 - 25
Cobalt	52.4 ug/g	50.7	96.9	75 - 125	0.31	0 - 25
Copper	52.4 ug/g	113	98.1	75 - 125	1.85	0 - 25
Lead	52.4 ug/g	57.3	108	75 - 125	0	0 - 25
Manganese	52.4 ug/g	51.3	97.9	75 - 125	0.307	0 - 25
Mercury	2.62 ug/g	3.2	122	50 - 150	10.3	0 - 25
Nickel	52.4 ug/g	50.9	96.9	75 - 125	0.309	0 - 25
Selenium	52.4 ug/g	56.3	107	50 - 150	2.84	0 - 25
Silver	52.4 ug/g	49.6	94.7	50 - 150	0.317	0 - 25
Thallium	52.4 ug/g	55.2	105	75 - 125	0.948	0 - 25
Tin	52.4 ug/g	51.9	98.9	75 - 125	3.09	0 - 25
Vanadium	52.4 ug/g	53	99.8	75 - 125	1.01	0 - 25
Zinc	52.4 ug/g	60.1	104	50 - 150	9.57	0 - 25

LCS Lab ID: 4561 | Original Lab ID: 4560 | Prep Batch: 7801
Matrix: Non-cohesive Solid | Analytical: 9001

AM118 Metals in NCS HD by ICP	*Expected*	*Result*	*Recovery*	*Rec Limits*
Lead	50 ug/g	48.5	96.8	75 - 125
Mercury	2.5 ug/g	2.52	101	75 - 125
Silver	50 ug/g	51.2	102	75 - 125
Thallium	50 ug/g	47	94	75 - 125

DUP Lab ID: 4562 | Original Lab ID: 030004-59-07 | Prep Batch: 7801
Matrix: Non-cohesive Solid | Analytical: 9001

AM118 Metals in NCS HD by ICP	*Original Result*	*Result*	*RPD*	*RPD Limits*
Lead	1340	22.5	193 *	0 - 20
Mercury	0.0243	0.00803	101 *	0 - 20
Silver	0.0424	0.0329	25.3 *	0 - 20
Thallium	0.0609	0.0379	46.5 *	0 - 20

MS Lab ID: 4563 | Original Lab ID: 030004-59-07 | Prep Batch: 7801
Matrix: Non-cohesive Solid | Analytical: 9001

AM118 Metals in NCS HD by ICP	*Original Result*	*Expected*	*Result*	*Recovery*	*Rec Limits*
Lead	1340	49.3 ug/g	63.6	-2580 *	75 - 125
Mercury	0.0243	2.46 ug/g	2.47	99.2	50 - 150
Silver	0.0424	49.3 ug/g	47.3	95.8	50 - 150
Thallium	0.0609	49.3 ug/g	48.7	98.8	75 - 125

MSD Lab ID: 4564 | Original Lab ID: 030004-59-07 | Prep Batch: 7801
Matrix: Non-cohesive Solid | Analytical: 9001

Report of Analysis

MSD Lab ID: 4564 — Original Lab ID: 030004-59-07 — Prep Batch: 7801
Matrix: Non-cohesive Solid — Analytical: 9001

AM118 Metals in NCS HD by ICP	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits
Lead	49.1 ug/g	67.9	-2580 *	75 - 125	0	0 - 25
Mercury	2.45 ug/g	2.51	101	50 - 150	1.8	0 - 25
Silver	49.1 ug/g	47.2	96.1	50 - 150	0.313	0 - 25
Thallium	49.1 ug/g	50.5	103	75 - 125	4.16	0 - 25

LCS Lab ID: 4565 — Original Lab ID: 4560 — Prep Batch: 7801
Matrix: Non-cohesive Solid — Analytical: 9001

AM118 Metals in NCS HD by ICP	Expected	Result	Recovery	Rec Limits
Lead	5.73 ug/g	5.2	89.7	75 - 125

LCSD Lab ID: 4566 — Original Lab ID: 4560 — Prep Batch: 7801
Matrix: Non-cohesive Solid — Analytical: 9001

AM118 Metals in NCS HD by ICP	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits
Lead	5.73 ug/g	5.22	90.2	75 - 125	0.556	0 - 25

LCS Lab ID: 4561 — Original Lab ID: 4560 — Prep Batch: 7801
Matrix: Non-cohesive Solid — Analytical: 9002

AM118 Metals in NCS HD by ICP	Expected	Result	Recovery	Rec Limits
Antimony	50 ug/g	48.8	97.6	75 - 125
Cadmium	50 ug/g	52	104	75 - 125
Tin	50 ug/g	49.7	99.4	75 - 125

DUP Lab ID: 4562 — Original Lab ID: 030004-59-07 — Prep Batch: 7801
Matrix: Non-cohesive Solid — Analytical: 9002

AM118 Metals in NCS HD by ICP	Original Result	Result	RPD	RPD Limits
Antimony	0.505	0.282	56.7 *	0 - 20
Cadmium	0.301	0.372	20.9 *	0 - 20
Tin	2.57	1.61	46.1 *	0 - 20

MS Lab ID: 4563 — Original Lab ID: 030004-59-07 — Prep Batch: 7801
Matrix: Non-cohesive Solid — Analytical: 9002

AM118 Metals in NCS HD by ICP	Original Result	Expected	Result	Recovery	Rec Limits
Antimony	0.505	49.3 ug/g	46.7	93.7	75 - 125
Cadmium	0.301	49.3 ug/g	49.6	100	75 - 125
Tin	2.57	49.3 ug/g	48.3	92.8	75 - 125

MSD Lab ID: 4564 — Original Lab ID: 030004-59-07 — Prep Batch: 7801
Matrix: Non-cohesive Solid — Analytical: 9002

AM118 Metals in NCS HD by ICP	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits
Antimony	49.1 ug/g	47.2	95.3	75 - 125	1.69	0 - 25
Cadmium	49.1 ug/g	50.1	101	75 - 125	0.995	0 - 25
Tin	49.1 ug/g	49.8	96.3	75 - 125	3.7	0 - 25

LCS Lab ID: 4616 — Original Lab ID: 4615 — Prep Batch: 8001
Matrix: Solid — Analytical: 9003

AM118 Metals in Sld HD by ICP	Expected	Result	Recovery	Rec Limits

Report of Analysis

LCS Lab ID: 4616 — Original Lab ID: 4615 — Prep Batch: 8001
Matrix: Solid — Analytical: 9003

AM118 Metals in Sld HD by ICP	*Expected*	*Result*	*Recovery*	*Rec Limits*
Aluminum	500 ug/g	515	91.3	75 - 125
Beryllium	50 ug/g	46.3	92.6	75 - 125
Boron	500 ug/g	458	88.7	75 - 125

DUP Lab ID: 4617 — Original Lab ID: 030004-60-07 — Prep Batch: 8001
Matrix: Solid — Analytical: 9003

AM118 Metals in Sld HD by ICP	*Original Result*	*Result*	*RPD*	*RPD Limits*
Aluminum	8.25	13	44.5 *	0 - 20
Beryllium	0.00704	0.0111	44.4 *	0 - 20
Boron	2.3	3.13	30.7 *	0 - 20

MS Lab ID: 4618 — Original Lab ID: 030004-60-07 — Prep Batch: 8001
Matrix: Solid — Analytical: 9003

AM118 Metals in Sld HD by ICP	*Original Result*	*Expected*	*Result*	*Recovery*	*Rec Limits*
Aluminum	8.25	510 ug/g	522	101	75 - 125
Beryllium	0.00704	51 ug/g	48.6	95.4	75 - 125
Boron	2.3	510 ug/g	506	98.7	75 - 125

MSD Lab ID: 4619 — Original Lab ID: 030004-60-07 — Prep Batch: 8001
Matrix: Solid — Analytical: 9003

AM118 Metals in Sld HD by ICP	*Expected*	*Result*	*Recovery*	*Rec Limits*	*RPD*	*RPD Limits*
Aluminum	542 ug/g	560	102	75 - 125	0.985	0 - 25
Beryllium	54.2 ug/g	54.7	101	75 - 125	5.7	0 - 25
Boron	542 ug/g	547	100	75 - 125	1.31	0 - 25

LCS Lab ID: 4620 — Original Lab ID: 4615 — Prep Batch: 8001
Matrix: Solid — Analytical: 9003

AM118 Metals in Sld HD by ICP	*Expected*	*Result*	*Recovery*	*Rec Limits*
Aluminum	6000 ug/g	4990	82.2	75 - 125

LCSD Lab ID: 4621 — Original Lab ID: 4615 — Prep Batch: 8001
Matrix: Solid — Analytical: 9003

AM118 Metals in Sld HD by ICP	*Expected*	*Result*	*Recovery*	*Rec Limits*	*RPD*	*RPD Limits*
Aluminum	6000 ug/g	5000	82.4	75 - 125	0.243	0 - 25

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

QC Summary

DUP Lab ID: 4584 — **Original Lab ID:** 030004-58-06 — **Prep Batch:** 7906
Matrix: Liquid — **Analytical:** 8007

AM100 Non-Vols in HD by GC	*Original Result*	*Result*	*RPD*	*RPD Limits*
Thiodiglycol (TDG)	12	11	8.5	0 - 25

LCS Lab ID: 4589 — **Original Lab ID:** — **Prep Batch:** 7906
Matrix: Liquid — **Analytical:** 8007

AM100 Non-Vols in HD by GC	*Expected*	*Result*	*Recovery*	*Rec Limits*
Thiodiglycol (TDG)	1020 ug/g	1200	117	50 - 150

MS Lab ID: 4590 — **Original Lab ID:** 030004-58-06 — **Prep Batch:** 7906
Matrix: Liquid — **Analytical:** 8007

AM100 Non-Vols in HD by GC	*Original Result*	*Expected*	*Result*	*Recovery*	*Rec Limits*
Thiodiglycol (TDG)	12	1030 ug/g	1010	97.1	50 - 150

MSD Lab ID: 4591 — **Original Lab ID:** 030004-58-06 — **Prep Batch:** 7906
Matrix: Liquid — **Analytical:** 8007

AM100 Non-Vols in HD by GC	*Expected*	*Result*	*Recovery*	*Rec Limits*	*RPD*	*RPD Limits*
Thiodiglycol (TDG)	1060 ug/g	947	88.2	50 - 150	9.61	0 - 25

LCS Lab ID: 4592 — **Original Lab ID:** — **Prep Batch:** 7906
Matrix: Liquid — **Analytical:** 8007

AM100 Non-Vols in HD by GC	*Expected*	*Result*	*Recovery*	*Rec Limits*
Thiodiglycol (TDG)	1020 ug/g	1120	110	50 - 150

Report of Analysis

QC Summary

LCS Lab ID: 4605 — Original Lab ID: — Matrix: Liquid — Prep Batch: 7910 — Analytical: 8005

AM117 Semi-Vols Liq HD by GC	Expected	Result	Recovery	Rec Limits
Hexachloroethane	950 ug/g	950	100	50 - 150
Q	9950 ug/g	11300	113	50 - 150
T	9120 ug/g	10400	114	50 - 150

LCS Lab ID: 4606 — Original Lab ID: — Matrix: Liquid — Prep Batch: 7910 — Analytical: 8005

AM117 Semi-Vols Liq HD by GC	Expected	Result	Recovery	Rec Limits
Q	50300 ug/g	52400	104	50 - 150

DUP Lab ID: 4607 — Original Lab ID: 030004-58-07 — Matrix: Liquid — Prep Batch: 7910 — Analytical: 8005

AM117 Semi-Vols Liq HD by GC	Original Result	Result	RPD	RPD Limits
Hexachloroethane	0	0	0	0 - 25
Q	25200	27600	9.13	0 - 25
T	3530	4080	14.4	0 - 25

MS Lab ID: 4609 — Original Lab ID: 030004-58-07 — Matrix: Liquid — Prep Batch: 7910 — Analytical: 8005

AM117 Semi-Vols Liq HD by GC	Original Result	Expected	Result	Recovery	Rec Limits
Hexachloroethane	0	990 ug/g	831	84	50 - 150
Q	25200	10400 ug/g	28900	35.8 *	50 - 150
T	3530	9500 ug/g	8640	53.7	50 - 150

MS Lab ID: 4610 — Original Lab ID: 4608 — Matrix: Liquid — Prep Batch: 7910 — Analytical: 8005

AM117 Semi-Vols Liq HD by GC	Original Result	Expected	Result	Recovery	Rec Limits
Q	28300	51700 ug/g	59700	60.8	50 - 150

MSD Lab ID: 4611 — Original Lab ID: 030004-58-07 — Matrix: Liquid — Prep Batch: 7910 — Analytical: 8005

AM117 Semi-Vols Liq HD by GC	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits
Hexachloroethane	1000 ug/g	844	84.4	50 - 150	0.475	0 - 25
Q	10500 ug/g	29500	41.8 *	50 - 150	15.5	0 - 25
T	9600 ug/g	8960	56.5	50 - 150	5.08	0 - 25

MSD Lab ID: 4612 — Original Lab ID: 4608 — Matrix: Liquid — Prep Batch: 7910 — Analytical: 8005

AM117 Semi-Vols Liq HD by GC	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits
Q	51200 ug/g	57100	56.4	50 - 150	7.51	0 - 25

LCS Lab ID: 4613 — Original Lab ID: — Matrix: Liquid — Prep Batch: 7910 — Analytical: 8005

AM117 Semi-Vols Liq HD by GC	Expected	Result	Recovery	Rec Limits
Hexachloroethane	950 ug/g	748	78.7	50 - 150
Q	9950 ug/g	7870	79	50 - 150

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

LCS Lab ID: 4613	**Original Lab ID:** **Matrix:** Liquid		**Prep Batch:** 7910 **Analytical:** 8005	
AM117 Semi-Vols Liq HD by GC	*Expected*	*Result*	*Recovery*	*Rec Limits*
T	9120 ug/g	6890	75.6	50 - 150
LCS Lab ID: 4614	**Original Lab ID:** **Matrix:** Liquid		**Prep Batch:** 7910 **Analytical:** 8005	
AM117 Semi-Vols Liq HD by GC	*Expected*	*Result*	*Recovery*	*Rec Limits*
Q	50300 ug/g	38100	75.8	50 - 150

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

QC Summary

LCS Lab ID: 4568 — **Original Lab ID:** — **Prep Batch:** 7901
Matrix: Liquid — **Analytical:** 7908

AM101 Vols in Liquid HD by GC	*Expected*	*Result*	*Recovery*	*Rec Limits*
1,2-Dichloroethane	9880 ug/g	11200	113	50 - 150
Tetrachloroethylene	10100 ug/g	11600	114	50 - 150
1,1,2,2-Tetrachloroethane	10400 ug/g	12000	115	50 - 150

DUP Lab ID: 4569 — **Original Lab ID:** 030004-58-06 — **Prep Batch:** 7901
Matrix: Liquid — **Analytical:** 7908

AM101 Vols in Liquid HD by GC	*Original Result*	*Result*	*RPD*	*RPD Limits*
1,2-Dichloroethane	3910	3860	1.4	0 - 25
Tetrachloroethylene	0	0	0	0 - 25
1,1,2,2-Tetrachloroethane	0	0	0	0 - 25

MS Lab ID: 4570 — **Original Lab ID:** 030004-58-06 — **Prep Batch:** 7901
Matrix: Liquid — **Analytical:** 7908

AM101 Vols in Liquid HD by GC	*Original Result*	*Expected*	*Result*	*Recovery*	*Rec Limits*
1,2-Dichloroethane	3910	10100 ug/g	14900	108	50 - 150
Tetrachloroethylene	0	10400 ug/g	11800	114	50 - 150
1,1,2,2-Tetrachloroethane	0	10600 ug/g	12400	117	50 - 150

MSD Lab ID: 4571 — **Original Lab ID:** 030004-58-06 — **Prep Batch:** 7901
Matrix: Liquid — **Analytical:** 7908

AM101 Vols in Liquid HD by GC	*Expected*	*Result*	*Recovery*	*Rec Limits*	*RPD*	*RPD Limits*
1,2-Dichloroethane	10200 ug/g	15800	117	50 - 150	8	0 - 25
Tetrachloroethylene	10400 ug/g	12400	119	50 - 150	4.29	0 - 25
1,1,2,2-Tetrachloroethane	10700 ug/g	12800	120	50 - 150	2.53	0 - 25

LCS Lab ID: 4572 — **Original Lab ID:** — **Prep Batch:** 7901
Matrix: Liquid — **Analytical:** 7908

AM101 Vols in Liquid HD by GC	*Expected*	*Result*	*Recovery*	*Rec Limits*
1,2-Dichloroethane	9880 ug/g	11300	115	50 - 150
Tetrachloroethylene	10100 ug/g	11600	114	50 - 150
1,1,2,2-Tetrachloroethane	10400 ug/g	12500	121	50 - 150

Appendix C-8

Analytical Test Report
Sample Set #8

U.S. Army Soldier and Biological Chemical Command
Edgewood Chemical Biological Center
ATTN: Edgewood Chemical Biological
Forensic Analytical Center
Aberdeen Proving Ground, MD 21010-5424
Phone: (410) 436-8600
Fax: (410) 436-3384

ANALYTICAL TEST REPORT
FINAL

Report Date: 18 September 2003

Project/Event Title: Analysis of HD Sample Collected From Ton Containers Stored at the Deseret Chemical Depot – Sample Set 8 – FINAL REPORT

Project/Event Number: 97P-0033-46

Report Number: 0033-46-091803B8

Report Prepared for:

EG&G Defense Materials Division
Attn.: Mr. Don Milton
11600 Stark Rd
Tooele, UT 84074

Note: This report replaces report number 0033-46-081803B8

This report shall not be reproduced except in full, without the written approval of the laboratory. Test results reported herein refer only to samples tested.

CASE NARRATIVE

Tooele Samples (Set 8)
Project/Event # 97P-0033-46

This report was revised to include results of analysis for sample 21-03-312 in Appendix A. No other changes appear in the remainder of this case narrative.

Receiving Notes

All sample containers were visually checked and compared to sample transfer form 1911. The containers were noted to be in satisfactory condition and all samples were received intact.

Sample Preparatory Notes

No discrepancies.

Analytical Notes:

Organic Compounds Analysis

VOLATILE ORGANIC COMPOUNDS

Volatile Organic Compounds (VOCs) were extracted on 11-June-03 and analyzed 13-June-03 through 16-June-03 by method AM-101.

The bromofluorobenzene (BFB) tune and the tune evaluation and performance standard both passed acceptance criteria.

The calibration curves for the target compounds along with the surrogate resulted in correlation coefficient (r^2) of 1.000 for linear / (0, 0) curve fits for all compounds. The individual calibration curve recovery values for all compounds of interest were within the acceptance criteria of ±15%. All levels had recovery values between 90% and 105% for all compounds.

The Continuing Calibration Verification (CCV) samples were all within acceptance criteria (±25%).

The surrogate (1,4-difluorobenzene) was present and fulfilled the recovery criteria (50%-150%) in all samples.

The Matrix Spike (MS) and Matrix Spike Duplicate (MSD) fulfilled the recovery criteria (50%-150%) in all analytes of interest. Recovery values for the surrogate, 1,2-dichloroethane (1,2-DCE), tetrachloroethylene (TCE) and 1,1,2,2-TCE were 103% to 121%. The Relative Percent Difference (RPD) for the MS and the MSD for 1,2-DCE, TCE, and 1,1,2,2-TCE were 2.7% to 3.4% with acceptance criteria (±25%) for all analytes of interest.

The Blank Spike (BS) and Blank Spike Duplicate (BSD) fulfilled the recovery criteria (50%-150%) for all analytes of interest. The BS/BSD are identified in the report as the Laboratory Control Sample (LCS).

Results showed that target compounds were not detected in either the Method Blank (MB) or the Reagent Blanks (RB).

The RPD values for the sample and sample duplicate met the specification required in AM-101 of ≤25%.

Sample holding time of 28 days from collection to analysis was met for all samples. Samples were collected starting 27-May-03 through 31-May-03 and analyzed on 13-June-03 through 16-June-03.

SEMI-VOLATILE ORGANIC COMPOUNDS

Semi-Volatiles Organic Compounds (SVOCs) were extracted on 11-June-03 and analyzed on 18-June-03 through 19-June-03 by method AM-117.

The decafluorotriphenylphosphine (DFTPP) tune and the tune evaluation and performance standard both passed acceptance criteria.

The calibration curves for the target compounds along with the surrogate resulted in correlation coefficient (r^2) of 1.000 for 1,4-dithiane-d4 and 0.997 for hexachloroethane (HCE) for a linear / (0, 0) curve fit. Compound Q had an r^2 of 1.000 for a linear / (0, 0) curve with a Practical Quantitation Limit (PQL) of 25 µg/ml. Compound T had an r^2 of 0.999 for a linear curve with a PQL of 25 µg/ml.

All analytes in the calibration curve standards were within the method criteria (±15%).

The CCV recovery values for HCE, Q, and T, were within the method criteria of ±25%.

It has been shown that the ton container samples contain native Q at approximately 300 µg/mL to 350 µg/mL. The original spiking level for Q was 100 µg/mL; however, it was determined through low spike recoveries that this amount was insufficient when compared to the native concentration of Q. To compensate for the elevated Q levels in the native samples, the spiking level of Q was raised by a factor of five. Due to the higher spiking amount, the samples were diluted to 25 mL (10 mL previously) to be within the range of the calibration curve. See Table 1 for the results.

Table-1. Quality Control Samples for Q (25 mL Dilution)

Quality Control Sample	Recovery, %
Blank Spike	116
Blank Spike Duplicate	96
Matrix Spike	57.7
Matrix Spike Duplicate	53.6
RPD (MS/MSD)	7.37

The MS/MSD (10 mL dilution) values for the surrogate and HCE were within the criteria of 50% to 150% and ≤25% for the RPD. The MS/MSD (10 mL dilution) values for T are outside criteria (17.8% and 15.5%). The MS/MSD values for Q at the 25 mL dilution were within criteria.

The BS recovery values for the surrogate, HCE, Q, and T were within acceptance levels.

When duplicate samples were analyzed, the RPDs for all analytes were below the method criteria of ±25% (<7%). HCE was not detected in the sample or sample duplicate.

Results showed that HCE, Q, and T were not detected in either the MB or RB. However, the surrogate (1,4-dithiane-d4) recovery for the method blank was 283%.

Sample holding time of 28 days from collection to analysis was met for all of the submitted samples. Samples were collected starting 27-May-03 through 31-May-03 and analyzed on 19 June-03.

THIODIGLYCOL

Samples for the non-volatile organic compound, thiodiglycol (TDG), were extracted 18-June-03 and analyzed on 23-June-03 through 24-June-03 by method AM-100.

The DFTPP tune and the tune evaluation and performance standard both passed acceptance criteria.

The calibration curves for the surrogate (TDG_{d8}) resulted in correlation coefficient (r^2) of 0.999 and for TDG an (r^2) of 1.000 for linear / (0, 0) curves.

The individual calibration curve levels for TDG-d8 (99% to 115%) were within the acceptance criteria of ±15%. Calibration levels for TDG (100% to 108%) were also within limits.

All CCV samples passed acceptance criteria of ±25% for TDG and the surrogate (104% to 112%).

When duplicate samples were analyzed, the RPDs for all analytes were below the method criteria of ±25% (<4%). TDG was not detected in the sample or sample duplicate.

The MS/MSD for all target compounds passed criteria. The RPD for the MS and the MSD passed acceptance criteria.

The BS/BSD fulfilled the acceptance criteria.

Results showed that target compounds were not detected in either the MB or RB.

Sample holding time of 28 days from collection to analysis was met for all samples. Samples were collected from 27-May-03 to 31-May-03. The analysis date was 24-June-03.

LEWISITE

Lewisite was extracted on 18-June-03 and analyzed on 23-June-03 through 24-June-03 by method AM-126.

The DFTPP tune and the tune evaluation and performance standard both passed acceptance criteria.

The calibration curve for the target compound resulted in a correlation coefficient (r^2) of 1.000 for a quadratic (not forced through 0, 0) curve fit for Lewisite. A quadratic fit was used to determine the calibration curve. Calibration curves behave differently for compounds over large orders of magnitude as well as for instrumental conditions and column types. After investigation, it was determined that a quadratic curve best represented the existing data. Six concentration levels were used in this curve. This meets the minimal requirements specified in EPA SW846 method 8000b. The individual calibration curve levels for Lewisite were within the acceptance criteria of ±15%.

The CCV samples (97% to 109%) were all within acceptance criteria (±25%).

The MS/MSD recovery values were not within acceptance limits (168% and 159%); the limit being 50% to 150%. These recoveries are somewhat higher than the upper limit of recovery. Samples were not rerun due to holding time issues.

The initial BS analyzed resulted in a 114% recovery. The wrong vial was analyzed at the end of the batch sequence resulting in no result for the final BS. The final BS was cancelled from the analytical batch sequence.

Results showed that Lewisite was not detected in either the MB or RB.

Sample holding time of 28 days from collection to analysis was met for all samples. Samples were collected from 27-May-03 to 31-May-03. The analysis dates were 23-June-03 through 24-June-03.

PURITY

Purity samples were extracted on 11-June-03 and analyzed on 20-June-03 by method AM-098. The purity data appeared to be somewhat low when compared to previous data sets. Therefore, the samples were re-prepared and re-analyzed on 14-August-03. The HD purity data that is presented in this report are the results from the re-analysis.

The DFTPP tune passed acceptance criteria.

The calibration curve for the target compound (HD) resulted in a correlation coefficient (r^2) of 0.998 for a linear curve fit. All individual points of the curve were between 98% and 106%.

The CCV standards all passed the acceptance criteria of ±15%.

The CASARM grade (HD) Laboratory Control Sample (LCS) results showed a purity that was 97.5% of its true value.

When duplicate samples were analyzed, the RPD for the purity was <7.0%, well below the method criteria of ±25%.

Results showed that HD was not detected in either the MB or RB.

Samples were re-analyzed 14-August-03. The sample holding time of 28 days from collection to analysis was not met for all samples.

METALS ANALYSIS

Liquids:
All undiluted and diluted samples were analyzed on 19-June-03. Dilutions and reruns were analyzed on 19-June-03 and 23-June-03. All samples were analyzed following Method AM-118.

Aluminum, beryllium, and boron were outside the acceptance limits of 90% to 110% for the CCV when analyzed on 19-June-03. Upon reanalysis on 23-June-03, aluminum and boron were within acceptance limits; however beryllium was outside the acceptance limits. All samples will be slightly underestimated for beryllium which had recoveries of 89.2% and 87.5% on the CCV's.

Chromium was outside the acceptance limits of 90% to 110% for the ICV when analyzed on 19-June-03. Upon reanalysis on 23-June-03, chromium was within the acceptance limits.

The percent recovery (%R) for the MS/MSD, BS, Post Digestion Spike Addition Sample (PDSA), and Lab Control Spike (LCS)/Lab Control Spike Duplicate (LCSD) indicated that all elements met the acceptance criteria of 75%-125%. The MS/MSD and LCS/LCSD RPD met the criterium.

Copper, the only element that had a result above 100 times the Instrument Detection Limit (IDL), had an acceptable RPD for the sample duplicate.

All liquid samples were analyzed within the 28-day holding period.

Non-Cohesive Solids:
All undiluted and diluted samples were analyzed on 16-June-03. All samples were analyzed following Method AM-118.

Boron was outside the acceptance limits of 90% to 110% for the CCV. All samples will be slightly underestimated for boron which had recoveries of 84.8% and 88.4% on the CCV's

Cadmium was found in all reagent blanks at a level above the MDL, but below the PQL. No corrective action was taken. Antimony was found in the first reagent blank at a level above the MDL, but below the. No corrective action was taken. Mercury was found in the last reagent blank above the PQL. Cadmium was found in the method blank at a level above the MDL, but below the PQL. No corrective action was taken.

The native sample used for the MS (4763) and the MSD (4764) had high levels of manganese and zinc. Since the spike levels were not sufficiently high when compared to the native levels in the sample, the MS and the MSD could not be properly evaluated for those elements. The RPD for the MS and MSD were within acceptable limits for all other elements. All other elements gave acceptable recoveries and RPD's for the MS and MSD.

For elements that had results above 100 times the IDL, copper and mercury had an acceptable RPD for the sample duplicate. However, manganese (35.5%) and zinc (36.9%) failed the RPD criteria. The failure was attributed to the sample being non-homogenous.

The %R for the BS, certified reference material (CRM), certified reference material duplicate (CRMD) and PDSA indicated that all elements met the acceptance criteria of 75%-125%. The CRM/CRMD RPD met the criterium.

All the Non-cohesive samples were analyzed within the 28-day hold time.

Solids:
All undiluted samples were analyzed on 18-June-03. Dilutions and reruns were analyzed on 18-June-03 and 24-June-03. All samples were analyzed following Method AM-118.

Thallium and lead were outside the acceptance limits of 90% to 110% for the CCV when analyzed on 18-June-03. Beryllium was outside the acceptance limits of 90% to 110% for the last CCV when analyzed on 18-June-03. Upon reanalysis on 24-June-03 all elements were within acceptance limits.

Cadmium was detected in all reagent blanks at a level above the MDL, but below the PQL when analyzed on 18-June-03. No corrective action was taken. Antimony was detected in the second reagent blank at a level above the MDL, but below the PQL when analyzed on 18-June-03. No corrective action was taken. Cadmium was found in the method blank at a level above the MDL, but below the PQL when analyzed on 18-June-03. No corrective action was taken.

The native sample used for the MS (4770) and MSD (4771) had high levels of manganese, mercury, and zinc. Since the spike level was considerably less than the original levels in the sample, the MS/MSD could not be properly evaluated for those elements. The recovery values for the MS and MSD for all elements that could be properly evaluated were within acceptable limits except for the MSD for Cr (134%). The RPD for the MS and MSD for all elements that could be properly evaluated were within acceptable limits evaluated except for copper (47%).

Samples 030004-70-07, 70-08, 70-09, and 70-11 were reanalyzed for beryllium on 24-June-03. The batch QC for that day is as follows: Method Blank (ND), Blank Spike (94.9%), PDSA (100%), MS (102%), MSD (98.5%), MS/MSD RPD (3.75%).

The %R for the BS, PDSA, CRM and CRM duplicate indicated that all elements met the acceptance criteria of 75%-125% except for the PDSA for copper (134%). The CRM/CRMD RPD met the criterium.

For elements that had results above 100 times the IDL, chromium, manganese, lead, mercury, and nickel had an acceptable RPD for the sample duplicate. However copper (23.7%) and zinc (20.5%) failed the RPD criteria. The failure was attributed to the sample being non-homogenous.

All the solid samples were analyzed within the 28-day hold time.

Analyst(s) of Record (Signature) 9/23/03 (Date) **Thomas Rusek** **Principal Investigator, Battelle Memorial Institute**	**Analyst(s) of Record** (Signature) 9/23/03 (Date) **Brian L. Boyd** **Researcher, Battelle Memorial Institute**
Analyst(s) of Record (Signature) 24 SEPT 03 (Date) **Robert L. Calloway** **Physical Science Technician, Edgewood Chemical & Biological Forensic Analytical Center**	**Analyst(s) of Record** (Signature) 9/23/03 (Date) for **Stephen S. Henck** **Researcher, Battelle Memorial Institute**
Analyst(s) of Record (Signature) 9/24/03 (Date) **Doug S. Nichols** **Researcher, Battelle Memorial Institute**	**Analyst(s) of Record** (Signature) 9/24/03 (Date) **Michael W. Wensing, Ph.D.** **Principal Research Scientist, Battelle Memorial Institute**
Analyst(s) of Record (Signature) 9/23/03 (Date) **James Rielle** **Researcher, Battelle Memorial Institute**	**Analyst(s) of Record** (Signature) 9/24/03 (Date) **Michele A. Maus** **Technician, Battelle Memorial Institute**
Report Reviewed by (Signature) 9/24/2003 (Date) **Timothy L. Kehring** **LIMS Technologist, Battelle Memorial Institute**	**Report Reviewed by** (Signature) 9/23/03 (Date) for **Andrey J. Raunig** **Principal Research Scientist, Battelle Memorial Institute**
Report Reviewed by (Signature) 9/23/04 (Date) **James H. Newman** **Laboratory Manager, Battelle Memorial Institute**	

Report Reviewed by

(Signature)

26 SEPT 03 (Date)

Robert L. Calloway

Designated Authority, Edgewood C/B Forensic Analytical Center

Report Approved by

(Signature)

24 September 03 (Date)

Dennis J. Reutter, Ph.D.

Chief, Edgewood C/B Forensic Analytical Center

Appendix A

LIMS DATA REPORT

This appendix contains the 72-page data report produced from the LIMS system. It contains a summary of sample numbers, sample results, method blank results and results of QC samples analyzed. Since the report is generated by the LIMS, the page numbers will begin again at 1, but each page has been identified as part of the appendix so that it may be distinguishable from the main report.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

ANALYTICAL RESULTS

Report Date: 9/18/2003

Work Order: Tooele HD/TC 06/10/2003

Deliver To: Don Milton
EG&G Defense Materials Div.
11600 Stark Road
Tooele, UT 84074

James Newman
Project Manager

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

The following represents qualifications to the associated analytical reports.

1. These descriptors will help identify the specific sample and clarify the report.

   DUP - Matrix Duplicate
   MS - Matrix Spike
   MSD - Matrix Spike Duplicate
   RPD - Relative Percent Difference
   PQL - Practical Quantitiation Limit
   MDL - Method Detection Limit
   ND - Not Detected at the PQL
   * - Indicates a limit was exceeded

   Surrogate - Organic compounds which are similar to analytes of interest in chemical composition, extraction, and chromotography, but which are not normally found in the samples.

2. Qualifier keys - These descriptors will follow individual results for a specific sample and a specific analyte and will help qualify the data.

   J - Indicates an estimated value between the PQL and MDL.

NOTE: This document is included as part of the Analytical Report for the above referenced and should be retained as a permanent record thereof.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Client
EG&G Defense Materials Division

Work ID
Tooele HD/TC 06/10/2003

Workorder Sample Summary

Lab ID	*Sample ID*	*Matrix*	*Collect Date/Time*	*Receive Date/Time*
03-0004-068-01	21-03-307	Liquid	5/27/2003 14:00	6/10/2003 13:59
03-0004-068-02	21-03-308	Liquid	5/27/2003 14:00	6/10/2003 13:59
03-0004-068-03	21-03-313	Liquid	5/27/2003 14:00	6/10/2003 13:59
03-0004-068-04	21-03-316	Liquid	5/27/2003 14:00	6/10/2003 13:59
03-0004-068-05	21-03-319	Liquid	5/28/2003 14:00	6/10/2003 13:59
03-0004-068-06	21-03-322	Liquid	5/28/2003 14:00	6/10/2003 13:59
03-0004-068-07	21-03-325	Liquid	5/29/2003 14:00	6/10/2003 13:59
03-0004-068-08	21-03-329	Liquid	5/29/2003 14:00	6/10/2003 13:59
03-0004-068-09	21-03-333	Liquid	5/29/2003 14:00	6/10/2003 13:59
03-0004-068-10	21-03-337	Liquid	5/30/2003 14:00	6/10/2003 13:59
03-0004-068-11	21-03-341	Liquid	5/31/2003 14:00	6/10/2003 13:59
03-0004-068-12	21-03-345	Liquid	5/31/2003 14:00	6/10/2003 13:59
03-0004-069-01	21-03-309	Non-cohesive Solid	5/27/2003 14:49	6/10/2003 14:45
03-0004-069-02	21-03-310	Non-cohesive Solid	5/27/2003 14:49	6/10/2003 14:45
03-0004-069-03	21-03-314	Non-cohesive Solid	5/27/2003 14:49	6/10/2003 14:45
03-0004-069-04	21-03-317	Non-cohesive Solid	5/27/2003 14:49	6/10/2003 14:45
03-0004-069-05	21-03-320	Non-cohesive Solid	5/28/2003 14:49	6/10/2003 14:45
03-0004-069-06	21-03-323	Non-cohesive Solid	5/28/2003 14:49	6/10/2003 14:45
03-0004-069-07	21-03-326	Non-cohesive Solid	5/29/2003 14:49	6/10/2003 14:45
03-0004-069-08	21-03-330	Non-cohesive Solid	5/29/2003 14:49	6/10/2003 14:45
03-0004-069-09	21-03-334	Non-cohesive Solid	5/29/2003 14:49	6/10/2003 14:45
03-0004-069-10	21-03-338	Non-cohesive Solid	5/30/2003 14:49	6/10/2003 14:45
03-0004-069-11	21-03-342	Non-cohesive Solid	5/31/2003 14:49	6/10/2003 14:45
03-0004-069-12	21-03-346	Non-cohesive Solid	5/31/2003 14:49	6/10/2003 14:45
03-0004-070-01	21-03-311	Solid	5/27/2003 15:18	6/10/2003 15:17
03-0004-070-02	21-03-312	Solid	5/27/2003 15:18	6/10/2003 15:17
03-0004-070-03	21-03-315	Solid	5/27/2003 15:18	6/10/2003 15:17
03-0004-070-04	21-03-318	Solid	5/27/2003 15:18	6/10/2003 15:17
03-0004-070-05	21-03-321	Solid	5/28/2003 15:18	6/10/2003 15:17
03-0004-070-06	21-03-324	Solid	5/28/2003 15:18	6/10/2003 15:17
03-0004-070-07	21-03-327	Solid	5/29/2003 15:18	6/10/2003 15:17
03-0004-070-08	21-03-331	Solid	5/29/2003 15:18	6/10/2003 15:17
03-0004-070-09	21-03-335	Solid	5/29/2003 15:18	6/10/2003 15:17
03-0004-070-10	21-03-339	Solid	5/30/2003 15:18	6/10/2003 15:17
03-0004-070-11	21-03-343	Solid	5/31/2003 15:18	6/10/2003 15:17
03-0004-070-12	21-03-347	Solid	5/31/2003 15:18	6/10/2003 15:17

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
03-0004-068-01	21-03-307	5/27/2003 14:00	6/10/2003 13:59	9/18/2003 09:09	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
8/14/2003 11:43	9701	AM098 HD Purity by GC	1	8/14/2003 16:01	tfr	9704

Parameter	Result	MDL	PQL	Units
bis-(2-Chloroethyl)sulfide	93.0			%

AM100 Non-Vols in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
6/18/2003 09:36	8503	AM100 Non-Vols in HD by GC	1	6/24/2003 0:00	ssh	8702

Parameter	Result	MDL	PQL	Units
Thiodiglycol (TDG)	ND	210	250	ug/g

Surrogates	Expected	Result	Recovery	Limits
Thiodiglycol-d8 (TDG-d8)	999	1060 ug/g	106	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
6/11/2003 14:19	8306	AM101 Vols in Liquid HD by GC	1	6/13/2003 19:50	ssh	8502

Parameter	Result	MDL	PQL	Units
1,2-Dichloroethane	1970	271	520	ug/g
Tetrachloroethylene	ND	104	520	ug/g
1,1,2,2-Tetrachloroethane	ND	156	520	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Difluorobenzene	11600	12200 ug/g	105	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
6/18/2003 09:19	8612	AM118 Metals in Liq HD by ICP	1	6/19/2003 17:22	blh	8616

Parameter	Result	MDL	PQL	Units
Antimony	ND	0.670	5.32	ug/g
Arsenic	2.55 J	1.30	5.32	ug/g
Barium	ND	0.457	5.32	ug/g
Cadmium	ND	0.436	5.32	ug/g
Cobalt	ND	0.287	1.06	ug/g
Copper	ND	2.59	5.32	ug/g
Lead	ND	0.436	5.32	ug/g
Manganese	ND	0.340	1.06	ug/g
Mercury	0.0551 J	0.0532	0.532	ug/g
Nickel	ND	0.372	5.32	ug/g
Selenium	ND	1.24	10.6	ug/g
Silver	ND	0.500	5.32	ug/g
Thallium	ND	1.04	5.32	ug/g
Tin	ND	2.65	10.6	ug/g
Vanadium	ND	1.06	5.32	ug/g
Zinc	ND	3.32	10.6	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/18/2003 09:19	8612	AM118 Metals in Liq HD by ICP	1	6/23/2003 15:28	blb	9201

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	13.0 J	10.6	53.2	ug/g
Beryllium	ND	0.957	5.32	ug/g
Boron	7.62 J	3.98	10.6	ug/g
Chromium	1.52 J	1.37	5.32	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/11/2003 16:13	8402	AM117 Semi-Vols Liq HD by GC	1	6/19/2003 0:00	tfr	8613

Parameter	*Result*	*MDL*	*PQL*	*Units*
Hexachloroethane	403	83.9	262	ug/g
Q	4670	53.5	2620	ug/g
T	1300 J	73.4	2620	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Dithiane-d4	1050	1010 ug/g	96.4	50 - 150

AM126 Lewisite in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/18/2003 09:34	8614	AM126 Lewisite in HD by GC	1	6/23/2003 21:05	tfr	8618

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lewisite	ND	2.04	5.22	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
03-0004-068-02	21-03-308	5/27/2003 14:00	6/10/2003 13:59	9/18/2003 09:09	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
8/14/2003 11:43	9701	AM098 HD Purity by GC	1	8/14/2003 16:39	tfr	9704

Parameter	*Result*	*MDL*	*PQL*	*Units*
bis-(2-Chloroethyl)sulfide	92.5			%

AM100 Non-Vols in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/18/2003 09:36	8503	AM100 Non-Vols in HD by GC	1	6/24/2003 0:00	ssh	8702

Parameter	*Result*	*MDL*	*PQL*	*Units*
Thiodiglycol (TDG)	ND	216	257	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
Thiodiglycol-d8 (TDG-d8)	1030	1100 ug/g	107	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/11/2003 14:19	8306	AM101 Vols in Liquid HD by GC	1	6/13/2003 21:06	ssh	8502

Parameter	*Result*	*MDL*	*PQL*	*Units*
1,2-Dichloroethane	2020	256	492	ug/g
Tetrachloroethylene	ND	98.4	492	ug/g
1,1,2,2-Tetrachloroethane	ND	148	492	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Difluorobenzene	11000	11800 ug/g	107	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/18/2003 09:19	8612	AM118 Metals in Liq HD by ICP	1	6/19/2003 17:26	blb	8616

Parameter	*Result*	*MDL*	*PQL*	*Units*
Antimony	ND	0.673	5.34	ug/g
Arsenic	3.02 J	1.30	5.34	ug/g
Barium	ND	0.459	5.34	ug/g
Cadmium	ND	0.438	5.34	ug/g
Cobalt	ND	0.288	1.07	ug/g
Copper	ND	2.60	5.34	ug/g
Lead	ND	0.438	5.34	ug/g
Manganese	0.390 J	0.342	1.07	ug/g
Mercury	0.0752 J	0.0534	0.534	ug/g
Nickel	ND	0.374	5.34	ug/g
Selenium	ND	1.25	10.7	ug/g
Silver	ND	0.502	5.34	ug/g
Thallium	ND	1.05	5.34	ug/g
Tin	ND	2.66	10.7	ug/g
Vanadium	ND	1.07	5.34	ug/g
Zinc	ND	3.33	10.7	ug/g

Report of Analysis

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
6/18/2003 09:19	8612	AM118 Metals in Liq HD by ICP	1	6/23/2003 15:32	blb	9201

Parameter	Result	MDL	PQL	Units
Aluminum	15.1 J	10.7	53.4	ug/g
Beryllium	ND	0.962	5.34	ug/g
Boron	5.36 J	4.00	10.7	ug/g
Chromium	1.58 J	1.38	5.34	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
6/11/2003 16:13	8402	AM117 Semi-Vols Liq HD by GC	1	6/19/2003 0:00	tfr	8613

Parameter	Result	MDL	PQL	Units
Hexachloroethane	390	83.9	262	ug/g
Q	4480	53.5	2620	ug/g
T	1300 J	73.5	2620	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Dithiane-d4	1050	1010 ug/g	96.2	50 - 150

AM126 Lewisite in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
6/18/2003 09:34	8614	AM126 Lewisite in HD by GC	1	6/23/2003 21:41	tfr	8618

Parameter	Result	MDL	PQL	Units
Lewisite	ND	2.00	5.12	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
03-0004-068-03	21-03-313	5/27/2003 14:00	6/10/2003 13:59	9/18/2003 09:09	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
8/14/2003 11:43	9701	AM098 HD Purity by GC	1	8/14/2003 16:58	tfr	9704

Parameter	*Result*	*MDL*	*PQL*	*Units*
bis-(2-Chloroethyl)sulfide	88.9			%

AM100 Non-Vols in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/18/2003 09:36	8503	AM100 Non-Vols in HD by GC	1	6/24/2003 0:57	ssh	8702

Parameter	*Result*	*MDL*	*PQL*	*Units*
Thiodiglycol (TDG)	ND	210	251	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
Thiodiglycol-d8 (TDG-d8)	1000	1030 ug/g	102	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/11/2003 14:19	8306	AM101 Vols in Liquid HD by GC	1	6/13/2003 21:44	ssh	8502

Parameter	*Result*	*MDL*	*PQL*	*Units*
1,2-Dichloroethane	7690	263	507	ug/g
Tetrachloroethylene	ND	101	507	ug/g
1,1,2,2-Tetrachloroethane	ND	152	507	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Difluorobenzene	11300	12000 ug/g	106	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/18/2003 09:19	8612	AM118 Metals in Liq HD by ICP	1	6/19/2003 16:40	blb	8616

Parameter	*Result*	*MDL*	*PQL*	*Units*
Antimony	ND	0.657	5.21	ug/g
Arsenic	ND	1.27	5.21	ug/g
Barium	ND	0.448	5.21	ug/g
Cadmium	ND	0.428	5.21	ug/g
Cobalt	ND	0.282	1.04	ug/g
Copper	30.6	2.53	5.21	ug/g
Lead	ND	0.428	5.21	ug/g
Manganese	2.81	0.334	1.04	ug/g
Mercury	0.0879 J	0.0521	0.521	ug/g
Nickel	0.562 J	0.365	5.21	ug/g
Selenium	ND	1.22	10.4	ug/g
Silver	ND	0.490	5.21	ug/g
Thallium	ND	1.02	5.21	ug/g
Tin	ND	2.60	10.4	ug/g
Vanadium	ND	1.04	5.21	ug/g
Zinc	ND	3.25	10.4	ug/g

Report of Analysis

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/18/2003 09:19	8612	AM118 Metals in Liq HD by ICP	1	6/23/2003 14:55	blb	9201

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	21.3 J	10.4	52.1	ug/g
Beryllium	ND	0.938	5.21	ug/g
Boron	5.39 J	3.90	10.4	ug/g
Chromium	1.40 J	1.35	5.21	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/11/2003 16:13	8402	AM117 Semi-Vols Liq HD by GC	1	6/19/2003 0:00	tfr	8613

Parameter	*Result*	*MDL*	*PQL*	*Units*
Hexachloroethane	ND	78.4	245	ug/g
Q	29000	50.0	2450	ug/g
T	2040 J	68.6	2450	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Dithiane-d4	980	968 ug/g	98.7	50 - 150

AM126 Lewisite in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/18/2003 09:34	8614	AM126 Lewisite in HD by GC	1	6/23/2003 19:54	tfr	8618

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lewisite	ND	2.00	5.12	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
03-0004-068-04	21-03-316	5/27/2003 14:00	6/10/2003 13:59	9/18/2003 09:09	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
8/14/2003 11:43	9701	AM098 HD Purity by GC	1	8/14/2003 17:17	tfr	9704

Parameter	*Result*	*MDL*	*PQL*	*Units*
bis-(2-Chloroethyl)sulfide	87.4			%

AM100 Non-Vols in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/18/2003 09:36	8503	AM100 Non-Vols in HD by GC	1	6/24/2003 0:00	ssh	8702

Parameter	*Result*	*MDL*	*PQL*	*Units*
Thiodiglycol (TDG)	ND	210	250	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
Thiodiglycol-d8 (TDG-d8)	999	1080 ug/g	108	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/11/2003 14:19	8306	AM101 Vols in Liquid HD by GC	1	6/13/2003 22:21	ssh	8502

Parameter	*Result*	*MDL*	*PQL*	*Units*
1,2-Dichloroethane	6200	264	508	ug/g
Tetrachloroethylene	ND	102	508	ug/g
1,1,2,2-Tetrachloroethane	ND	152	508	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Difluorobenzene	11300	11900 ug/g	105	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/18/2003 09:19	8612	AM118 Metals in Liq HD by ICP	1	6/19/2003 17:31	blb	8616

Parameter	*Result*	*MDL*	*PQL*	*Units*
Antimony	ND	0.667	5.30	ug/g
Arsenic	ND	1.29	5.30	ug/g
Barium	ND	0.456	5.30	ug/g
Cadmium	ND	0.434	5.30	ug/g
Cobalt	ND	0.286	1.06	ug/g
Copper	25.3	2.57	5.30	ug/g
Lead	ND	0.434	5.30	ug/g
Manganese	1.57	0.339	1.06	ug/g
Mercury	ND	0.0530	0.530	ug/g
Nickel	ND	0.371	5.30	ug/g
Selenium	ND	1.24	10.6	ug/g
Silver	ND	0.498	5.30	ug/g
Thallium	ND	1.04	5.30	ug/g
Tin	ND	2.64	10.6	ug/g
Vanadium	ND	1.06	5.30	ug/g
Zinc	ND	3.31	10.6	ug/g

Report of Analysis

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/18/2003 09:19	8612	AM118 Metals in Liq HD by ICP	1	6/23/2003 15:36	blb	9201

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	10.6	53.0	ug/g
Beryllium	ND	0.953	5.30	ug/g
Boron	ND	3.96	10.6	ug/g
Chromium	ND	1.37	5.30	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/11/2003 16:13	8402	AM117 Semi-Vols Liq HD by GC	1	6/19/2003 0:00	tfr	8613

Parameter	*Result*	*MDL*	*PQL*	*Units*
Hexachloroethane	ND	79.9	250	ug/g
Q	27200	50.9	2500	ug/g
T	2000 J	69.9	2500	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Dithiane-d4	999	929 ug/g	93	50 - 150

AM126 Lewisite in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/18/2003 09:34	8614	AM126 Lewisite in HD by GC	1	6/23/2003 22:17	tfr	8618

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lewisite	ND	1.97	5.04	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
03-0004-068-05	21-03-319	5/28/2003 14:00	6/10/2003 13:59	9/18/2003 09:09	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
8/14/2003 11:43	9701	AM098 HD Purity by GC	1	8/14/2003 17:37	tfr	9704

Parameter	*Result*	*MDL*	*PQL*	*Units*
bis-(2-Chloroethyl)sulfide	87.3			%

AM100 Non-Vols in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/18/2003 09:36	8503	AM100 Non-Vols in HD by GC	1	6/24/2003 0:00	ssh	8702

Parameter	*Result*	*MDL*	*PQL*	*Units*
Thiodiglycol (TDG)	ND	211	252	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
Thiodiglycol-d8 (TDG-d8)	1010	983 ug/g	97.6	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/11/2003 14:19	8306	AM101 Vols in Liquid HD by GC	1	6/13/2003 22:58	ssh	8502

Parameter	*Result*	*MDL*	*PQL*	*Units*
1,2-Dichloroethane	6380	261	502	ug/g
Tetrachloroethylene	ND	100	502	ug/g
1,1,2,2-Tetrachloroethane	ND	151	502	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Difluorobenzene	11200	12000 ug/g	107	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/18/2003 09:19	8612	AM118 Metals in Liq HD by ICP	1	6/19/2003 17:35	blb	8616

Parameter	*Result*	*MDL*	*PQL*	*Units*
Antimony	ND	0.664	5.27	ug/g
Arsenic	ND	1.29	5.27	ug/g
Barium	ND	0.453	5.27	ug/g
Cadmium	ND	0.432	5.27	ug/g
Cobalt	ND	0.285	1.05	ug/g
Copper	17.5	2.56	5.27	ug/g
Lead	2.69 J	0.432	5.27	ug/g
Manganese	1.26	0.337	1.05	ug/g
Mercury	0.0917 J	0.0527	0.527	ug/g
Nickel	ND	0.369	5.27	ug/g
Selenium	ND	1.23	10.5	ug/g
Silver	ND	0.495	5.27	ug/g
Thallium	ND	1.03	5.27	ug/g
Tin	ND	2.62	10.5	ug/g
Vanadium	ND	1.05	5.27	ug/g
Zinc	ND	3.29	10.5	ug/g

Report of Analysis

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/18/2003 09:19	8612	AM118 Metals in Liq HD by ICP	1	6/23/2003 15:40	blb	9201

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	13.8 J	10.5	52.7	ug/g
Beryllium	ND	0.948	5.27	ug/g
Boron	ND	3.94	10.5	ug/g
Chromium	ND	1.36	5.27	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/11/2003 16:13	8402	AM117 Semi-Vols Liq HD by GC	1	6/19/2003 0:00	tfr	8613

Parameter	*Result*	*MDL*	*PQL*	*Units*
Hexachloroethane	ND	82.6	258	ug/g
Q	31600	52.7	2580	ug/g
T	1860 J	72.3	2580	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Dithiane-d4	1030	1050 ug/g	102	50 - 150

AM126 Lewisite in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/18/2003 09:34	8614	AM126 Lewisite in HD by GC	1	6/23/2003 22:52	tfr	8618

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lewisite	ND	1.96	5.04	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
03-0004-068-06	21-03-322	5/28/2003 14:00	6/10/2003 13:59	9/18/2003 09:09	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
8/14/2003 11:43	9701	AM098 HD Purity by GC	1	8/14/2003 17:56	tfr	9704

Parameter	Result	MDL	PQL	Units
bis-(2-Chloroethyl)sulfide	88.7			%

AM100 Non-Vols in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
6/18/2003 09:36	8503	AM100 Non-Vols in HD by GC	1	6/24/2003 0:00	ssh	8702

Parameter	Result	MDL	PQL	Units
Thiodiglycol (TDG)	ND	203	241	ug/g

Surrogates	Expected	Result	Recovery	Limits
Thiodiglycol-d8 (TDG-d8)	965	998 ug/g	103	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
6/11/2003 14:19	8306	AM101 Vols in Liquid HD by GC	1	6/13/2003 23:35	ssh	8502

Parameter	Result	MDL	PQL	Units
1,2-Dichloroethane	6880	264	509	ug/g
Tetrachloroethylene	ND	102	509	ug/g
1,1,2,2-Tetrachloroethane	ND	153	509	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Difluorobenzene	11400	13400 ug/g	118	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
6/18/2003 09:19	8612	AM118 Metals in Liq HD by ICP	1	6/19/2003 17:40	blb	8616

Parameter	Result	MDL	PQL	Units
Antimony	ND	0.665	5.27	ug/g
Arsenic	ND	1.29	5.27	ug/g
Barium	ND	0.454	5.27	ug/g
Cadmium	ND	0.432	5.27	ug/g
Cobalt	ND	0.285	1.05	ug/g
Copper	23.9	2.56	5.27	ug/g
Lead	ND	0.432	5.27	ug/g
Manganese	1.60	0.338	1.05	ug/g
Mercury	ND	0.0527	0.527	ug/g
Nickel	ND	0.369	5.27	ug/g
Selenium	ND	1.23	10.5	ug/g
Silver	ND	0.496	5.27	ug/g
Thallium	ND	1.03	5.27	ug/g
Tin	ND	2.63	10.5	ug/g
Vanadium	ND	1.05	5.27	ug/g
Zinc	ND	3.29	10.5	ug/g

Report of Analysis

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/18/2003 09:19	8612	AM118 Metals in Liq HD by ICP	1	6/23/2003 15:45	blb	9201

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	10.5	52.7	ug/g
Beryllium	ND	0.949	5.27	ug/g
Boron	ND	3.95	10.5	ug/g
Chromium	1.72 J	1.36	5.27	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/11/2003 16:13	8402	AM117 Semi-Vols Liq HD by GC	1	6/19/2003 0:00	tfr	8613

Parameter	*Result*	*MDL*	*PQL*	*Units*
Hexachloroethane	ND	81.8	256	ug/g
Q	25900	52.1	2560	ug/g
T	1840 J	71.6	2560	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Dithiane-d4	1020	971 ug/g	95	50 - 150

AM126 Lewisite in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/18/2003 09:34	8614	AM126 Lewisite in HD by GC	1	6/23/2003 23:27	tfr	8618

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lewisite	ND	1.91	4.90	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
03-0004-068-07	21-03-325	5/29/2003 14:00	6/10/2003 13:59	9/18/2003 09:09	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
8/14/2003 11:43	9701	AM098 HD Purity by GC	1	8/14/2003 18:15	tfr	9704

Parameter	Result	MDL	PQL	Units
bis-(2-Chloroethyl)sulfide	91.0			%

AM100 Non-Vols in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
6/18/2003 09:36	8503	AM100 Non-Vols in HD by GC	1	6/24/2003 0:00	ssh	8702

Parameter	Result	MDL	PQL	Units
Thiodiglycol (TDG)	ND	212	252	ug/g

Surrogates	Expected	Result	Recovery	Limits
Thiodiglycol-d8 (TDG-d8)	1010	961 ug/g	95.3	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
6/11/2003 14:19	8306	AM101 Vols in Liquid HD by GC	1	6/14/2003 0:12	ssh	8502

Parameter	Result	MDL	PQL	Units
1,2-Dichloroethane	10400	267	514	ug/g
Tetrachloroethylene	ND	103	514	ug/g
1,1,2,2-Tetrachloroethane	ND	154	514	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Difluorobenzene	11500	12500 ug/g	109	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
6/18/2003 09:19	8612	AM118 Metals in Liq HD by ICP	1	6/19/2003 17:44	blb	8616

Parameter	Result	MDL	PQL	Units
Antimony	ND	0.638	5.07	ug/g
Arsenic	54.7	1.24	5.07	ug/g
Barium	ND	0.436	5.07	ug/g
Cadmium	ND	0.415	5.07	ug/g
Cobalt	ND	0.274	1.01	ug/g
Copper	23.7	2.46	5.07	ug/g
Lead	ND	0.415	5.07	ug/g
Manganese	1.10	0.324	1.01	ug/g
Mercury	6.96	0.0507	0.507	ug/g
Nickel	1.94 J	0.355	5.07	ug/g
Selenium	ND	1.19	10.1	ug/g
Silver	ND	0.476	5.07	ug/g
Thallium	ND	0.993	5.07	ug/g
Tin	ND	2.52	10.1	ug/g
Vanadium	ND	1.01	5.07	ug/g
Zinc	ND	3.16	10.1	ug/g

Report of Analysis

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/18/2003 09:19	8612	AM118 Metals in Liq HD by ICP	1	6/23/2003 15:49	blb	9201

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	11.6 J	10.1	50.7	ug/g
Beryllium	ND	0.912	5.07	ug/g
Boron	ND	3.79	10.1	ug/g
Chromium	2.09 J	1.31	5.07	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/11/2003 16:13	8402	AM117 Semi-Vols Liq HD by GC	1	6/19/2003 0:00	tfr	8613

Parameter	*Result*	*MDL*	*PQL*	*Units*
Hexachloroethane	ND	82.5	258	ug/g
Q	31200	52.6	2580	ug/g
T	2270 J	72.2	2580	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Dithiane-d4	1030	942 ug/g	91.4	50 - 150

AM126 Lewisite in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/18/2003 09:34	8614	AM126 Lewisite in HD by GC	1	6/24/2003 0:03	tfr	8618

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lewisite	21.8	1.99	5.09	ug/g

Comments: Sample diluted an additional 10 fold for mercury.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
03-0004-068-08	21-03-329	5/29/2003 14:00	6/10/2003 13:59	9/18/2003 09:09	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
8/14/2003 11:43	9701	AM098 HD Purity by GC	1	8/14/2003 18:34	tfr	9704

Parameter	*Result*	*MDL*	*PQL*	*Units*
bis-(2-Chloroethyl)sulfide	85.3			%

AM100 Non-Vols in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/18/2003 09:36	8503	AM100 Non-Vols in HD by GC	1	6/24/2003 0:00	ssh	8702

Parameter	*Result*	*MDL*	*PQL*	*Units*
Thiodiglycol (TDG)	ND	217	259	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
Thiodiglycol-d8 (TDG-d8)	1040	1080 ug/g	104	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/11/2003 14:19	8306	AM101 Vols in Liquid HD by GC	1	6/14/2003 0:49	ssh	8502

Parameter	*Result*	*MDL*	*PQL*	*Units*
1,2-Dichloroethane	6570	266	512	ug/g
Tetrachloroethylene	ND	102	512	ug/g
1,1,2,2-Tetrachloroethane	ND	154	512	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Difluorobenzene	11400	12100 ug/g	105	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/18/2003 09:19	8612	AM118 Metals in Liq HD by ICP	1	6/19/2003 18:05	blb	8616

Parameter	*Result*	*MDL*	*PQL*	*Units*
Antimony	ND	0.642	5.09	ug/g
Arsenic	22.4	1.24	5.09	ug/g
Barium	ND	0.438	5.09	ug/g
Cadmium	ND	0.418	5.09	ug/g
Cobalt	ND	0.275	1.02	ug/g
Copper	27.8	2.47	5.09	ug/g
Lead	ND	0.418	5.09	ug/g
Manganese	ND	0.326	1.02	ug/g
Mercury	55.8	0.0509	0.509	ug/g
Nickel	ND	0.356	5.09	ug/g
Selenium	ND	1.19	10.2	ug/g
Silver	ND	0.479	5.09	ug/g
Thallium	ND	0.998	5.09	ug/g
Tin	ND	2.54	10.2	ug/g
Vanadium	ND	1.02	5.09	ug/g
Zinc	ND	3.18	10.2	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/18/2003 09:19	8612	AM118 Metals in Liq HD by ICP	1	6/23/2003 15:53	blb	9201

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	10.2	50.9	ug/g
Beryllium	ND	0.916	5.09	ug/g
Boron	ND	3.81	10.2	ug/g
Chromium	1.69 J	1.31	5.09	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/11/2003 16:13	8402	AM117 Semi-Vols Liq HD by GC	1	6/19/2003 0:00	tfr	8613

Parameter	*Result*	*MDL*	*PQL*	*Units*
Hexachloroethane	ND	80.6	252	ug/g
Q	26900	51.4	2520	ug/g
T	1970 J	70.6	2520	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Dithiane-d4	1010	967 ug/g	95.9	50 - 150

AM126 Lewisite in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/18/2003 09:34	8614	AM126 Lewisite in HD by GC	1	6/24/2003 0:38	tfr	8618

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lewisite	16.0	1.98	5.07	ug/g

Comments: Sample diluted an additional 20 fold for mercury.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
03-0004-068-09	21-03-333	5/29/2003 14:00	6/10/2003 13:59	9/18/2003 09:09	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
8/14/2003 11:43	9701	AM098 HD Purity by GC	1	8/14/2003 18:53	tfr	9704

Parameter	Result	MDL	PQL	Units
bis-(2-Chloroethyl)sulfide	87.7			%

AM100 Non-Vols in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
6/18/2003 09:36	8503	AM100 Non-Vols in HD by GC	1	6/24/2003 0:00	ssh	8702

Parameter	Result	MDL	PQL	Units
Thiodiglycol (TDG)	ND	215	256	ug/g

Surrogates	Expected	Result	Recovery	Limits
Thiodiglycol-d8 (TDG-d8)	1020	997 ug/g	97.4	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
6/11/2003 14:19	8306	AM101 Vols in Liquid HD by GC	1	6/14/2003 0:00	ssh	8502

Parameter	Result	MDL	PQL	Units
1,2-Dichloroethane	5230	266	512	ug/g
Tetrachloroethylene	ND	102	512	ug/g
1,1,2,2-Tetrachloroethane	ND	154	512	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Difluorobenzene	11400	12500 ug/g	109	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
6/18/2003 09:19	8612	AM118 Metals in Liq HD by ICP	1	6/19/2003 17:48	blb	8616

Parameter	Result	MDL	PQL	Units
Antimony	ND	0.682	5.41	ug/g
Arsenic	1.35 J	1.32	5.41	ug/g
Barium	ND	0.465	5.41	ug/g
Cadmium	ND	0.444	5.41	ug/g
Cobalt	ND	0.292	1.08	ug/g
Copper	19.0	2.63	5.41	ug/g
Lead	ND	0.444	5.41	ug/g
Manganese	1.24	0.346	1.08	ug/g
Mercury	3.02	0.0541	0.541	ug/g
Nickel	ND	0.379	5.41	ug/g
Selenium	ND	1.27	10.8	ug/g
Silver	ND	0.509	5.41	ug/g
Thallium	ND	1.06	5.41	ug/g
Tin	ND	2.69	10.8	ug/g
Vanadium	ND	1.08	5.41	ug/g
Zinc	ND	3.38	10.8	ug/g

Report of Analysis

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/18/2003 09:19	8612	AM118 Metals in Liq HD by ICP	1	6/23/2003 15:57	blb	9201

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	10.8	54.1	ug/g
Beryllium	ND	0.974	5.41	ug/g
Boron	ND	4.05	10.8	ug/g
Chromium	1.89 J	1.40	5.41	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/11/2003 16:13	8402	AM117 Semi-Vols Liq HD by GC	1	6/19/2003 0:00	tfr	8613

Parameter	*Result*	*MDL*	*PQL*	*Units*
Hexachloroethane	ND	81.5	255	ug/g
Q	25500	52.0	2550	ug/g
T	1900 J	71.4	2550	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Dithiane-d4	1020	969 ug/g	95.1	50 - 150

AM126 Lewisite in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/18/2003 09:34	8614	AM126 Lewisite in HD by GC	1	6/24/2003 1:13	tfr	8618

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lewisite	ND	1.91	4.89	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
03-0004-068-10	21-03-337	5/30/2003 14:00	6/10/2003 13:59	9/18/2003 09:09	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
8/14/2003 11:43	9701	AM098 HD Purity by GC	1	8/14/2003 19:13	tfr	9704

Parameter	*Result*	*MDL*	*PQL*	*Units*
bis-(2-Chloroethyl)sulfide	88.4			%

AM100 Non-Vols in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/18/2003 09:36	8503	AM100 Non-Vols in HD by GC	1	6/24/2003 0:00	ssh	8702

Parameter	*Result*	*MDL*	*PQL*	*Units*
Thiodiglycol (TDG)	ND	213	254	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
Thiodiglycol-d8 (TDG-d8)	1020	1110 ug/g	110	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/11/2003 14:19	8306	AM101 Vols in Liquid HD by GC	1	6/14/2003 0:00	ssh	8502

Parameter	*Result*	*MDL*	*PQL*	*Units*
1,2-Dichloroethane	9930	267	514	ug/g
Tetrachloroethylene	ND	103	514	ug/g
1,1,2,2-Tetrachloroethane	ND	154	514	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Difluorobenzene	11500	12500 ug/g	109	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/18/2003 09:19	8612	AM118 Metals in Liq HD by ICP	1	6/19/2003 18:09	blb	8616

Parameter	*Result*	*MDL*	*PQL*	*Units*
Antimony	ND	0.665	5.27	ug/g
Arsenic	ND	1.29	5.27	ug/g
Barium	ND	0.454	5.27	ug/g
Cadmium	ND	0.432	5.27	ug/g
Cobalt	ND	0.285	1.05	ug/g
Copper	35.1	2.56	5.27	ug/g
Lead	ND	0.432	5.27	ug/g
Manganese	1.27	0.338	1.05	ug/g
Mercury	0.176 J	0.0527	0.527	ug/g
Nickel	ND	0.369	5.27	ug/g
Selenium	ND	1.23	10.5	ug/g
Silver	ND	0.496	5.27	ug/g
Thallium	ND	1.03	5.27	ug/g
Tin	ND	2.63	10.5	ug/g
Vanadium	ND	1.05	5.27	ug/g
Zinc	ND	3.29	10.5	ug/g

Report of Analysis

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/18/2003 09:19	8612	AM118 Metals in Liq HD by ICP	1	6/23/2003 16:01	blb	9201

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	10.5	52.7	ug/g
Beryllium	ND	0.949	5.27	ug/g
Boron	ND	3.95	10.5	ug/g
Chromium	1.41 J	1.36	5.27	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/11/2003 16:13	8402	AM117 Semi-Vols Liq HD by GC	1	6/19/2003 0:00	tfr	8613

Parameter	*Result*	*MDL*	*PQL*	*Units*
Hexachloroethane	ND	83.0	259	ug/g
Q	25600	52.9	2590	ug/g
T	2260 J	72.6	2590	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Dithiane-d4	1040	987 ug/g	95.1	50 - 150

AM126 Lewisite in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/18/2003 09:34	8614	AM126 Lewisite in HD by GC	1	6/24/2003 1:48	tfr	8618

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lewisite	ND	1.97	5.04	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
03-0004-068-11	21-03-341	5/31/2003 14:00	6/10/2003 13:59	9/18/2003 09:09	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
8/14/2003 11:43	9701	AM098 HD Purity by GC	1	8/14/2003 20:10	tfr	9704

Parameter	*Result*	*MDL*	*PQL*	*Units*
bis-(2-Chloroethyl)sulfide	88.9			%

AM100 Non-Vols in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/18/2003 09:36	8503	AM100 Non-Vols in HD by GC	1	6/24/2003 11:06	ssh	8702

Parameter	*Result*	*MDL*	*PQL*	*Units*
Thiodiglycol (TDG)	ND	214	255	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
Thiodiglycol-d8 (TDG-d8)	1020	987 ug/g	96.9	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/11/2003 14:19	8306	AM101 Vols in Liquid HD by GC	1	6/16/2003 15:45	ssh	8502

Parameter	*Result*	*MDL*	*PQL*	*Units*
1,2-Dichloroethane	10600	266	511	ug/g
Tetrachloroethylene	ND	102	511	ug/g
1,1,2,2-Tetrachloroethane	ND	153	511	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Difluorobenzene	11400	12000 ug/g	105	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/18/2003 09:19	8612	AM118 Metals in Liq HD by ICP	1	6/19/2003 18:17	blb	8616

Parameter	*Result*	*MDL*	*PQL*	*Units*
Antimony	ND	0.662	5.25	ug/g
Arsenic	38.5	1.28	5.25	ug/g
Barium	ND	0.452	5.25	ug/g
Cadmium	ND	0.431	5.25	ug/g
Cobalt	ND	0.284	1.05	ug/g
Copper	20.2	2.55	5.25	ug/g
Lead	ND	0.431	5.25	ug/g
Manganese	ND	0.336	1.05	ug/g
Mercury	4.06	0.0525	0.525	ug/g
Nickel	ND	0.368	5.25	ug/g
Selenium	ND	1.23	10.5	ug/g
Silver	ND	0.494	5.25	ug/g
Thallium	ND	1.03	5.25	ug/g
Tin	ND	2.62	10.5	ug/g
Vanadium	ND	1.05	5.25	ug/g
Zinc	ND	3.28	10.5	ug/g

Report of Analysis

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/18/2003 09:19	8612	AM118 Metals in Liq HD by ICP	1	6/23/2003 16:14	blb	9201

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	10.5	52.5	ug/g
Beryllium	ND	0.945	5.25	ug/g
Boron	ND	3.93	10.5	ug/g
Chromium	ND	1.36	5.25	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/11/2003 16:13	8402	AM117 Semi-Vols Liq HD by GC	1	6/19/2003 12:43	tfr	8613

Parameter	*Result*	*MDL*	*PQL*	*Units*
Hexachloroethane	ND	85.9	269	ug/g
Q	33800	54.8	2690	ug/g
T	2590 J	75.2	2690	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Dithiane-d4	1070	1020 ug/g	95.1	50 - 150

AM126 Lewisite in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/18/2003 09:34	8614	AM126 Lewisite in HD by GC	1	6/24/2003 4:07	tfr	8618

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lewisite	14.7	2.02	5.19	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
03-0004-068-12	21-03-345	5/31/2003 14:00	6/10/2003 13:59	9/18/2003 09:09	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
8/14/2003 11:43	9701	AM098 HD Purity by GC	1	8/14/2003 20:29	tfr	9704

Parameter	Result	MDL	PQL	Units
bis-(2-Chloroethyl)sulfide	93.1			%

AM100 Non-Vols in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
6/18/2003 09:36	8503	AM100 Non-Vols in HD by GC	1	6/24/2003 11:50	ssh	8702

Parameter	Result	MDL	PQL	Units
Thiodiglycol (TDG)	ND	206	245	ug/g

Surrogates	Expected	Result	Recovery	Limits
Thiodiglycol-d8 (TDG-d8)	980	1100 ug/g	112	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
6/11/2003 14:19	8306	AM101 Vols in Liquid HD by GC	1	6/16/2003 16:20	ssh	8502

Parameter	Result	MDL	PQL	Units
1,2-Dichloroethane	6840	264	508	ug/g
Tetrachloroethylene	ND	102	508	ug/g
1,1,2,2-Tetrachloroethane	ND	152	508	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Difluorobenzene	11400	12000 ug/g	106	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
6/18/2003 09:19	8612	AM118 Metals in Liq HD by ICP	1	6/19/2003 18:13	blb	8616

Parameter	Result	MDL	PQL	Units
Antimony	ND	0.652	5.18	ug/g
Arsenic	ND	1.26	5.18	ug/g
Barium	ND	0.445	5.18	ug/g
Cadmium	ND	0.424	5.18	ug/g
Cobalt	ND	0.280	1.04	ug/g
Copper	51.3	2.52	5.18	ug/g
Lead	ND	0.424	5.18	ug/g
Manganese	0.369 J	0.331	1.04	ug/g
Mercury	0.0780 J	0.0518	0.518	ug/g
Nickel	0.932 J	0.362	5.18	ug/g
Selenium	ND	1.21	10.4	ug/g
Silver	ND	0.487	5.18	ug/g
Thallium	ND	1.01	5.18	ug/g
Tin	ND	2.58	10.4	ug/g
Vanadium	1.09 J	1.04	5.18	ug/g
Zinc	ND	3.23	10.4	ug/g

Report of Analysis

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/18/2003 09:19	8612	AM118 Metals in Liq HD by ICP	1	6/23/2003 16:18	blb	9201

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	10.4	51.8	ug/g
Beryllium	ND	0.932	5.18	ug/g
Boron	ND	3.87	10.4	ug/g
Chromium	2.72 J	1.34	5.18	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/11/2003 16:13	8402	AM117 Semi-Vols Liq HD by GC	1	6/19/2003 13:22	tfr	8613

Parameter	*Result*	*MDL*	*PQL*	*Units*
Hexachloroethane	ND	83.9	262	ug/g
Q	35700	53.5	2620	ug/g
T	1330 J	73.5	2620	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Dithiane-d4	1050	965 ug/g	92	50 - 150

AM126 Lewisite in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/18/2003 09:34	8614	AM126 Lewisite in HD by GC	1	6/24/2003 4:42	tfr	8618

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lewisite	ND	1.96	5.04	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
03-0004-069-01	21-03-309	5/27/2003 14:49	6/10/2003 14:45	9/18/2003 09:09	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/12/2003 08:23	8601	AM118 Metals in NCS HD by ICP	1	6/16/2003 15:19	blb	8604

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	10.7	53.7	ug/g
Antimony	ND	0.140	5.37	ug/g
Arsenic	238	0.612	5.37	ug/g
Barium	0.150 J	0.0430	5.37	ug/g
Beryllium	ND	0.0537	5.37	ug/g
Boron	ND	4.30	10.7	ug/g
Cadmium	0.216 J	0.0215	5.37	ug/g
Chromium	25.5	1.07	5.37	ug/g
Cobalt	0.710 J	0.129	1.07	ug/g
Copper	45.8	3.47	10.7	ug/g
Lead	17.2	2.03	10.7	ug/g
Manganese	14.3	3.54	10.7	ug/g
Mercury	9.29	0.0752	0.537	ug/g
Nickel	16.8	0.666	5.37	ug/g
Selenium	ND	0.763	26.9	ug/g
Silver	ND	0.0644	5.37	ug/g
Thallium	ND	0.354	5.37	ug/g
Tin	0.733 J	0.473	10.7	ug/g
Vanadium	ND	1.07	5.37	ug/g
Zinc	14.2	2.36	10.7	ug/g

Comments: Sample diluted an additional 4 fold for mercury.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
03-0004-069-02	21-03-310	5/27/2003 14:49	6/10/2003 14:45	9/18/2003 09:09	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/12/2003 08:23	8601	AM118 Metals in NCS HD by ICP	1	6/16/2003 15:24	blb	8604

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	11.1	55.7	ug/g
Antimony	0.256 J	0.145	5.57	ug/g
Arsenic	352	0.635	5.57	ug/g
Barium	0.118 J	0.0446	5.57	ug/g
Beryllium	ND	0.0557	5.57	ug/g
Boron	ND	4.46	11.1	ug/g
Cadmium	0.247 J	0.0223	5.57	ug/g
Chromium	37.4	1.11	5.57	ug/g
Cobalt	1.10 J	0.134	1.11	ug/g
Copper	127	3.60	11.1	ug/g
Lead	83.7	2.11	11.1	ug/g
Manganese	21.3	3.68	11.1	ug/g
Mercury	14.6	0.0780	0.557	ug/g
Nickel	24.0	0.691	5.57	ug/g
Selenium	ND	0.792	27.9	ug/g
Silver	ND	0.0669	5.57	ug/g
Thallium	ND	0.368	5.57	ug/g
Tin	1.26 J	0.491	11.1	ug/g
Vanadium	ND	1.11	5.57	ug/g
Zinc	61.3	2.45	11.1	ug/g

Comments: Sample diluted an additional 5 fold for mercury.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
03-0004-069-03	21-03-314	5/27/2003 14:49	6/10/2003 14:45	9/18/2003 09:09	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/12/2003 08:23	8601	AM118 Metals in NCS HD by ICP	1	6/16/2003 13:44	blb	8604

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	10.1	50.4	ug/g
Antimony	ND	0.131	5.04	ug/g
Arsenic	4.06 J	0.575	5.04	ug/g
Barium	0.0528 J	0.0403	5.04	ug/g
Beryllium	ND	0.0504	5.04	ug/g
Boron	ND	4.03	10.1	ug/g
Cadmium	0.214 J	0.0202	5.04	ug/g
Chromium	11.1	1.01	5.04	ug/g
Cobalt	2.20	0.121	1.01	ug/g
Copper	27.2	3.26	10.1	ug/g
Lead	6.11 J	1.91	10.1	ug/g
Manganese	118	3.33	10.1	ug/g
Mercury	1.65	0.0706	0.504	ug/g
Nickel	11.4	0.625	5.04	ug/g
Selenium	ND	0.716	25.2	ug/g
Silver	ND	0.0605	5.04	ug/g
Thallium	ND	0.333	5.04	ug/g
Tin	2.01 J	0.444	10.1	ug/g
Vanadium	1.06 J	1.01	5.04	ug/g
Zinc	37.4	2.22	10.1	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
03-0004-069-04	21-03-317	5/27/2003 14:49	6/10/2003 14:45	9/18/2003 09:09	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/12/2003 08:23	8601	AM118 Metals in NCS HD by ICP	1	6/16/2003 15:04	blb	8604

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	19.0 J	9.57	47.8	ug/g
Antimony	4.24 J	0.124	4.78	ug/g
Arsenic	10.6	0.545	4.78	ug/g
Barium	5.81	0.0383	4.78	ug/g
Beryllium	ND	0.0478	4.78	ug/g
Boron	ND	3.83	9.57	ug/g
Cadmium	0.203 J	0.0191	4.78	ug/g
Chromium	184	0.957	4.78	ug/g
Cobalt	10.2	0.115	0.957	ug/g
Copper	43.4	3.09	9.57	ug/g
Lead	72.2	1.81	9.57	ug/g
Manganese	735	3.16	9.57	ug/g
Mercury	0.144 J	0.0670	0.478	ug/g
Nickel	591	0.593	4.78	ug/g
Selenium	ND	0.679	23.9	ug/g
Silver	ND	0.0574	4.78	ug/g
Thallium	ND	0.316	4.78	ug/g
Tin	16.8	0.421	9.57	ug/g
Vanadium	ND	0.957	4.78	ug/g
Zinc	48.7	2.11	9.57	ug/g

Comments: Sample diluted an additional 4 fold for manganese.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
03-0004-069-05	21-03-320	5/28/2003 14:49	6/10/2003 14:45	9/18/2003 09:09	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/12/2003 08:23	8601	AM118 Metals in NCS HD by ICP	1	6/16/2003 14:34	blb	8604

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	10.1	50.5	ug/g
Antimony	ND	0.131	5.05	ug/g
Arsenic	1.71 J	0.575	5.05	ug/g
Barium	0.182 J	0.0404	5.05	ug/g
Beryllium	ND	0.0505	5.05	ug/g
Boron	ND	4.04	10.1	ug/g
Cadmium	0.196 J	0.0202	5.05	ug/g
Chromium	9.26	1.01	5.05	ug/g
Cobalt	0.161 J	0.121	1.01	ug/g
Copper	19.9	3.26	10.1	ug/g
Lead	19.0	1.91	10.1	ug/g
Manganese	14.6	3.33	10.1	ug/g
Mercury	0.0900 J	0.0706	0.505	ug/g
Nickel	16.1	0.626	5.05	ug/g
Selenium	ND	0.716	25.2	ug/g
Silver	ND	0.0605	5.05	ug/g
Thallium	ND	0.333	5.05	ug/g
Tin	ND	0.444	10.1	ug/g
Vanadium	ND	1.01	5.05	ug/g
Zinc	7.64 J	2.22	10.1	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
03-0004-069-06	21-03-323	5/28/2003 14:49	6/10/2003 14:45	9/18/2003 09:09	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/12/2003 08:23	8601	AM118 Metals in NCS HD by ICP	1	6/16/2003 15:10	blb	8604

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	10.7 J	9.92	49.6	ug/g
Antimony	1.31 J	0.129	4.96	ug/g
Arsenic	8.57	0.565	4.96	ug/g
Barium	0.313 J	0.0397	4.96	ug/g
Beryllium	ND	0.0496	4.96	ug/g
Boron	ND	3.97	9.92	ug/g
Cadmium	0.239 J	0.0198	4.96	ug/g
Chromium	44.5	0.992	4.96	ug/g
Cobalt	6.76	0.119	0.992	ug/g
Copper	35.3	3.20	9.92	ug/g
Lead	19.5	1.88	9.92	ug/g
Manganese	362	3.27	9.92	ug/g
Mercury	0.217 J	0.0694	0.496	ug/g
Nickel	70.7	0.615	4.96	ug/g
Selenium	ND	0.704	24.8	ug/g
Silver	ND	0.0595	4.96	ug/g
Thallium	ND	0.327	4.96	ug/g
Tin	8.80 J	0.437	9.92	ug/g
Vanadium	ND	0.992	4.96	ug/g
Zinc	92.0	2.18	9.92	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
03-0004-069-07	21-03-326	5/29/2003 14:49	6/10/2003 14:45	9/18/2003 09:09	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/12/2003 08:23	8601	AM118 Metals in NCS HD by ICP	1	6/16/2003 16:27	blb	8604

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	9.82	49.1	ug/g
Antimony	0.435 J	0.128	4.91	ug/g
Arsenic	1860	0.560	4.91	ug/g
Barium	0.125 J	0.0393	4.91	ug/g
Beryllium	ND	0.0491	4.91	ug/g
Boron	ND	3.93	9.82	ug/g
Cadmium	0.177 J	0.0196	4.91	ug/g
Chromium	13.8	0.982	4.91	ug/g
Cobalt	1.44	0.118	0.982	ug/g
Copper	28.3	3.17	9.82	ug/g
Lead	3.73 J	1.86	9.82	ug/g
Manganese	112	3.24	9.82	ug/g
Mercury	621	0.0688	0.491	ug/g
Nickel	12.7	0.609	4.91	ug/g
Selenium	ND	0.697	24.6	ug/g
Silver	ND	0.0589	4.91	ug/g
Thallium	ND	0.324	4.91	ug/g
Tin	1.64 J	0.432	9.82	ug/g
Vanadium	ND	0.982	4.91	ug/g
Zinc	20.7	2.16	9.82	ug/g

Comments: Sample diluted an additional 10 fold for arsenic.
Sample diluted an additional 200 fold for mercury.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
03-0004-069-08	21-03-330	5/29/2003 14:49	6/10/2003 14:45	9/18/2003 09:09	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/12/2003 08:23	8601	AM118 Metals in NCS HD by ICP	1	6/16/2003 16:31	blb	8604

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	10.2 J	9.51	47.6	ug/g
Antimony	ND	0.124	4.76	ug/g
Arsenic	62.0	0.542	4.76	ug/g
Barium	0.351 J	0.0381	4.76	ug/g
Beryllium	ND	0.0476	4.76	ug/g
Boron	ND	3.81	9.51	ug/g
Cadmium	0.180 J	0.0190	4.76	ug/g
Chromium	5.37	0.951	4.76	ug/g
Cobalt	ND	0.114	0.951	ug/g
Copper	32.7	3.07	9.51	ug/g
Lead	ND	1.80	9.51	ug/g
Manganese	9.17 J	3.14	9.51	ug/g
Mercury	75.9	0.0666	0.476	ug/g
Nickel	48.4	0.590	4.76	ug/g
Selenium	ND	0.676	23.8	ug/g
Silver	ND	0.0571	4.76	ug/g
Thallium	ND	0.314	4.76	ug/g
Tin	ND	0.419	9.51	ug/g
Vanadium	ND	0.951	4.76	ug/g
Zinc	2.17 J	2.09	9.51	ug/g

Comments: Sample diluted an additional 40 fold for mercury.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
03-0004-069-09	21-03-334	5/29/2003 14:49	6/10/2003 14:45	9/18/2003 09:09	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/12/2003 08:23	8601	AM118 Metals in NCS HD by ICP	1	6/16/2003 16:36	blb	8604

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	14.0 J	10.4	51.8	ug/g
Antimony	1.16 J	0.135	5.18	ug/g
Arsenic	111	0.590	5.18	ug/g
Barium	0.133 J	0.0414	5.18	ug/g
Beryllium	ND	0.0518	5.18	ug/g
Boron	ND	4.14	10.4	ug/g
Cadmium	0.315 J	0.0207	5.18	ug/g
Chromium	40.1	1.04	5.18	ug/g
Cobalt	12.7	0.124	1.04	ug/g
Copper	26.7	3.34	10.4	ug/g
Lead	43.8	1.96	10.4	ug/g
Manganese	625	3.42	10.4	ug/g
Mercury	210	0.0725	0.518	ug/g
Nickel	188	0.642	5.18	ug/g
Selenium	ND	0.735	25.9	ug/g
Silver	ND	0.0621	5.18	ug/g
Thallium	ND	0.342	5.18	ug/g
Tin	11.9	0.455	10.4	ug/g
Vanadium	ND	1.04	5.18	ug/g
Zinc	122	2.28	10.4	ug/g

Comments: Sample diluted an additional 4 fold for manganese.
Sample diluted an additional 100 fold for mercury.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
03-0004-069-10	21-03-338	5/30/2003 14:49	6/10/2003 14:45	9/18/2003 09:09	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/12/2003 08:23	8601	AM118 Metals in NCS HD by ICP	1	6/16/2003 15:14	blb	8604

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	10.7	53.5	ug/g
Antimony	ND	0.139	5.35	ug/g
Arsenic	0.648 J	0.610	5.35	ug/g
Barium	0.305 J	0.0428	5.35	ug/g
Beryllium	ND	0.0535	5.35	ug/g
Boron	ND	4.28	10.7	ug/g
Cadmium	0.213 J	0.0214	5.35	ug/g
Chromium	147	1.07	5.35	ug/g
Cobalt	1.98	0.128	1.07	ug/g
Copper	57.4	3.46	10.7	ug/g
Lead	26.2	2.02	10.7	ug/g
Manganese	58.2	3.53	10.7	ug/g
Mercury	ND	0.0749	0.535	ug/g
Nickel	557	0.664	5.35	ug/g
Selenium	ND	0.760	26.8	ug/g
Silver	ND	0.0642	5.35	ug/g
Thallium	ND	0.353	5.35	ug/g
Tin	ND	0.471	10.7	ug/g
Vanadium	2.07 J	1.07	5.35	ug/g
Zinc	13.0	2.36	10.7	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
03-0004-069-11	21-03-342	5/31/2003 14:49	6/10/2003 14:45	9/18/2003 09:09	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
6/12/2003 08:23	8601	AM118 Metals in NCS HD by ICP	1	6/16/2003 16:22	blb	8604

Parameter	Result	MDL	PQL	Units
Aluminum	ND	10.1	50.4	ug/g
Antimony	0.512 J	0.131	5.04	ug/g
Arsenic	6350	0.575	5.04	ug/g
Barium	0.115 J	0.0403	5.04	ug/g
Beryllium	ND	0.0504	5.04	ug/g
Boron	ND	4.03	10.1	ug/g
Cadmium	0.211 J	0.0202	5.04	ug/g
Chromium	28.2	1.01	5.04	ug/g
Cobalt	4.00	0.121	1.01	ug/g
Copper	22.3	3.26	10.1	ug/g
Lead	15.6	1.91	10.1	ug/g
Manganese	311	3.33	10.1	ug/g
Mercury	1700	0.0706	0.504	ug/g
Nickel	60.5	0.625	5.04	ug/g
Selenium	ND	0.716	25.2	ug/g
Silver	ND	0.0605	5.04	ug/g
Thallium	ND	0.333	5.04	ug/g
Tin	2.21 J	0.444	10.1	ug/g
Vanadium	ND	1.01	5.04	ug/g
Zinc	112	2.22	10.1	ug/g

Comments: Sample diluted an additional 20 fold for arsenic.
Sample diluted an additional 1000 fold for mercury.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
03-0004-069-12	21-03-346	5/31/2003 14:49	6/10/2003 14:45	9/18/2003 09:09	Non-cohesive Solid

(Results reported as received basis)

AM118 Metals in NCS HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/12/2003 08:23	8601	AM118 Metals in NCS HD by ICP	1	6/16/2003 15:29	blb	8604

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	10.6	52.9	ug/g
Antimony	ND	0.137	5.29	ug/g
Arsenic	3.11 J	0.603	5.29	ug/g
Barium	ND	0.0423	5.29	ug/g
Beryllium	ND	0.0529	5.29	ug/g
Boron	ND	4.23	10.6	ug/g
Cadmium	0.218 J	0.0211	5.29	ug/g
Chromium	9.59	1.06	5.29	ug/g
Cobalt	1.46	0.127	1.06	ug/g
Copper	78.2	3.41	10.6	ug/g
Lead	6.57 J	2.00	10.6	ug/g
Manganese	72.0	3.49	10.6	ug/g
Mercury	0.0770 J	0.0740	0.529	ug/g
Nickel	11.4	0.655	5.29	ug/g
Selenium	ND	0.751	26.4	ug/g
Silver	ND	0.0634	5.29	ug/g
Thallium	ND	0.349	5.29	ug/g
Tin	1.04 J	0.465	10.6	ug/g
Vanadium	ND	1.06	5.29	ug/g
Zinc	40.3	2.33	10.6	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
03-0004-070-01	21-03-311	5/27/2003 15:18	6/10/2003 15:17	9/18/2003 09:09	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/17/2003 12:16	8602	AM118 Metals in Sld HD by ICP	1	6/18/2003 16:09	blb	8611

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	19.0 J	10.8	54.1	ug/g
Antimony	0.691 J	0.141	5.41	ug/g
Arsenic	528	0.617	5.41	ug/g
Barium	0.1000 J	0.0433	5.41	ug/g
Beryllium	ND	0.0541	5.41	ug/g
Boron	ND	4.33	10.8	ug/g
Cadmium	0.244 J	0.0216	5.41	ug/g
Chromium	53.1	1.08	5.41	ug/g
Cobalt	2.67	0.130	1.08	ug/g
Copper	121	3.50	10.8	ug/g
Manganese	71.5	3.57	10.8	ug/g
Mercury	23.3	0.0758	0.541	ug/g
Nickel	36.8	0.671	5.41	ug/g
Selenium	ND	0.768	27.1	ug/g
Silver	ND	0.0649	5.41	ug/g
Tin	2.83 J	0.476	10.8	ug/g
Vanadium	ND	1.08	5.41	ug/g
Zinc	47.1	2.38	10.8	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/17/2003 12:16	8602	AM118 Metals in Sld HD by ICP	1	6/24/2003 13:02	blb	9202

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lead	115	2.05	10.8	ug/g
Thallium	0.412 J	0.357	5.41	ug/g

Comments: Sample diluted an additional 5 fold for mercury.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
03-0004-070-02	21-03-312	5/27/2003 15:18	6/10/2003 15:17	9/18/2003 09:09	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/17/2003 12:16	8602	AM118 Metals in Sld HD by ICP	1	6/18/2003 16:14	blb	8611

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	10.4	52.0	ug/g
Antimony	0.684 J	0.135	5.20	ug/g
Arsenic	702	0.593	5.20	ug/g
Barium	0.0660 J	0.0416	5.20	ug/g
Beryllium	ND	0.0520	5.20	ug/g
Boron	ND	4.16	10.4	ug/g
Cadmium	0.220 J	0.0208	5.20	ug/g
Chromium	55.4	1.04	5.20	ug/g
Cobalt	2.00	0.125	1.04	ug/g
Copper	104	3.36	10.4	ug/g
Manganese	47.0	3.43	10.4	ug/g
Mercury	25.6	0.0728	0.520	ug/g
Nickel	38.3	0.644	5.20	ug/g
Selenium	ND	0.738	26.0	ug/g
Silver	ND	0.0624	5.20	ug/g
Tin	2.32 J	0.457	10.4	ug/g
Vanadium	ND	1.04	5.20	ug/g
Zinc	44.0	2.29	10.4	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/17/2003 12:16	8602	AM118 Metals in Sld HD by ICP	1	6/24/2003 13:06	blb	9202

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lead	63.3	1.96	10.4	ug/g
Thallium	ND	0.343	5.20	ug/g

Comments: Sample diluted an additional 5 fold for mercury.
Sample diluted an additional 5 fold for arsenic.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
03-0004-070-03	21-03-315	5/27/2003 15:18	6/10/2003 15:17	9/18/2003 09:09	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
6/17/2003 12:16	8602	AM118 Metals in Sld HD by ICP	1	6/18/2003 15:22	blb	8611

Parameter	Result	MDL	PQL	Units
Aluminum	ND	9.98	49.9	ug/g
Antimony	0.897 J	0.130	4.99	ug/g
Arsenic	12.3	0.569	4.99	ug/g
Barium	1.22 J	0.0399	4.99	ug/g
Beryllium	ND	0.0499	4.99	ug/g
Boron	ND	3.99	9.98	ug/g
Cadmium	0.273 J	0.0200	4.99	ug/g
Chromium	39.3	0.998	4.99	ug/g
Cobalt	6.12	0.120	0.998	ug/g
Copper	90.1	3.22	9.98	ug/g
Manganese	336	3.29	9.98	ug/g
Mercury	10.1	0.0699	0.499	ug/g
Nickel	52.4	0.619	4.99	ug/g
Selenium	ND	0.709	25.0	ug/g
Silver	ND	0.0599	4.99	ug/g
Tin	6.69 J	0.439	9.98	ug/g
Vanadium	1.66 J	0.998	4.99	ug/g
Zinc	92.4	2.20	9.98	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
6/17/2003 12:16	8602	AM118 Metals in Sld HD by ICP	1	6/24/2003 12:41	blb	9202

Parameter	Result	MDL	PQL	Units
Lead	40.2	1.89	9.98	ug/g
Thallium	ND	0.329	4.99	ug/g

Comments: Sample diluted an additional 5 fold for mercury.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
03-0004-070-04	21-03-318	5/27/2003 15:18	6/10/2003 15:17	9/18/2003 09:10	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/17/2003 12:16	8602	AM118 Metals in Sld HD by ICP	1	6/18/2003 14:58	blb	8611

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	10.4	52.0	ug/g
Antimony	0.528 J	0.135	5.20	ug/g
Arsenic	0.935 J	0.593	5.20	ug/g
Barium	0.498 J	0.0416	5.20	ug/g
Beryllium	ND	0.0520	5.20	ug/g
Boron	ND	4.16	10.4	ug/g
Cadmium	0.232 J	0.0208	5.20	ug/g
Chromium	20.3	1.04	5.20	ug/g
Cobalt	2.97	0.125	1.04	ug/g
Copper	28.0	3.36	10.4	ug/g
Manganese	107	3.43	10.4	ug/g
Mercury	0.123 J	0.0728	0.520	ug/g
Nickel	21.8	0.645	5.20	ug/g
Selenium	ND	0.739	26.0	ug/g
Silver	ND	0.0624	5.20	ug/g
Tin	2.58 J	0.458	10.4	ug/g
Vanadium	1.22 J	1.04	5.20	ug/g
Zinc	26.9	2.29	10.4	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/17/2003 12:16	8602	AM118 Metals in Sld HD by ICP	1	6/24/2003 13:10	blb	9202

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lead	8.09 J	1.97	10.4	ug/g
Thallium	ND	0.343	5.20	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
03-0004-070-05	21-03-321	5/28/2003 15:18	6/10/2003 15:17	9/18/2003 09:10	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/17/2003 12:16	8602	AM118 Metals in Sld HD by ICP	1	6/18/2003 15:50	blb	8611

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	16.5 J	10.7	53.4	ug/g
Antimony	0.422 J	0.139	5.34	ug/g
Arsenic	11.7	0.608	5.34	ug/g
Barium	1.50 J	0.0427	5.34	ug/g
Beryllium	ND	0.0534	5.34	ug/g
Boron	4.92 J	4.27	10.7	ug/g
Cadmium	0.285 J	0.0213	5.34	ug/g
Chromium	26.8	1.07	5.34	ug/g
Cobalt	5.05	0.128	1.07	ug/g
Copper	19.1	3.45	10.7	ug/g
Manganese	429	3.52	10.7	ug/g
Mercury	2.24	0.0747	0.534	ug/g
Nickel	34.3	0.662	5.34	ug/g
Selenium	ND	0.758	26.7	ug/g
Silver	ND	0.0640	5.34	ug/g
Tin	2.09 J	0.470	10.7	ug/g
Vanadium	ND	1.07	5.34	ug/g
Zinc	120	2.35	10.7	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/17/2003 12:16	8602	AM118 Metals in Sld HD by ICP	1	6/24/2003 13:14	blb	9202

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lead	462	2.02	10.7	ug/g
Thallium	ND	0.352	5.34	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
03-0004-070-06	21-03-324	5/28/2003 15:18	6/10/2003 15:17	9/18/2003 09:10	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
6/17/2003 12:16	8602	AM118 Metals in Sld HD by ICP	1	6/18/2003 14:53	blb	8611

Parameter	Result	MDL	PQL	Units
Aluminum	13.9 J	9.43	47.1	ug/g
Antimony	4.56 J	0.123	4.71	ug/g
Arsenic	24.3	0.537	4.71	ug/g
Barium	0.236 J	0.0377	4.71	ug/g
Beryllium	ND	0.0471	4.71	ug/g
Boron	ND	3.77	9.43	ug/g
Cadmium	0.363 J	0.0189	4.71	ug/g
Chromium	126	0.943	4.71	ug/g
Cobalt	21.4	0.113	0.943	ug/g
Copper	73.3	3.04	9.43	ug/g
Manganese	994	3.11	9.43	ug/g
Mercury	0.795	0.0660	0.471	ug/g
Nickel	239	0.584	4.71	ug/g
Selenium	ND	0.669	23.6	ug/g
Silver	ND	0.0566	4.71	ug/g
Tin	24.1	0.415	9.43	ug/g
Vanadium	ND	0.943	4.71	ug/g
Zinc	259	2.07	9.43	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
6/17/2003 12:16	8602	AM118 Metals in Sld HD by ICP	1	6/24/2003 13:19	blb	9202

Parameter	Result	MDL	PQL	Units
Lead	77.5	1.78	9.43	ug/g
Thallium	ND	0.311	4.71	ug/g

Comments: Sample diluted an additional 5 fold for manganese.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
03-0004-070-07	21-03-327	5/29/2003 15:18	6/10/2003 15:17	9/18/2003 09:10	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
6/17/2003 12:16	8602	AM118 Metals in Sld HD by ICP	1	6/18/2003 17:34	blb	8611

Parameter	Result	MDL	PQL	Units
Aluminum	22.3 J	9.85	49.3	ug/g
Antimony	2.42 J	0.128	4.93	ug/g
Arsenic	10300	0.562	4.93	ug/g
Barium	0.158 J	0.0394	4.93	ug/g
Beryllium	ND	0.0493	4.93	ug/g
Boron	4.97 J	3.94	9.85	ug/g
Cadmium	0.259 J	0.0197	4.93	ug/g
Chromium	25.6	0.985	4.93	ug/g
Cobalt	4.65	0.118	0.985	ug/g
Copper	98.5	3.18	9.85	ug/g
Manganese	359	3.25	9.85	ug/g
Mercury	2200	0.0690	0.493	ug/g
Nickel	31.9	0.611	4.93	ug/g
Selenium	ND	0.700	24.6	ug/g
Silver	ND	0.0591	4.93	ug/g
Tin	5.33 J	0.433	9.85	ug/g
Vanadium	ND	0.985	4.93	ug/g
Zinc	65.1	2.17	9.85	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
6/17/2003 12:16	8602	AM118 Metals in Sld HD by ICP	1	6/24/2003 13:23	blb	9202

Parameter	Result	MDL	PQL	Units
Lead	21.5	1.86	9.85	ug/g
Thallium	ND	0.325	4.93	ug/g

Comments: Sample reanalyzed for beryllium on June 24th, 2003 with appropriate batch QC. Result shown is for the June 24th reanalysis for beryllium.
Sample diluted an additional 1000 fold for mercury.
Sample diluted an additional 33.3 fold for arsenic.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
03-0004-070-08	21-03-331	5/29/2003 15:18	6/10/2003 15:17	9/18/2003 09:10	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/17/2003 12:16	8602	AM118 Metals in Sld HD by ICP	1	6/18/2003 17:39	blb	8611

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	10.0 J	9.50	47.5	ug/g
Antimony	1.80 J	0.123	4.75	ug/g
Arsenic	361	0.541	4.75	ug/g
Barium	0.0962 J	0.0380	4.75	ug/g
Beryllium	ND	0.0475	4.75	ug/g
Boron	ND	3.80	9.50	ug/g
Cadmium	0.275 J	0.0190	4.75	ug/g
Chromium	34.9	0.950	4.75	ug/g
Cobalt	3.43	0.114	0.950	ug/g
Copper	75.7	3.07	9.50	ug/g
Manganese	295	3.13	9.50	ug/g
Mercury	3020	0.0665	0.475	ug/g
Nickel	115	0.589	4.75	ug/g
Selenium	ND	0.674	23.7	ug/g
Silver	0.224 J	0.0570	4.75	ug/g
Tin	10.4	0.418	9.50	ug/g
Vanadium	ND	0.950	4.75	ug/g
Zinc	49.8	2.09	9.50	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/17/2003 12:16	8602	AM118 Metals in Sld HD by ICP	1	6/24/2003 13:27	blb	9202

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lead	22.3	1.79	9.50	ug/g
Thallium	ND	0.313	4.75	ug/g

Comments: Sample reanalyzed for beryllium on June 24th, 2003 with appropriate batch QC. Result shown is for the June 24th reanalysis for beryllium.
Sample diluted an additional 1000 fold for mercury.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
03-0004-070-09	21-03-335	5/29/2003 15:18	6/10/2003 15:17	9/18/2003 09:10	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/17/2003 12:16	8602	AM118 Metals in Sld HD by ICP	1	6/18/2003 17:43	blb	8611

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	105	11.1	55.7	ug/g
Antimony	6.19	0.145	5.57	ug/g
Arsenic	33.4	0.635	5.57	ug/g
Barium	1.29 J	0.0445	5.57	ug/g
Beryllium	ND	0.0557	5.57	ug/g
Boron	4.49 J	4.45	11.1	ug/g
Cadmium	0.393 J	0.0223	5.57	ug/g
Chromium	295	1.11	5.57	ug/g
Cobalt	8.69	0.134	1.11	ug/g
Copper	18.1	3.60	11.1	ug/g
Manganese	1200	3.67	11.1	ug/g
Mercury	185	0.0780	0.557	ug/g
Nickel	1230	0.690	5.57	ug/g
Selenium	ND	0.791	27.8	ug/g
Silver	ND	0.0668	5.57	ug/g
Tin	8.74 J	0.490	11.1	ug/g
Vanadium	1.81 J	1.11	5.57	ug/g
Zinc	27.3	2.45	11.1	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/17/2003 12:16	8602	AM118 Metals in Sld HD by ICP	1	6/24/2003 13:31	blb	9202

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lead	130	2.10	11.1	ug/g
Thallium	ND	0.367	5.57	ug/g

Comments: Sample reanalyzed for beryllium on June 24th, 2003 with appropriate batch QC. Result shown is for the June 24th reanalysis for beryllium.
Sample diluted an additional 20 fold for manganese.
Sample diluted an additional 20 fold for nickel.
Sample diluted an additional 50 fold for mercury.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
03-0004-070-10	21-03-339	5/30/2003 15:18	6/10/2003 15:17	9/18/2003 09:10	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/17/2003 12:16	8602	AM118 Metals in Sld HD by ICP	1	6/18/2003 15:55	blb	8611

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	11.1	55.6	ug/g
Antimony	0.179 J	0.145	5.56	ug/g
Arsenic	1.33 J	0.634	5.56	ug/g
Barium	ND	0.0445	5.56	ug/g
Beryllium	ND	0.0556	5.56	ug/g
Boron	ND	4.45	11.1	ug/g
Cadmium	0.254 J	0.0222	5.56	ug/g
Chromium	22.5	1.11	5.56	ug/g
Cobalt	6.09	0.133	1.11	ug/g
Copper	150	3.59	11.1	ug/g
Manganese	266	3.67	11.1	ug/g
Mercury	0.253 J	0.0779	0.556	ug/g
Nickel	18.2	0.690	5.56	ug/g
Selenium	ND	0.790	27.8	ug/g
Silver	0.0711 J	0.0667	5.56	ug/g
Tin	2.60 J	0.489	11.1	ug/g
Vanadium	ND	1.11	5.56	ug/g
Zinc	52.8	2.45	11.1	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/17/2003 12:16	8602	AM118 Metals in Sld HD by ICP	1	6/24/2003 13:35	blb	9202

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lead	15.3	2.10	11.1	ug/g
Thallium	ND	0.367	5.56	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
03-0004-070-11	21-03-343	5/31/2003 15:18	6/10/2003 15:17	9/18/2003 09:10	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
6/17/2003 12:16	8602	AM118 Metals in Sld HD by ICP	1	6/18/2003 17:29	blb	8611

Parameter	Result	MDL	PQL	Units
Aluminum	16.2 J	9.74	48.7	ug/g
Antimony	2.34 J	0.127	4.87	ug/g
Arsenic	12900	0.555	4.87	ug/g
Barium	2.88 J	0.0389	4.87	ug/g
Beryllium	ND	0.0487	4.87	ug/g
Boron	ND	3.89	9.74	ug/g
Cadmium	0.333 J	0.0195	4.87	ug/g
Chromium	51.5	0.974	4.87	ug/g
Cobalt	9.17	0.117	0.974	ug/g
Copper	103	3.15	9.74	ug/g
Manganese	604	3.21	9.74	ug/g
Mercury	4780	0.0682	0.487	ug/g
Nickel	27.4	0.604	4.87	ug/g
Selenium	ND	0.691	24.3	ug/g
Silver	ND	0.0584	4.87	ug/g
Tin	4.43 J	0.428	9.74	ug/g
Vanadium	ND	0.974	4.87	ug/g
Zinc	138	2.14	9.74	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
6/17/2003 12:16	8602	AM118 Metals in Sld HD by ICP	1	6/24/2003 13:48	blb	9202

Parameter	Result	MDL	PQL	Units
Lead	169	1.84	9.74	ug/g
Thallium	ND	0.321	4.87	ug/g

Comments: Sample reanalyzed for beryllium on June 24th, 2003 with appropriate batch QC. Result shown is for the June 24th reanalysis for beryllium.
Sample diluted an additional 40 fold for arsenic.
Sample diluted an additional 10 fold for manganese.
Sample diluted an additional 2000 fold for mercury.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	*Sample ID*	*Collected*	*Received*	*Reported*	*Matrix*
03-0004-070-12	21-03-347	5/31/2003 15:18	6/10/2003 15:17	9/18/2003 09:10	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/17/2003 12:16	8602	AM118 Metals in Sld HD by ICP	1	6/18/2003 16:00	blb	8611

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	17.3 J	11.1	55.5	ug/g
Antimony	0.256 J	0.144	5.55	ug/g
Arsenic	ND	0.633	5.55	ug/g
Barium	0.0467 J	0.0444	5.55	ug/g
Beryllium	ND	0.0555	5.55	ug/g
Boron	ND	4.44	11.1	ug/g
Cadmium	0.289 J	0.0222	5.55	ug/g
Chromium	30.5	1.11	5.55	ug/g
Cobalt	4.45	0.133	1.11	ug/g
Copper	129	3.58	11.1	ug/g
Manganese	291	3.66	11.1	ug/g
Mercury	0.141 J	0.0777	0.555	ug/g
Nickel	10.5	0.688	5.55	ug/g
Selenium	ND	0.788	27.7	ug/g
Silver	ND	0.0666	5.55	ug/g
Tin	2.27 J	0.488	11.1	ug/g
Vanadium	1.13 J	1.11	5.55	ug/g
Zinc	102	2.44	11.1	ug/g

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/17/2003 12:16	8602	AM118 Metals in Sld HD by ICP	1	6/24/2003 13:52	blb	9202

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lead	19.8	2.10	11.1	ug/g
Thallium	ND	0.366	5.55	ug/g

Report of Analysis

Method Blank

Lab ID	Sample ID	Reported
4728	MB for HBN 8306 [PREP/1469]	7/8/2003 17:00
	(Results reported on a wet weight basis)	

AM101 Vols in Liquid HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
6/11/2003 14:19	8306	AM101 Vols in Liquid HD by GC	1	6/13/2003 18:33	ssh	8502

Surrogates	Expected	Result	Recover	Limits
1,4-Difluorobenzene	112	124 ug/mL	111	50 - 150

Method Blank

Lab ID	Sample ID	Reported
4737	MB for HBN 8402 [PREP/1471]	7/8/2003 17:00
	(Results reported on a wet weight basis)	

AM117 Semi-Vols Liq HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
6/11/2003 16:13	8402	AM117 Semi-Vols Liq HD by GC	1	6/18/2003 23:24	tfr	8613

Surrogates	Expected	Result	Recover	Limits
1,4-Dithiane-d4	1000	2830 ug/mL	283 *	50 - 150

Method Blank

Lab ID	Sample ID	Reported
4754	MB for HBN 8503 [PREP/1472]	7/8/2003 17:00
	(Results reported on a wet weight basis)	

AM100 Non-Vols in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
6/18/2003 09:36	8503	AM100 Non-Vols in HD by GC	1	6/23/2003 23:29	ssh	8702

Surrogates	Expected	Result	Recover	Limits
Thiodiglycol-d8 (TDG-d8)	10	11 ug/mL	110	50 - 150

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Method Blank

Lab ID	*Sample ID*	*Reported*
4820	MB for HBN 8614 [PREP/1476] *(Results reported on a wet weight basis)*	7/8/2003 17:00

AM126 Lewisite in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/18/2003 09:34	8614	AM126 Lewisite in HD by GC	1	6/23/2003 18:41	tfr	8618

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lewisite	ND	1.95	5.00	ug/g

Method Blank

Lab ID	*Sample ID*	*Reported*
5064	MB for HBN 9701 [PREP/1490] *(Results reported on a wet weight basis)*	7/8/2003 17:00

AM098 HD Purity by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
8/14/2003 11:43	9701	AM098 HD Purity by GC	1	8/14/2003 15:22	tfr	9704

Parameter	*Result*	*MDL*	*PQL*	*Units*
bis-(2-Chloroethyl)sulfide	0.00			%

Report of Analysis

Method Blank

Lab ID	*Sample ID*	*Reported*
4760	MB for HBN 8601 [PREP/1473]	7/8/2003 17:00

(Results reported on a wet weight basis)

AM118 Metals in NCS HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/12/2003 08:23	8601	AM118 Metals in NCS HD by ICP	1	6/16/2003 13:32	blb	8604

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	10.0	50.0	ug/g
Antimony	ND	0.130	5.00	ug/g
Arsenic	ND	0.570	5.00	ug/g
Barium	ND	0.0400	5.00	ug/g
Beryllium	ND	0.0500	5.00	ug/g
Boron	ND	4.00	10.0	ug/g
Cadmium	0.178 J	0.0200	5.00	ug/g
Chromium	ND	1.00	5.00	ug/g
Cobalt	ND	0.120	1.00	ug/g
Copper	ND	3.23	10.0	ug/g
Lead	ND	1.89	10.0	ug/g
Manganese	ND	3.30	10.0	ug/g
Mercury	ND	0.0700	0.500	ug/g
Nickel	ND	0.620	5.00	ug/g
Selenium	ND	0.710	25.0	ug/g
Silver	ND	0.0600	5.00	ug/g
Thallium	ND	0.330	5.00	ug/g
Tin	ND	0.440	10.0	ug/g
Vanadium	ND	1.00	5.00	ug/g
Zinc	ND	2.20	10.0	ug/g

Method Blank

Lab ID	*Sample ID*	*Reported*
4767	MB for HBN 8602 [PREP/1474]	7/8/2003 17:00

(Results reported on a wet weight basis)

AM118 Metals in Sld HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/17/2003 12:16	8602	AM118 Metals in Sld HD by ICP	1	6/18/2003 13:43	blb	8611

Parameter	*Result*	*MDL*	*PQL*	*Units*
Aluminum	ND	10.0	50.0	ug/g
Antimony	ND	0.130	5.00	ug/g
Arsenic	ND	0.570	5.00	ug/g
Barium	ND	0.0400	5.00	ug/g
Beryllium	ND	0.0500	5.00	ug/g
Boron	ND	4.00	10.0	ug/g
Cadmium	0.173 J	0.0200	5.00	ug/g
Chromium	ND	1.00	5.00	ug/g
Cobalt	ND	0.120	1.00	ug/g
Copper	ND	3.23	10.0	ug/g

Report of Analysis

8602 8611 Method Blank

Manganese	ND	3.30	10.0	ug/g
Mercury	ND	0.0700	0.500	ug/g
Nickel	ND	0.620	5.00	ug/g
Selenium	ND	0.710	25.0	ug/g
Silver	ND	0.0600	5.00	ug/g
Tin	ND	0.440	10.0	ug/g
Vanadium	ND	1.00	5.00	ug/g
Zinc	ND	2.20	10.0	ug/g

Method Blank

Lab ID	Sample ID	Reported
4800	MB for HBN 8612 [PREP/1475]	7/8/2003 17:00
	(Results reported on a wet weight basis)	

AM118 Metals in Liq HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
6/18/2003 09:19	8612	AM118 Metals in Liq HD by ICP	1	6/19/2003 16:28	blb	8616

Parameter	Result	MDL	PQL	Units
Antimony	ND	0.630	5.00	ug/g
Arsenic	ND	1.22	5.00	ug/g
Barium	ND	0.430	5.00	ug/g
Cadmium	ND	0.410	5.00	ug/g
Cobalt	ND	0.270	1.00	ug/g
Copper	ND	2.43	5.00	ug/g
Lead	ND	0.410	5.00	ug/g
Manganese	ND	0.320	1.00	ug/g
Mercury	ND	0.0500	0.500	ug/g
Nickel	ND	0.350	5.00	ug/g
Selenium	ND	1.17	10.0	ug/g
Silver	ND	0.470	5.00	ug/g
Thallium	ND	0.980	5.00	ug/g
Tin	ND	2.49	10.0	ug/g
Vanadium	ND	1.00	5.00	ug/g
Zinc	ND	3.12	10.0	ug/g

Method Blank

Lab ID	Sample ID	Reported
4800	MB for HBN 8612 [PREP/1475]	7/27/2003 19:40
	(Results reported on a wet weight basis)	

AM118 Metals in Liq HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
6/18/2003 09:19	8612	AM118 Metals in Liq HD by ICP	1	6/23/2003 14:42	blb	9201

Parameter	Result	MDL	PQL	Units
Aluminum	ND	10.0	50.0	ug/g
Beryllium	ND	0.900	5.00	ug/g
Boron	ND	3.74	10.0	ug/g
Chromium	ND	1.29	5.00	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Method Blank

Lab ID	*Sample ID*	*Reported*
4767	MB for HBN 8602 [PREP/1474]	7/30/2003 18:37

(Results reported on a wet weight basis)

AM118 Metals in Sld HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/17/2003 12:16	8602	AM118 Metals in Sld HD by ICP	1	6/24/2003 12:29	blb	9202

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lead	ND	1.89	10.0	ug/g
Thallium	ND	0.330	5.00	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Method Blank

Lab ID	*Sample ID*	*Reported*
4754	MB for HBN 8503 [PREP/1472] *(Results reported on a wet weight basis)*	7/8/2003 17:00

AM100 Non-Vols in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/18/2003 09:36	8503	AM100 Non-Vols in HD by GC	1	6/23/2003 23:29	ssh	8702

Parameter	*Result*	*MDL*	*PQL*	*Units*
Thiodiglycol (TDG)	ND	210	250	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Method Blank

Lab ID	*Sample ID*	*Reported*
4737	MB for HBN 8402 [PREP/1471]	7/8/2003 17:00

(Results reported on a wet weight basis)

AM117 Semi-Vols Liq HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/11/2003 16:13	8402	AM117 Semi-Vols Liq HD by GC	1	6/18/2003 23:24	tfr	8613

Parameter	*Result*	*MDL*	*PQL*	*Units*
Hexachloroethane	ND	80.0	250	ug/g
Q	ND	51.0	2500	ug/g
T	ND	70.0	2500	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Method Blank

Lab ID	*Sample ID*	*Reported*
4728	MB for HBN 8306 [PREP/1469]	7/8/2003 17:00

(Results reported on a wet weight basis)

AM101 Vols in Liquid HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
6/11/2003 14:19	8306	AM101 Vols in Liquid HD by GC	1	6/13/2003 18:33	ssh	8502

Parameter	*Result*	*MDL*	*PQL*	*Units*
1,2-Dichloroethane	ND	260	500	ug/g
Tetrachloroethylene	ND	100	500	ug/g
1,1,2,2-Tetrachloroethane	ND	150	500	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

QC Summary

LCS Lab ID: 4821 — **Original Lab ID:** — **Matrix:** Liquid — **Prep Batch:** 8614 — **Analytical:** 8618

AM126 Lewisite in HD by GC	Expected	Result	Recovery	Rec Limits
Lewisite	25.2 ug/g	28.8	114	50 - 150

DUP Lab ID: 4822 — **Original Lab ID:** 03-0004-068-03 — **Matrix:** Liquid — **Prep Batch:** 8614 — **Analytical:** 8618

AM126 Lewisite in HD by GC	Original Result	Result	RPD	RPD Limits
Lewisite	0	0	0	0 - 25

MS Lab ID: 4823 — **Original Lab ID:** 03-0004-068-03 — **Matrix:** Liquid — **Prep Batch:** 8614 — **Analytical:** 8618

AM126 Lewisite in HD by GC	Original Result	Expected	Result	Recovery	Rec Limits
Lewisite	0	26.1 ug/g	43.9	168 *	50 - 150

MSD Lab ID: 4824 — **Original Lab ID:** 03-0004-068-03 — **Matrix:** Liquid — **Prep Batch:** 8614 — **Analytical:** 8618

AM126 Lewisite in HD by GC	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits
Lewisite	25.8 ug/g	41	159 *	50 - 150	5.5	0 - 25

LCS Lab ID: 5065 — **Original Lab ID:** — **Matrix:** Liquid — **Prep Batch:** 9701 — **Analytical:** 9704

AM098 HD Purity by GC	Expected	Result	Recovery	Rec Limits
bis-(2-Chloroethyl)sulfide	98.2 %	95.8	97.5	85 - 115

DUP Lab ID: 5066 — **Original Lab ID:** 030008-06701-2 — **Matrix:** Liquid — **Prep Batch:** 9701 — **Analytical:** 9704

AM098 HD Purity by GC	Original Result	Result	RPD	RPD Limits
bis-(2-Chloroethyl)sulfide	92.5	87.1	6.03	0 - 25

Report of Analysis

QC Summary

LCS Lab ID: 4761 | Original Lab ID: 4760 | Prep Batch: 8601
Matrix: Non-cohesive Solid | Analytical: 8604

AM118 Metals in NCS HD by ICP	Expected	Result	Recovery	Rec Limits
Aluminum	500 ug/g	483	96.4	75 - 125
Antimony	50 ug/g	47.7	95.3	75 - 125
Arsenic	50 ug/g	50.5	101	75 - 125
Barium	50 ug/g	51	102	75 - 125
Beryllium	50 ug/g	46	91.9	75 - 125
Boron	500 ug/g	395	78.9	75 - 125
Cadmium	50 ug/g	50.9	101	75 - 125
Chromium	50 ug/g	50.4	101	75 - 125
Cobalt	50 ug/g	48.5	97	75 - 125
Copper	50 ug/g	50.5	101	75 - 125
Lead	50 ug/g	50.4	101	75 - 125
Manganese	50 ug/g	50	100	75 - 125
Mercury	2.5 ug/g	2.45	97.9	75 - 125
Nickel	50 ug/g	48	95.9	75 - 125
Selenium	50 ug/g	48.8	97.5	75 - 125
Silver	50 ug/g	47	94	75 - 125
Thallium	50 ug/g	45	89.9	75 - 125
Tin	50 ug/g	49.4	98.9	75 - 125
Vanadium	50 ug/g	50.3	101	75 - 125
Zinc	50 ug/g	51.7	101	75 - 125

DUP Lab ID: 4762 | Original Lab ID: 03-0004-069-03 | Prep Batch: 8601
Matrix: Non-cohesive Solid | Analytical: 8604

AM118 Metals in NCS HD by ICP	Original Result	Result	RPD	RPD Limits
Aluminum	2.75	2.21	22 *	0 - 20
Antimony	0.121	0.0191	146 *	0 - 20
Arsenic	4.06	2.16	61 *	0 - 20
Barium	0.0528	0.0463	13.1	0 - 20
Beryllium	0.00755	0.00288	89.7 *	0 - 20
Boron	2.47	1.48	50.2 *	0 - 20
Cadmium	0.214	0.193	10.1	0 - 20
Chromium	11.1	7.78	35.3 *	0 - 20
Cobalt	2.2	1.49	38.3 *	0 - 20
Copper	27.2	30.1	10	0 - 20
Lead	6.11	4.28	35.2 *	0 - 20
Manganese	118	82.4	35.5 *	0 - 20
Mercury	1.65	1.28	25.8 *	0 - 20
Nickel	11.4	7.62	39.4 *	0 - 20
Selenium	0	0	0	0 - 20
Silver	0.00673	0.00486	32.4 *	0 - 20
Thallium	0.0686	0.0486	34.2 *	0 - 20
Tin	2.01	1.23	47.9 *	0 - 20
Vanadium	1.06	1.03	3.26	0 - 20
Zinc	37.4	25.7	36.9 *	0 - 20

Report of Analysis

MS Lab ID: 4763 | Original Lab ID: 03-0004-069-03 | Prep Batch: 8601
Matrix: Non-cohesive Solid | Analytical: 8604

AM118 Metals in NCS HD by ICP	*Original Result*	*Expected*	*Result*	*Recovery*	*Rec Limits*
Aluminum	2.75	549 ug/g	546	98.9	75 - 125
Antimony	0.121	54.9 ug/g	52.6	95.6	75 - 125
Arsenic	4.06	54.9 ug/g	66.3	113	50 - 150
Barium	0.0528	54.9 ug/g	56.6	103	75 - 125
Beryllium	0.00755	54.9 ug/g	55.8	102	75 - 125
Boron	2.47	549 ug/g	487	88.3	75 - 125
Cadmium	0.214	54.9 ug/g	53.9	97.9	75 - 125
Chromium	11.1	54.9 ug/g	75.5	117	75 - 125
Cobalt	2.2	54.9 ug/g	61.7	108	75 - 125
Copper	27.2	54.9 ug/g	84.5	104	75 - 125
Lead	6.11	54.9 ug/g	67.6	112	75 - 125
Manganese	118	54.9 ug/g	269	275 *	75 - 125
Mercury	1.65	2.74 ug/g	5.76	150	50 - 150
Nickel	11.4	54.9 ug/g	74.5	115	75 - 125
Selenium	0	54.9 ug/g	57.3	104	50 - 150
Silver	0.00673	54.9 ug/g	52.2	95.1	50 - 150
Thallium	0.0686	54.9 ug/g	51.8	94.2	75 - 125
Tin	2.01	54.9 ug/g	56.8	99.8	75 - 125
Vanadium	1.06	54.9 ug/g	62.7	112	75 - 125
Zinc	37.4	54.9 ug/g	124	158 *	50 - 150

MSD Lab ID: 4764 | Original Lab ID: 03-0004-069-03 | Prep Batch: 8601
Matrix: Non-cohesive Solid | Analytical: 8604

AM118 Metals in NCS HD by ICP	*Expected*	*Result*	*Recovery*	*Rec Limits*	*RPD*	*RPD Limits*
Aluminum	520 ug/g	524	100	75 - 125	1.11	0 - 25
Antimony	52 ug/g	49	93.9	75 - 125	1.79	0 - 25
Arsenic	52 ug/g	60.8	109	50 - 150	3.6	0 - 25
Barium	52 ug/g	52.9	102	75 - 125	0.976	0 - 25
Beryllium	52 ug/g	52.6	101	75 - 125	0.985	0 - 25
Boron	520 ug/g	454	86.9	75 - 125	1.6	0 - 25
Cadmium	52 ug/g	49.9	95.6	75 - 125	2.38	0 - 25
Chromium	52 ug/g	71.5	116	75 - 125	0.858	0 - 25
Cobalt	52 ug/g	57.1	106	75 - 125	1.87	0 - 25
Copper	52 ug/g	81.2	104	75 - 125	0	0 - 25
Lead	52 ug/g	61.9	107	75 - 125	4.57	0 - 25
Manganese	52 ug/g	235	225 *	75 - 125	20	0 - 25
Mercury	2.6 ug/g	4.86	123	50 - 150	19.8	0 - 25
Nickel	52 ug/g	65.5	104	75 - 125	10	0 - 25
Selenium	52 ug/g	52.4	101	50 - 150	2.93	0 - 25
Silver	52 ug/g	46.3	89	50 - 150	6.63	0 - 25
Thallium	52 ug/g	47.5	91.3	75 - 125	3.13	0 - 25
Tin	52 ug/g	53.5	99.1	75 - 125	0.704	0 - 25
Vanadium	52 ug/g	59.8	113	75 - 125	0.889	0 - 25
Zinc	52 ug/g	111	142	50 - 150	10.7	0 - 25

LCS Lab ID: 4765 | Original Lab ID: 4760 | Prep Batch: 8601
Matrix: Non-cohesive Solid | Analytical: 8604

Report of Analysis

LCS Lab ID: 4765 | Original Lab ID: 4760 | Prep Batch: 8601
Matrix: Non-cohesive Solid | Analytical: 8604

AM118 Metals in NCS HD by ICP	*Expected*	*Result*	*Recovery*	*Rec Limits*
Aluminum	6000 ug/g	5200	86.6	75 - 125
Arsenic	141 ug/g	139	98.4	75 - 125
Barium	58.2 ug/g	59.6	102	75 - 125
Chromium	111 ug/g	108	96.9	75 - 125
Cobalt	11.1 ug/g	10.6	95.2	75 - 125
Copper	398 ug/g	340	85.3	75 - 125
Lead	5.73 ug/g	5.85	101	75 - 125
Manganese	480 ug/g	447	93.2	75 - 125
Nickel	195 ug/g	178	91.2	75 - 125
Vanadium	11.9 ug/g	12.6	106	75 - 125
Zinc	249 ug/g	218	87.1	75 - 125

LCSD Lab ID: 4766 | Original Lab ID: 4760 | Prep Batch: 8601
Matrix: Non-cohesive Solid | Analytical: 8604

AM118 Metals in NCS HD by ICP	*Expected*	*Result*	*Recovery*	*Rec Limits*	*RPD*	*RPD Limits*
Aluminum	6000 ug/g	5570	92.7	75 - 125	6.8	0 - 25
Arsenic	141 ug/g	132	93.5	75 - 125	5.11	0 - 25
Barium	58.2 ug/g	68.3	117	75 - 125	13.7	0 - 25
Chromium	111 ug/g	112	101	75 - 125	4.14	0 - 25
Cobalt	11.1 ug/g	10.7	96.8	75 - 125	1.67	0 - 25
Copper	398 ug/g	339	85.1	75 - 125	0.235	0 - 25
Lead	5.73 ug/g	5.43	94.2	75 - 125	6.97	0 - 25
Manganese	480 ug/g	460	95.9	75 - 125	2.86	0 - 25
Nickel	195 ug/g	175	89.8	75 - 125	1.55	0 - 25
Vanadium	11.9 ug/g	13.7	115	75 - 125	8.14	0 - 25
Zinc	249 ug/g	214	85.6	75 - 125	1.74	0 - 25

LCS Lab ID: 4768 | Original Lab ID: 4767 | Prep Batch: 8602
Matrix: Solid | Analytical: 8611

AM118 Metals in Sld HD by ICP	*Expected*	*Result*	*Recovery*	*Rec Limits*
Aluminum	500 ug/g	464	91.2	75 - 125
Antimony	50 ug/g	47.5	95	75 - 125
Arsenic	50 ug/g	51.9	104	75 - 125
Barium	50 ug/g	50.4	101	75 - 125
Beryllium	50 ug/g	50	100	75 - 125
Boron	500 ug/g	418	83.1	75 - 125
Cadmium	50 ug/g	51	102	75 - 125
Chromium	50 ug/g	47.7	95.5	75 - 125
Cobalt	50 ug/g	47.8	95.5	75 - 125
Copper	50 ug/g	49.5	98.4	75 - 125
Manganese	50 ug/g	49	97.9	75 - 125
Mercury	2.5 ug/g	2.99	120	75 - 125
Nickel	50 ug/g	47.4	94.8	75 - 125
Selenium	50 ug/g	52	104	75 - 125
Silver	50 ug/g	49.9	99.8	75 - 125
Tin	50 ug/g	49.3	98.6	75 - 125

Report of Analysis

LCS Lab ID: 4768 | Original Lab ID: 4767 | Prep Batch: 8602
Matrix: Solid | Analytical: 8611

AM118 Metals in Sld HD by ICP	*Expected*	*Result*	*Recovery*	*Rec Limits*
Vanadium	50 ug/g	49.3	98.7	75 - 125
Zinc	50 ug/g	52.1	104	75 - 125

DUP Lab ID: 4769 | Original Lab ID: 03-0004-070-03 | Prep Batch: 8602
Matrix: Solid | Analytical: 8611

AM118 Metals in Sld HD by ICP	*Original Result*	*Result*	*RPD*	*RPD Limits*
Aluminum	4.37	5.34	20.1 *	0 - 20
Antimony	0.897	0.836	7.11	0 - 20
Arsenic	12.3	12.5	1.43	0 - 20
Barium	1.22	0.908	29 *	0 - 20
Beryllium	0.0079	0.00896	12.5	0 - 20
Boron	1.55	1.54	0.369	0 - 20
Cadmium	0.273	0.305	11.3	0 - 20
Chromium	39.3	35	11.8	0 - 20
Cobalt	6.12	5.64	8.3	0 - 20
Copper	90.1	71	23.7 *	0 - 20
Manganese	336	334	0.678	0 - 20
Mercury	10.1	11	8.66	0 - 20
Nickel	52.4	44.4	16.6	0 - 20
Selenium	0	0	0	0 - 20
Silver	0.031	0.0355	13.4	0 - 20
Tin	6.69	6.09	9.33	0 - 20
Vanadium	1.66	1.77	6.32	0 - 20
Zinc	92.4	75.2	20.5 *	0 - 20

MS Lab ID: 4770 | Original Lab ID: 03-0004-070-03 | Prep Batch: 8602
Matrix: Solid | Analytical: 8611

AM118 Metals in Sld HD by ICP	*Original Result*	*Expected*	*Result*	*Recovery*	*Rec Limits*
Aluminum	4.37	539 ug/g	575	106	75 - 125
Antimony	0.897	53.9 ug/g	52	94.9	75 - 125
Arsenic	12.3	53.9 ug/g	72.8	112	50 - 150
Barium	1.22	53.9 ug/g	57.2	104	75 - 125
Beryllium	0.0079	53.9 ug/g	62.6	116	75 - 125
Boron	1.55	539 ug/g	544	101	75 - 125
Cadmium	0.273	53.9 ug/g	54.9	101	75 - 125
Chromium	39.3	53.9 ug/g	96.9	107	75 - 125
Cobalt	6.12	53.9 ug/g	62.5	105	75 - 125
Copper	90.1	53.9 ug/g	157	125	75 - 125
Manganese	336	53.9 ug/g	363	49.8 *	75 - 125
Mercury	10.1	2.69 ug/g	13	108	50 - 150
Nickel	52.4	53.9 ug/g	106	98.7	75 - 125
Selenium	0	53.9 ug/g	58.7	109	50 - 150
Silver	0.031	53.9 ug/g	55.1	102	50 - 150
Tin	6.69	53.9 ug/g	60.2	99.4	75 - 125
Vanadium	1.66	53.9 ug/g	64.5	117	75 - 125
Zinc	92.4	53.9 ug/g	141	90.4	50 - 150

Report of Analysis

MSD Lab ID: 4771 | Original Lab ID: 03-0004-070-03 | Prep Batch: 8602
Matrix: Solid | Analytical: 8611

AM118 Metals in Sld HD by ICP	*Expected*	*Result*	*Recovery*	*Rec Limits*	*RPD*	*RPD Limits*
Aluminum	534 ug/g	540	100	75 - 125	5.83	0 - 25
Antimony	53.4 ug/g	50.4	92.7	75 - 125	2.35	0 - 25
Arsenic	53.4 ug/g	77.7	122	50 - 150	8.55	0 - 25
Barium	53.4 ug/g	53.9	98.6	75 - 125	5.33	0 - 25
Beryllium	53.4 ug/g	62.5	117	75 - 125	0.858	0 - 25
Boron	534 ug/g	545	102	75 - 125	0.985	0 - 25
Cadmium	53.4 ug/g	53.6	99.7	75 - 125	1.3	0 - 25
Chromium	53.4 ug/g	111	134 *	75 - 125	22.4	0 - 25
Cobalt	53.4 ug/g	62.9	106	75 - 125	0.948	0 - 25
Copper	53.4 ug/g	131	77.4	75 - 125	47 *	0 - 25
Manganese	53.4 ug/g	515	334 *	75 - 125	148 *	0 - 25
Mercury	2.67 ug/g	17.5	278 *	50 - 150	88.1 *	0 - 25
Nickel	53.4 ug/g	114	116	75 - 125	16.1	0 - 25
Selenium	53.4 ug/g	60.1	112	50 - 150	2.71	0 - 25
Silver	53.4 ug/g	52.5	98.3	50 - 150	3.69	0 - 25
Tin	53.4 ug/g	60.2	100	75 - 125	0.602	0 - 25
Vanadium	53.4 ug/g	62.7	114	75 - 125	2.6	0 - 25
Zinc	53.4 ug/g	175	155 *	50 - 150	52.6 *	0 - 25

LCS Lab ID: 4772 | Original Lab ID: 4767 | Prep Batch: 8602
Matrix: Solid | Analytical: 8611

AM118 Metals in Sld HD by ICP	*Expected*	*Result*	*Recovery*	*Rec Limits*
Aluminum	6000 ug/g	5570	92.7	75 - 125
Arsenic	141 ug/g	147	104	75 - 125
Barium	58.2 ug/g	57.7	99.1	75 - 125
Chromium	111 ug/g	106	95.6	75 - 125
Cobalt	11.1 ug/g	10.4	93.7	75 - 125
Copper	398 ug/g	335	84.1	75 - 125
Manganese	480 ug/g	450	93.6	75 - 125
Nickel	195 ug/g	172	88.3	75 - 125
Vanadium	11.9 ug/g	13.7	115	75 - 125
Zinc	249 ug/g	224	89.8	75 - 125

LCSD Lab ID: 4773 | Original Lab ID: 4767 | Prep Batch: 8602
Matrix: Solid | Analytical: 8611

AM118 Metals in Sld HD by ICP	*Expected*	*Result*	*Recovery*	*Rec Limits*	*RPD*	*RPD Limits*
Aluminum	6000 ug/g	5670	94.4	75 - 125	1.82	0 - 25
Arsenic	141 ug/g	149	106	75 - 125	1.9	0 - 25
Barium	58.2 ug/g	59.7	102	75 - 125	2.88	0 - 25
Chromium	111 ug/g	113	101	75 - 125	5.49	0 - 25
Cobalt	11.1 ug/g	10.6	95.9	75 - 125	2.32	0 - 25
Copper	398 ug/g	343	86.1	75 - 125	2.35	0 - 25
Manganese	480 ug/g	462	96.3	75 - 125	2.84	0 - 25
Nickel	195 ug/g	177	90.9	75 - 125	2.9	0 - 25
Vanadium	11.9 ug/g	14.1	119	75 - 125	3.42	0 - 25
Zinc	249 ug/g	227	91.2	75 - 125	1.55	0 - 25

Report of Analysis

LCS Lab ID: 4801 | Original Lab ID: 4800 | Prep Batch: 8612
Matrix: Liquid | Analytical: 8616

AM118 Metals in Liq HD by ICP	*Expected*	*Result*	*Recovery*	*Rec Limits*
Antimony	50 ug/g	52.2	104	75 - 125
Arsenic	50 ug/g	55.1	109	75 - 125
Barium	50 ug/g	55.5	111	75 - 125
Cadmium	50 ug/g	56.4	113	75 - 125
Cobalt	50 ug/g	50.1	100	75 - 125
Copper	50 ug/g	52.4	104	75 - 125
Lead	50 ug/g	50.4	101	75 - 125
Manganese	50 ug/g	51.1	102	75 - 125
Mercury	2.5 ug/g	2.76	110	75 - 125
Nickel	50 ug/g	50.1	100	75 - 125
Selenium	50 ug/g	53.8	107	75 - 125
Silver	50 ug/g	56.1	112	75 - 125
Thallium	50 ug/g	50.3	100	75 - 125
Tin	50 ug/g	53.9	108	75 - 125
Vanadium	50 ug/g	50.2	100	75 - 125
Zinc	50 ug/g	53.1	106	75 - 125

DUP Lab ID: 4802 | Original Lab ID: 03-0004-068-03 | Prep Batch: 8612
Matrix: Liquid | Analytical: 8616

AM118 Metals in Liq HD by ICP	*Original Result*	*Result*	*RPD*	*RPD Limits*
Antimony	0.0325	0	200 *	0 - 20
Arsenic	0.866	0.676	24.6 *	0 - 20
Barium	0.078	0.0419	60.2 *	0 - 20
Cadmium	0.205	0.174	16.5	0 - 20
Cobalt	0.0661	0.0621	6.24	0 - 20
Copper	30.6	29.7	3.16	0 - 20
Lead	0.146	0.141	3.33	0 - 20
Manganese	2.81	2.83	0.933	0 - 20
Mercury	0.0879	0.0983	11.2	0 - 20
Nickel	0.562	0.483	15.1	0 - 20
Selenium	0.684	0.766	11.2	0 - 20
Silver	0.0268	0.0148	57.6 *	0 - 20
Thallium	0.132	0.092	35.4 *	0 - 20
Tin	0.0716	0.0427	50.5 *	0 - 20
Vanadium	0.535	0.899	50.8 *	0 - 20
Zinc	1.16	1.31	12.8	0 - 20

MS Lab ID: 4803 | Original Lab ID: 03-0004-068-03 | Prep Batch: 8612
Matrix: Liquid | Analytical: 8616

AM118 Metals in Liq HD by ICP	*Original Result*	*Expected*	*Result*	*Recovery*	*Rec Limits*
Antimony	0.0325	53.5 ug/g	53.1	99.2	75 - 125
Arsenic	0.866	53.5 ug/g	58.5	108	50 - 150
Barium	0.078	53.5 ug/g	57.6	108	75 - 125
Cadmium	0.205	53.5 ug/g	55.7	104	75 - 125
Cobalt	0.0661	53.5 ug/g	51	95.2	75 - 125
Copper	30.6	53.5 ug/g	84.5	101	75 - 125

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

MS Lab ID: 4803 | Original Lab ID: 03-0004-068-03 | Prep Batch: 8612
Matrix: Liquid | Analytical: 8616

AM118 Metals in Liq HD by ICP	*Original Result*	*Expected*	*Result*	*Recovery*	*Rec Limits*
Lead	0.146	53.5 ug/g	55.1	103	75 - 125
Manganese	2.81	53.5 ug/g	54.8	97.2	75 - 125
Mercury	0.0879	2.67 ug/g	3.05	111	50 - 150
Nickel	0.562	53.5 ug/g	51.3	95	75 - 125
Selenium	0.684	53.5 ug/g	58.5	108	50 - 150
Silver	0.0268	53.5 ug/g	55	103	50 - 150
Thallium	0.132	53.5 ug/g	55.9	104	75 - 125
Tin	0.0716	53.5 ug/g	56.2	105	75 - 125
Vanadium	0.535	53.5 ug/g	50.6	93.6	75 - 125
Zinc	1.16	53.5 ug/g	55.1	101	50 - 150

MSD Lab ID: 4804 | Original Lab ID: 03-0004-068-03 | Prep Batch: 8612
Matrix: Liquid | Analytical: 8616

AM118 Metals in Liq HD by ICP	*Expected*	*Result*	*Recovery*	*Rec Limits*	*RPD*	*RPD Limits*
Antimony	51.4 ug/g	50.5	98.1	75 - 125	1.12	0 - 25
Arsenic	51.4 ug/g	55.8	107	50 - 150	0.93	0 - 25
Barium	51.4 ug/g	55.9	109	75 - 125	0.922	0 - 25
Cadmium	51.4 ug/g	53	103	75 - 125	0.966	0 - 25
Cobalt	51.4 ug/g	50	97	75 - 125	1.87	0 - 25
Copper	51.4 ug/g	81.6	99.2	75 - 125	1.8	0 - 25
Lead	51.4 ug/g	53.9	105	75 - 125	1.92	0 - 25
Manganese	51.4 ug/g	52.4	96.5	75 - 125	0.723	0 - 25
Mercury	2.57 ug/g	2.81	106	50 - 150	4.61	0 - 25
Nickel	51.4 ug/g	50.2	96.5	75 - 125	1.57	0 - 25
Selenium	51.4 ug/g	57.4	110	50 - 150	1.83	0 - 25
Silver	51.4 ug/g	53.4	104	50 - 150	0.966	0 - 25
Thallium	51.4 ug/g	54.2	105	75 - 125	0.957	0 - 25
Tin	51.4 ug/g	54.2	105	75 - 125	0	0 - 25
Vanadium	51.4 ug/g	48.8	93.8	75 - 125	0.213	0 - 25
Zinc	51.4 ug/g	53.4	102	50 - 150	0.985	0 - 25

LCS Lab ID: 4801 | Original Lab ID: 4800 | Prep Batch: 8612
Matrix: Liquid | Analytical: 9201

AM118 Metals in Liq HD by ICP	*Expected*	*Result*	*Recovery*	*Rec Limits*
Aluminum	500 ug/g	522	104	75 - 125
Beryllium	50 ug/g	50.8	102	75 - 125
Boron	500 ug/g	514	102	75 - 125
Chromium	50 ug/g	54.3	108	75 - 125

DUP Lab ID: 4802 | Original Lab ID: 03-0004-068-03 | Prep Batch: 8612
Matrix: Liquid | Analytical: 9201

AM118 Metals in Liq HD by ICP	*Original Result*	*Result*	*RPD*	*RPD Limits*
Aluminum	21.3	0.795	186 *	0 - 20
Beryllium	0.0272	0.0112	83.4 *	0 - 20
Boron	5.39	0.798	148 *	0 - 20
Chromium	1.4	4.52	105 *	0 - 20

Report of Analysis

MS Lab ID: 4803 — Original Lab ID: 03-0004-068-03 — Prep Batch: 8612
Matrix: Liquid — Analytical: 9201

AM118 Metals in Liq HD by ICP	*Original Result*	*Expected*	*Result*	*Recovery*	*Rec Limits*
Aluminum	21.3	535 ug/g	535	96	75 - 125
Beryllium	0.0272	53.5 ug/g	50.8	94.9	75 - 125
Boron	5.39	535 ug/g	556	103	75 - 125
Chromium	1.4	53.5 ug/g	61.1	112	75 - 125

MSD Lab ID: 4804 — Original Lab ID: 03-0004-068-03 — Prep Batch: 8612
Matrix: Liquid — Analytical: 9201

AM118 Metals in Liq HD by ICP	*Expected*	*Result*	*Recovery*	*Rec Limits*	*RPD*	*RPD Limits*
Aluminum	514 ug/g	487	90.5	75 - 125	5.9	0 - 25
Beryllium	51.4 ug/g	48.9	95	75 - 125	0.105	0 - 25
Boron	514 ug/g	485	93.2	75 - 125	9.99	0 - 25
Chromium	51.4 ug/g	58.4	111	75 - 125	0.897	0 - 25

LCS Lab ID: 4768 — Original Lab ID: 4767 — Prep Batch: 8602
Matrix: Solid — Analytical: 9202

AM118 Metals in Sld HD by ICP	*Expected*	*Result*	*Recovery*	*Rec Limits*
Lead	50 ug/g	50.9	102	75 - 125
Thallium	50 ug/g	48.6	97.1	75 - 125

DUP Lab ID: 4769 — Original Lab ID: 03-0004-070-03 — Prep Batch: 8602
Matrix: Solid — Analytical: 9202

AM118 Metals in Sld HD by ICP	*Original Result*	*Result*	*RPD*	*RPD Limits*
Lead	40.2	37.7	6.35	0 - 20
Thallium	0.0892	0.0545	48.3 *	0 - 20

MS Lab ID: 4770 — Original Lab ID: 03-0004-070-03 — Prep Batch: 8602
Matrix: Solid — Analytical: 9202

AM118 Metals in Sld HD by ICP	*Original Result*	*Expected*	*Result*	*Recovery*	*Rec Limits*
Lead	40.2	53.9 ug/g	102	114	75 - 125
Thallium	0.0892	53.9 ug/g	55.3	102	75 - 125

MSD Lab ID: 4771 — Original Lab ID: 03-0004-070-03 — Prep Batch: 8602
Matrix: Solid — Analytical: 9202

AM118 Metals in Sld HD by ICP	*Expected*	*Result*	*Recovery*	*Rec Limits*	*RPD*	*RPD Limits*
Lead	53.4 ug/g	96.5	105	75 - 125	8.22	0 - 25
Thallium	53.4 ug/g	55.7	104	75 - 125	1.94	0 - 25

LCS Lab ID: 4772 — Original Lab ID: 4767 — Prep Batch: 8602
Matrix: Solid — Analytical: 9202

AM118 Metals in Sld HD by ICP	*Expected*	*Result*	*Recovery*	*Rec Limits*
Lead	5.73 ug/g	6.17	106	75 - 125

LCSD Lab ID: 4773 — Original Lab ID: 4767 — Prep Batch: 8602
Matrix: Solid — Analytical: 9202

AM118 Metals in Sld HD by ICP	*Expected*	*Result*	*Recovery*	*Rec Limits*	*RPD*	*RPD Limits*
Lead	5.73 ug/g	6.25	107	75 - 125	0.939	0 - 25

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

QC Summary

LCS Lab ID: 4755 | Original Lab ID: | Prep Batch: 8503
Matrix: Liquid | Analytical: 8702

AM100 Non-Vols in HD by GC	Expected	Result	Recovery	Rec Limits
Thiodiglycol (TDG)	1020 ug/g	1180	116	50 - 150

DUP Lab ID: 4756 | Original Lab ID: 03-0004-068-03 | Prep Batch: 8503
Matrix: Liquid | Analytical: 8702

AM100 Non-Vols in HD by GC	Original Result	Result	RPD	RPD Limits
Thiodiglycol (TDG)	0	0	0	0 - 25

MS Lab ID: 4757 | Original Lab ID: 03-0004-068-03 | Prep Batch: 8503
Matrix: Liquid | Analytical: 8702

AM100 Non-Vols in HD by GC	Original Result	Expected	Result	Recovery	Rec Limits
Thio diglycol (TDG)	0	999 ug/g	1060	106	50 - 150

MSD Lab ID: 4758 | Original Lab ID: 03-0004-068-03 | Prep Batch: 8503
Matrix: Liquid | Analytical: 8702

AM100 Non-Vols in HD by GC	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits
Thiodiglycol (TDG)	1080 ug/g	1150	106	50 - 150	0	0 - 25

LCS Lab ID: 4759 | Original Lab ID: | Prep Batch: 8503
Matrix: Liquid | Analytical: 8702

AM100 Non-Vols in HD by GC	Expected	Result	Recovery	Rec Limits
Thiodiglycol (TDG)	1020 ug/g	1120	110	50 - 150

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

QC Summary

LCS Lab ID: 4738 — Original Lab ID: — Matrix: Liquid — Prep Batch: 8402 — Analytical: 8613

AM117 Semi-Vols Liq HD by GC	*Expected*	*Result*	*Recovery*	*Rec Limits*
Hexachloroethane	950 ug/g	971	102	50 - 150
Q	9950 ug/g	9570	96.2	50 - 150
T	9120 ug/g	9190	101	50 - 150

LCS Lab ID: 4739 — Original Lab ID: — Matrix: Liquid — Prep Batch: 8402 — Analytical: 8613

AM117 Semi-Vols Liq HD by GC	*Expected*	*Result*	*Recovery*	*Rec Limits*
Q	50300 ug/g	58400	116	50 - 150

DUP Lab ID: 4740 — Original Lab ID: 03-0004-068-03 — Matrix: Liquid — Prep Batch: 8402 — Analytical: 8613

AM117 Semi-Vols Liq HD by GC	*Original Result*	*Result*	*RPD*	*RPD Limits*
Hexachloroethane	0	0	0	0 - 25
Q	29000	27000	6.97	0 - 25
T	2040	1960	4.33	0 - 25

MS Lab ID: 4742 — Original Lab ID: 03-0004-068-03 — Matrix: Liquid — Prep Batch: 8402 — Analytical: 8613

AM117 Semi-Vols Liq HD by GC	*Original Result*	*Expected*	*Result*	*Recovery*	*Rec Limits*
Hexachloroethane	0	978 ug/g	942	96.3	50 - 150
Q	29000	10200 ug/g	33500	44.1 *	50 - 150
T	2040	9390 ug/g	3710	17.8 *	50 - 150

MS Lab ID: 4743 — Original Lab ID: 4741 — Matrix: Liquid — Prep Batch: 8402 — Analytical: 8613

AM117 Semi-Vols Liq HD by GC	*Original Result*	*Expected*	*Result*	*Recovery*	*Rec Limits*
Q	34700	51800 ug/g	64500	57.7	50 - 150

MSD Lab ID: 4744 — Original Lab ID: 03-0004-068-03 — Matrix: Liquid — Prep Batch: 8402 — Analytical: 8613

AM117 Semi-Vols Liq HD by GC	*Expected*	*Result*	*Recovery*	*Rec Limits*	*RPD*	*RPD Limits*
Hexachloroethane	988 ug/g	921	93.3	50 - 150	3.16	0 - 25
Q	10300 ug/g	31500	24.5 *	50 - 150	57.1 *	0 - 25
T	9480 ug/g	3510	15.5 *	50 - 150	13.8	0 - 25

MSD Lab ID: 4745 — Original Lab ID: 4741 — Matrix: Liquid — Prep Batch: 8402 — Analytical: 8613

AM117 Semi-Vols Liq HD by GC	*Expected*	*Result*	*Recovery*	*Rec Limits*	*RPD*	*RPD Limits*
Q	51600 ug/g	62300	53.6	50 - 150	7.37	0 - 25

LCS Lab ID: 4746 — Original Lab ID: — Matrix: Liquid — Prep Batch: 8402 — Analytical: 8613

AM117 Semi-Vols Liq HD by GC	*Expected*	*Result*	*Recovery*	*Rec Limits*
Hexachloroethane	950 ug/g	858	90.3	50 - 150
Q	9950 ug/g	7810	78.4	50 - 150

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

LCS Lab ID: 4746	Original Lab ID: Matrix: Liquid		Prep Batch: 8402 Analytical: 8613	
AM117 Semi-Vols Liq HD by GC T	*Expected* 9120 ug/g	*Result* 6460	*Recovery* 70.9	*Rec Limits* 50 - 150
LCS Lab ID: 4747	Original Lab ID: Matrix: Liquid		Prep Batch: 8402 Analytical: 8613	
AM117 Semi-Vols Liq HD by GC Q	*Expected* 50300 ug/g	*Result* 48300	*Recovery* 96	*Rec Limits* 50 - 150

Report of Analysis

QC Summary

LCS Lab ID: 4729 — Original Lab ID: — Matrix: Liquid — Prep Batch: 8306 — Analytical: 8502

AM101 Vols in Liquid HD by GC	Expected	Result	Recovery	Rec Limits
1,2-Dichloroethane	9880 ug/g	10300	104	50 - 150
Tetrachloroethylene	10100 ug/g	11200	110	50 - 150
1,1,2,2-Tetrachloroethane	10400 ug/g	11400	110	50 - 150

DUP Lab ID: 4730 — Original Lab ID: 03-0004-068-03 — Matrix: Liquid — Prep Batch: 8306 — Analytical: 8502

AM101 Vols in Liquid HD by GC	Original Result	Result	RPD	RPD Limits
1,2-Dichloroethane	7690	8150	5.83	0 - 25
Tetrachloroethylene	0	0	0	0 - 25
1,1,2,2-Tetrachloroethane	0	0	0	0 - 25

MS Lab ID: 4731 — Original Lab ID: 03-0004-068-03 — Matrix: Liquid — Prep Batch: 8306 — Analytical: 8502

AM101 Vols in Liquid HD by GC	Original Result	Expected	Result	Recovery	Rec Limits
1,2-Dichloroethane	7690	10100 ug/g	19900	121	50 - 150
Tetrachloroethylene	0	10400 ug/g	11100	106	50 - 150
1,1,2,2-Tetrachloroethane	0	10600 ug/g	12100	114	50 - 150

MSD Lab ID: 4732 — Original Lab ID: 03-0004-068-03 — Matrix: Liquid — Prep Batch: 8306 — Analytical: 8502

AM101 Vols in Liquid HD by GC	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits
1,2-Dichloroethane	10100 ug/g	19500	117	50 - 150	3.36	0 - 25
Tetrachloroethylene	10400 ug/g	10700	103	50 - 150	2.87	0 - 25
1,1,2,2-Tetrachloroethane	10600 ug/g	11800	111	50 - 150	2.67	0 - 25

LCS Lab ID: 4733 — Original Lab ID: — Matrix: Liquid — Prep Batch: 8306 — Analytical: 8502

AM101 Vols in Liquid HD by GC	Expected	Result	Recovery	Rec Limits
1,2-Dichloroethane	9880 ug/g	10700	108	50 - 150
Tetrachloroethylene	10100 ug/g	10700	105	50 - 150
1,1,2,2-Tetrachloroethane	10400 ug/g	11700	113	50 - 150

Appendix D

QA/QC Report

MUSTARD CHARACTERIZATION PROJECT REPORT FOR THE DESERET CHEMICAL DEPOT MUSTARD TON CONTAINERS

APPENDIX D

QA/QC REPORT

Revision 0

January 14, 2004

TABLE OF CONTENTS

TABLE OF CONTENTS ..... **D-i**

LIST OF TABLES ..... D-iii
LIST OF ACRONYMNS AND ABBREVIATIONS ..... D-iv

1.0 INTRODUCTION **D-1**

2.0 DATA VALIDATION FOR ORGANIC COMPOUND ANALYSES **D-3**

2.1 AGENT PURITY ANALYSES – METHOD AM-098 ..... D-3
2.1.1 GC/MS Tuning *D-3*
2.1.2 Instrument Calibration *D-4*
2.1.3 Laboratory Blanks *D-4*
2.1.4 Laboratory Control Samples *D-4*
2.1.5 Duplicate Analyses *D-6*
2.2 THIODIGLYCOL ANALYSES – METHOD AM-100 ..... D-8
2.2.1 GC/MS Tuning *D-8*
2.2.2 Instrument Calibration *D-9*
2.2.3 Laboratory Blanks *D-9*
2.2.4 Surrogate Recovery *D-9*
2.2.5 Laboratory Control Sample Data *D-9*
2.2.6 Duplicate Sample Analyses *D-13*
2.2.7 Matrix Spike/Matrix Spike Duplicates *D-13*
2.3 VOCs ANALYSES – METHOD AM-101 ..... D-15
2.3.1 GC/MS Tuning *D-15*
2.2.2 Instrument Calibration *D-16*
2.3.3 Laboratory Blanks *D-16*
2.3.4 Surrogate Recovery *D-16*
2.3.5 Laboratory Control Sample Data *D-16*
2.3.6 Duplicate Sample Analyses *D-20*
2.3.7 Matrix Spike/Matrix Spike Duplicates *D-20*
2.4 SVOCs ANALYSES – METHOD AM-117 ..... D-23
2.4.1 GC/MS Tuning *D-23*
2.4.2 Instrument Calibration *D-24*
2.4.3 Laboratory Blanks *D-24*
2.4.4 Surrogate Recovery *D-24*
2.4.5 Laboratory Control Sample Data *D-24*
2.4.6 Duplicate Sample Analyses *D-28*
2.4.7 Matrix Spike/Matrix Spike Duplicates *D-28*
2.5 LEWISITE ANALYSES – METHOD AM-126 ..... D-32
2.5.1 GC/MS Tuning *D-32*
2.5.2 Instrument Calibration *D-33*
2.5.3 Laboratory Blanks *D-33*
2.5.4 Laboratory Control Sample Data *D-33*
2.5.5 Duplicate Sample Analyses *D-33*
2.5.6 Matrix Spike/Matrix Spike Duplicates *D-35*

TABLE OF CONTENS (Continued)

3.0 DATA VALIDATION OF ANALYSES FOR METALS D-37

3.1 METALS ANALYSES OF LIQUID MUSTARD SAMPLES D-37
3.1.1 Instrument Tune Data D-37
3.1.2 Instrument Calibration D-38
3.1.3 Internal Standards D-38
3.1.4 Method Blanks D-38
3.1.5 Laboratory Control Sample Results D-38
3.1.6 Matrix Spike/Matrix Spike Duplicate Results D-39
3.1.7 Sample Duplicate Results D-39
3.2 METALS ANALYSES OF NON-COHESIVE SOLID SAMPLES D-50
3.2.1 Instrument Tune Data D-50
3.2.2 Instrument Calibration D-50
3.2.3 Internal Standards D-50
3.2.4 Method Blanks D-51
3.2.5 Laboratory Control Sample Results D-51
3.2.6 Matrix Spike/Matrix Spike Duplicate Results D-51
3.2.7 Analyses of Certified Reference Materials D-58
3.2.8 Sample Duplicate Results D-58
3.3 METALS ANALYSES OF SOLID SAMPLES D-67
3.3.1 Instrument Tune Data D-67
3.3.2 Instrument Calibration D-67
3.3.3 Internal Standards D-68
3.3.4 Method Blanks D-68
3.3.5 Laboratory Control Sample Results D-68
3.3.6 Matrix Spike/Matrix Spike Duplicate Results D-68
3.3.7 Analyses of Certified Reference Materials D-75
3.3.8 Sample Duplicate Results D-75

LIST OF ANNEXES

ANNEX A SAMPLE COLLECTION SURVEILLANCE D-84

LIST OF TABLES

D-2-1 HD Laboratory Control Sample Results D-5
D-2-2 HD Laboratory Duplicate Results D-7
D-2-3 HD Field Duplicate Results D-7
D-2-4 TDG Surrogate Results D-10
D-2-5 TDG Laboratory Control Sample Results D-12
D-2-6 TDG MS/MSD Data D-14
D-2-7 VOC Surrogate Results D-17
D-2-8 VOC Laboratory Control Sample Results D-19
D-2-9 VOC Laboratory Duplicate Results D-21
D-2-10 VOC Field Duplicate Results D-21
D-2-11 VOC MS/MSD Data D-22
D-2-12 SVOC Surrogate Results D-25
D-2-13 SVOC Laboratory Control Sample Results D-27
D-2-14 SVOC Laboratory Duplicate Results D-29
D-2-15 SVOC Field Duplicate Results D-29
D-2-16 SVOC MS/MSD Data D-30
D-2-17 Lewisite Laboratory Control Sample Results D-34
D-2-18 Lewisite MS/MSD Data D-36

D-3-1 Liquid Metals Laboratory Control Sample Results D-40
D-3-2 Liquid Metals MS/MSD Data D-42
D-3-3 Liquid Metals Laboratory Duplicate Results D-46
D-3-4 Liquid Metals Field Duplicate Results D-48
D-3-5 NCS Metals Laboratory Control Sample Results D-52
D-3-6 NCS Metals MS/MSD Data D-54
D-3-7 NCS Metals CRM Results D-59
D-3-8 NCS Metals Laboratory Duplicate Results D-63
D-3-9 NCS Metals Field Duplicate Results D-65
D-3-10 Solids Metals Laboratory Control Sample Results D-69
D-3-11 Solids Metals MS/MSD Data D-71
D-3-12 Solids Metals CRM Results D-76
D-3-13 Solids Metals Laboratory Duplicate Results D-80
D-3-14 Solids Metals Field Duplicate Results D-82

LIST OF ACRONYMNS AND ABBREVIATIONS

amu	Atomic Mass Unit
CAMDS	Chemical Agent Munitions Disposal System
CCC	Continuing Calibration Check
CCV	Continuing Calibration Verification
CFR	Code of Federal Regulations
CMA	Chemical Material Agency
COC	Chain-of-Custody
CRM	Certified Reference Material
DCD	Deseret Chemical Depot
DFTPP	Decafluorotriphenylphosphine
DQO	Data Quality Objectives
DSHW	Department of Environmental Quality (State of Utah), Division of Solid and Hazardous Waste
EC/B	Edgewood Chemical/Biological
EG&G	EG&G Defense Materials, Inc.
EPA	U.S. Environmental Protection Agency
FAC	Forensic Analytical Center
GC/MS	Gas Chromatograph/Mass Spectrometry
HHRA	Human Health Risk Assessment
ICP/MS	Inductively Coupled Plasma/Mass Spectrometry
ICS	Interference Check Sample
LCS	Laboratory Control Sample
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
NCS	Non-Cohesive Solids
PQL	Practical Quantitation Limit
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control

LIST OF ACRONYMS AND ABBREVIATIONS (Continued)

%R	Percent Recovery
RCRA	Resource Conservation and Recovery Act
RPD	Relative Percent Difference
SVOC	Semi-Volatile Organic Compound
SW-846	Test Methods for Evaluating Solid Waste, 3rd Edition including Update III, USEPA, SW-846, December 1996.
TCs	Ton Containers
TDG	Thiodiglycol
TDG-d8	Deuterated Thiodiglycol
TEU	Technical Escort Unit
TIC	Tentatively Identified Compound
TOCDF	Tooele Chemical Agent Disposal Facility
VOCs	Volatile Organic Compounds

1.0 INTRODUCTION

The Mustard Characterization Project was conducted to establish design criteria for safely processing the chemical agent munitions containing Mustard in its various forms. The Mustard munitions have been stored at the Deseret Chemical Depot (DCD) located south of Tooele, Utah. Samples were collected at the Chemical Agent Munitions Disposal System (CAMDS) facility. The samples were transported by the Tech Escort Unit from the DCD to Edgewood, Maryland. The samples were analyzed by the Edgewood Chemical/Biological (EC/B) Forensic Analytical Center (FAC).

The sampling and analysis of the samples were conducted under the guidelines proposed in the "Mustard Sampling and Analysis Project Quality Assurance Project Plan for DCD Mustard Ton Containers", Revision 1, December 9, 2002, (QAPP).

The samples were collected as three different phases. A minimum of one analysis was made from each of the three phases from each Ton Container (TC). An evaluation of the sample collection observations and the data indicates there are only liquid Mustard and solids in the bottom of the TCs. The sample phase collected as the Non-Cohesive Solids was a mixture of liquid Mustard and loosely adhered solids that are not different from the solids on the bottom of the TCs.

The liquid Mustard samples were analyzed for purity, thiodigylcol (TDG), Volatile Organic Compounds (VOCs), Semi-Volatile Organic Compounds (SVOCs), Lewisite, and the metals used in the Human Health Risk Analysis (HHRA) conducted by the State of Utah in 2002. The solid samples were analyzed for the HHRA metals.

The collection, shipment, and analyses for this project were time intensive and holding times had the potential to be a problem. A stability study was conducted to determine if holding time was a concern for these samples. The results of the study are included in Appendix E of this report. Samples were analyzed over a time period. It was demonstrated that the composition of the samples did not change over the 150 days of the study. The analytes tested included the target analytes for this study. Mercury was added as an organo-metallic compound. It was stable for the 150 days of the study. Samples analyzed after 28 days were flagged to indicate the analysis times were between 28 days and the demonstrated stability time of 150 days. The analysis date is recorded with the results in Appendix C of this report.

This appendix to the report covers the Quality Assurance/Quality Control (QA/QC) activities conducted to ensure the quality of the data generated by the laboratory.

The QA/QC procedures and results summarized in this appendix include:

- Data validation results for organic compound analyses,
- Data validation results for metal analyses,
- Comparability of the analytical data,
- Representativeness for the analytical data,
- Completeness of the analytical data, and
- Usability of the analytical data.

Data validation was conducted at the EC/B FAC in Edgewood, Maryland. The data package was reviewed and the analysts were interviewed over any questions on the data. The data was made available for review. Selected samples were reanalyzed to verify results. Data files were reviewed of total mass spectrograms to review the Tentatively Identified Compounds (TICs). The compound review showed the compounds identified as TICs. The TICs were included with the target analytes to develop a mass balance. The mass balances were close to 100 % indicating the composition of the liquid Mustard had been adequately identified.

Sample collection was observed by personnel from Battelle and EG&G. Surveillance reports were prepared for each day of sampling. These reports are included in Annex A to this Appendix. The observations indicated the samples were collected as directed by the work plan.

2.0 DATA VALIDATION FOR ORGANIC COMPOUND ANALYSES

This section presents the results of the data validation conducted in accordance with the QAPP to verify the quality and usability of the organic compound analytical data. The criteria used for evaluating the organic compound analysis data were those outlined in the analytical methods and the QA/QC Objectives presented in Section 5 of the of the QAPP.

2.1 AGENT PURITY ANALYSES – METHOD AM-098

Agent purity is based on the concentration of *Bis*(2-Chloroethyl) sulfide or Mustard. The samples were analyzed for *Bis*(2-Chloroethyl) sulfide using Method AM-098. An aliquot of each agent sample was weighed into a volumetric flask, the weight recorded, and the sample diluted to the known volume as directed by the method. The samples were then analyzed by Gas Chromatography/Mass Spectroscopy (GC/MS). Agent purity was then calculated from the analysis results from the diluted samples.

The data review included an evaluation of the following:

- GC/MS tuning,
- Instrument calibration,
- Laboratory blank results,
- LCS results, and
- Duplicate Analyses Results.

Results of the data review are contained in the following subsections. Method AM-098 data can be found in Appendix C.

2.1.1 GC/MS Tuning

GC/MS instruments were tuned to ensure mass resolution, identification, and sensitivity. The GC/MS instrument was tuned by performing the following tasks:

- Analyzing DFTPP at the beginning of each 12-hour period during which samples or standards are analyzed; and

- Comparing the ion abundance for selected mass to electron ratios to the ion abundance criteria specified in Method 8270C.

The GC/MS instrument tunings met the criteria during analysis of the samples.

An additional part of the GC/MS tune was the system check on the injection port inertness and column performance. The criteria for injection port inertness and peak tailing were met for each tune check.

2.1.2 Instrument Calibration

Requirements for instrument calibration were established to ensure the instrument was capable of producing acceptable quantitative data for *Bis*(2-Chloroethyl) sulfide. Initial calibration demonstrated the instrument was capable of producing a linear calibration curve. Continuing calibration demonstrated maintenance of the linear curve over the course of the analysis period. Percent Recovery (%R) criteria were established for the Continuing Calibration Checks (CCC) of ± 15%.

The initial calibration was conducted for each sample set. The criteria were a linear regression with a r^2 greater than or equal to (≥) 0.995 and the calculated calibration points were within ± 15% with one exception. The low standard for Sample Set 3 was high, but the r^2 met the criteria so the curve was not rerun. The criteria were met for each set of data.

The CCCs met the criteria or the samples and CCCs were rerun. The data reported were from analyses that met the CCC criteria.

2.1.3 Laboratory Blanks

Laboratory blank samples were analyzed to determine the existence and magnitude of contamination resulting from laboratory activities. The blank for Sample Set 3 had contamination so a new blank was prepared and it met the criterion. No other sample sets had *Bis*(2-chloroethyl) sulfide detected in the laboratory blanks at or above the Practical Quantitation Limit (PQL). The Method Blank results are reported at the end of the Analytical Summary Sheets for each sample set in Appendix C.

2.1.4 Laboratory Control Samples

The Laboratory Control Samples (LCS) were analyzed to provide information on the precision and accuracy of the analytical method and on the laboratory performance. Table D-2-1 summarizes the LCS results for Method AM-098. No data was qualified based on the results from the LCS sample analyses.

TABLE D-2-1. HD LCS RESULTS

Sample Set	LCS Lab ID	Result Wt.%	Known Value Wt.%	%R
1	3495	105	98.4	107
1	4393	101	98.2	103
2	4416	95	98.4	97
3	3862	97.2	98.4	99
4	4077	98	98.4	100
5	4287	95.6	98.2	97
6	4393	101	98.2	103
7	4602	98.4	98.2	100
8	5065	95.8	98.2	98

Notes: The %R limits were from 75% to 125%.

2.1.5 Duplicate Analyses

Two types of duplicate analyses were performed using Method AM-098. The first type was a laboratory duplicate which were prepared by weighing out two aliquots of the same sample and analyzing them separately. The laboratory duplicate results are summarized in Table D-2-2. The criterion for Relative Percent Difference (RPD) was set by the laboratory to be less than or equal to (≤) 25%. The criterion was met as shown in Table D-2-2.

The second type of duplicate analyses was field duplicates, which were prepared by collecting duplicate samples in the field. The field duplicates were submitted as blind samples to the laboratory. The results of the field duplicates are summarized in Table D-2-3. The duplicate analyses met the criterion set by the laboratory for RPD of ≤ 25%.

TABLE D-2-2. HD LABORATORY DUPLICATE RESULTS

Sample Set	DUP Lab ID	Result Wt.%	Duplicate Result Wt.%	Average Wt.%	RPD
1	4394	89.0	95.6	92.3	7.2
2	4417	88.2	85.6	86.9	3.0
3	3863	87.1	88.3	87.7	1.4
4	4078	101	91.6	96.3	9.8
5	4288	92.1	97.2	94.65	5.4
6	4394	89.0	95.6	92.3	7.2
7	4603	88.1	89.8	88.95	1.9
8	5066	92.5	87.1	89.8	6.0

Note: The RPD limit is 25%.

TABLE D-2-3. HD FIELD DUPLICATE RESULTS

Sample Set	Ton Container ID	Result Wt.%	Duplicate Result Wt.%	Average Wt.%	RPD
1	**D94550**	89.0	95.6	92.3	7.2
2	**D14498**	88.2	85.6	86.9	3.0
3	**D52785**	87.1	88.3	87.7	1.4
4	**D46680**	101	91.6	96.3	9.8
5	**D46992**	92.1	97.2	94.65	5.4
6	**D47472**	89.0	95.3	92.15	6.8
7	**D50373**	88.1	89.8	88.95	1.9
8	**D77859**	92.5	87.1	89.8	6.0

Note: The RPD limit is 25%.

2.2 THIODIGLYCOL ANALYSES – METHOD AM-100

Thiodiglycol is the major hydrolysis product of Mustard. Initially, it was thought that TDG would be a major impurity in the Mustard samples. The initial analyses determined that TDG was not present in the samples. Further investigation revealed literature articles that reported TDG reacts with Mustard to form a sulfonium ion that is insoluble in Mustard. This reaction explained the lack of TDG in the samples. The data quality was then based on the recovery of surrogates and spiked samples to show if any TDG was present, it would have been detected.

The data review included an evaluation of the following:

- GC/MS tuning,
- Instrument calibration,
- Laboratory blank results,
- Surrogate recoveries,
- LCS results,
- Duplicate Analyses Results, and
- MS/MSD Results.

Results of the data review are contained in the following subsections. Method AM-100 data can be found in Appendix C.

2.2.1 GC/MS Tuning

The GC/MS instrument was tuned to ensure mass resolution, identification, and sensitivity. The GC/MS instrument was tuned by performing the following tasks:

- Analyzing DFTPP at the beginning of each 12-hour period during which samples or standards are analyzed; and

- Comparing the ion abundance for selected mass to electron ratios to the ion abundance criteria specified in Method 8270C.

The GC/MS instrument tunings met the criteria during analysis of the samples.

An additional part of the GC/MS tune was the system check on the injection port inertness and column performance. The criteria for injection port inertness and peak tailing were met for each tune check.

2.2.2 Instrument Calibration

Requirements for instrument calibration were established to ensure the instrument was capable of producing acceptable quantitative data for TDG. Initial calibration demonstrated the instrument was capable of producing a linear calibration curve. Continuing calibration demonstrated maintenance of the linear curve over the course of the analysis period. The %R criteria were established for the CCC of ± 15%.

The initial calibration was conducted for each sample set. The criteria were a linear regression with a r^2 greater than or equal (≥) 0.990 and the calculated calibration points were within ± 15% for the higher standards. Several of the sample sets had the low standards with high %R. This would result in a high bias, since no TDG was detected, no corrective actions were taken.

The CCCs met the %R limit of ± 25% for each sample set.

2.2.3 Laboratory Blanks

Laboratory blank samples were analyzed to determine the existence and magnitude of contamination resulting from laboratory activities. No TDG was detected in the laboratory blanks at or above the PQL. The Method Blank results are reported at the end of the Analytical Summary Sheets for each sample set in Appendix C.

2.2.4 Surrogate Recovery

A surrogate was added to the sample aliquot during the sample preparation process. The surrogate used was deuterated thiodiglycol (TDG-d8). Table D-2-4 summarizes the surrogate recoveries for the Method AM-100 analyses. Surrogate recoveries were compared to the criteria of ± 50% from Table 5-4 in the QAPP. The surrogate recoveries meet the limit for each sample set except Sample 21-03-155, which did not appear to have the surrogate added to the sample.

2.2.5 Laboratory Control Sample Data

The LCS was analyzed to provide information on the accuracy of the analytical method and on the laboratory performance. Table D-2-5 summarizes the LCS results for Method AM-100. No data was qualified based on the results from the LCS analyses.

TABLE D-2-4. TDG SURROGATE RESULTS

Sample	Known Conc. µg/g	Found Conc. µg/g	%R		Sample	Known Conc. µg/g	Found Conc. µg/g	%R
21-03-001	1020	1050	102.9		21-03-173	1010	1010	100.0
21-03-004	1120	1150	102.7		21-03-177	997	1050	105.3
21-03-007a	1160	1200	103.4		21-03-178	1030	998	96.9
21-03-007b	1000	1010	101.0		21-03-183	1130	1130	100.0
21-03-007c	998	994	99.6		21-03-186	967	1020	105.5
21-03-007d	1040	935	89.9		21-03-189	998	991	99.3
21-03-011	1080	1040	96.3		21-03-192	960	1150	119.8
21-03-018	1160	1230	106.0		21-03-195	1040	1040	100.0
21-03-021	1130	1050	92.9		21-03-198	1050	1150	109.5
21-03-024	952	964	101.3		21-03-201	1040	1250	120.2
21-03-027	971	1000	103.0		21-03-204	1010	1160	114.9
21-03-030	873	880	100.8		21-03-207	1030	1030	100.0
21-03-033	1000	1100	110.0		21-03-210	1020	1100	107.8
21-03-036	1020	1060	103.9		21-03-213	1030	1230	119.4
21-03-039	1050	1290	122.9		21-03-214	1030	1180	114.6
21-03-042	1020	1080	105.9		21-03-219	1010	1140	112.9
21-03-045	970	1010	104.1		21-03-222	978	1130	115.5
21-03-048	1030	1120	108.7		21-03-225	1040	1060	101.9
21-03-051	1080	1130	104.6		21-03-228	1030	1020	99.0
21-03-054	973	982	100.9		21-03-231	998	1070	107.2
21-03-057	984	1030	104.7		21-03-234	1030	1180	114.6
21-03-060	1100	1070	97.3		21-03-238	1010	1100	108.9
21-03-063	989	992	100.3		21-03-241	1020	1040	102.0
21-03-066	987	918	93.0		21-03-244	1010	1130	111.9
21-03-069D	1000	1060	106.0		21-03-247	1030	1200	116.5
21-03-072	1020	1100	107.8		21-03-251A	1070	1010	94.4
21-03-075	1010	1140	112.9		21-03-251B	1100	947	86.1
21-03-078	1010	1090	107.9		21-03-251C	1020	915	89.7
21-03-081	996	991	99.5		21-03-251D	1100	985	89.5
21-03-084	1110	1070	96.4		21-03-251E	1070	915	85.5
21-03-087	992	807	81.4		21-03-254	998	900	90.2
21-03-090	1020	971	95.2		21-03-255	1050	929	88.5
21-03-096	1000	985	98.5		21-03-262	1040	924	88.8
21-03-099	1020	1070	104.9		21-03-265	1060	976	92.1

TABLE D-2-4. TDG SURROGATE RESULTS (Continued)

Sample	Known Conc. µg/g	Found Conc. µg/g	%R		Sample	Known Conc. µg/g	Found Conc. µg/g	%R
21-03-102	1010	1080	106.9		21-03-269	1060	918	86.6
21-03-105	1020	1050	102.9		21-03-273	1010	847	83.9
21-03-108	1030	1010	98.1		21-03-276	1080	929	86.0
21-03-111	1020	967	94.8		21-03-279	1010	863	85.4
21-03-114	1030	1080	104.9		21-03-282	1050	848	80.8
21-03-117	1000	946	94.6		21-03-286	1020	807	79.1
21-03-120	1050	969	92.3		21-03-290	1050	812	77.3
21-03-123	1030	984	95.5		21-03-294	1040	864	83.1
21-03-126	1040	982	94.4		21-03-298	1050	878	83.6
21-03-129	1030	958	93.0		21-03-301	1030	833	80.9
21-03-132	1040	981	94.3		21-03-304	987	776	78.6
21-03-135	1020	982	96.3		21-03-307	999	1060	106.1
21-03-138	1110	1030	92.8		21-03-308	1030	1100	106.8
21-03-141	1080	958	88.7		21-03-313	1000	1030	103.0
21-03-144	1020	916	89.8		21-03-316	999	1080	108.1
21-03-147	1030	894	86.8		21-03-319	1010	983	97.3
21-03-150	1010	865	85.6		21-03-322	965	998	103.4
21-03-154	1040	1100	105.8		21-03-325	1010	961	95.1
21-03-155	1020	41.7	4.1 *		21-03-329	1040	1080	103.8
21-03-160	1000	1160	116.0		21-03-333	1020	997	97.7
21-03-163	1000	1120	112.0		21-03-337	1020	1110	108.8
21-03-166	1010	1070	105.9		21-03-341	1020	987	96.8
21-03-169	1020	1190	116.7		21-03-345	980	1100	112.2

Note: * Indicates Result did not meet the QC Limit.

TABLE D-2-5. TDG LABORATORY CONTROL SAMPLE RESULTS

Sample Set	Lab ID	Known Conc. µg/g	Found Conc. µg/g	%R
1	3501	9700	9350	96.4
	3505	9700	9190	94.7
2	3678	1020	1190	116.7
	3682	1020	1210	118.6
3	3855	9700	9290	95.8
	3859	9700	9830	101.3
4	4132	1020	1140	111.8
	4136	1020	1100	107.8
5	4218	1020	977	95.8
	4222	1020	969	95.0
6	4363	1020	1230	120.6
	4367	1020	1160	113.7
7	4589	1020	1200	117.6
	4592	1020	1120	109.8
8	4755	1020	1180	115.7
	4759	1020	1120	109.8

Note: The %R limits are 50% to 150%.

2.2.6 Duplicate Sample Analyses

Two types of duplicate analyses were performed using Method AM-100. The first type was a laboratory duplicate prepared by weighing out two aliquots of the same sample and analyzing them separately. TDG was not detected in the samples or the laboratory duplicates.

The second duplicate analyses were from the field duplicates, which were prepared by collecting duplicate samples in the field. The field duplicates were submitted as blind samples to the laboratory. TDG was not detected in the samples or the field duplicates.

2.2.7 Matrix Spike/Matrix Spike Duplicates

Matrix Spike/Matrix Spike Duplicate (MS/MSD) samples were analyzed to determine precision and accuracy of the analytical method on the matrix of concern at the time of sample analysis. The MS/MSD were created by the laboratory by splitting a sample and spiking the splits with TDG prior to analysis. Accuracy was assessed by evaluating the %R of the spiked compounds in the MS/MSD. Precision was assessed by evaluating the RPD between the MS and MSD.

Table D-2-6 summarizes the MS/MSD results associated with the samples. The results of the MS/MSD were within the QC limits established by the laboratory with one exception. The MSD for Sample Set 5 was low which caused the RPD to be out of specification. The MS met the %R limit and no TDG was detected in the samples. Therefore, no corrective action was taken and the data was not qualified.

TABLE D-2-6. TDG MS/MSD DATA

Sample Set	Analytical Batch	Sample Result µg/g	Matrix Spike			Matrix Spike Duplicate			RPD
			Spiked Conc. µg/g	Found Conc. µg/g	%R	Spiked Conc. µg/g	Found Conc. µg/g	%R	
1	3903	ND	8670	8040	92.7	10200	9370	91.9	0.9
2	4101	ND	975	1130	115.9	1020	1220	119.6	3.7
3	4903	ND	9660	8360	86.5	9750	8860	90.9	4.3
4	6302	ND	1070	1090	101.9	1040	1150	110.6	8.7
5	6905	ND	1040	1140	109.6	1090	435	39.9 *	69.7 *
6	7504	ND	1060	1300	122.6	1040	1370	131.7	9.1
7	8007	ND	1030	1010	98.1	1060	947	89.3	8.7
8	8702	ND	999	1060	106.1	1080	1150	106.5	0.4

Note: The %R limits are 50% to 150%. The RPD limit is 25%.

* Indicates Result did not meet the QC limit.

2.3 VOCs ANALYSES – METHOD AM-101

The samples were analyzed for VOCs using Method AM-101. The VOCs were a known impurity in Mustard based on prior analyses conducted on Mustard Stockpiles at other Army installations. An aliquot of each agent sample was weighed into a volumetric flask, the weight recorded, and the sample diluted to the known volume with hexadecane as directed by the method. The samples were then analyzed by GC/MS. Concentrations of VOCs were then calculated from the analysis results from the diluted samples. The data quality was verified by the recovery of surrogates and spiked samples.

The data review included an evaluation of the following:

- GC/MS tuning,
- Instrument calibration,
- Laboratory blank results,
- Surrogate recoveries,
- LCS results, and
- Duplicate Analyses Results.

Results of the data review are contained in the following subsections. Method AM-101 data can be found in Appendix C.

2.3.1 GC/MS Tuning

GC/MS instruments were tuned to ensure mass resolution, identification, and sensitivity. The GC/MS instrument was tuned by performing the following tasks:

- Analyzing BFB at the beginning of each 12-hour period during which samples or standards are analyzed; and

- Comparing the ion abundance for selected mass to electron ratios to the ion abundance criteria specified in Method 8260C.

The GC/MS instrument tunings met the criteria during analysis of the samples.

An additional part of the GC/MS tune was the system check on the injection port inertness and column performance. The criteria for injection port inertness and peak tailing were met for each tune check.

2.2.2 Instrument Calibration

Requirements for instrument calibration were established to ensure the instrument was capable of producing acceptable quantitative data for VOCs. Initial calibration demonstrated the instrument was capable of producing a linear calibration curve. Continuing calibration demonstrated maintenance of the linear curve over the course of the analysis period.

The initial calibration was conducted for each sample set. The criteria were a linear regression with a $r^2 \geq 0.990$ and the calculated calibration points were within ± 15%. The criteria were met for each sample set except for the 1,2-dichloroethane standard for Sample Set 3, which was 121%. No corrective action was taken since the r^2 criterion was met.

The CCCs met the %R limit of ± 25% for each sample set.

2.3.3 Laboratory Blanks

Laboratory blank samples were analyzed to determine the existence and magnitude of contamination resulting from laboratory activities. No VOCs were detected in the laboratory blanks at or above the PQL. The Method Blank results are reported at the end of the Analytical Summary Sheets for each sample set in Appendix C.

2.3.4 Surrogate Recovery

A surrogate was added to the sample aliquot during the sample preparation process. The surrogate used was 1,4-difluorobenzene. Table D-2-7 summarizes the surrogate recoveries for the Method AM-101 analyses. Surrogate recoveries were compared to the criterion of ± 50% from Table 5-5 in the QAPP. The surrogate recoveries meet the limit for each sample set.

2.3.5 Laboratory Control Sample Data

The LCS was analyzed to provide information on the accuracy of the analytical method and on the laboratory performance. Table D-2-8 summarizes the LCS results for Method AM-101. No data was qualified based on the results from the LCS analyses.

TABLE D-2-7. VOC SURROGATE RESULTS
1,4-Difluorobenzene

Sample	Known Conc. µg/g	Found Conc. µg/g	%R		Sample	Known Conc. µg/g	Found Conc. µg/g	%R
21-03-001	23300	22600	97.0		21-03-173	10600	11400	107.5
21-03-004	22500	22500	100.0		21-03-177	10600	8970	84.6
21-03-007a	21200	19000	89.6		21-03-178	10700	9100	85.0
21-03-007b	21600	19600	90.7		21-03-183	10900	9110	83.6
21-03-007c	21100	19900	94.3		21-03-186	10700	8990	84.0
21-03-007d	20200	17400	86.1		21-03-189	10600	8550	80.7
21-03-011	23400	23500	100.4		21-03-192	10500	9190	87.5
21-03-018	24200	23200	95.9		21-03-195	10900	9860	90.5
21-03-021	20100	20200	100.5		21-03-198	10700	8820	82.4
21-03-024	22100	22000	99.5		21-03-201	10500	8520	81.1
21-03-027	24300	26400	108.6		21-03-204	10600	9020	85.1
21-03-030	19500	18300	93.8		21-03-207	11000	9330	84.8
21-03-033	10300	11300	109.7		21-03-210	10500	9300	88.6
21-03-036	10400	10100	97.1		21-03-213	11000	11700	106.4
21-03-039	11000	10800	98.2		21-03-214	10500	10800	102.9
21-03-042	10300	11000	106.8		21-03-219	11100	11800	106.3
21-03-045	10300	11100	107.8		21-03-222	10300	11100	107.8
21-03-048	11000	11300	102.7		21-03-225	10700	11400	106.5
21-03-051	10900	11700	107.3		21-03-228	10500	10900	103.8
21-03-054	10400	11400	109.6		21-03-231	10700	10800	100.9
21-03-057	10600	11500	108.5		21-03-234	10800	11400	105.6
21-03-060	11200	12100	108.0		21-03-238	10400	8800	84.6
21-03-063	11200	11100	99.1		21-03-241	10600	10700	100.9
21-03-066	10600	11700	110.4		21-03-244	10700	10800	100.9
21-03-069D	10300	10800	104.9		21-03-247	10700	10500	98.1
21-03-072	10300	11100	107.8		21-03-251A	11100	11100	100.0
21-03-075	11000	12100	110.0		21-03-251B	9720	9880	101.6
21-03-078	10800	10400	96.3		21-03-251C	11000	11000	100.0
21-03-081	10800	11800	109.3		21-03-251D	10900	10400	95.4
21-03-084	11200	11600	103.6		21-03-251E	11000	10700	97.3
21-03-087	10500	10600	101.0		21-03-254	11000	10900	99.1
21-03-090	10200	10700	104.9		21-03-255	10600	9910	93.5
21-03-096	10800	12000	111.1		21-03-262	10800	10400	96.3
21-03-099	11100	11700	105.4		21-03-265	10900	10800	99.1

TABLE D-2-7. VOC SURROGATE RESULTS (Continued)
1,4-Difluorobenzene

Sample	Known Conc. µg/g	Found Conc. µg/g	%R		Sample	Known Conc. µg/g	Found Conc. µg/g	%R
21-03-102	10800	11400	105.6		21-03-269	10900	10400	95.4
21-03-105	10300	11300	109.7		21-03-273	10900	10500	96.3
21-03-108	10300	10600	102.9		21-03-276	10700	10400	97.2
21-03-111	10600	11100	104.7		21-03-279	10200	9730	95.4
21-03-114	10900	11800	108.3		21-03-282	10300	9910	96.2
21-03-117	11100	11900	107.2		21-03-286	10800	10400	96.3
21-03-120	11300	12500	110.6		21-03-290	10800	11000	101.9
21-03-123	10900	11800	108.3		21-03-294	10800	10400	96.3
21-03-126	11600	13500	116.4		21-03-298	10800	10600	98.1
21-03-129	10500	12000	114.3		21-03-301	10300	10100	98.1
21-03-132	10500	12300	117.1		21-03-304	10700	10900	101.9
21-03-135	10500	12200	116.2		21-03-307	11600	12200	105.2
21-03-138	10600	12300	116.0		21-03-308	11000	11800	107.3
21-03-141	10400	12000	115.4		21-03-313	11300	12000	106.2
21-03-144	10700	12100	113.1		21-03-316	11300	11900	105.3
21-03-147	10600	12600	118.9		21-03-319	11200	12000	107.1
21-03-150	10400	11900	114.4		21-03-322	11400	13400	117.5
21-03-154	10600	11600	109.4		21-03-325	11500	12500	108.7
21-03-155	10400	11200	107.7		21-03-329	11400	12100	106.1
21-03-160	10500	11800	112.4		21-03-333	11400	12500	109.6
21-03-163	10500	11400	108.6		21-03-337	11500	12500	108.7
21-03-166	10400	11500	110.6		21-03-341	11400	12000	105.3
21-03-169	10400	11900	114.4		21-03-345	11400	12000	105.3

Note: The %R limits are from 50% to 150%.

TABLE D-2-8. VOCs LABORATORY CONTROL SAMPLE RESULTS

Lab ID	1,2-Dichloroethane			Tetrachloroethylene			1,1,2,2-Tetrachloroethane		
	Known Conc. µg/g	Found Conc. µg/g	%R	Known Conc. µg/g	Found Conc. µg/g	%R	Known Conc. µg/g	Found Conc. µg/g	%R
3488	19800	18300	92.4	20300	19100	94.1	20700	19400	93.7
3492	19800	17300	87.4	20300	18600	91.6	20700	18600	89.9
3737	9880	9830	99.5	10100	10000	99.0	10400	10600	101.9
3741	9880	9890	100.1	10100	10100	100.0	10400	10600	101.9
3793	9880	12400	125.5	10100	12400	122.8	10400	13100	126.0
3797	9880	11200	113.4	10100	12300	121.8	10400	12200	117.3
4071	9880	11500	116.4	10100	11800	116.8	10400	11600	111.5
4075	9880	11400	115.4	10100	11900	117.8	10400	11800	113.5
4197	9880	9670	97.9	10100	10100	100.0	10400	10200	98.1
4201	9880	9320	94.3	10100	10100	100.0	10400	9640	92.7
4357	9880	9390	95.0	10100	10800	106.9	10400	11000	105.8
4361	9880	9460	95.7	10100	10900	107.9	10400	10900	104.8
4568	9880	11200	113.4	10100	11600	114.9	10400	12000	115.4
4572	9880	11300	114.4	10100	11600	114.9	10400	12500	120.2
4729	9880	10300	104.3	10100	11200	110.9	10400	11400	109.6
4733	9880	10700	108.3	10100	10700	105.9	10400	11700	112.5

Note: The %R limits are from 50% to 150%.

2.3.6 Duplicate Sample Analyses

Two types of duplicate analyses were performed using Method AM-101. The first type was a Laboratory Duplicate prepared by weighing out two aliquots of the same sample and analyzing them separately. The Laboratory Duplicate results are summarized in Table D-2-9. The RPD criterion was ≤ 25%. Table D-2-9 shows the criterion was met for each sample set except for the 1,2-dichloroethane results for Sample Set 1, which was slightly over the limit.

The second duplicate analyses were from the field duplicates, which were prepared by collecting duplicate samples in the field. The field duplicates were submitted as blind samples to the laboratory. The results of the field duplicates are summarized in Table D-2-10. The duplicate analyses met the criterion for RPD of ≤ 25%.

2.3.7 Matrix Spike/Matrix Spike Duplicates

The MS/MSD were analyzed to determine precision and accuracy of the analytical method on the matrix of concern at the time of sample analysis. The MS/MSD were created by the laboratory by splitting a sample and spiking the splits with three compounds of interest prior to analysis. Accuracy was assessed by evaluating the %R of the spiked compounds in the MS/MSD. Precision was assessed by evaluating the RPD between the MS and MSD.

Table D-2-11 summarizes the MS/MSD results associated with the samples. The results of the MS/MSD were within the QC limits established by the laboratory with the exception of the Sample Set 3 results. The VOC results for Sample Set 3 were qualified for failure of the MS/MSD to meet the RPD Limit.

TABLE D-2-9. VOCs LABORATORY DUPLICATE RESULTS

Sample Set	DUP Lab ID	1,2-Dichloroethane				Tetrachloroethylene				1,1,2,2-Tetrachloroethane			
		Result µg/g	Duplicate Result µg/g	Average µg/g	RPD	Result µg/g	Duplicate Result µg/g	Average µg/g	RPD	Result µg/g	Duplicate Result µg/g	Average µg/g	RPD
1	3489	4180	5450	4815	26.4 *	ND	ND	NC	NC	ND	ND	NC	NC
2	3738	4650	4440	4545	4.6	ND	ND	NC	NC	ND	ND	NC	NC
3	3794	7140	7600	7370	6.2	ND	ND	NC	NC	ND	ND	NC	NC
4	4072	6950	6820	6885	1.9	492	478	485	2.9	ND	ND	NC	NC
5	4198	5820	5880	5850	1.0	ND	ND	NC	NC	ND	ND	NC	NC
6	4358	6900	6870	6885	0.4	ND	ND	NC	NC	ND	ND	NC	NC
7	4569	3910	3860	3885	1.3	ND	ND	NC	NC	ND	ND	NC	NC
8	4730	7690	8150	7920	5.8	ND	ND	NC	NC	ND	ND	NC	NC

Note: * Indicates Result did not meet the QC Limit

TABLE D-2-10. VOCs FIELD DUPLICATE RESULTS

Sample Set	TC ID	1,2-Dichloroethane				Tetrachloroethylene				1,1,2,2-Tetrachloroethane			
		Result Wt.%	Duplicate Result Wt.%	Average Wt.%	RPD	Result Wt.%	Duplicate Result Wt.%	Average Wt.%	RPD	Result Wt.%	Duplicate Result Wt.%	Average Wt.%	RPD
1	**D94550**	0.606	0.564	0.585	7.2	ND	ND	NC	NC	ND	ND	NC	NC
2	**D14498**	0.446	0.423	0.4345	5.3	ND	ND	NC	NC	ND	ND	NC	NC
3	**D52785**	0.593	0.660	0.6265	10.7	0.066	0.0684	0.0672	3.6	ND	ND	NC	NC
4	**D46680**	0.695	0.637	0.666	8.7	0.049	0.049	0.049	0.0	ND	ND	NC	NC
5	**D46992**	0.582	0.578	0.580	0.7	ND	ND	NC	NC	ND	ND	NC	NC
6	**D47472**	0.690	0.671	0.681	2.8	ND	ND	NC	NC	ND	ND	NC	NC
7	**D50373**	0.391	0.369	0.380	5.8	ND	ND	NC	NC	ND	ND	NC	NC
8	**D77859**	0.197	0.202	0.200	2.5	ND	ND	NC	NC	ND	ND	NC	NC

TABLE D-2-11. VOCs MS/MSD DATA

1,2-Dichloroethane

Analytical Batch	Sample Result µg/g	Matrix Spike			Matrix Spike Duplicate			RPD
		Spiked Conc. µg/g	Found Conc. µg/g	%R	Spiked Conc. µg/g	Found Conc. µg/g	%R	
3906	4180	20600	23000	91.4	18600	21700	94.2	2.8
4702	4650	10200	14400	95.6	10500	15500	103.3	7.7
5004	7140	10300	22200	146.2	9960	15600	84.9	61.3 *
6107	6950	11000	18900	108.6	10300	18200	109.2	0.6
6702	5820	10000	14300	84.8	10200	14100	81.2	3.6
7205	6900	10300	16200	90.3	10800	17200	95.4	5.1
7908	3910	10100	14900	108.8	10200	15800	116.6	7.8
8502	7690	10100	19900	120.9	10100	19500	116.9	4.0

Tetrachloroethylene

Analytical Batch	Sample Result µg/g	Matrix Spike			Matrix Spike Duplicate			RPD
		Spiked Conc. µg/g	Found Conc. µg/g	%R	Spiked Conc. µg/g	Found Conc. µg/g	%R	
3903	ND	21200	19400	91.5	19100	18300	95.8	4.3
4702	ND	10400	9700	93.3	10800	11000	101.9	8.6
5004	ND	10600	14900	140.6	10200	8190	80.3	60.3 *
6107	492	11300	12700	108.0	10600	12400	112.3	4.3
6702	ND	10300	10100	98.1	10500	9680	92.2	5.9
7205	ND	10600	11000	103.8	11000	11700	106.4	2.6
7908	ND	10400	11800	113.5	10400	12400	119.2	5.8
8502	ND	10400	11100	106.7	10400	10700	102.9	3.8

1,1,2,2-Tetrachloroethane

Analytical Batch	Sample Result µg/g	Matrix Spike			Matrix Spike Duplicate			RPD
		Spiked Conc. µg/g	Found Conc. µg/g	%R	Spiked Conc. µg/g	Found Conc. µg/g	%R	
3903	ND	21600	19500	90.3	19500	18300	93.8	3.6
4702	ND	10700	10000	93.5	11100	11100	100.0	6.5
5004	ND	10800	15100	139.8	10500	8180	77.9	61.9 *
6107	ND	11500	12000	104.3	10800	11500	106.5	2.1
6702	ND	10500	9750	92.9	10700	9530	89.1	3.8
7205	ND	10800	11000	101.9	11300	11800	104.4	2.6
7908	ND	10600	12400	117.0	10700	12800	119.6	2.6
8502	ND	10600	12100	114.2	10600	11800	111.3	2.8

Note: * Indicates Result did not meet the QC Limit

2.4 SVOCs ANALYSES – METHOD AM-117

The samples were analyzed for SVOCs using Method AM-117. The SVOCs were known impurities in Mustard based on prior analyses conducted on Mustard Stockpiles at other Army installations. An aliquot of each agent sample was weighed into a volumetric flask, the weight recorded, and the sample diluted to the known volume with methylene chloride as directed by the method. The samples were then analyzed by GC/MS. Concentrations of SVOCs were then calculated from the analysis results from the diluted samples. The data quality was verified by the recovery of surrogates and spiked samples.

The data review included an evaluation of the following:

- GC/MS tuning,
- Instrument calibration,
- Laboratory blank results,
- Surrogate recoveries,
- LCS results,
- Duplicate Analyses Results, and
- MS/MSD Results.

Results of the data review are contained in the following subsections. Method AM-117 data can be found in Appendix C.

2.4.1 GC/MS Tuning

The GC/MS instruments were tuned to ensure mass resolution, identification, and sensitivity. The GC/MS instrument was tuned by performing the following tasks:

- Analyzing DFTPP at the beginning of each 12-hour period during which samples or standards are analyzed; and

- Comparing the ion abundance for selected mass to electron ratios to the ion abundance criteria specified in Method 8270C.

The GC/MS instrument tunings met the criteria during analysis of the samples.

An additional part of the GC/MS tune was the system check on the injection port inertness and column performance. The criteria for injection port inertness and peak tailing were met for each tune check.

2.4.2 Instrument Calibration

Requirements for instrument calibration were established to ensure the instrument was capable of producing acceptable quantitative data for SVOCs. Initial calibration demonstrated the instrument was capable of producing a linear calibration curve. Continuing calibration demonstrated maintenance of the linear curve over the course of the analysis period.

The initial calibration was conducted for each sample set. The criteria were a linear regression with a $r^2 > 0.995$ and the calculated calibration points were within ± 15%. Problems with the initial calibrations for Sample Sets 1 and 2 resulted in the calibration curves being recalculated with an increased PQL. The revised curves met the criteria for r^2 and the higher standards for Q met the calculated recovery of ± 15%. The limit for the r^2 was met for each sample set. Problems were experienced with high recoveries for the low standards on the curves for Q. The samples were generally high on the curves so no additional corrective actions were taken. The CCCs met the %R limit of ± 25%.

2.4.3 Laboratory Blanks

Laboratory blank samples were analyzed to determine the existence and magnitude of contamination resulting from laboratory activities. No SVOCs were detected in the laboratory blanks at or above the PQL. Method Blank data are reported in Appendix C.

2.4.4 Surrogate Recovery

A surrogate was added to the sample during the sample preparation process. The surrogate used was deuterated 1,4-dithiane (d4). Table D-2-12 summarizes the surrogate recoveries for the Method AM-117 analyses. Surrogate recoveries were compared to the criteria of ± 50% from Table 5-6 in the QAPP. The surrogate recoveries meet the QC limits for each sample except for two samples from Sample Set 7. One sample appeared to not have been spiked and one sample that appeared to have received two spike aliquots.

2.4.5 Laboratory Control Sample Data

The LCS was analyzed to provide information on the accuracy of the analytical method and on the laboratory performance. Table D-2-13 summarizes the LCS results for Method AM-117. The LCS results met the QC Criteria specified in Table 5-6 of the QAPP with the exception of the T results. The T results for Sample Sets 2 and 3 failed the limit high. The T data for these sets were qualified as estimated high. Samples in Sample Sets 6, 7, and 8 were diluted and rerun for Q and a LCS was run with the samples resulting in LCS values for Q only.

TABLE D-2-12. SVOC SURROGATE RESULTS
1,4-Dithiane-d4

Sample	Known Conc. µg/g	Found Conc. µg/g	%R		Sample	Known Conc. µg/g	Found Conc. µg/g	%R
21-03-001	1080	1110	103		21-03-173	1090	1110	102
21-03-004	1030	1100	107		21-03-177	1070	1140	107
21-03-007a	945	969	103		21-03-178	1000	1070	107
21-03-007b	1000	1040	104		21-03-183	993	1070	108
21-03-007c	1080	1100	102		21-03-186	1030	1110	108
21-03-007d	987	981	99		21-03-189	1010	1100	109
21-03-011	973	1010	104		21-03-192	980	1010	103
21-03-018	1030	1140	111		21-03-195	1000	1060	106
21-03-021	1020	1100	108		21-03-198	1010	1040	103
21-03-024	997	1050	105		21-03-201	996	1050	105
21-03-027	1020	1070	105		21-03-204	994	1010	102
21-03-030	1060	1050	99		21-03-207	1000	1060	106
21-03-033	969	1060	109		21-03-210	993	1040	105
21-03-036	1030	1150	112		21-03-213	1050	1280	122
21-03-039	1060	1150	108		21-03-214	1030	1090	106
21-03-042	1070	1180	110		21-03-219	1020	1080	106
21-03-045	1080	1170	108		21-03-222	1050	1120	107
21-03-048	1170	1250	107		21-03-225	1070	1120	105
21-03-051	1020	1080	106		21-03-228	1030	1090	106
21-03-054	1110	1210	109		21-03-231	1040	1070	103
21-03-057	1060	1150	108		21-03-234	1040	1060	102
21-03-060	1030	1120	109		21-03-238	1020	1100	108
21-03-063	1070	1180	110		21-03-241	1020	1060	104
21-03-066	1040	1140	110		21-03-244	990	1060	107
21-03-069D	1070	1160	108		21-03-247	1040	1120	108
21-03-072	1080	1110	103		21-03-251A	1090	1230	113
21-03-075	1090	1180	108		21-03-251B	989	1040	105
21-03-078	1040	1150	111		21-03-251C	1050	1150	110
21-03-081	1080	1160	107		21-03-251D	1060	0	0 *
21-03-084	1060	1150	108		21-03-251E	1060	1170	110
21-03-087	1000	1060	106		21-03-254	1040	1160	112
21-03-090	1020	1010	99		21-03-255	1040	1120	108
21-03-096	1030	1040	101		21-03-262	1010	1110	110
21-03-099	1010	997	99		21-03-265	1060	2360	223 *

TABLE D-2-12. SVOC SURROGATE RESULTS (Continued)
1,4-Dithiane-d4

Sample	Known Conc. µg/g	Found Conc. µg/g	%R		Sample	Known Conc. µg/g	Found Conc. µg/g	%R
21-03-102	1020	986	97		21-03-269	1060	1200	113
21-03-105	1020	1010	99		21-03-273	992	950	96
21-03-108	1020	1060	104		21-03-276	1070	1000	93
21-03-111	1040	1070	103		21-03-279	1040	1010	97
21-03-114	1020	33.5	3 **		21-03-282	1040	1010	97
21-03-117	1040	1040	100		21-03-286	1040	986	95
21-03-120	1040	1000	96		21-03-290	1020	961	94
21-03-123	1070	1120	105		21-03-294	1020	972	95
21-03-126	1040	1020	98		21-03-298	1020	966	95
21-03-129	1050	1020	97		21-03-301	1000	923	92
21-03-132	1030	969	94		21-03-304	1020	965	95
21-03-135	1070	1040	97		21-03-307	1050	1010	96
21-03-138	997	999	100		21-03-308	1050	1010	96
21-03-141	1090	1060	97		21-03-313	980	968	99
21-03-144	1080	1010	94		21-03-316	999	929	93
21-03-147	1020	962	94		21-03-319	1030	1050	102
21-03-150	1040	1050	101		21-03-322	1020	971	95
21-03-154	1040	1050	101		21-03-325	1030	942	91
21-03-155	1020	1050	103		21-03-329	1010	967	96
21-03-160	1020	1030	101		21-03-333	1020	969	95
21-03-163	1000	1000	100		21-03-337	1040	987	95
21-03-166	1050	1060	101		21-03-341	1070	1020	95
21-03-169	1060	1040	98		21-03-345	1050	965	92

Note: * Indicates the Results did not meet the QC Limit.
** Sample was rerun.

TABLE D-2-13. SVOCs LABORATORY CONTROL SAMPLE RESULTS

Lab ID	T			Q			Hexachloroethane		
	Known Conc. µg/g	Found Conc. µg/g	%R	Known Conc. µg/g	Found Conc. µg/g	%R	Known Conc. µg/g	Found Conc. µg/g	%R
3494	10300	11300	110	7180	8320	116	10800	10800	100
3499	10300	9000	87	7180	7020	98	10800	10500	97
3665	1020	1900	186 *	9290	9260	100	998	1200	120
3670	1020	1620	159 *	9290	7770	84	998	1160	116
3861	1020	2500	245 *	9290	9590	103	998	1160	116
3867	1020	2270	223 *	9290	8370	90	998	1120	112
4080	1020	1060	104	9290	9930	107	998	1270	127
4084	1020	911	89	9290	9200	99	998	1340	134
4290	9120	10200	112	9950	11400	115	950	973	102
4294	9120	7580	83	9950	9890	99	950	734	77
4396	9120	10900	120	9950	12100	122	950	1070	113
4400	9120	8900	98	9950	10700	108	950	1030	108
4410	NA	NA	NC	50300	59500	118	NA	NA	NC
4414	NA	NA	NC	50300	54000	107	NA	NA	NC
4605	9120	10400	114	9950	11300	114	950	950	100
4606	NA	NA	NC	50300	52400	104	NA	NA	NC
4613	9120	6890	76	9950	7870	79	950	748	79
4614	NA	NA	NC	50300	38100	76	NA	NA	NC
4738	9120	9190	101	9950	9570	96	950	971	102
4739	NA	NA	NC	50300	58400	116	NA	NA	NC
4746	9120	6460	71	9950	7810	78	950	858	90
4747	NA	NA	NC	50300	48300	96	NA	NA	NC

Notes: The %R limits are 50% to 150%.

NA = Not Analyzed NC = Not Calculated * Indicates the Result did not meet QC limit.

2.4.6 Duplicate Sample Analyses

Two types of duplicate analyses were performed using Method AM-117. The first type was a Laboratory Duplicate prepared by weighing out two aliquots of the same sample and analyzing them separately. The Laboratory Duplicate results are summarized in Table D-2-14. The criterion for RPD was < 25%. The criterion was met as shown in Table D-2-14 with the exception of one sample. Laboratory duplicate samples from Sample Set 1 slightly exceeded the 25% criterion. The sample results were below the PQL; therefore, no data was qualified based on the laboratory duplicate results.

The second duplicate analyses were from the field duplicates, which were prepared by collecting duplicate samples in the field. The field duplicates were submitted as blind samples to the laboratory. The results of the field duplicates are summarized in Table D-2-15. The duplicate analyses met the RPD criterion of ≤ 25%.

2.4.7 Matrix Spike/Matrix Spike Duplicates

The MS/MSD were analyzed to determine precision and accuracy of the analytical method on the matrix of concern at the time of sample analysis. The MS/MSD were created by the laboratory by splitting a sample and spiking the splits with three compounds of interest prior to analysis. Accuracy was assessed by evaluating the %R of the spiked compounds in the MS/MSD. Precision was assessed by evaluating the RPD between the MS and MSD.

Table D-2-16 summarizes the MS/MSD results associated with the samples. Problems were experienced with the Q and T values for Sample Sets 1 and 2. The revision of the calibration curves resulted in the spikes being below the PQL. The T results were qualified for Sample Sets 1, 2, 3, 6, and 8 based on low recoveries of the MS/MSD. The Q data for Sample Set 1 was qualified because of the RPD failure. The Q data for Sample Set 3 was qualified because the MS/MSD results were low. Values are listed for Q for the additionally diluted samples for Sample Sets 6, 7, and 8. Both sets of MS/MSD are shown in the table. Since the second set of MS/MSD samples met the criteria, the data was not qualified for these sets. The hexachloroethane data met the QC criteria.

TABLE D-2-14. SVOCs LABORATORY DUPLICATE RESULTS

Batch No.	DUP Lab ID	T				Q				Hexachloroetrhane			
		Result µg/g	Duplicate Result µg/g	Average µg/g	RPD	Result µg/g	Duplicate Result µg/g	Average µg/g	RPD	Result µg/g	Duplicate Result µg/g	Average µg/g	RPD
1	3496	559	432	495.5	25.6 *	26400	25300	25850	4.3	ND	ND	NC	NC
2	3667	2170	2320	2245	6.7	29200	32300	30750	10.1	ND	ND	NC	NC
3	3863	2900	2850	2875	1.7	30200	30000	30100	0.7	ND	ND	NC	NC
4	4081	789	794	791.5	0.6	29700	28400	29050	4.5	ND	ND	NC	NC
5	4291	1670	1580	1625	5.5	42900	42800	42850	0.2	ND	ND	NC	NC
6	4397	1090.0	1100	1095	0.9	49300	50000	49650	1.4	ND	ND	NC	NC
7	4607	3530	4080	3805	14.5	25200	27600	26400	9.1	ND	ND	NC	NC
8	4740	2040	1960	2000	4.0	29000	27000	28000	7.1	ND	ND	NC	NC

TABLE D-2-15. SVOCs FIELD DUPLICATE RESULTS

Batch No.	Ton Container ID	T				Q				Hexachloroethane			
		Result Wt.%	Duplicate Result Wt.%	Average Wt.%	RPD	Result Wt.%	Duplicate Result Wt.%	Average Wt.%	RPD	Result Wt.%	Duplicate Result Wt.%	Average Wt.%	RPD
1	**D94550**	0.0701	0.0727	0.0714	3.6	4.41	4.44	4.425	0.7	ND	ND	NC	NC
2	**D14498**	0.273	0.279	0.276	2.2	2.66	2.74	2.7	3.0	ND	ND	NC	NC
3	**D52785**	0.252	0.22	0.236	13.6	3.90	3.86	3.88	1.0	ND	ND	NC	NC
4	**D46680**	0.079	0.076	0.0775	3.9	2.97	2.94	2.96	1.0	ND	ND	NC	NC
5	**D46992**	0.17	0.16	0.165	6.1	4.29	4.33	4.31	0.9	ND	ND	NC	NC
6	**D47472**	0.110	0.098	0.104	11.5	4.93	4.75	4.84	3.7	ND	ND	NC	NC
7	**D50373**	0.355	0.353	0.354	0.6	2.55	2.52	2.54	1.2	ND	ND	NC	NC
8	**D77859**	0.13	0.13	0.13	0.0	0.467	0.448	0.458	4.2	0.0403	0.0390	0.0397	3.3

Note: The RPD limit is 25%.

TABLE D-2-16. SVOCs MS/MSD DATA

T

Analytical Batch	Sample Result µg/g	Matrix Spike			Matrix Spike Duplicate			RPD
		Spiked Conc. µg/g	Found Conc. µg/g	%R	Spiked Conc. µg/g	Found Conc. µg/g	%R	
3705	559	11200	3020	22 *	10200	2890	23 *	0.9
4102	2170	1100	2560	35 *	1120	2590	38 *	2.0
4901	2900	1020	2940	4 *	1030	2920	2 *	2.0
6203	787	1130	1360	51	1040	1330	52	1.5
7104	1670	9350	7010	57	9440	7010	57	0.5
7606	1090	9290	5160	44 *	9700	5200	42 *	1.4
8005	3530	9500	8640	54	9600	8960	57	2.8
8613	2040	9390	3710	18 *	9480	3510	16 *	2.3

Q

Analytical Batch	Sample Result µg/g	Matrix Spike			Matrix Spike Duplicate			RPD
		Spiked Conc. µg/g	Found Conc. µg/g	%R	Spiked Conc. µg/g	Found Conc. µg/g	%R	
3705	26400	7800	31300	63	7150	27500	15 *	47.4 *
4102	29200	10000	38200	90	10200	38900	95	5.1
4901	30200	9310	34700	48 *	9380	34500	46 *	2.5
6203	29700	10300	38500	85	9510	36900	76	9.7
7104	42900	10200	51700	86	10300	50200	71	15.4
7606	49300	10100	52400	31 *	10600	52300	28 *	2.4
7606/4413	58500	53600	101000	79	51400	96100	73	6.1
8005	25200	10400	28900	36 *	10500	29500	41 *	5.4
8005/4610	28300	51700	59700	61	51200	57100	56	4.5
8613	29000	10200	33500	44 *	10300	31500	24 *	19.8
8613/4743	34700	51800	64500	58	51600	62300	53	4.0

Note: The %R limits are 50% to 150%. The RPD limit is 25%.

* Indicates the Result did not meet the QC limit.

TABLE D-2-16. SVOCs MS/MSD DATA (Continued)

Hexachloroethane

Analytical Batch	Sample Result µg/g	Matrix Spike			Matrix Spike Duplicate			RPD
		Spiked Conc. µg/g	Found Conc. µg/g	%R	Spiked Conc. µg/g	Found Conc. µg/g	%R	
3705	ND	11700	11500	98	10700	10600	99	0.8
4102	ND	1080	1270	118	1100	1320	120	2.4
4901	ND	1000	1120	112	1010	1110	110	2.1
6203	ND	1110	1420	128	1020	1300	127	0.5
7104	ND	974	816	84	983	789	80	3.5
7606	ND	967	1040	108	1010	1090	108	0.4
8005	ND	990	831	84	1000	844	84	0.5
8613	ND	978	942	96	988	921	93	3.1

Note: The %R limits are 50% to 150%. The RPD limit is 25%.

* Indicates the Result did not meet the QC limit.

2.5 LEWISITE ANALYSES – METHOD AM-126

The samples were analyzed for Lewisite using Method AM-126. The possible presence of Lewisite in Mustard was based on the unknown history of the Mustard ton containers used to store the Mustard. An aliquot of each agent sample was weighed into a volumetric flask, the weight recorded, and the sample diluted to the known volume with methylene chloride as directed by the method. A 1.0-mL aliquot is placed in the autosampler vials and the internal standard and derivatization reagent were added. The samples were then analyzed by GC/MS. Concentrations of Lewisite were then calculated from the analysis results from the diluted samples. The data quality was verified by the recovery of surrogates and spiked samples.

The data review included an evaluation of the following:

- GC/MS tuning,
- Instrument calibration,
- Laboratory blank results,
- LCS results,
- Duplicate Analyses Results and,
- MS/MSD Results.

Results of the data review are contained in the following subsections. Method AM-126 data can be found in Appendix C.

2.5.1 GC/MS Tuning

The GC/MS instrument was tuned to ensure mass resolution, identification, and sensitivity. The GC/MS instrument was tuned by performing the following tasks:

- Analyzing DFTPP at the beginning of each 12-hour period during which samples or standards are analyzed; and

- Comparing the ion abundance for selected mass to electron ratios to the ion abundance criteria specified in Method 8270C.

The GC/MS instrument tunings met the criteria during analysis of the samples.

An additional part of the GC/MS tune was the system check on the injection port inertness and column performance. The criteria for injection port inertness and peak tailing were met for each tune check.

2.5.2 Instrument Calibration

Requirements for instrument calibration were established to ensure the instrument was capable of producing acceptable quantitative data for Lewisite. A quadratic curve was used to calculate the calibration curve for Lewisite. A six-point curve was run and the quadratic calculation best fit the data. SW-846 Method 8000B allows the use of quadratic curves if six standards are used. Continuing calibration demonstrated maintenance of the linear curve over the course of the analysis period.

The initial calibration was conducted for each sample set. A quadratic curve was fitted to each sample set. Six standards were used for the calibration curve because a quadratic curve fit was used for the calibration data. The calculated calibration points were within ± 15% with the exception of the low standard for Sample Sets 4 and 6. These values had %R of 119% and 131%. The CCCs met the %R limit of ± 25% for each sample set.

2.5.3 Laboratory Blanks

Laboratory blank samples were analyzed to determine the existence and magnitude of contamination resulting from laboratory activities. No Lewisite was detected in the laboratory blanks at or above the PQL. Method Blank data are reported in Appendix C.

2.5.4 Laboratory Control Sample Data

The LCS was analyzed to provide information on the accuracy of the analytical method and on the laboratory performance. Table D-2-17 summarizes the LCS results for Method AM-126. The %R limits were met for each sample. No data was qualified based on the results from the LCS analyses.

2.5.5 Duplicate Sample Analyses

Two types of duplicate analyses were performed using Method AM-101. The first type was a Laboratory Duplicate prepared by weighing out two aliquots of the same sample and analyzing them separately. Lewisite was found in the laboratory duplicate set from Sample Set 5. The results were 12.7 μg/g and 12.6 μg/g for an RPD of 0.8%.

The second duplicate analyses were from the field duplicates, which were prepared by collecting duplicate samples in the field. The field duplicates were submitted as blind samples to the laboratory. Lewisite was found in the field duplicates from Sample Set 5. The results were 12.7 μg/g and 13.9 μg/g for an RPD of 9.0%.

TABLE D-2-17. LEWISITE LABORATORY CONTROL SAMPLE RESULTS

Batch No.	Lab ID	Known Conc. µg/g	Found Conc. µg/g	%R
1	3743	25.2	29.2	116
	3747	25.2	26.6	106
2	3672	25.2	28.3	112
	3676	25.2	32.3	128
3	3894	25.2	29.9	119
	3898	25.2	25.3	100
4	4138	25.2	26.1	104
	4142	25.2	26.3	104
5	4224	25.2	23.9	95
	4228	25.2	25.0	99
6	4488	25.2	37.3	148
	4492	25.2	32.1	127
7	4650	25.2	26.9	107
	4654	25.2	32.2	128
8	4821	25.2	28.8	114

Note: The %R limits are 50% to 150%.

2.5.6 Matrix Spike/Matrix Spike Duplicates

The MS/MSD were analyzed to determine precision and accuracy of the analytical method on the matrix of concern at the time of sample analysis. The MS/MSD were created by the laboratory by splitting a sample and spiking the splits with Lewisite prior to analysis. Accuracy was assessed by evaluating the %R of the spiked compounds in the MS/MSD. Precision was assessed by evaluating the RPD between the MS and MSD.

Table D-2-18 summarizes the Lewisite MS/MSD results associated with the samples. The MS/MSD results were within the QC limits established by the laboratory with the exception of two sets of data. Sample Set 2 failed the QC limits for RPD. Samples from Sample Set 8 were above the %R limits for both samples. The data from Sample Set 8 was qualified as estimated high.

TABLE D-2-18. LEWISITE MS/MSD DATA

Batch No.	Analytical Batch	Sample Result µg/g	Matrix Spike			Matrix Spike Duplicate			RPD
			Spiked Conc. µg/g	Found Conc. µg/g	%R	Spiked Conc. µg/g	Found Conc. µg/g	%R	
1	4204	ND	24.7	25.8	104	26.1	25.9	99	5.2
2	4203	ND	26.1	38.4	147	26.8	20.2	75	71.8 *
3	5002	ND	27.2	26.6	98	27.3	26.0	95	2.6
4	6201	ND	25.5	26.4	104	25.3	24.2	96	7.9
5	6903	12.7	25.9	33.3	80	25.6	33.5	81	1.7
6	7705	ND	26	30	115	25.7	28.8	112	3.3
7	8304	ND	25.7	27.2	106	25.7	27	105	0.8
8	8618	ND	26.1	43.9	168 *	25.8	41	159 *	9.3

Note: The %R limits are 50% to 150%. The RPD limit is 25%.

3.0 DATA VALIDATION OF ANALYSES FOR METALS

This section presents the results of the data validation conducted in accordance with the QAPP to verify the quality and usability of the metals analyses data. The criteria used for evaluating the metals analysis data were those outlined in the analytical methods and the QA/QC Objectives presented in Section 5 of the of the QAPP.

The samples were analyzed for metallic elements using Method AM-118, which uses an inductively couple plasma/mass spectrometer (ICP/MS) to analyze the samples. The metals were a known impurity in Mustard based on prior analyses conducted on Mustard Stockpiles at other Army installations. Metals were analyzed in the liquid Mustard samples, samples of the Non-Cohesive Solids (NCS), and the solid samples. The metals analyzed were those used in the HHRA conducted in 2002.

3.1 METALS ANALYSES OF LIQUID MUSTARD SAMPLES

Liquid Mustard samples were analyzed for the HHRA metals using Method AM-118. The data validation included an evaluation of the following:

- Instrument tune,
- Instrument calibration,
- Internal standards,
- Interference checks samples,
- Laboratory blank sample results,
- Laboratory control sample results,
- Method Blank results, and
- Sample duplicate analyses results.

Results of the data validation are contained in the following subsections. Method AM-118 data are presented in Appendix C.

3.1.1 Instrument Tune Data

The ICP/MS instrument was tuned to ensure mass resolution, identification and sensitivity. The ICP/MS was tuned prior to calibration and achieved a mass resolution of <1.0 atomic mass units (amu) at 10% peak height and met the mass calibration of ± 0.1 amu from the expected value.

3.1.2 Instrument Calibration

Instrument calibration was performed to ensure the instrument was capable of producing acceptable quantitative data. Initial calibration demonstrated the instrument was capable of acceptable performance prior to sample analysis. Continuing calibration sample analyses verify that the initial calibration was still valid.

The ICP/MS was calibrated in accordance with Methods AM-118. Initial calibration verification (ICV) and continuing calibration verification (CCV) standard results were within the acceptable control limits of 90 to 110% with a few exceptions. The selenium ICV results for Sample Set 6 was 86%. The selenium CCV standards were within limit so the data was not qualified. The CCV values for aluminum and boron were low for Sample Set 1 so the data was qualified. The boron CCV values for Sample Set 2 were low so the data was qualified. The beryllium CCVs were low for Sample Set 8, but the data was not qualified since no beryllium was detected in the samples.

3.1.3 Internal Standards

Internal standards were monitored to ensure that instrument sensitivity and response were stable during the analysis of each sample. Internal standard responses were > 30% for each sample as required by Method AM-118.

3.1.4 Method Blanks

Method Blanks were analyzed to determine the background contamination resulting from laboratory handling of the samples. Method blank results are reported at the end of the Analytical Summary Sheets included for each sample set. No elements were detected above the laboratory PQL. No qualification of the liquid Mustard sample metals results were required due to method blank results.

3.1.5 Laboratory Control Sample Results

Laboratory control samples are samples of known concentration which were prepared and analyzed along with the liquid Mustard samples. The LCS was used to monitor the overall performance of the preparation and analysis process. The LCS provided an evaluation of the accuracy of the preparation and analysis process. The %R limits for the LCS were 75% to 125%.

The LCS results are summarized in Table D-3-1. The %R limits were met for each sample set except the boron for Sample Set 5. The result was just under the limit so the data was qualified. The other data met the %R Limit.

3.1.6 Matrix Spike/Matrix Spike Duplicate Results

The MS/MSD samples were prepared when the samples were prepared for analysis. A known concentration was spiked into a sample aliquot, which were prepared and analyzed along with the liquid Mustard samples. The MS/MSD were used to monitor the overall performance of the preparation and analysis process. The MS/MSD provided an evaluation of the accuracy and precision of the preparation and analysis process. The %R limits for the MS/MSD were 75% to 125% for most metals, but selected metals had limits that were 50% to 150%. The RPD criterion was ≤ 25%.

The MS/MSD results are summarized in Table D-3-2. The criteria for %R and RPD were met for each sample set except for one. The boron results for Sample Set 1 were low resulting in the boron data for Sample Set 1 being qualified.

3.1.7 Sample Duplicate Results

Two types of duplicate analyses were performed using Method AM-118. The first type was a Laboratory Duplicate prepared by weighing out two aliquots of the same sample and analyzing them separately. The Laboratory Duplicate results are summarized in Table D-3-3. The criterion for RPD was ≤ 25%. Table D-3-3 shows the criterion was met for the sample sets. The data was not qualified.

The second duplicate analyses were from the field duplicates, which were prepared by collecting duplicate samples in the field. The field duplicates were submitted as blind samples to the laboratory. The results of the field duplicates are summarized in Table D-3-4. The duplicate analyses met the criteria for RPD of ≤ 25%.

TABLE D-3-1. LIQUID METALS LABORATORY CONTROL SAMPLE RESULTS

Metals	Known Value mg/Kg	Sample Set 1		Sample Set 2		Sample Set 3		Sample Set 4	
		Result mg/Kg	%R	Result mg/Kg	%R	Result mg/Kg	%R	Result mg/Kg	%R
Aluminum	500	470	94	489	98	524	105	483	97
Antimony	50	50.7	101	44.2	88	54.9	110	47	94
Arsenic	50	50.1	100	51.7	103	53.2	106	51.5	103
Barium	50	51.5	103	49.4	99	53.6	107	50	100
Beryllium	50	48.1	96	47.1	94	41.8	84	43.8	88
Boron	500	446	89	388	78	418	84	423	85
Cadmium	50	52.9	106	50.7	101	56.2	112	48.1	96
Chromium	50	47.2	94	49.5	99	52.9	106	48.1	96
Cobalt	50	47.1	94	47.8	96	50.6	101	47.9	96
Copper	50	57	114	49.7	99	51.3	103	50.2	100
Lead	50	48.2	96	49.1	98	51.1	102	49.9	100
Manganese	50	47	94	49.2	98	52.1	104	48.8	98
Mercury	2.5	2.74	110	2.67	107	2.89	116	2.57	103
Nickel	50	47.2	94	48	96	50.3	101	47.3	95
Selenium	50	49.9	100	51.4	103	51.9	104	51.3	103
Silver	50	54.1	108	49.7	99	55.1	110	47.7	95
Thallium	50	47	94	47.3	95	49.8	100	47	94
Tin	50	51.4	103	48.7	97	54.8	110	47.7	95
Vanadium	50	46.3	93	47.6	95	50.4	101	47.9	96
Zinc	50	50.6	101	52.1	104	52.9	106	52	104

Note: The %R limits are from 75% to 125%.

* Indicates the Results did not meet the QC Limit.

TABLE D-3-1. LIQUID METALS LABORATORY CONTROL SAMPLE RESULTS (Continued)

Metals	Known Value mg/Kg	Sample Set 5		Sample Set 6		Sample Set 7		Sample Set 8	
		Result mg/Kg	%R	Result mg/Kg	%R	Result mg/Kg	%R	Result mg/Kg	%R
Aluminum	500	458	92	534	107	505	101	522	104
Antimony	50	42.7	85	42	84	48.7	97	52.2	104
Arsenic	50	50.7	101	50.8	102	50.6	101	55.1	110
Barium	50	49	98	50.5	101	52.5	105	55.5	111
Beryllium	50	41.9	84	46.6	93	47.1	94	50.8	102
Boron	500	370	74 *	458	92	414	83	514	103
Cadmium	50	46.8	94	50.8	102	51.3	103	56.4	113
Chromium	50	49.1	98	49.2	98	50.4	101	54.3	109
Cobalt	50	48	96	48.7	97	49.4	99	50.1	100
Copper	50	49.1	98	49.9	100	50.7	101	52.4	105
Lead	50	52.1	104	50	100	50.3	101	50.4	101
Manganese	50	49.3	99	49.2	98	50.3	101	51.1	102
Mercury	2.5	2.42	97	2.53	101	2.68	107	2.76	110
Nickel	50	47.3	95	48.5	97	49	98	50.1	100
Selenium	50	47.2	94	49.1	98	47.6	95	53.8	108
Silver	50	47.2	94	53.7	107	46	92	56.1	112
Thallium	50	50.5	101	51	102	46.6	93	50.3	101
Tin	50	47	94	49.2	98	51.2	102	53.9	108
Vanadium	50	49.2	98	49	98	50	100	50.2	100
Zinc	50	47.9	96	50.5	101	52.5	105	53.1	106

Note: The %R limiThe %R limits are from 75% to 125%.

* Indicates t* Indicates the Results did not meet the QC Limit.

TABLE D-3-2. LIQUID METALS MS/MSD DATA

	Sample Set 1								Sample Set 2							
		MS			MSD					MS			MSD			
Metals	Sample Result mg/Kg	Spiked Amount mg/Kg	Result mg/Kg	%R	Spiked Amount mg/Kg	Result mg/Kg	%R	RPD	Sample Result mg/Kg	Spiked Amount mg/Kg	Result mg/Kg	%R	Spiked Amount mg/Kg	Result mg/Kg	%R	RPD
Aluminum	ND	514	469	91	519	467	90	1.3	ND	500	532	106	505	480	95	11.4
Antimony	ND	51.4	50.5	98	51.9	50.1	97	1.7	ND	50	51.2	102	50.5	49.7	98	4.0
Arsenic	ND	51.4	56.1	109	51.9	55.1	106	3.0	ND	50	52.8	106	50.5	52.2	103	2.2
Barium	ND	51.4	50.4	98	51.9	49.3	95	3.1	ND	50	52.3	105	50.5	50.4	100	4.8
Beryllium	ND	51.4	42.1	82	51.9	42.3	82	0.4	ND	50	48.5	97	50.5	48.2	95	1.6
Boron	ND	514	350	68 *	519	349	67 *	0.8	ND	500	428	86	505	419	83	2.6
Cadmium	ND	51.4	51.3	100	51.9	50.1	97	3.3	ND	50	51.6	103	50.5	50.2	99	3.8
Chromium	ND	51.4	52.3	102	51.9	51.6	99	2.3	10.9	50	60.9	100	50.5	59.6	96	3.6
Cobalt	ND	51.4	49.2	96	51.9	48	92	3.2	ND	50	53	106	50.5	51.3	102	4.4
Copper	9.43	51.4	61.4	101	51.9	59.5	96	4.6	20.4	50	79.2	118	50.5	74	106	11.5
Lead	ND	51.4	48	93	51.9	47	91	2.8	ND	50	52.4	105	50.5	51	101	3.8
Manganese	3.76	51.4	54.9	99	51.9	53.9	97	2.9	ND	50	54.2	108	50.5	53	105	3.4
Mercury	ND	2.57	2.8	109	2.59	2.81	108	0.5	ND	2.5	2.68	107	2.52	2.67	106	1.2
Nickel	ND	51.4	52.1	101	51.9	50.1	97	4.8	ND	50	53.5	107	50.5	51.7	102	4.6
Selenium	ND	51.4	53.3	104	51.9	52.8	102	2.0	ND	50	52.6	105	50.5	52	103	2.2
Silver	ND	51.4	49.7	97	51.9	48.9	94	2.5	ND	50	53.6	107	50.5	52.2	103	3.8
Thallium	ND	51.4	47.2	92	51.9	46.3	89	2.6	ND	50	51.8	104	50.5	50.4	100	3.8
Tin	ND	51.4	49.5	96	51.9	49.1	95	1.7	ND	50	51.8	104	50.5	51	101	2.6
Vanadium	ND	51.4	50.4	98	51.9	50	96	1.7	ND	50	55.2	110	50.5	54.1	107	3.3
Zinc	ND	51.4	57.7	112	51.9	55	106	6.3	ND	50	52.7	105	50.5	51.1	101	4.2

Notes: The %R limits are 75% to 125%, except for As, Hg, Se, Ag, and Zn, which are 50% to 150%. The RPD limit is 25%.

* Indicates the Result did not meet the QC Limit.

ND = Not Detected at the PQL.

TABLE D-3-2. LIQUID METALS MS/MSD DATA (Continued)

Metals	Sample Set 3								Sample Set 4							
		MS			MSD					MS			MSD			
	Sample Result mg/Kg	Spiked Amount mg/Kg	Result mg/Kg	%R	Spiked Amount mg/Kg	Result mg/Kg	%R	RPD	Sample Result mg/Kg	Spiked Amount mg/Kg	Result mg/Kg	%R	Spiked Amount mg/Kg	Result mg/Kg	%R	RPD
Aluminum	ND	543	613	113	505	557	110	2.6	ND	537	489	91	532	449	84	6.7
Antimony	ND	54.3	58.5	108	50.5	51.4	102	6.0	ND	53.7	50.2	93	53.2	49.6	93	0.2
Arsenic	ND	54.3	58.7	108	50.5	54.2	107	0.8	7.51	53.7	58.1	94	53.2	59.7	98	3.9
Barium	ND	54.3	58.8	108	50.5	52.2	103	4.9	ND	53.7	54	101	53.2	53.1	100	0.7
Beryllium	ND	54.3	62.1	114	50.5	57.1	113	1.3	ND	53.7	43.8	82	53.2	43.9	83	1.0
Boron	ND	543	574	106	505	492	97	8.3	ND	537	448	83	532	459	86	2.9
Cadmium	ND	54.3	58.8	108	50.5	53.3	106	2.7	ND	53.7	49.5	92	53.2	48.6	91	0.8
Chromium	ND	54.3	66.8	123	50.5	58.1	115	8.0	ND	53.7	60.8	113	53.2	58	109	4.2
Cobalt	ND	54.3	59.6	110	50.5	52.6	104	5.6	ND	53.7	53.7	100	53.2	53.1	100	0.2
Copper	5.79	54.3	66.2	111	50.5	58.8	105	6.3	39.3	53.7	95.4	104	53.2	96	107	2.1
Lead	ND	54.3	58.7	108	50.5	52	103	5.1	ND	53.7	55.3	103	53.2	54.8	103	0.0
Manganese	1.52	54.3	63.4	114	50.5	55.6	107	6.9	ND	53.7	55.7	104	53.2	55.3	104	0.2
Mercury	ND	2.71	3.15	116	2.52	2.92	116	0.4	ND	2.69	2.76	103	2.66	2.78	105	1.9
Nickel	ND	54.3	59.8	110	50.5	52.8	105	5.6	5.64	53.7	56	94	53.2	57.5	97	3.7
Selenium	ND	54.3	56.8	105	50.5	53.1	105	0.5	ND	53.7	55.1	103	53.2	54.7	103	0.2
Silver	ND	54.3	57.9	107	50.5	53.5	106	0.7	ND	53.7	50.7	94	53.2	49.9	94	0.6
Thallium	ND	54.3	56.8	105	50.5	51.1	101	3.4	ND	53.7	53	99	53.2	51.7	97	1.5
Tin	ND	54.3	62	114	50.5	53	105	9.2	ND	53.7	51	95	53.2	50.5	95	0.0
Vanadium	ND	54.3	60.6	112	50.5	53	105	6.7	ND	53.7	56.8	106	53.2	55.8	105	0.9
Zinc	ND	54.3	57.5	106	50.5	53.9	107	0.8	ND	53.7	57	106	53.2	58.7	110	4.2

Notes: The %R limits are 75% to 125%, except for As, Hg, Se, Ag, and Zn, which are 50% to 150%. The RPD limit is 25%.

* Indicates the Result did not meet the QC Limit.

ND = Not Detected at the PQL.

TABLE D-3-2. LIQUID METALS MS/MSD DATA (Continued)

	Sample Set 5								Sample Set 6							
		MS			MSD					MS			MSD			
Metals	Sample Result mg/Kg	Spiked Amount mg/Kg	Result mg/Kg	%R	Spiked Amount mg/Kg	Result mg/Kg	%R	RPD	Sample Result mg/Kg	Spiked Amount mg/Kg	Result mg/Kg	%R	Spiked Amount mg/Kg	Result mg/Kg	%R	RPD
Aluminum	ND	512	478	93	520	465	89	3.9	ND	518	542	105	514	532	104	1.1
Antimony	ND	51.2	48.8	95	52	46.9	90	5.1	ND	51.8	46.3	89	51.4	43.3	84	5.1
Arsenic	21.6	51.2	77.4	109	52	75.4	103	5.5	ND	51.8	51.2	99	51.4	51.7	101	1.7
Barium	ND	51.2	53.3	104	52	51.1	98	5.8	ND	51.8	51.2	99	51.4	50.2	98	1.2
Beryllium	ND	51.2	45.2	88	52	46.6	90	1.3	ND	51.8	46.7	90	51.4	48.2	94	3.6
Boron	ND	512	397	78	520	409	79	1.1	ND	518	472	91	514	486	95	3.4
Cadmium	ND	51.2	50.6	99	52	48.8	94	5.0	ND	51.8	48.3	93	51.4	47.4	92	1.0
Chromium	4.61	51.2	57.3	103	52	54.5	96	7.0	5.16	51.8	55.9	98	51.4	56.9	101	2.7
Cobalt	ND	51.2	52.5	103	52	50.3	97	5.8	ND	51.8	50.8	98	51.4	49.9	97	1.0
Copper	57	51.2	112	107	52	106	94	13.2	45.4	51.8	98.6	103	51.4	96.4	99	3.5
Lead	ND	51.2	58.8	115	52	56.5	109	6.2	ND	51.8	52.3	101	51.4	51.2	100	1.4
Manganese	ND	51.2	54.2	106	52	52	100	5.9	ND	51.8	52.2	101	51.4	51	99	1.6
Mercury	1.47	2.56	4.17	105	2.6	4.25	107	1.5	ND	2.59	2.65	102	2.57	2.47	96	6.2
Nickel	ND	51.2	53	104	52	50.9	98	5.6	ND	51.8	51.1	99	51.4	50.1	97	1.2
Selenium	ND	51.2	57.3	112	52	55.9	108	4.4	ND	51.8	49.4	95	51.4	50.3	98	2.5
Silver	ND	51.2	53.6	105	52	50.2	97	8.1	ND	51.8	52.8	102	51.4	51.9	101	1.0
Thallium	ND	51.2	58.3	114	52	55.4	107	7.3	ND	51.8	54	104	51.4	52.9	103	1.3
Tin	ND	51.2	51.1	100	52	49.7	96	4.2	ND	51.8	50.2	97	51.4	47.9	93	3.7
Vanadium	ND	51.2	54.7	107	52	51.4	99	8.0	ND	51.8	52.9	102	51.4	52.8	103	0.6
Zinc	ND	51.2	50.9	99	52	49.9	96	3.5	ND	51.8	49.9	96	51.4	48.8	95	1.4

Notes: The %R limits are 75% to 125%, except for As, Hg, Se, Ag, and Zn, which are 50% to 150%. The RPD limit is 25%.

* Indicates the Result did not meet the QC Limit.

ND = Not Detected at the PQL.

TABLE D-3-2. LIQUID METALS MS/MSD DATA (Continued)

Metals	Sample Set 7								Sample Set 8							
		MS			MSD					MS			MSD			
	Sample Result mg/Kg	Spiked Amount mg/Kg	Result mg/Kg	%R	Spiked Amount mg/Kg	Result mg/Kg	%R	RPD	Sample Result mg/Kg	Spiked Amount mg/Kg	Result mg/Kg	%R	Spiked Amount mg/Kg	Result mg/Kg	%R	RPD
Aluminum	ND	515	489	95	524	507	97	1.8	ND	535	535	100	514	487	95	5.3
Antimony	ND	51.5	50.4	98	52.4	51.2	98	0.2	ND	53.5	53.1	99	51.4	50.5	98	1.0
Arsenic	ND	51.5	53.8	104	52.4	56.1	107	2.6	ND	53.5	58.5	109	51.4	55.8	109	0.8
Barium	ND	51.5	54.9	107	52.4	55.9	107	0.1	ND	53.5	57.6	108	51.4	55.9	109	1.1
Beryllium	ND	51.5	45.7	89	52.4	47.6	91	2.1	ND	53.5	50.8	95	51.4	48.9	95	0.2
Boron	ND	515	452	88	524	467	89	1.4	ND	535	556	104	514	485	94	9.6
Cadmium	ND	51.5	51	99	52.4	52.8	101	1.7	ND	53.5	55.7	104	51.4	53	103	1.0
Chromium	ND	51.5	54.3	105	52.4	55.6	106	0.7	ND	53.5	61.1	114	51.4	58.4	114	0.6
Cobalt	ND	51.5	49.8	97	52.4	50.7	97	0.1	ND	53.5	51	95	51.4	50	97	1.9
Copper	61.7	51.5	111	96	52.4	113	98	2.2	30.6	53.5	84.5	101	51.4	81.6	99	1.5
Lead	ND	51.5	56.4	110	52.4	57.3	109	0.2	ND	53.5	55.1	103	51.4	53.9	105	1.9
Manganese	ND	51.5	50.4	98	52.4	51.3	98	0.0	2.81	53.5	54.8	102	51.4	52.4	102	0.5
Mercury	ND	2.58	2.84	110	2.62	3.2	122	12.1	ND	2.67	3.05	114	2.57	2.81	109	4.9
Nickel	ND	51.5	50.2	97	52.4	50.9	97	0.3	ND	53.5	51.3	96	51.4	50.2	98	1.8
Selenium	ND	51.5	53.6	104	52.4	56.3	107	3.4	ND	53.5	58.5	109	51.4	57.4	112	2.3
Silver	ND	51.5	48.7	95	52.4	49.6	95	0.1	ND	53.5	55	103	51.4	53.4	104	1.1
Thallium	ND	51.5	54.7	106	52.4	55.2	105	0.9	ND	53.5	55.9	104	51.4	54.2	105	1.0
Tin	ND	51.5	52.8	103	52.4	51.9	99	3.5	ND	53.5	56.2	105	51.4	54.2	105	0.4
Vanadium	ND	51.5	51.6	100	52.4	53	101	1.0	ND	53.5	50.6	95	51.4	48.8	95	0.4
Zinc	ND	51.5	54.1	105	52.4	60.1	115	9.6	ND	53.5	55.1	103	51.4	53.4	104	0.9

Notes: The %R limits are 75% to 125%, except for As, Hg, Se, Ag, and Zn, which are 50% to 150%. The RPD limit is 25%.

* Indicates the Result did not meet the QC Limit.

ND = Not Detected at the PQL.

TABLE D-3-3. LIQUID METALS LABORATORY DUPLICATE RESULTS

Metals	Sample Set 1			Sample Set 2			Sample Set 3			Sample Set 4		
	Sample Result mg/Kg	Dupl. Result mg/Kg	RPD	Sample Result mg/Kg	Dupl. Result mg/Kg	RPD	Sample Result mg/Kg	Dupl. Result mg/Kg	RPD	Sample Result mg/Kg	Dupl. Result mg/Kg	RPD
Aluminum	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Antimony	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Arsenic	ND	ND	NC	ND	ND	NC	ND	ND	NC	7.51	ND	NC
Barium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Beryllium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Boron	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Cadmium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Chromium	ND	ND	NC	10.9	ND	NC	ND	ND	NC	ND	ND	NC
Cobalt	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Copper	9.43	9.27	1.7	20.4	20.3	0.5	5.79	5.99	3.4	39.3	39.6	0.8
Lead	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Manganese	3.76	3.65	3.0	ND	ND	NC	1.52	1.59	4.5	ND	ND	NC
Mercury	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Nickel	ND	ND	NC	ND	ND	NC	ND	ND	NC	5.64	ND	NC
Selenium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Silver	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Thallium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Tin	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Vanadium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Zinc	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC

Notes: The RPD limit is 25%.

* Indicates the Result did not meet the QC Limit.

ND = Not Detected above the PQL.

NC = Not Calculated

TABLE D-3-3. LIQUID METALS LABORATORY DUPLICATE RESULTS (Continued)

Metals	Sample Set 5			Sample Set 6			Sample Set 7			Sample Set 8		
	Sample Result mg/Kg	Dupl. Result mg/Kg	RPD	Sample Result mg/Kg	Dupl. Result mg/Kg	RPD	Sample Result mg/Kg	Dupl. Result mg/Kg	RPD	Sample Result mg/Kg	Dupl. Result mg/Kg	RPD
Aluminum	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Antimony	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Arsenic	21.6	22	1.8	ND	ND	NC	ND	ND	NC	ND	ND	NC
Barium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Beryllium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Boron	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Cadmium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Chromium	4.61	4.97	7.5	5.16	5.18	0.4	ND	ND	NC	ND	ND	NC
Cobalt	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Copper	57	57.1	0.2	45.4	44.0	3.1	61.7	61.7	0.0	30.6	29.7	3.0
Lead	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Manganese	ND	ND	NC	ND	ND	NC	ND	ND	NC	2.81	2.83	0.7
Mercury	1.47	1.4	4.9	ND	ND	NC	ND	ND	NC	ND	ND	NC
Nickel	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Selenium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Silver	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Thallium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Tin	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Vanadium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Zinc	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC

Notes: The RPD limit is 25%.

* Indicates the Result did not meet the QC Limit.

ND = Not Detected above the PQL.

NC = Not Calculated

TABLE D-3-4. LIQUID METALS FIELD DUPLICATE RESULTS

Metals	Sample Set 1			Sample Set 2			Sample Set 3			Sample Set 4		
	Sample Result mg/Kg	Dupl. Result mg/Kg	RPD	Sample Result mg/Kg	Dupl. Result mg/Kg	RPD	Sample Result mg/Kg	Dupl. Result mg/Kg	RPD	Sample Result mg/Kg	Dupl. Result mg/Kg	RPD
Aluminum	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Antimony	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Arsenic	ND	ND	NC	ND	ND	NC	ND	ND	NC	7.51	ND	NC
Barium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Beryllium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Boron	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Cadmium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Chromium	ND	ND	NC	5.30	5.00	5.8	6.05	ND	NC	ND	5.24	NC
Cobalt	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Copper	84.3	84.80	0.6	4.48	4.8	6.5	62.1	65.0	4.6	39.3	41.3	5.0
Lead	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Manganese	1.37	1.50	9.1	ND	ND	NC	ND	ND	NC	ND	ND	NC
Mercury	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Nickel	ND	ND	NC	ND	ND	NC	ND	ND	NC	5.64	ND	NC
Selenium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Silver	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Thallium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Tin	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Vanadium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Zinc	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC

Notes: The RPD limit is 25%.

ND = Not Detected above the PQL.

NC = Not Calculated

TABLE D-3-4. LIQUID METALS FIELD DUPLICATE RESULTS (Continued)

Metals	Sample Set 5			Sample Set 6			Sample Set 7			Sample Set 8		
	Sample Result mg/Kg	Dupl. Result mg/Kg	RPD	Sample Result mg/Kg	Dupl. Result mg/Kg	RPD	Sample Result mg/Kg	Dupl. Result mg/Kg	RPD	Sample Result mg/Kg	Dupl. Result mg/Kg	RPD
Aluminum	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Antimony	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Arsenic	21.6	21.7	0.5	ND	ND	NC	ND	ND	NC	ND	ND	NC
Barium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Beryllium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Boron	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Cadmium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Chromium	4.61	4.90	6.1	5.16	5.56	7.5	ND	ND	NC	ND	ND	NC
Cobalt	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Copper	57	58.7	2.9	45.4	45.7	0.7	7.53	8.9	16.3	ND	ND	NC
Lead	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Manganese	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Mercury	1.47	1.48	0.7	ND	ND	NC	ND	ND	NC	ND	ND	NC
Nickel	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Selenium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Silver	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Thallium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Tin	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Vanadium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Zinc	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC

Notes: The RPD limit is 25%.

ND = Not Detected above the PQL.

NC = Not Calculated

3.2 METALS ANALYSES OF NON-COHESIVE SOLID SAMPLES

Samples of the NCS were analyzed for the HHRA metals using Method AM-118. The data validation included an evaluation of the following:

- Instrument tune,
- Instrument calibration,
- Internal standards,
- Interference checks samples,
- Method Blank sample results,
- Laboratory control sample results,
- Certified Reference Material Sample results, and
- Sample duplicate analyses results.

Results of the data validation are contained in the following subsections. Method AM-118 data are presented in Appendix C.

3.2.1 Instrument Tune Data

The ICP/MS instrument was tuned to ensure mass resolution, identification and sensitivity. The ICP/MS was tuned prior to calibration and achieved a mass resolution of <1.0 amu at 10% peak height and met the mass calibration of ±0.1 amu from the expected value.

3.2.2 Instrument Calibration

Instrument calibration was performed to ensure the instrument was capable of producing acceptable quantitative data. Initial calibration demonstrated the instrument was capable of acceptable performance prior to sample analysis. Continuing calibration sample analyses verify that the initial calibration was still valid.

The ICP/MS was calibrated in accordance with Methods AM-118. The ICV standard results were within the acceptable control limits of 90 to 110%. There were four cases where the CCV standard did not meet the %R Limit. The boron CCV standards were low for Sample Sets 1, 2, and 8. The boron NCS results for these sample sets were qualified. The aluminum CCV standards for Sample Set 3 were high resulting in the aluminum NCS data being qualified for Sample Set 3.

3.2.3 Internal Standards

Internal standards were monitored to ensure that instrument sensitivity and response were stable during the analysis of each sample. Internal standard recovery for each sample was > 30% as required in Method AM-118.

3.2.4 Method Blanks

Method Blanks were analyzed to determine the background contamination resulting from laboratory handling of the samples. Method blank results are reported at the end of the Analytical Summary Sheets included for each sample set. No elements were detected above the laboratory PQL. No qualification of the liquid Mustard sample metals results were required due to method blank results.

3.2.5 Laboratory Control Sample Results

Laboratory control samples are samples of known concentration which were prepared and analyzed along with the liquid Mustard samples. The LCS was used to monitor the overall performance of the preparation and analysis process. The LCS provided an evaluation of the accuracy of the preparation and analysis process. The %R limits for the LCS were 75% to 125%.

The LCS results are summarized in Table D-3-5. The %R and RPD criteria were met for each sample set except for boron in Sample Set 1 which were low. The Sample Set 1 boron data was qualified.

3.2.6 Matrix Spike/Matrix Spike Duplicate Results

The MS/MSD samples were prepared with the other samples for analysis. A known concentration was spiked into a sample aliquot, which were prepared and analyzed along with the NCS samples. The MS/MSD provided an evaluation of the accuracy and precision of the preparation and analysis process. The %R limits for the MS/MSD were 75% to 125% for most metals, but selected metals had limits that were 50% to 150%. The RPD criterion was ≤ 25%.

The MS/MSD results are summarized in Table D-3-6. Several native concentrations were greater than 4 times the spike concentration so %R and RPD results were not calculated. Sample Set 1 MSD boron results were low, but since the MS met the criteria, the data was not qualified. Manganese results were qualified for Sample Sets 2, 3, 5, and 8 based on the MS/MSD results. The manganese MS results for Sample Set 4 was high, since the MSD and RPD met the criteria, the results were not qualified. Sample Set 7 chromium, copper, nickel, and zinc MS/MSD results were low; therefore, the NCS Sample Set 7 data was qualified for those elements. Sample Set 7 manganese data was qualified because the RPD did not meet the criterion. The Sample Set 8 mercury RPD value was high; therefore, the data was qualified. The Sample Set 8 zinc MS data was high, since the MSD and RPD data met the criteria, the data was not qualified. The other MS/MSD data met the criteria.

TABLE D-3-5. NCS METALS LABORATORY CONTROL SAMPLE RESULTS

Metals	Known Value mg/Kg	Sample Set 1		Sample Set 2		Sample Set 3		Sample Set 4	
		Result mg/Kg	%R	Result mg/Kg	%R	Result mg/Kg	%R	Result mg/Kg	%R
Aluminum	500	480	96	475	95	511	102	513	103
Antimony	50	49.8	100	56.1	112	46.6	93	44.1	88
Arsenic	50	56.4	113	52	104	52.9	106	53.7	107
Barium	50	49.8	100	50.5	101	51	102	53.2	106
Beryllium	50	45.2	90	50.2	100	44.8	90	46	92
Boron	500	371	74 *	422	84	408	82	417	83
Cadmium	50	50	100	52.6	105	52.9	106	55.1	110
Chromium	50	51.3	103	52.2	104	52.4	105	49.5	99
Cobalt	50	49.7	99	50.5	101	49.9	100	49.3	99
Copper	50	51.5	103	51.9	104	51.1	102	51.1	102
Lead	50	47.8	96	51	102	49.2	98	51	102
Manganese	50	51.9	104	51.8	104	50.3	101	49.9	100
Mercury	2.5	2.92	117	2.79	112	2.83	113	2.69	108
Nickel	50	49.8	100	49.8	100	49.8	100	49	98
Selenium	50	51.4	103	51.3	103	51.5	103	55	110
Silver	50	48.9	98	51.5	103	52.5	105	54.9	110
Thallium	50	47.4	95	49.5	99	48.2	96	48.8	98
Tin	50	48.5	97	51.4	103	50.6	101	49.7	99
Vanadium	50	50.8	102	50.5	101	49.4	99	49.3	99
Zinc	50	57.8	116	53.9	108	61.7	123	51.3	103

Notes: The %R limits are 75% to 125%.

ND = Not Detected at the PQL.

* Indicates the Result did not meet the QC Limit.

TABLE D-3-5. NCS METALS LABORATORY CONTROL SAMPLE RESULTS (Continued)

Metals	Known Value mg/Kg	Sample Set 5		Sample Set 6		Sample Set 7		Sample Set 8	
		Result mg/Kg	%R	Result mg/Kg	%R	Result mg/Kg	%R	Result mg/Kg	%R
Aluminum	500	490	98	502	100	487	97	483	97
Antimony	50	44.6	89	44.1	88	48.8	98	47.7	95
Arsenic	50	53.6	107	53.5	107	53.4	107	50.5	101
Barium	50	53.1	106	50.6	101	51.7	103	51	102
Beryllium	50	44.6	89	49.5	99	44	88	46	92
Boron	500	413	83	424	85	409	82	395	79
Cadmium	50	56.9	114	51	102	52	104	50.9	102
Chromium	50	48.3	97	49.1	98	50.8	102	50.4	101
Cobalt	50	47.9	96	48.7	97	50.5	101	48.5	97
Copper	50	50.1	100	50.8	102	52.4	105	50.5	101
Lead	50	49	98	51.9	104	48.5	97	50.4	101
Manganese	50	49.1	98	49.8	100	51.3	103	50	100
Mercury	2.5	2.56	102	2.6	104	2.52	101	2.45	98
Nickel	50	47	94	48	96	50.4	101	48	96
Selenium	50	50.9	102	52.6	105	52.4	105	48.8	98
Silver	50	54.6	109	52.4	105	51.2	102	47	94
Thallium	50	48.4	97	52.6	105	47	94	45	90
Tin	50	52.2	104	49	98	49.7	99	49.4	99
Vanadium	50	48.8	98	49.2	98	50	100	50.3	101
Zinc	50	52.1	104	51.9	104	53.1	106	51.7	103

Notes: The %R limits are 75% to 125%.

ND = Not Detected at the PQL.

* Indicates the Result did not meet the QC Limit.

TABLE D-3-6. NCS METALS MS/MSD DATA

	Sample Set 1								Sample Set 2							
		MS			MSD					MS			MSD			
Metals	Sample Result mg/Kg	Spiked Amount mg/Kg	Result mg/Kg	%R	Spiked Amount mg/Kg	Result mg/Kg	%R	RPD	Sample Result mg/Kg	Spiked Amount mg/Kg	Result mg/Kg	%R	Spiked Amount mg/Kg	Result mg/Kg	%R	RPD
Aluminum	ND	556	531	96	583	534	92	3.9	ND	508	466	92	503	510	101	9.7
Antimony	ND	55.6	52.9	95	58.3	44.8	77	18.3	ND	50.8	51.9	102	50.3	50.4	100	2.0
Arsenic	33	55.6	97.9	117	58.3	90.8	99	17.6	381	50.8	448	NC	50.3	420	NC	NC
Barium	ND	55.6	54.1	97	58.3	54.4	93	4.0	ND	50.8	49.1	97	50.3	53	105	8.7
Beryllium	ND	55.6	49.4	89	58.3	50.2	86	2.7	ND	50.8	48.7	96	50.3	52.9	105	9.3
Boron	ND	556	427	77	583	360	62 *	15.0	ND	508	452	89	503	437	87	2.1
Cadmium	ND	55.6	52.9	95	58.3	53.1	91	4.1	ND	50.8	52.7	104	50.3	57	113	9.6
Chromium	5.91	55.6	63.1	103	58.3	63.4	99	4.2	14.1	50.8	65.4	101	50.3	68.3	108	6.8
Cobalt	1.63	55.6	55.8	97	58.3	56.9	95	2.6	2.36	50.8	53.2	100	50.3	56.2	107	7.0
Copper	39.8	55.6	98.3	105	58.3	95.6	96	9.5	49.6	50.8	102	103	50.3	107	114	11.0
Lead	4.87	55.6	58.6	97	58.3	56.8	89	7.6	ND	50.8	54.7	108	50.3	57.4	114	6.4
Manganese	56.1	55.6	124	122	58.3	116	103	19.4	163	50.8	279	228 *	50.3	237	147 *	81.2 *
Mercury	0.965	2.78	3.22	81	2.91	3.28	80	1.6	ND	2.54	3.25	128	2.52	3.17	126	2.2
Nickel	6.47	55.6	60.7	98	58.3	61.2	94	3.7	12.6	50.8	62.4	98	50.3	67.7	110	11.5
Selenium	ND	55.6	57.2	103	58.3	60	103	0.0	ND	50.8	52.5	103	50.3	55	109	6.0
Silver	ND	55.6	51.4	92	58.3	51.5	88	4.1	ND	50.8	44	87	50.3	47.9	95	8.6
Thallium	ND	55.6	52	94	58.3	52.4	90	3.6	ND	50.8	47.2	93	50.3	51.1	102	8.7
Tin	ND	55.6	52.6	95	58.3	44.5	76	18.3	11.9	50.8	71.3	117	50.3	65.8	107	9.8
Vanadium	ND	55.6	57.9	104	58.3	58.3	100	4.1	ND	50.8	51.9	102	50.3	55.4	110	8.0
Zinc	29	55.6	90.1	110	58.3	87.2	100	10.1	46.1	50.8	110	126	50.3	104	115	10.7

Notes: The %R limits are 75% to 125%, except for As, Hg, Se, Ag, and Zn, which are 50% to 150%. The RPD limit is 25%.

ND = Not Detected at the PQL.

NC = Not Calculated since the native concentration was 4 or more times the spike concentration.

* Indicates the Result did not meet the QC Limit.

TABLE D-3-6. NCS METALS MS/MSD DATA (Continued)

Metals	Sample Set 3								Sample Set 4							
		MS			MSD					MS			MSD			
	Sample Result mg/Kg	Spiked Amount mg/Kg	Result mg/Kg	%R	Spiked Amount mg/Kg	Result mg/Kg	%R	RPD	Sample Result mg/Kg	Spiked Amount mg/Kg	Result mg/Kg	%R	Spiked Amount mg/Kg	Result mg/Kg	%R	RPD
Aluminum	ND	548	606	111	510	514	101	9.8	ND	498	513	103	531	538	101	1.7
Antimony	ND	54.8	57.7	105	51	49.8	98	7.6	ND	49.8	42.5	85	53.1	48.2	91	5.4
Arsenic	ND	54.8	61.2	112	51	55.3	108	3.2	33.7	49.8	75	83	53.1	87	100	17.4
Barium	ND	54.8	57.7	105	51	52.4	103	2.5	ND	49.8	47.5	95	53.1	51.7	97	2.0
Beryllium	ND	54.8	59.4	108	51	52.7	103	5.1	ND	49.8	47.6	96	53.1	52.4	99	3.1
Boron	ND	548	553	101	510	494	97	4.0	ND	498	455	91	531	517	97	6.0
Cadmium	ND	54.8	59.2	108	51	54.3	106	1.6	ND	49.8	47.8	96	53.1	52.1	98	2.1
Chromium	16.4	54.8	71.9	101	51	63.2	92	9.5	13.7	49.8	62.2	97	53.1	67.5	101	3.9
Cobalt	1.53	54.8	56	99	51	51	97	2.4	2.09	49.8	49.5	95	53.1	53.8	97	2.2
Copper	5.59	54.8	60.9	101	51	53.8	95	6.4	44.3	49.8	94.6	101	53.1	97.7	101	0.4
Lead	4.46	54.8	61	103	51	52.6	94	8.8	10.6	49.8	58.7	97	53.1	64.5	102	4.9
Manganese	95.4	54.8	184	162 *	51	128	64 *	97.8 *	137	49.8	200	127 *	53.1	197	113	13.5
Mercury	ND	2.74	3.5	128	2.55	3.04	119	8.5	ND	2.49	2.52	101	2.65	2.86	108	6.7
Nickel	11.3	54.8	71.4	110	51	58.7	93	16.7	11.6	49.8	55.8	89	53.1	62.6	96	7.3
Selenium	ND	54.8	57.9	106	51	51.9	102	3.9	ND	49.8	49.3	99	53.1	55.7	105	5.9
Silver	ND	54.8	59.4	108	51	54	106	2.5	ND	49.8	48.2	97	53.1	52.5	99	2.1
Thallium	ND	54.8	54.5	99	51	49.6	97	2.2	ND	49.8	45.5	91	53.1	50.1	94	3.0
Tin	ND	54.8	59.8	109	51	52.6	103	6.0	ND	49.8	47	94	53.1	53.8	101	6.9
Vanadium	ND	54.8	55.2	101	51	49.4	97	3.9	ND	49.8	50	100	53.1	54.2	102	1.7
Zinc	ND	54.8	59.2	108	51	54.5	107	1.2	50.1	49.8	99.5	99	53.1	103	100	0.4

Notes: The %R limits are 75% to 125%, except for As, Hg, Se, Ag, and Zn, which are 50% to 150%. The RPD limit is 25%.

ND = Not Detected at the PQL.

NC = Not Calculated since the native concentration was 4 or more times the spike concentration.

* Indicates the Result did not meet the QC Limit.

TABLE D-3-6. NCS METALS MS/MSD DATA (Continued)

	Sample Set 5								Sample Set 6							
		MS			MSD					MS			MSD			
Metals	Sample Result mg/Kg	Spiked Amount mg/Kg	Result mg/Kg	%R	Spiked Amount mg/Kg	Result mg/Kg	%R	RPD	Sample Result mg/Kg	Spiked Amount mg/Kg	Result mg/Kg	%R	Spiked Amount mg/Kg	Result mg/Kg	%R	RPD
Aluminum	ND	527	517	98	493	523	106	8.0	ND	481	487	101	526	607	115	14.2
Antimony	ND	52.7	56	106	49.3	51.7	105	1.4	ND	48.1	44.6	93	52.6	49.2	94	0.8
Arsenic	309	52.7	441	NC	49.3	383	NC	NC	ND	48.1	49.8	104	52.6	53.7	102	1.4
Barium	ND	52.7	49.8	94	49.3	50.3	102	7.5	ND	48.1	46.9	98	52.6	51.9	99	1.2
Beryllium	ND	52.7	50.7	96	49.3	51.2	104	7.6	ND	48.1	44.3	92	52.6	48.9	93	0.9
Boron	ND	527	515	98	493	478	97	0.8	ND	481	432	90	526	448	85	4.6
Cadmium	ND	52.7	51.5	98	49.3	52.3	106	8.4	ND	48.1	44.6	93	52.6	49.6	94	1.6
Chromium	8.07	52.7	61.8	102	49.3	63.6	113	10.7	ND	48.1	56.1	117	52.6	54.6	104	12.8
Cobalt	ND	52.7	51.1	97	49.3	51.8	105	8.1	ND	48.1	45.9	95	52.6	50.4	96	0.4
Copper	51.6	52.7	103	98	49.3	103	104	6.7	48.4	48.1	96.1	99	52.6	101	100	0.8
Lead	ND	52.7	50.8	96	49.3	51.4	104	7.9	ND	48.1	48.8	101	52.6	53.3	101	0.1
Manganese	67.3	52.7	146	149 *	49.3	132	131 *	18.1	1.04	48.1	48.9	100	52.6	52.4	98	1.9
Mercury	101	2.64	145	NC	2.46	119	NC	NC	ND	2.63	2.42	92	2.63	2.63	100	8.0
Nickel	8.93	52.7	56.9	91	49.3	59.6	103	11.8	ND	48.1	54.7	114	52.6	51.8	98	15.2
Selenium	ND	52.7	52.6	100	49.3	53.7	109	9.1	ND	48.1	47.9	100	52.6	50.6	96	3.4
Silver	ND	52.7	49.5	94	49.3	50	101	7.5	ND	48.1	47.5	99	52.6	51.7	98	0.5
Thallium	ND	52.7	48.7	92	49.3	49.3	100	7.6	ND	48.1	49.9	104	52.6	55	105	0.8
Tin	ND	52.7	56	106	49.3	51.5	104	1.8	ND	48.1	46.2	96	52.6	51.3	98	1.5
Vanadium	ND	52.7	53.8	102	49.3	54.7	111	8.9	ND	48.1	47.9	100	52.6	52.4	100	0.0
Zinc	22.8	52.7	79.2	107	49.3	76.6	109	2.1	ND	48.1	47.8	99	52.6	52.2	99	0.1

Notes: The %R limits are 75% to 125%, except for As, Hg, Se, Ag, and Zn, which are 50% to 150%. The RPD limit is 25%.

ND = Not Detected at the PQL.

NC = Not Calculated since the native concentration was 4 or more times the spike concentration.

* Indicates the Result did not meet the QC Limit.

TABLE D-3-6. NCS METALS MS/MSD DATA (Continued)

	Sample Set 7								Sample Set 8							
		MS			MSD					MS			MSD			
Metals	Sample Result mg/Kg	Spiked Amount mg/Kg	Result mg/Kg	%R	Spiked Amount mg/Kg	Result mg/Kg	%R	RPD	Sample Result mg/Kg	Spiked Amount mg/Kg	Result mg/Kg	%R	Spiked Amount mg/Kg	Result mg/Kg	%R	RPD
Aluminum	ND	493	481	98	491	493	100	2.8	ND	549	546	99	520	524	101	1.3
Antimony	ND	49.3	46.7	95	49.1	47.2	96	1.4	ND	54.9	52.6	96	52	49	94	1.6
Arsenic	74.9	49.3	119	89	49.1	109	69	20.0	ND	54.9	66.3	121	52	60.8	117	3.8
Barium	ND	49.3	48.4	98	49.1	48.3	98	0.2	ND	54.9	56.6	103	52	52.9	102	1.4
Beryllium	ND	49.3	44.7	91	49.1	45.9	93	2.8	ND	54.9	55.8	102	52	52.6	101	0.5
Boron	ND	493	442	90	491	455	93	3.0	ND	549	487	89	520	454	87	1.4
Cadmium	ND	49.3	49.6	101	49.1	50.1	102	1.4	ND	54.9	53.9	98	52	49.9	96	2.2
Chromium	77.3	49.3	60	-35 *	49.1	61.1	-33 *	2.1	11.1	54.9	75.5	117	52	71.5	116	1.2
Cobalt	2.41	49.3	52.8	102	49.1	52.8	103	0.4	2.2	54.9	61.7	108	52	57.1	106	2.8
Copper	109	49.3	131	45 *	49.1	129	41 *	3.9	27.2	54.9	84.5	104	52	81.2	104	0.5
Lead	1340	49.3	63.6	NC	49.1	67.9	NC	NC	6.11	54.9	67.6	112	52	61.9	107	4.7
Manganese	145	49.3	162	34 *	49.1	184	79	44.9 *	118	54.9	269	275 *	52	235	225 *	50.0 *
Mercury	ND	2.46	2.47	100	2.45	2.51	102	2.0	1.65	2.74	5.76	150	2.6	4.86	123	26.5 *
Nickel	47.2	49.3	65	36 *	49.1	61.8	30 *	6.4	11.4	54.9	74.5	115	52	65.5	104	10.9
Selenium	ND	49.3	50.9	103	49.1	53.6	109	5.9	ND	54.9	57.3	104	52	52.4	101	3.6
Silver	ND	49.3	47.3	96	49.1	47.2	96	0.2	ND	54.9	52.2	95	52	46.3	89	6.0
Thallium	ND	49.3	48.7	99	49.1	50.5	103	4.1	ND	54.9	51.8	94	52	47.5	91	3.0
Tin	ND	49.3	48.3	98	49.1	49.8	101	3.5	ND	54.9	56.8	103	52	53.5	103	0.6
Vanadium	ND	49.3	51.6	105	49.1	51.8	105	0.8	ND	54.9	62.7	114	52	59.8	115	0.8
Zinc	136	49.3	110	-53 *	49.1	109	-55 *	2.3	37.4	54.9	124	158 *	52	111	142	16.2

Notes: The %R limits are 75% to 125%, except for As, Hg, Se, Ag, and Zn, which are 50% to 150%. The RPD limit is 25%.

ND = Not Detected at the PQL.

NC = Not Calculated since the native concentration was 4 or more times the spike concentration.

* Indicates the Result did not meet the QC Limit.

3.2.7 Analyses of Certified Reference Materials

A Certified Reference Material (CRM) was obtained to allow evaluation of the accuracy and precision of the analysis of solid samples in addition to the LCS samples. The CRM was an organic solid waste sample to match the matrix of the solid samples analyzed for this project. Known values were established for the CRM by multiple analyses conducted by independent laboratories, which allows for an evaluation of the accuracy of the analyses of solid samples. The CRM was prepared in duplicate to allow an evaluation of the precision of the analysis of solid samples. The results of the analysis of the CRM are summarized in Table D-3-7. The data shows good accuracy and precision for the analyses conducted on the solids for this project. One sample in Sample Set 3 experienced systematic low recoveries, since the duplicate result met the criteria, the data was not qualified. Lead results were between the MDL and the PQL; therefore, they were not used to qualify the data.

3.2.8 Sample Duplicate Results

Two types of duplicate analyses were performed using Method AM-118. The first type was a Laboratory Duplicate prepared by weighing out two aliquots of the same sample and analyzing them separately. The Laboratory Duplicate results are summarized in Table D-3-8. The criterion for RPD was ≤ 25%. The non-homogeneous nature of the sample matrix caused several of the duplicates to fail the RPD limit.

The second duplicate analyses were from the field duplicates, which were prepared by collecting duplicate samples in the field. The field duplicates were submitted as blind samples to the laboratory. The results of the field duplicates are summarized in Table D-3-9. The non-homogeneous nature of the sample matrix caused several of the duplicates to fail the RPD limit.

TABLE D-3-7. Non-COHESIVE SOLIDS METALS CRM DATA

Metals	Sample Set 1						Sample Set 2					
	Known Value mg/Kg	CRM		CRMD		RPD	Known Value mg/Kg	CRM		CRMD		RPD
		Result mg/Kg	%R	Result mg/Kg	%R			Result mg/Kg	%R	Result mg/Kg	%R	
Aluminum	6000	4610	76.8	4660	77.7	1.1	6000	6260	104.3	5800	96.7	7.6
Antimony		141	NC	143	NC	NC	119	166	139.5	147	123.5	12.1
Arsenic	141	149	105.7	147	104.3	1.4	141	168	119.1	151	107.1	10.7
Barium	58.2	56.3	96.7	57.1	98.1	1.4	58.2	71.4	122.7	63	108.2	12.5
Beryllium		ND	NC	ND	NC	NC		ND	NC	ND	NC	NC
Boron		62.7	NC	64.2	NC	NC		86.3	NC	78.5	NC	NC
Cadmium		ND	NC	ND	NC	NC		ND	NC	ND	NC	NC
Chromium	111	105	94.6	102	91.9	2.9	111	130	117.1	117	105.4	10.5
Cobalt	11.1	10.7	96.4	10.7	96.4	0.0	11.1	13.2	118.9	11.9	107.2	10.4
Copper	398	352	88.4	350	87.9	0.6	398	421	105.8	377	94.7	11.0
Lead **	5.73	6.32	110.3	5.61	97.9	11.9	5.73	8.17	142.6 *	5.61	97.9	37.2 *
Manganese	480	444	92.5	441	91.9	0.7	480	555	115.6	486	101.3	13.3
Mercury		0.543	NC	ND	NC	NC		0.875	NC	0.751	NC	NC
Nickel	195	181	92.8	180	92.3	0.6	195	225	115.4	201	103.1	11.3
Selenium		ND	NC	ND	NC	NC		ND	NC	ND	NC	NC
Silver		ND	NC	ND	NC	NC		ND	NC	ND	NC	NC
Thallium		ND	NC	ND	NC	NC		ND	NC	ND	NC	NC
Tin		34.6	NC	35.2	NC	NC		45.1	NC	40.2	NC	NC
Vanadium	11.9	12.8	107.6	12.9	108.4	0.8	11.9	15.7	131.9	14.5	121.8	7.9
Zinc	249	232	93.2	234	94.0	0.9	249	267	107.2	244	98.0	9.0

Notes: * Indicates the Result did not meet the QC Limit.
** Results were between the MDL and the PQL.
ND = Not Detected at the PQL.
NC = Not Calculated

TABLE D-3-7. Non-COHESIVE SOLIDS METALS CRM DATA (Continued)

Metals	Sample Set 3						Sample Set 4					
	Known Value mg/Kg	CRM		CRMD		RPD	Known Value mg/Kg	CRM		CRMD		RPD
		Result mg/Kg	%R	Result mg/Kg	%R			Result mg/Kg	%R	Result mg/Kg	%R	
Aluminum	6000	3910	65.2 *	5060	84.3	25.6 *	6000	4930	82.2	5130	85.5	4.0
Antimony	119	110	92.4	142	119.3	25.4 *	119	126	105.9	132	110.9	4.7
Arsenic	141	108	76.6	140	99.3	25.8 *	141	143	101.4	144	102.1	0.7
Barium	58.2	46.7	80.2	58.8	101.0	22.9	58.2	56.7	97.4	58.4	100.3	3.0
Beryllium		ND	NC	ND	NC	NC		ND	NC	ND	NC	NC
Boron		63.6	NC	71.1	NC	NC		79.9	NC	82.2	NC	NC
Cadmium		ND	NC	ND	NC	NC		ND	NC	ND	NC	NC
Chromium	111	81.3	73.2 *	106	95.5	26.4 *	111	102	91.9	106	95.5	3.8
Cobalt	11.1	7.98	71.9 *	10.3	92.8	25.4 *	11.1	10.5	94.6	11	99.1	4.7
Copper	398	254	63.8 *	327	82.2	25.1 *	398	345	86.7	354	88.9	2.6
Lead **	5.73	4.11	71.7 *	5.4	94.2	27.1 *	5.73	5.62	98.1	5.64	98.4	0.4
Manganese	480	331	69.0 *	431	89.8	26.2 *	480	441	91.9	448	93.3	1.6
Mercury		0.883	NC	0.774	NC	NC		0.589	NC	0.6	NC	NC
Nickel	195	135	69.2 *	173	88.7	24.7	195	178	91.3	183	93.8	2.8
Selenium		ND	NC	ND	NC	NC		ND	NC	ND	NC	NC
Silver		ND	NC	ND	NC	NC		ND	NC	ND	NC	NC
Thallium		ND	NC	ND	NC	NC		ND	NC	ND	NC	NC
Tin		28.7	NC	36.5	NC	NC		36.2	NC	36.9	NC	NC
Vanadium	11.9	10.8	90.8	14.1	118.5	26.5 *	11.9	13.5	113.4	13.1	110.1	3.0
Zinc	249	172	69.1 *	215	86.3	22.2	249	219	88.0	219	88.0	0.0

Notes: * Indicates the Result did not meet the QC Limit.
** Results were between the MDL and the PQL.
ND = Not Detected at the PQL.
NC = Not Calculated

TABLE D-3-7. Non-COHESIVE SOLIDS METALS CRM DATA (Continued)

	Sample Set 5						Sample Set 6					
		CRM		CRMD				CRM		CRMD		
Metals	Known Value mg/Kg	Result mg/Kg	%R	Result mg/Kg	%R	RPD	Known Value mg/Kg	Result mg/Kg	%R	Result mg/Kg	%R	RPD
Aluminum	6000	4750	79	4920	82	3.5	6000	4980	83	4920	82	1.2
Antimony		142	NC	139	NC	NC		135	NC	135	NC	NC
Arsenic	141	152	108	150	106	1.3	141	142	101	139	99	2.1
Barium	58.2	59.3	102	62.9	108	5.9	58.2	58.8	101	57.7	99	1.9
Beryllium		ND	NC	ND	NC	NC		ND	NC	ND	NC	NC
Boron		ND	NC	ND	NC	NC		80.2	NC	78.3	NC	NC
Cadmium		ND	NC	ND	NC	NC		ND	NC	ND	NC	NC
Chromium	111	107	96	107	96	0.0	111	101	91	102	92	1.0
Cobalt	11.1	11.3	102	11.1	100	1.8	11.1	10.2	92	10.3	93	1.0
Copper	398	360	90	359	90	0.3	398	339	85	333	84	1.8
Lead **	5.73	5.81	101	5.44	95	6.6	5.73	5.6	98	6.16	108	9.5
Manganese	480	463	96	462	96	0.2	480	428	89	422	88	1.4
Mercury		0.599	NC	0.582	NC	NC		0.568	NC	0.544	NC	NC
Nickel	195	189	97	186	95	1.6	195	172	88	170	87	1.2
Selenium		ND	NC	ND	NC	NC		ND	NC	ND	NC	NC
Silver		ND	NC	ND	NC	NC		ND	NC	ND	NC	NC
Thallium		ND	NC	ND	NC	NC		ND	NC	ND	NC	NC
Tin		36.2	NC	36.1	NC	NC		36.6	NC	37.7	NC	NC
Vanadium	11.9	ND	NC	ND	NC	NC	11.9	12.9	108	12.7	107	1.6
Zinc	249	234	94	236	95	0.9	249	216	87	213	86	1.4

Notes: * Indicates the Result did not meet the QC Limit.
** Results were between the MDL and the PQL.
ND = Not Detected at the PQL.
NC = Not Calculated

TABLE D-3-7. Non-COHESIVE SOLIDS METALS CRM DATA (Continued)

Metals	Sample Set 7						Sample Set 8					
	Known Value mg/Kg	CRM		CRMD		RPD	Known Value mg/Kg	CRM		CRMD		RPD
		Result mg/Kg	%R	Result mg/Kg	%R			Result mg/Kg	%R	Result mg/Kg	%R	
Aluminum	6000	5110	85	4920	82	3.8	6000	5200	87	5570	93	6.9
Antimony		138	NC	139	NC	NC		140	NC	140	NC	NC
Arsenic	141	145	103	150	106	3.4	141	139	99	132	94	5.2
Barium	58.2	58.7	101	62.9	108	6.9	58.2	59.6	102	68.3	117	13.6
Beryllium		ND	NC	ND	NC	NC		ND	NC	ND	NC	NC
Boron		77.9	NC	ND	NC	NC		66.4	NC	65.3	NC	NC
Cadmium		ND	NC	ND	NC	NC		ND	NC	ND	NC	NC
Chromium	111	109	98	107	96	1.9	111	108	97	112	101	3.6
Cobalt	11.1	11.3	102	11.1	100	1.8	11.1	10.6	95	10.7	96	0.9
Copper	398	373	94	359	90	3.8	398	340	85	339	85	0.3
Lead **	5.73	5.55	97	5.94	104	6.8	5.73	5.2	91	5.22	91	0.4
Manganese	480	471	98	462	96	1.9	480	447	93	460	96	2.9
Mercury		ND	NC	0.582	NC	NC		0.512	NC	ND	NC	NC
Nickel	195	192	98	186	95	3.2	195	178	91	175	90	1.7
Selenium		ND	NC	ND	NC	NC		ND	NC	ND	NC	NC
Silver		ND	NC	ND	NC	NC		ND	NC	ND	NC	NC
Thallium		ND	NC	ND	NC	NC		ND	NC	ND	NC	NC
Tin		35.4	NC	36.1	NC	NC		37.4	NC	38.4	NC	NC
Vanadium	11.9	13.2	111	ND	NC	NC	11.9	12.6	106	13.7	115	8.4
Zinc	249	251	101	236	95	6.2	249	218	88	214	86	1.9

Notes: * Indicates the Result did not meet the QC Limit.
** Results were between the MDL and the PQL.
ND = Not Detected at the PQL.
NC = Not Calculated

TABLE D-3-8. NCS METALS LABORATORY DUPLICATE RESULTS

Metals	Sample Set 1			Sample Set 2			Sample Set 3			Sample Set 4		
	Sample Result mg/Kg	Dupl. Result mg/Kg	RPD	Sample Result mg/Kg	Dupl. Result mg/Kg	RPD	Sample Result mg/Kg	Dupl. Result mg/Kg	RPD	Sample Result mg/Kg	Dupl. Result mg/Kg	RPD
Aluminum	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Antimony	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Arsenic	33	33.1	0.3	381	316	18.7	ND	ND	NC	33.7	21.5	44.2 *
Barium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Beryllium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Boron	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Cadmium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Chromium	5.91	6.14	3.8	14.1	13	8.1	16.4	18.7	13.1	13.7	10.9	22.8
Cobalt	1.63	1.29	23.3	2.36	2.09	12.1	1.53	1.62	5.7	2.09	1.41	38.9 *
Copper	39.8	42.00	5.4	49.6	46.4	6.7	5.59	6.03	7.6	44.3	44.50	0.5
Lead	4.87	4.8	1.4	ND	ND	NC	4.46	4.2	6.0	10.6	8.3	24.3
Manganese	56.1	58.40	4.0	163	144	12.4	95.4	101	5.7	137	93.70	37.5 *
Mercury	0.965	0.767	22.9	ND	ND	NC	ND	ND	NC	ND	ND	NC
Nickel	6.47	6.25	3.5	12.6	11.2	11.8	11.3	14.2	22.7	11.6	7.26	46.0 *
Selenium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Silver	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Thallium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Tin	ND	ND	NC	11.9	12.3	3.3	ND	ND	NC	ND	ND	NC
Vanadium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Zinc	29	30.1	3.7	46.1	42.5	8.1	ND	ND	NC	50.1	33.8	38.9 *

Notes: * Indicates the Result did not meet the QC Limit.

ND = Not Detected above the PQL.

NC = Not Calculated

TABLE D-3-8. NCS METALS LABORATORY DUPLICATE RESULTS (Continued)

Metals	Sample Set 5			Sample Set 6			Sample Set 7			Sample Set 8		
	Sample Result mg/Kg	Dupl. Result mg/Kg	RPD	Sample Result mg/Kg	Dupl. Result mg/Kg	RPD	Sample Result mg/Kg	Dupl. Result mg/Kg	RPD	Sample Result mg/Kg	Dupl. Result mg/Kg	RPD
Aluminum	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Antimony	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Arsenic	309	200	42.8	ND	ND	NC	74.9	74.4	0.7	ND	ND	NC
Barium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Beryllium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Boron	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Cadmium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Chromium	8.07	11.2	32.5 *	ND	ND	NC	77.3	13	142 *	11.1	7.78	35.2 *
Cobalt	ND	ND	NC	ND	ND	NC	2.41	2.02	17.6	2.2	1.49	38.5 *
Copper	51.6	54.8	6.0	48.4	48.3	0.2	109	99.7	8.9	27.2	30.1	10.1
Lead	ND	ND	NC	ND	ND	NC	1340	22.5	193 *	6.11	4.28	35.2 *
Manganese	67.3	44.10	41.7 *	1.04	1.03	1.0	145	138	4.9	118	82.4	35.5 *
Mercury	101	65.1	43.2 *	ND	ND	NC	ND	ND	NC	1.65	1.28	25.3 *
Nickel	8.93	9.1	1.9	ND	ND	NC	47.2	14.2	107 *	11.4	7.62	39.7 *
Selenium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Silver	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Thallium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Tin	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Vanadium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Zinc	22.8	14.7	43.2	ND	ND	NC	136	203	39.5 *	37.4	25.7	37.1 *

Notes: * Indicates the Result did not meet the QC Limit.

ND = Not Detected above the PQL.

NC = Not Calculated

TABLE D-3-9. NCS METALS FIELD DUPLICATE RESULTS

Metals	Sample Set 1			Sample Set 2			Sample Set 3			Sample Set 4		
	Sample Result mg/Kg	Dupl. Result mg/Kg	RPD	Sample Result mg/Kg	Dupl. Result mg/Kg	RPD	Sample Result mg/Kg	Dupl. Result mg/Kg	RPD	Sample Result mg/Kg	Dupl. Result mg/Kg	RPD
Aluminum	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Antimony	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Arsenic	128	131	2.3	ND	ND	NC	55.7	71.4	24.7	18.5	33.7	58.2 *
Barium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Beryllium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Boron	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Cadmium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Chromium	17.1	8.61	66.0 *	ND	432	NC	12	19.1	45.7 *	5.86	13.7	80.2 *
Cobalt	2.16	2.39	10.1	ND	25.1	NC	3.26	2.06	45.1 *	ND	2.09	NC
Copper	105	58.1	57.5 *	ND	39.2	NC	59.2	93.6	45.0 *	64.3	44.3	36.8 *
Lead	ND	ND	NC	ND	144	NC	ND	ND	NC	ND	10.6	NC
Manganese	88.2	83.5	5.5	ND	835	NC	116	68.0	52.2 *	23.6	137	141.2 *
Mercury	ND	ND	NC	ND	4.53	NC	ND	ND	NC	ND	ND	NC
Nickel	75.7	32.4	80.1 *	ND	453	NC	15.6	45.3	97.5 *	11.6	11.6	0.0
Selenium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Silver	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Thallium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Tin	ND	ND	NC	ND	15.3	NC	ND	ND	NC	ND	ND	NC
Vanadium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Zinc	41.7	55.1	27.7 *	ND	32	NC	51.9	33.6	42.8 *	10	50.1	133.4 *

Notes: * Indicates the Result did not meet the QC Limit.

ND = Not Detected above the PQL.

NC = Not Calculated

TABLE D-3-9. NCS METALS FIELD DUPLICATE RESULTS (Continued)

Metals	Sample Set 5			Sample Set 6			Sample Set 7			Sample Set 8		
	Sample Result mg/Kg	Dupl. Result mg/Kg	RPD	Sample Result mg/Kg	Dupl. Result mg/Kg	RPD	Sample Result mg/Kg	Dupl. Result mg/Kg	RPD	Sample Result mg/Kg	Dupl. Result mg/Kg	RPD
Aluminum	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Antimony	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Arsenic	309	225	31.5 *	ND	ND	NC	5.99	8.19	31.0 *	238	352	38.6 *
Barium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Beryllium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Boron	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Cadmium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Chromium	8.07	8.68	7.3	ND	ND	NC	127	76.6	49.5 *	25.5	37.4	37.8 *
Cobalt	ND	ND	NC	ND	ND	NC	18	10.7	NC	ND	ND	NC
Copper	51.6	65.3	23.4	48.4	26.2	59.5 *	195	111	54.9 *	45.8	127.0	94.0 *
Lead	ND	ND	NC	ND	ND	NC	91.7	55.1	49.9 *	17.2	83.7	131.8 *
Manganese	67.3	69.0	2.5	ND	ND	NC	777	492	44.9 *	14.3	21.30	39.3 *
Mercury	101	77.8	26.0 *	ND	ND	NC	0.808	0.45	56.9 *	9.29	14.6	44.5 *
Nickel	8.93	13.1	37.9 *	ND	ND	NC	301	213	34.2 *	16.8	24	35.3 *
Selenium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Silver	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Thallium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Tin	ND	ND	NC	ND	ND	NC	26.2	15.4	51.9 *	ND	ND	NC
Vanadium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Zinc	22.8	23.2	1.7	ND	ND	NC	53.9	32.5	49.5 *	14.2	61.3	124.8 *

Notes: * Indicates the Result did not meet the QC Limit.

ND = Not Detected above the PQL.

NC = Not Calculated

3.3 METALS ANALYSES OF SOLID SAMPLES

Samples of the solids were analyzed for the HHRA metals using Method AM-118. The data validation included an evaluation of the following:

- Instrument tune,
- Instrument calibration,
- Internal standards,
- Interference checks samples,
- Method Blank sample results,
- Laboratory control sample results,
- MS/MSD Results,
- Certified Reference Material Sample results, and
- Sample duplicate analyses results.

Results of the data validation are contained in the following subsections. Method AM-118 data are presented in Appendix C.

3.3.1 Instrument Tune Data

The ICP/MS instrument was tuned to ensure mass resolution, identification and sensitivity. The ICP/MS was tuned prior to calibration and achieved a mass resolution of < 1.0 amu at 10% peak height and met the mass calibration of ±0.1 amu from the expected value.

3.3.2 Instrument Calibration

Instrument calibration was performed to ensure the instrument was capable of producing acceptable quantitative data. Initial calibration demonstrated the instrument was capable of acceptable performance prior to sample analysis. Continuing calibration sample analyses verify that the initial calibration was still valid.

The ICP/MS was calibrated in accordance with Methods AM-118. The ICV selenium and silver standards were high for Sample Set 1; therefore, the results were qualified. Boron and beryllium ICV standards for Sample Set 3 were low, but the CCV met the %R Limit. No boron or beryllium results were above the PQL so the data was not qualified. The ICV standard for selenium was low for Sample Set 6; therefore, the data was qualified. The antimony CCV for Sample Set 7 was low; therefore, the results were qualified. The aluminum CCV for Sample Set 7 was high resulting in the data being qualified. The other ICV and CCV data met the %R limits of 90 to 110%.

3.3.3 Internal Standards

Internal standards were monitored to ensure that instrument sensitivity and response were stable during the analysis of each sample. Internal standard recovery for each sample was > 30% as required in Method AM-118.

3.3.4 Method Blanks

Method Blanks were analyzed to determine the background contamination resulting from laboratory handling of the samples. Method blank results are reported at the end of the Analytical Summary Sheets included for each sample set. No elements were detected above the laboratory PQL. No qualification of the liquid Mustard sample metals results were required due to method blank results.

3.3.5 Laboratory Control Sample Results

Laboratory control samples are samples of known concentration which were prepared and analyzed along with the liquid Mustard samples. The LCS was used to monitor the overall performance of the preparation and analysis process. The LCS provided an evaluation of the accuracy of the preparation and analysis process. The %R limits for the LCS were 75% to 125%.

The LCS results are summarized in Table D-3-10. The accuracy objectives were met with the LCS showing that the system was in control. Data qualification was not required based on the LCS results.

3.3.6 Matrix Spike/Matrix Spike Duplicate Results

The MS/MSD samples were prepared when the solid samples were prepared for analysis. A known concentration was spiked into a sample aliquot, which were prepared and analyzed along with the liquid Mustard samples. The MS/MSD were used to monitor the overall performance of the preparation and analysis process. The MS/MSD provided an evaluation of the accuracy and precision of the preparation and analysis process. The %R limits for the MS/MSD were 75% to 125% for most metals, but selected metals had limits that were 50% to 150%. The RPD criterion was ≤ 25%.

The MS/MSD results are summarized in Table D-3-11. The non-homogeneous nature of the sample matrix made it difficult to obtain reproducible samples. Sample Set 1 data was qualified because of high MS/MSD results for arsenic, lead, mercury, tin, and zinc. Sample Set 1 data was qualified because of RPD failure for cadmium, chromium, cobalt, nickel, selenium, silver, and thallium. Sample Set 3 manganese data was qualified because of RPD failure. Sample Set 4 copper and manganese data was qualified because of RPD failure. Sample Set 5 zinc data was qualified because of RPD failure.

TABLE D-3-10. SOLIDS METALS LABORATORY CONTROL SAMPLE RESULTS

Metals	Known Value mg/Kg	Sample Set 1 LCS Result mg/Kg	Sample Set 1 LCS %R	Sample Set 2 LCS Result mg/Kg	Sample Set 2 LCS %R	Sample Set 3 LCS Result mg/Kg	Sample Set 3 LCS %R	Sample Set 4 LCS Result mg/Kg	Sample Set 4 LCS %R
Aluminum	500	511	102	491	98	480	96	485	97
Antimony	50	45.4	91	50.3	101	49.1	98	49.3	99
Arsenic	50	51.7	103	54.4	109	49.4	99	53.7	107
Barium	50	50.8	102	52.2	104	49.6	99	54.3	109
Beryllium	50	49	98	51.6	103	40.4	81	46.9	94
Boron	500	436	87	443	89	377	75	400	80
Cadmium	50	51.7	103	56.3	113	52.7	105	53.9	108
Chromium	50	50.4	101	49.5	99	49.4	99	50.7	101
Cobalt	50	50.2	100	47.2	94	47.4	95	50	100
Copper	50	51.8	104	50.1	100	48.4	97	52.4	105
Lead	50	54.4	109	49.9	100	45.8	92	51.8	104
Manganese	50	50.4	101	48.6	97	49.3	99	50.6	101
Mercury	2.5	3.05	122	2.66	106	2.63	105	2.66	106
Nickel	50	49.8	100	47.7	95	47.7	95	50	100
Selenium	50	52.8	106	53.3	107	49.4	99	53.6	107
Silver	50	61.3	123	47.6	95	51.4	103	53.6	107
Thallium	50	52.3	105	48.8	98	44.1	88	51.1	102
Tin	50	49.4	99	52.9	106	52.1	104	49.8	100
Vanadium	50	49.5	99	48.7	97	47.2	94	49.7	99
Zinc	50	52.1	104	56.6	113	50.9	102	52.7	105

Notes: The %R limits are 75% to 125%.

TABLE D-3-10. SOLIDS METALS LABORATORY CONTROL SAMPLE RESULTS (Continued)

Metals	Known Value mg/Kg	Sample Set 5 LCS Result mg/Kg	Sample Set 5 LCS %R	Sample Set 6 LCS Result mg/Kg	Sample Set 6 LCS %R	Sample Set 7 LCS Result mg/Kg	Sample Set 7 LCS %R	Sample Set 8 LCS Result mg/Kg	Sample Set 8 LCS %R
Aluminum	500	543	109	508	102	515	103	464	93
Antimony	50	50.6	101	41.9	84	41	82	47.5	95
Arsenic	50	52.7	105	52	104	51.4	103	51.9	104
Barium	50	54.3	109	51.7	103	48	96	50.4	101
Beryllium	50	54.9	110	47.6	95	46.3	93	50	100
Boron	500	512	102	438	88	458	92	418	84
Cadmium	50	57.9	116	52.2	104	46.9	94	51	102
Chromium	50	49.1	98	49.5	99	48.4	97	47.7	95
Cobalt	50	48.6	97	49.5	99	47.8	96	47.8	96
Copper	50	50.9	102	51.3	103	49.1	98	49.5	99
Lead	50	51.3	103	50.2	100	50.1	100	50.9	102
Manganese	50	51.1	102	50.3	101	48.9	98	49	98
Mercury	2.5	2.65	106	2.53	101	2.69	108	2.99	120
Nickel	50	48.7	97	49.2	98	47.5	95	47.4	95
Selenium	50	49.7	99	50	100	50.8	102	52	104
Silver	50	51.4	103	54.5	109	47.4	95	49.9	100
Thallium	50	50.9	102	50.1	100	48.6	97	48.6	97
Tin	50	49.6	99	48.6	97	45.3	91	49.3	99
Vanadium	50	50.2	100	49.5	99	48.8	98	49.3	99
Zinc	50	53.4	107	52	104	49.7	99	52.1	104

Notes: The %R limits are 75% to 125%.

TABLE D-3-11. SOLIDS METALS MS/MSD DATA

	Sample Set 1								Sample Set 2							
		MS			MSD					MS			MSD			
Metals	Sample Result mg/Kg	Spiked Amount mg/Kg	Result mg/Kg	%R	Spiked Amount mg/Kg	Result mg/Kg	%R	RPD	Sample Result mg/Kg	Spiked Amount mg/Kg	Result mg/Kg	%R	Spiked Amount mg/Kg	Result mg/Kg	%R	RPD
Aluminum	ND	464	501	108	487	600	123	15.2	ND	497	572	115	514	576	112	3.0
Antimony	ND	46.4	58.1	125	48.7	61.2	126 *	0.5	ND	49.7	54.2	109	51.4	53.5	104	5.0
Arsenic	62.1	46.4	137	161 *	48.7	188	259 *	97.1 *	1520	49.7	2020	NC	51.4	1730	NC	NC
Barium	ND	46.4	48.8	105	48.7	61.6	126 *	21.3	ND	49.7	51.4	103	51.4	56	109	5.5
Beryllium	ND	46.4	44.8	97	48.7	58.7	121	24.0	ND	49.7	54	109	51.4	58.8	114	5.7
Boron	ND	464	510	110	487	536	110	0.1	ND	497	402	81	514	480	93	12.5
Cadmium	ND	46.4	49.9	108	48.7	65.2	134 *	26.3 *	ND	49.7	53.9	108	51.4	55.6	108	0.3
Chromium	20.3	46.4	61.6	89	48.7	80.2	123	34.0 *	23	49.7	74.4	103	51.4	73.9	99	4.4
Cobalt	3.84	46.4	47.4	94	48.7	63.3	122	28.2 *	4.29	49.7	53	98	51.4	52.9	95	3.4
Copper	328	46.4	348	NC	48.7	459	NC	NC	129	49.7	181	105	51.4	181	101	3.5
Lead	42.2	46.4	120	168 *	48.7	154	230 *	61.9 *	35.5	49.7	95.3	120	51.4	96.4	118	1.8
Manganese	261	46.4	293	NC	48.7	414	NC	NC	319	49.7	416	NC	51.4	376	NC	NC
Mercury	ND	2.32	3.7	159 *	2.44	3.88	159 *	0.5	ND	2.48	3.38	136	2.57	3.46	135	1.7
Nickel	32	46.4	74.6	92	48.7	100	140 *	47.8 *	29.7	49.7	82.5	106	51.4	83.2	104	2.2
Selenium	ND	46.4	48.3	104	48.7	64.9	133 *	29.2 *	ND	49.7	44.5	90	51.4	56.7	110	20.8
Silver	ND	46.4	57.8	125	48.7	74.9	154 *	29.2 *	ND	49.7	50	101	51.4	51.7	101	0.0
Thallium	ND	46.4	49.4	106	48.7	65.6	135 *	28.2 *	ND	49.7	40.4	81	51.4	51.3	100	18.5
Tin	ND	46.4	60.4	130 *	48.7	64	131 *	1.2	29.1	49.7	85.2	113	51.4	80.7	100	12.5
Vanadium	ND	46.4	45.1	97	48.7	59.5	122	25.0	ND	49.7	52.2	105	51.4	54	105	0.0
Zinc	148	46.4	231	179 *	48.7	326	366 *	186.6 *	118	49.7	170	105	51.4	160	82	22.9

Notes: The %R limits are 75% to 125%, except for As, Hg, Se, Ag, and Zn, which are 50% to 150%. The RPD limit is 25%.

ND = Not Detected at the PQL.

NC = Not Calculated since the native concentration was 4 or more times the spike concentration.

* Indicates the Result did not meet the QC Limit.

TABLE D-3-11. SOLIDS METALS MS/MSD DATA (Continued)

	Sample Set 3								Sample Set 4							
		MS			MSD					MS			MSD			
Metals	Sample Result mg/Kg	Spiked Amount mg/Kg	Result mg/Kg	%R	Spiked Amount mg/Kg	Result mg/Kg	%R	RPD	Sample Result mg/Kg	Spiked Amount mg/Kg	Result mg/Kg	%R	Spiked Amount mg/Kg	Result mg/Kg	%R	RPD
Aluminum	ND	505	564	112	522	648	124	12.5	ND	479	484	101	497	485	98	3.5
Antimony	ND	50.5	50.8	101	52.2	51	98	2.9	ND	47.9	49.3	103	49.7	50.3	101	1.7
Arsenic	ND	50.5	62.2	123	52.2	60.5	116	7.3	27	47.9	74.2	99	49.7	80.1	107	8.3
Barium	ND	50.5	53	105	52.2	54.6	105	0.4	ND	47.9	51.6	108	49.7	51.8	104	3.5
Beryllium	ND	50.5	52.4	104	52.2	51.9	99	4.3	ND	47.9	47.1	98	49.7	46.3	93	5.2
Boron	ND	505	491	97	522	513	98	1.0	ND	479	431	90	497	437	88	2.1
Cadmium	ND	50.5	53	105	52.2	54	103	1.5	ND	47.9	47.7	100	49.7	49.7	100	0.4
Chromium	19.1	50.5	78.2	117	52.2	68.7	95	22.0	16	47.9	68.2	109	49.7	68	105	4.3
Cobalt	2.94	50.5	60.4	114	52.2	59.5	108	5.4	2.51	47.9	52.6	105	49.7	53.1	102	2.8
Copper	18.3	50.5	75.1	112	52.2	74.3	107	5.2	75.2	47.9	143	142 *	49.7	127	104	37.3 *
Lead	8.13	50.5	63.4	109	52.2	57.9	95	14.1	10.7	47.9	59.5	102	49.7	61	101	0.7
Manganese	188	50.5	377	374 *	52.2	230	80	293.8 *	181	47.9	249	142 *	49.7	213	64 *	77.6 *
Mercury	ND	2.53	3.19	126	2.61	3.36	129	2.6	ND	2.4	2.7	113	2.48	2.69	108	4.0
Nickel	21.7	50.5	79.3	114	52.2	70.9	94	19.8	9.26	47.9	60.5	107	49.7	60.1	102	4.7
Selenium	ND	50.5	53.5	106	52.2	52.7	101	5.0	ND	47.9	51.3	107	49.7	54.2	109	2.0
Silver	ND	50.5	51.4	102	52.2	52.2	100	1.8	ND	47.9	48.7	102	49.7	49.9	100	1.3
Thallium	ND	50.5	55.6	110	52.2	55.2	106	4.4	ND	47.9	50.7	106	49.7	51.3	103	2.6
Tin	ND	50.5	53.3	106	52.2	53.4	102	3.2	ND	47.9	50.6	106	49.7	51.1	103	2.8
Vanadium	ND	50.5	57	113	52.2	57	109	3.7	ND	47.9	52.5	110	49.7	53.1	107	2.8
Zinc	ND	50.5	62	123	52.2	61.3	117	5.3	56.2	47.9	105	102	49.7	101	90	11.7

Notes: The %R limits are 75% to 125%, except for As, Hg, Se, Ag, and Zn, which are 50% to 150%. The RPD limit is 25%.

ND = Not Detected at the PQL.

NC = Not Calculated since the native concentration was 4 or more times the spike concentration.

* Indicates the Result did not meet the QC Limit.

TABLE D-3-11. SOLIDS METALS MS/MSD DATA (Continued)

	Sample Set 5								Sample Set 6							
		MS			MSD					MS			MSD			
Metals	Sample Result mg/Kg	Spiked Amount mg/Kg	Result mg/Kg	%R	Spiked Amount mg/Kg	Result mg/Kg	%R	RPD	Sample Result mg/Kg	Spiked Amount mg/Kg	Result mg/Kg	%R	Spiked Amount mg/Kg	Result mg/Kg	%R	RPD
Aluminum	ND	493	402	82	497	462	93	11.4	ND	543	563	104	538	557	104	0.2
Antimony	ND	49.3	54.8	111	49.7	50.9	102	8.7	ND	54.3	48.9	90	53.8	49.8	93	2.5
Arsenic	2050	49.3	1500	NC	49.7	1050	NC	NC	ND	54.3	57.6	106	53.8	57.4	107	0.6
Barium	ND	49.3	47.8	97	49.7	51.7	104	7.1	ND	54.3	55.5	102	53.8	54.8	102	0.4
Beryllium	ND	49.3	49.3	100	49.7	50.8	102	2.2	ND	54.3	53.2	98	53.8	55.5	103	5.2
Boron	ND	493	508	103	497	473	95	7.9	ND	543	501	92	538	537	100	7.5
Cadmium	ND	49.3	48.9	99	49.7	51.8	104	5.0	ND	54.3	52.8	97	53.8	52.6	98	0.5
Chromium	12.2	49.3	59.3	96	49.7	56.5	89	6.4	17	54.3	70.5	99	53.8	74.2	106	7.8
Cobalt	3.63	49.3	49.6	93	49.7	51.5	96	3.1	3.86	54.3	59.1	102	53.8	59.7	104	2.1
Copper	207	49.3	291	NC	49.7	293	NC	NC	115	54.3	179	118	53.8	276	299 *	181 *
Lead	14.9	49.3	66.2	104	49.7	64.8	100	3.7	35.4	54.3	84.9	91	53.8	113	144 *	53 *
Manganese	301	49.3	347	NC	49.7	321	NC	NC	298	54.3	367	NC	53.8	397	NC	NC
Mercury	694	2.46	701	NC	2.48	536	NC	NC	0.893	2.72	3.59	99	2.69	3.42	94	5.2
Nickel	30.8	49.3	85	110	49.7	87.1	113	3.3	17.5	54.3	74.9	106	53.8	75.6	108	2.3
Selenium	ND	49.3	51	103	49.7	52.4	105	2.0	ND	54.3	51.8	95	53.8	51.6	96	0.5
Silver	ND	49.3	47.7	97	49.7	49.8	100	3.4	ND	54.3	55.7	103	53.8	55.6	103	0.8
Thallium	ND	49.3	51	103	49.7	53.8	108	4.8	ND	54.3	57.8	106	53.8	56.8	106	0.9
Tin	10.9	49.3	60.8	101	49.7	57.7	94	7.1	13.4	54.3	62.5	90	53.8	66.3	98	7.9
Vanadium	ND	49.3	45.9	93	49.7	49.3	99	6.1	ND	54.3	57.6	106	53.8	56.7	105	0.7
Zinc	133	49.3	180	95	49.7	140	14 *	81.3 *	69.5	54.3	115	84	53.8	184	213 *	129 *

Notes: The %R limits are 75% to 125%, except for As, Hg, Se, Ag, and Zn, which are 50% to 150%. The RPD limit is 25%.

ND = Not Detected at the PQL.

NC = Not Calculated since the native concentration was 4 or more times the spike concentration.

* Indicates the Result did not meet the QC Limit.

TABLE D-3-11. SOLIDS METALS MS/MSD DATA (Continued)

	Sample Set 7								Sample Set 8							
		MS			MSD					MS			MSD			
Metals	Sample Result mg/Kg	Spiked Amount mg/Kg	Result mg/Kg	%R	Spiked Amount mg/Kg	Result mg/Kg	%R	RPD	Sample Result mg/Kg	Spiked Amount mg/Kg	Result mg/Kg	%R	Spiked Amount mg/Kg	Result mg/Kg	%R	RPD
Aluminum	ND	510	522	102	542	560	103	1.0	ND	539	575	107	534	540	101	5.6
Antimony	ND	51	43.3	85	54.2	46	85	0.0	ND	53.9	52	96	53.4	50.4	94	2.1
Arsenic	58.2	51	121	123	54.2	124	121	1.7	12.3	53.9	72.8	112	53.4	77.7	122	10.2
Barium	ND	51	46.5	91	54.2	51.8	96	4.4	ND	53.9	57.2	106	53.4	53.9	101	5.2
Beryllium	ND	51	48.6	95	54.2	54.7	101	5.6	ND	53.9	62.6	116	53.4	62.5	117	0.9
Boron	ND	510	506	99	542	547	101	1.7	ND	539	544	101	534	545	102	1.1
Cadmium	ND	51	44.2	87	54.2	48.9	90	3.6	ND	53.9	54.9	102	53.4	53.6	100	1.5
Chromium	9.28	51	57.2	94	54.2	64	101	7.0	39.3	53.9	96.9	107	53.4	111	134 *	27.4 *
Cobalt	3.22	51	50	92	54.2	55.2	96	4.2	6.12	53.9	62.5	105	53.4	62.9	106	1.7
Copper	315	51	347	NC	54.2	370	NC	NC	90.1	53.9	157	124	53.4	131	77	47.5 *
Lead	12.5	51	65	103	54.2	99.5	161 *	58 *	40.2	53.9	102	115	53.4	96.5	105	9.2
Manganese	289	51	338	NC	54.2	331	NC	NC	336	53.9	363	NC	53.4	515	NC	NC
Mercury	ND	2.55	2.8	110	2.71	2.9	107	2.8	10.1	2.69	13	108	2.67	17.5	277 *	169 *
Nickel	33	51	75.1	83	54.2	80.7	88	5.5	52.4	53.9	106	99	53.4	114	115	15.9
Selenium	ND	51	48.8	96	54.2	55.3	102	6.3	ND	53.9	58.7	109	53.4	60.1	113	3.6
Silver	ND	51	45.1	88	54.2	49.5	91	2.9	ND	53.9	55.1	102	53.4	52.5	98	3.9
Thallium	ND	51	47.7	94	54.2	53	98	4.3	ND	53.9	55.3	103	53.4	55.7	104	1.7
Tin	ND	51	49.4	97	54.2	53.2	98	1.3	6.69	53.9	60.2	99	53.4	60.2	100	0.9
Vanadium	ND	51	48.5	95	54.2	54	100	4.5	ND	53.9	64.5	120	53.4	62.7	117	2.3
Zinc	153	51	234	159 *	54.2	433	517 *	358 *	92.4	53.9	141	90	53.4	175	155 *	64.5 *

Notes: The %R limits are 75% to 125%, except for As, Hg, Se, Ag, and Zn, which are 50% to 150%. The RPD limit is 25%.

ND = Not Detected at the PQL.

NC = Not Calculated since the native concentration was 4 or more times the spike concentration.

* Indicates the Result did not meet the QC Limit.

Sample Set 6 copper, lead, and zinc data was qualified for RPD failure. Sample Set 7 lead data was qualified because of RPD failure. Sample Set 7 zinc data was qualified because of high MS/MSD results. Sample Set 8 chromium, copper, mercury, and zinc data was qualified because of RPD failure. The other data met the necessary criteria.

3.3.7 Analyses of Certified Reference Materials

A CRM was obtained to allow evaluation of the accuracy and precision of the analysis of solid samples in addition to the LCS samples. The CRM was an organic solid waste sample to match the matrix of the solid samples analyzed for this project. Known values were established for the CRM by multiple analyses conducted by independent laboratories, which allows for an evaluation of the accuracy of the analyses of solid samples. The CRM was prepared in duplicate to allow an evaluation of the precision of the analysis of solid samples. The results of the analysis of the CRM are summarized in Table D-3-12. The data shows good accuracy and precision for the analyses conducted on the solids for this project. Lead results were between the MDL and the PQL; therefore, they were not used to qualify the data. The aluminum results for Sample Set 1 were slightly low; therefore, the data was qualified. The antimony levels were high on Sample Sets 2 and 4; therefore, the data was qualified. The vanadium MSD was high on Sample Set 2, but the data was not qualified because the MS and RPD criteria were met.

3.3.8 Sample Duplicate Results

Two types of duplicate analyses were performed using Method AM-118. The first type was a laboratory duplicate prepared by weighing out two aliquots of the same sample and analyzing them separately. The laboratory duplicate results are summarized in Table D-3-13. The criterion for RPD was ≤ 25%. The non-homogeneous nature of the sample matrix made it difficult to obtain consistent samples. Therefore, the data was not qualified based on the laboratory duplicate results.

The second duplicate analyses were from the field duplicates, which were prepared by collecting duplicate samples in the field. The field duplicates were submitted as blind samples to the laboratory. The results of the field duplicates are summarized in Table D-3-14. The non-homogeneous nature of the sample matrix made it difficult to obtain consistent samples. Therefore, the data was not qualified based on the field duplicate results.

TABLE D-3-12. SOLIDS METALS CRM DATA

Metals	Sample Set 1						Sample Set 2					
	Known Value mg/Kg	CRM		CRMD		RPD	Known Value mg/Kg	CRM		CRMD		RPD
		Result mg/Kg	%R	Result mg/Kg	%R			Result mg/Kg	%R	Result mg/Kg	%R	
Aluminum	6000	4490	75 *	4450	74 *	0.9	6000	5770	96	5830	97	1.0
Antimony		123	NC	119	NC	NC	119	164	138 *	169	142 *	3.0
Arsenic	141	130	92	128	91	1.6	141	156	111	159	113	1.9
Barium	58.2	52.5	90	51.5	88	1.9	58.2	65.1	112	68.1	117	4.5
Beryllium		ND	NC	ND	NC	NC		ND	NC	ND	NC	NC
Boron		71.1	NC	68.6	NC	NC		84.3	NC	89.2	NC	NC
Cadmium		ND	NC	ND	NC	NC		ND	NC	ND	NC	NC
Chromium	111	93.4	84	92.4	83	1.1	111	116	105	120	108	3.4
Cobalt	11.1	9.54	86	9.4	85	1.5	11.1	11.9	107	12.2	110	2.5
Copper	398	331	83	331	83	0.0	398	384	96	393	99	2.3
Lead **	5.73	5.47	95	5.48	96	0.2	5.73	6.00	105	6.04	105	0.7
Manganese	480	397	83	385	80	3.1	480	488	102	503	105	3.0
Mercury		0.552	NC	0.526	NC	NC		0.662	NC	0.673	NC	NC
Nickel	195	163	84	161	83	1.2	195	200	103	207	106	3.4
Selenium		ND	NC	ND	NC	NC		ND	NC	ND	NC	NC
Silver		ND	NC	ND	NC	NC		ND	NC	ND	NC	NC
Thallium		ND	NC	ND	NC	NC		ND	NC	ND	NC	NC
Tin		33.6	NC	33.3	NC	NC		40.9	NC	42.6	NC	NC
Vanadium	11.9	11.3	95	11.2	94	0.9	11.9	14.4	121	15.2	128 *	5.4
Zinc	249	212	85	208	84	1.9	249	243	98	249	100	2.4

Notes: * Indicates the Result did not meet the QC Limit.
** Results were between the MDL and the PQL.
ND = Not Detected at the PQL.
NC = Not Calculated

TABLE D-3-12. SOLIDS METALS CRM DATA (Continued)

Metals	Sample Set 3						Sample Set 4					
	Known Value mg/Kg	CRM		CRMD		RPD	Known Value mg/Kg	CRM		CRMD		RPD
		Result mg/Kg	%R	Result mg/Kg	%R			Result mg/Kg	%R	Result mg/Kg	%R	
Aluminum	6000	4820	80	5070	85	5.1	6000	5340	89	5290	88	0.9
Antimony	119	129	108	140	118	8.2	119	153	129 *	153	129 *	0.0
Arsenic	141	138	98	149	106	7.7	141	154	109	151	107	2.0
Barium	58.2	55.2	95	59.3	102	7.2	58.2	64.1	110	62.3	107	2.8
Beryllium		ND	NC	ND	NC	NC		ND	NC	ND	NC	NC
Boron		71.6	NC	71.8	NC	NC		ND	NC	ND	NC	NC
Cadmium		ND	NC	ND	NC	NC		ND	NC	ND	NC	NC
Chromium	111	107	96	112	101	4.6	111	115	104	114	103	0.9
Cobalt	11.1	10.4	94	11	99	5.6	11.1	11.9	107	11.9	107	0.0
Copper	398	314	79	336	84	6.8	398	384	96	379	95	1.3
Lead	5.73	4.94	86	5.35	93	8.0	5.73	ND	NC	ND	NC	NC
Manganese	480	436	91	471	98	7.7	480	498	104	484	101	2.9
Mercury		0.635	NC	0.622	NC	NC		ND	NC	ND	NC	NC
Nickel	195	175	90	186	95	6.1	195	202	104	197	101	2.5
Selenium		ND	NC	ND	NC	NC		ND	NC	ND	NC	NC
Silver		ND	NC	ND	NC	NC		ND	NC	ND	NC	NC
Thallium		ND	NC	ND	NC	NC		ND	NC	ND	NC	NC
Tin		33.9	NC	36.6	NC	NC		ND	NC	ND	NC	NC
Vanadium	11.9	13.6	114	13.8	116	1.5	11.9	ND	NC	ND	NC	NC
Zinc	249	218	88	231	93	5.8	249	242	97	237	95	2.1

Notes: * Indicates the Result did not meet the QC Limit.
** Results were between the MDL and the PQL.
ND = Not Detected at the PQL.
NC = Not Calculated

TABLE D-3-12. SOLIDS METALS CRM DATA (Continued)

Metals	Sample Set 5						Sample Set 6					
	Known Value mg/Kg	CRM		CRMD		RPD	Known Value mg/Kg	CRM		CRMD		RPD
		Result mg/Kg	%R	Result mg/Kg	%R			Result mg/Kg	%R	Result mg/Kg	%R	
Aluminum	6000	5320	89	5210	87	2.1	6000	5210	87	5100	85	2.1
Antimony		145	NC	145	NC	NC		133	NC	134	NC	NC
Arsenic	141	148	105	143	101	3.4	141	142	101	139	99	2.1
Barium	58.2	59	101	58.6	101	0.7	58.2	60.5	104	59.6	102	1.5
Beryllium		ND	NC	ND	NC	NC		ND	NC	ND	NC	NC
Boron		88.8	NC	98.4	NC	NC		79.9	NC	83.8	NC	NC
Cadmium		ND	NC	ND	NC	NC		ND	NC	ND	NC	NC
Chromium	111	108	97	105	95	2.8	111	106	95	106	95	0.0
Cobalt	11.1	11	99	10.8	97	1.8	11.1	10.8	97	10.8	97	0.0
Copper	398	359	90	349	88	2.8	398	353	89	351	88	0.6
Lead	5.73	6	105	5.72	100	4.8	5.73	5.85	102	5.43	95	7.4
Manganese	480	466	97	454	95	2.6	480	452	94	444	93	1.8
Mercury		0.6	NC	0.589	NC	NC		0.674	NC	0.623	NC	NC
Nickel	195	186	95	181	93	2.7	195	184	94	181	93	1.6
Selenium		ND	NC	ND	NC	NC		ND	NC	ND	NC	NC
Silver		ND	NC	ND	NC	NC		ND	NC	ND	NC	NC
Thallium		ND	NC	ND	NC	NC		ND	NC	ND	NC	NC
Tin		36.4	NC	36.6	NC	NC		37	NC	36.7	NC	NC
Vanadium	11.9	ND	NC	ND	NC	NC	11.9	13.2	111	12.8	108	3.1
Zinc	249	220	88	227	91	3.1	249	223	90	219	88	1.8

Notes: * Indicates the Result did not meet the QC Limit.
** Results were between the MDL and the PQL.
ND = Not Detected at the PQL.
NC = Not Calculated

TABLE D-3-12. SOLIDS METALS CRM DATA (Continued)

Metals	Sample Set 7						Sample Set 8					
	Known Value mg/Kg	CRM		CRMD		RPD	Known Value mg/Kg	CRM		CRMD		RPD
		Result mg/Kg	%R	Result mg/Kg	%R			Result mg/Kg	%R	Result mg/Kg	%R	
Aluminum	6000	4990	83	5000	83	0.2	6000	5570	93	5670	95	1.8
Antimony		119	NC	120	NC	NC		134	NC	137	NC	NC
Arsenic	141	139	99	139	99	0.0	141	147	104	149	106	1.4
Barium	58.2	53.5	92	57.6	99	7.4	58.2	57.7	99	59.7	103	3.4
Beryllium		ND	NC	ND	NC	NC		ND	NC	ND	NC	NC
Boron		81.6	NC	79	NC	NC		78	NC	75.7	NC	NC
Cadmium		ND	NC	ND	NC	NC		ND	NC	ND	NC	NC
Chromium	111	134	121	106	95	23.3	111	106	95	113	102	6.4
Cobalt	11.1	10.7	96	10.4	94	2.8	11.1	10.4	94	10.6	95	1.9
Copper	398	338	85	343	86	1.5	398	335	84	343	86	2.4
Lead	5.73	5.83	102	5.8	101	0.5	5.73	6.17	108	6.25	109	1.3
Manganese	480	436	91	443	92	1.6	480	450	94	462	96	2.6
Mercury		ND	NC	ND	NC	NC		0.698	NC	0.709	NC	NC
Nickel	195	187	96	178	91	4.9	195	172	88	177	91	2.9
Selenium		ND	NC	ND	NC	NC		ND	NC	ND	NC	NC
Silver		ND	NC	ND	NC	NC		ND	NC	ND	NC	NC
Thallium		ND	NC	ND	NC	NC		ND	NC	ND	NC	NC
Tin		32.8	NC	32.6	NC	NC		35.7	NC	36.6	NC	NC
Vanadium	11.9	12.6	106	12.4	104	1.6	11.9	13.7	115	14.1	118	2.9
Zinc	249	218	88	215	86	1.4	249	224	90	227	91	1.3

Notes: * Indicates the Result did not meet the QC Limit.
** Results were between the MDL and the PQL.
ND = Not Detected at the PQL.
NC = Not Calculated

TABLE D-3-13. SOLIDS METALS LABORATORY DUPLICATE RESULTS

Metals	Sample Set 1			Sample Set 2			Sample Set 3			Sample Set 4		
	Sample Result mg/Kg	Dupl. Result mg/Kg	RPD	Sample Result mg/Kg	Dupl. Result mg/Kg	RPD	Sample Result mg/Kg	Dupl. Result mg/Kg	RPD	Sample Result mg/Kg	Dupl. Result mg/Kg	RPD
Aluminum	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Antimony	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Arsenic	62.1	119	62.8 *	1520	1340	12.6	ND	ND	NC	27	27.9	3.3
Barium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Beryllium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Boron	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Cadmium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Chromium	20.3	25.5	22.7 *	23	22.5	2.2	19.1	27.2	35.0 *	16	19.7	20.7 *
Cobalt	3.84	5.05	27.2 *	4.29	4.06	5.5	2.94	4.04	31.5 *	2.51	2.81	11.3
Copper	328	440	29.2 *	129	126	2.4	18.3	15.2	18.5	75.2	74.2	1.3
Lead	42.2	112	90.5 *	35.5	28.1	NC	8.13	9.18	12.1	10.7	11	2.8
Manganese	261	386	38.6 *	319	304	4.8	188	248	27.5 *	181	186	2.7
Mercury	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Nickel	32	46.4	36.7 *	29.7	29.1	2.0	21.7	28.6	27.4 *	9.26	10.7	14.4
Selenium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Silver	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Thallium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Tin	ND	ND	NC	29.1	30	3.0	ND	ND	NC	ND	ND	NC
Vanadium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Zinc	148	409	93.7 *	118	99.6	16.9	ND	ND	NC	56.2	61.9	9.7

Notes: * Indicates the Result did not meet the QC Limit.

ND = Not Detected above the PQL.

NC = Not Calculated

TABLE D-3-13. SOLIDS METALS LABORATORY DUPLICATE RESULTS (Continued)

Metals	Sample Set 5			Sample Set 6			Sample Set 7			Sample Set 8		
	Sample Result mg/Kg	Dupl. Result mg/Kg	RPD	Sample Result mg/Kg	Dupl. Result mg/Kg	RPD	Sample Result mg/Kg	Dupl. Result mg/Kg	RPD	Sample Result mg/Kg	Dupl. Result mg/Kg	RPD
Aluminum	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Antimony	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Arsenic	2050	1390	38.4 *	ND	ND	NC	58.2	84.1	36.4 *	12.3	12.5	1.6
Barium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Beryllium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Boron	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Cadmium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Chromium	12.2	15.1	21.2 *	17	17	0.0	9.28	12.6	30.3 *	39.3	35	11.6
Cobalt	3.63	3.2	12.6	3.86	3.83	0.8	3.22	3.41	5.7	6.12	5.64	8.2
Copper	207	213.0	2.9	115	127.0	9.9	315	293.0	7.2	90.1	71.0	23.7 *
Lead	14.9	16.3	9.0	35.4	38.9	9.4	12.5	16.7	28.8 *	40.2	37.7	6.4
Manganese	301	279.00	7.6	298	295	1.0	289	293	1.4	336	334	0.6
Mercury	694	605	13.7	0.893	0.836	6.6	ND	ND	NC	10.1	11	8.5
Nickel	30.8	34.6	11.6	17.5	16.7	4.7	33	31.4	5.0	52.4	44.4	16.5
Selenium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Silver	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Thallium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Tin	10.9	9.09	18.1	13.4	11.3	17.0	ND	ND	NC	6.69	6.09	9.4
Vanadium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Zinc	133	94.8	33.5 *	69.5	75.3	8.0	153	179	15.7	92.4	75.2	20.5 *

Notes: * Indicates the Result did not meet the QC Limit.

ND = Not Detected above the PQL.

NC = Not Calculated

TABLE D-3-14. SOLIDS METALS FIELD DUPLICATE RESULTS

Metals	Batch 1			Batch 2			Batch 3			Batch 4		
	Sample Result mg/Kg	Dupl. Result mg/Kg	RPD	Sample Result mg/Kg	Dupl. Result mg/Kg	RPD	Sample Result mg/Kg	Dupl. Result mg/Kg	RPD	Sample Result mg/Kg	Dupl. Result mg/Kg	RPD
Aluminum	ND	86	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Antimony	ND	ND	NC	ND	ND	NC	ND	7.2	NC	ND	ND	NC
Arsenic	338	413	20.0	ND	ND	NC	660	882	28.8 *	27	22.9	16.4
Barium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Beryllium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Boron	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Cadmium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Chromium	26.3	27.2	3.4	188	216	13.9	56.3	64.3	13.3	16	15.4	3.8
Cobalt	9.65	9.49	1.7	19.1	20.5	7.1	17.6	23.1	27.0 *	2.51	3.33	NC
Copper	1310	568	79.0 *	29.4	34.3	15.4	319	185	53.2 *	75.2	80.2	6.4
Lead	127	75.8	50.5 *	122	146	17.9	80.1	74.6	7.1	10.7	ND	NC
Manganese	355	323	9.4	790	815	3.1	496	647	26.4 *	181	205	12.4
Mercury	0.759	ND	NC	3.37	3.65	8.0	0.552	0.742	29.4 *	ND	ND	NC
Nickel	49.8	43	14.7	685	626	9.0	34.4	33.6	2.4	9.26	10.6	13.5
Selenium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Silver	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Thallium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Tin	10.4	13.6	26.7 *	9.77	10.8	10.0	19.8	29.8	40.3 *	ND	ND	NC
Vanadium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Zinc	2110	1190	55.8 *	29.7	38.9	26.8 *	323	331	2.4	56.2	58.3	3.7

Notes:

ND = Not Detected above the PQL.

NC = Not Calculated

TABLE D-3-14. SOLIDS METALS FIELD DUPLICATE RESULTS (Continued)

	Batch 5			Batch 6			Batch 7			Batch 8		
Metals	Sample Result mg/Kg	Dupl. Result mg/Kg	RPD	Sample Result mg/Kg	Dupl. Result mg/Kg	RPD	Sample Result mg/Kg	Dupl. Result mg/Kg	RPD	Sample Result mg/Kg	Dupl. Result mg/Kg	RPD
Aluminum	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Antimony	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Arsenic	2050	3940	63.1 *	ND	ND	NC	5.94	6.44	8.1	528	702	28.3 *
Barium	ND	ND	NC	ND	ND	NC	ND	6.55	NC	ND	ND	NC
Beryllium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Boron	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Cadmium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Chromium	12.2	16.1	27.6 *	17	15.6	8.6	78.2	79.6	1.8	53.1	55.4	4.2
Cobalt	3.63	5.13	34.2 *	3.86	4.09	5.8	16.6	17.5	5.3	2.67	2.00	28.7 *
Copper	207	196	5.5	115	114	0.9	131	125	4.7	121	104	15.1
Lead	14.9	24.5	48.7 *	35.4	30.8	13.9	81.6	67.4	19.1	115	63.3	58.0 *
Manganese	301	384	24.2 *	298	317	6.2	789	808	2.4	71.5	47.0	41.4 *
Mercury	694	895	25.3 *	0.893	0.684	26.5 *	0.747	0.832	10.8	23.3	25.6	9.4
Nickel	30.8	26.8	13.9	17.5	17.7	1.1	376	385	2.4	36.8	38.3	4.0
Selenium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Silver	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Thallium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Tin	10.9	ND	NC	13.4	12.3	8.6	16.8	17.3	2.9	ND	ND	NC
Vanadium	ND	ND	NC	ND	ND	NC	ND	ND	NC	ND	ND	NC
Zinc	133	159	17.8	69.5	63.9	8.4	32.6	25.9	22.9 *	47.1	44.0	6.8

Notes:

MUSTARD CHARACTERIZATION PROJECT REPORT
FOR THE
DESERET CHEMICAL DEPOT
MUSTARD TON CONTAINERS

APPENDIX D
ANNEX A

QA/QC FIELD SURVEILLANCE REPORT

QA/QC Field Surveillance Report
Mustard Sampling and Analysis Project
For Deseret Chemical Depot Mustard Ton Containers

Introduction

A sampling and analysis project was conducted to characterize the mustard stockpile stored at Deseret Chemical Depot (DCD) in preparation for efforts to dispose of the stockpile at the Tooele Chemical Agent Disposal Facility (TOCDF). Samples were collected from a total of 98 mustard ton containers by personnel at the Oquirrh Mountain Facility (OMF), formerly Chemical Agent Munitions Disposal System (CAMDS). A QA/QC field surveillance program was established to ensure the samples were collected in accordance with *Work Plan 21-05, HD Ton Container Sampling*, OMF, September 30, 2002, and the *Mustard Sampling and Analysis Project Quality Assurance Project Plan for Deseret Chemical Depot Mustard Ton Containers*, EG&G Defense Materials, Inc., Revision 1, December 9, 2002 (QAPP). This surveillance program was conducted by Battelle Memorial Institute with staff from Dugway Proving Ground.

Summary of Surveillance Efforts

A checklist was developed based on the sampling requirements outlined in the OMF work plan and the TOCDF QAPP to ensure that a consistent review was conducted by the sampling observers. Review items included a check of the orientation of the ton container during sampling; assurance that samples were collected from the three matrices of interest (liquid, non-cohesive solid, and solid) from each ton container; a check to ensure samples were collected in accordance with the work plan and QAPP; a check that proper sampling container identification practices were employed; a check to ensure that the test team leader documented any sampling deviations; a check that the appropriate duplicate samples were collected; a check to ensure that appropriate sample control methodologies were in place; a check to ensure that a new syringe was used to collect each sample; and a review to ensure that accurate documentation was being collected regarding the sampling efforts.

The results of these reviews were captured on the *Checklist for TC Sampling* form. Completed copies of these forms for the sample collections witness by the Battelle representatives are provided as Attachment 1. There were four instances were observers were unavailable to witness, review and document the sample collection:

- May 27, 2003, for ton container number D15990 (samples 21-03-313, 21-03-314, and 21-03-315);
- May 28, 2003, for ton container number D56861 (samples 21-03-319, 21-03-320, and 21-03-321); and
- May 31, 2003, for ton containers D44485 (samples 21-03-341, 21-03-342, and 21-03-343) and D17698 (samples 21-03-345, 21-03-346, and 21-03-347).

Deviations from Sampling/Documentation Requirements

The following deviations were noted from the planned sampling/documentation requirements:

Sample Date	Ton Container	Deviation/Comment
30 January 2003	D7814	After rotating the TC to open plug for collection of the solid sample, the plug could not be opened. Operators used the crane to switch ends of the TC, opened the plug on the opposite end, and collected the solid sample.
04 February 2003	D14354	TC sprayed with WD-40® prior to sample collection.
06 February 2003	D15856	Solid sample collection yielded a very small amount. Unable to scrape sludge.
06 February 2003	D14498	Operator poured too much of the non-cohesive sample into sample jar. Poured out the liquid and left the sludge in the sample jar.
08 February 2003	D54643	PTRD would not seal. This TC was opened without sealing (approved by OMF project manager).
10 February 2003	D83852	Samples #55 and #56 were mislabeled. Two identified as #56 and none as #55. Changed one of #56 to #55(N).
12 February 2003	D21934	Non-cohesive sample was pulled twice because of a transfer problem between vial and syringe.
13 February 2003	D41559	Non-cohesive sample did not have as much sediment as usual.
14 February 2003	D79558	Solid sample was only 1 mL because of the lack of solid in TC.
19 February 2003	D93179	1. At onset a wire brush was used around plug to try for a better seal. Question on metal flakes in sample. 2. Non-cohesive sample was only 1 mL because of lack of sample.
01 April 2003	D46680	Sample bottle shattered while putting non-cohesive sample into bottle. Collected another non-cohesive sample.
02 April 2003	D56259	Solid sample collected from the bottom – not scraped off the top.
04 April 2003	D14409	Used SNOOP® to look for leaks at site of plug on solid sample.
14 April 2003	D46992	Used SNOOP® to look for leaks at site of plug on solid sample.
15 April 2003	D33724	Used SNOOP® to look for leaks at site of plug on solid sample.

Sample Date	Ton Container	Deviation/Comment
16 April 2003	D8685	1. Used SNOOP® to look for leaks at site of plug on solid sample. 2. Unable to collected solid sample after rotating TC; turned TC to the other plug to gain better access to solid sample.
17 April 2003	D17045	Used SNOOP® to look for leaks at site of plug on solid sample.
18 April 2003	D610	Used SNOOP® to look for leaks at site of plug on solid sample.
18 April 2003	D16541	Used SNOOP® to look for leaks at site of plug on solid sample.
28 April 2003	D47472	Used SNOOP® to look for leaks at site of plug on solid sample.
29 April 2003	D41617	Non-cohesive sample sat for three hours in between entries before it was separated and vialed up.
29 April 2003	D47708	Used SNOOP® to look for leaks.
01 May 2003	D54617	PTRD did not seal on this TC. Plug was removed by alternate procedure involving a shielded ratchet on the plug.
03 May 2003	D1841	Used SNOOP® to look for leaks at site of plug on solid sample.
14 May 2003	D51059	Used SNOOP® to look for leaks at site of plug on solid sample.
15 May 2003	D22213	1. Removed PTRD after collecting gas sample; removed PTRD without purging TC; reattached PTRD and purged TC. 2. Used SNOOP® to look for leaks at site of plug on solid sample.
15 May 2003	D45179	1. Unable to determine PSI because PTRD failed. 2. Used SNOOP® to look for leaks at site of plug on solid sample.
16 May 2003	D19497	Used SNOOP® to look for leaks at site of plug on solid sample.
16 May 2003	D44007	Used SNOOP® to look for leaks at site of plug on solid sample.
16 May 2003	D94138	Used SNOOP® to look for leaks at site of plug on solid sample.
17 May 2003	D20382	PTRD failed.
27 May 2003	D92455	Used SNOOP® to look for leaks at site of plug on solid sample.
28 May 2003	D43395	Used Decon solution to look for leaks at site of plug on solid sample.

Attachment 1

Completed *Checklist for TC Sampling* Forms

Date: 1-22-03
Observer: Karen Palmer
Initials: KP
Ton Container #: D94550

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	✓		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.	✓		
15). Shipments not to exceed 20 samples.		✓	

*COMMENTS:

If more space needed - continue on back of sheet.

Date: 01-23-03
Observer: Karen Palmer
Initials: KP
Ton Container #: 46673

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	✓		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

*COMMENTS:

If more space needed - continue on back of sheet.

Date: 01-23-03
Observer: Karen Palmer
Initials: KP
Ton Container #: 14944

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	✓		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

*COMMENTS:

If more space needed - continue on back of sheet.

Date: 01-24-03
Observer: Karen Palmer
Initials: KP
Ton Container #: 15056

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	✓		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

***COMMENTS:**

If more space needed - continue on back of sheet.

Date: 01-24-03
Observer: Karen Palmer
Initials: KP
Ton Container #: 42249

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	✓		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

***COMMENTS:**

If more space needed - continue on back of sheet.

Date: 01-28-03

Observer: Karen Palmer

Initials: KP

Ton Container #: 1650

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	✓		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.	KP		✓
15). Shipments not to exceed 20 samples.	✓		✓

*COMMENTS:

If more space needed - continue on back of sheet.

Date: 01-28-03

Observer: Kevin Palmer

Initials: KP

Ton Container #: 79439

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	✓		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

***COMMENTS:**

If more space needed - continue on back of sheet.

Date: 01-29-03
Observer: Karen Palmer
Initials: KP
Ton Container #: D613

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	✓		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

***COMMENTS:**

If more space needed - continue on back of sheet.

Date: 01-29-03
Observer: Karen Palmer
Initials: KP
Ton Container #: D85521

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	✓		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

***COMMENTS:**

If more space needed - continue on back of sheet.

Date: 01-30-03
Observer: Daniel Lamb
Initials: DL
Ton Container #: 7814

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	X		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	X		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	* X		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	X		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	X		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	X		
7). Verify the color of the sample.	X		
8). Ensure that a new syringe is used for each sample.	X		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	X		
10). Ensure that the COC record begins once the sample is placed in the container.	X		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	X		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	X		
13). Ensure that all deviations are documented and signed by the test team leader.	X		
14). Duplicate every 20th sample.			X
15). Shipments not to exceed 20 samples.			X

*COMMENTS: After rotating TC to open plug for solid sample, plug would not budge. Operators used the crane to switch ends. The plug on the opposite end loosened easily.

If more space needed - continue on back of sheet.

Date: 01-31-03
Observer: KPalmer
Initials: KP
Ton Container #: 17290

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	✓		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

***COMMENTS:**

If more space needed - continue on back of sheet.

Date: 01-31-03
Observer: Karen Palmer
Initials: KP
Ton Container #: 14856

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	✓		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

***COMMENTS:**

If more space needed - continue on back of sheet.

Date: 2-3-03
Observer: Karen Palmer
Initials: KP
Ton Container #: D3207

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	✓		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.		✓	
15). Shipments not to exceed 20 samples.		✓	

*COMMENTS:

If more space needed - continue on back of sheet.

Date: 02-03-02
Observer: Karen Palmer
Initials: KP
Ton Container #: 19397

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	✓		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

***COMMENTS:**

If more space needed - continue on back of sheet.

Date: 02-04-03
Observer: Karen Palmer
Initials: KP
Ton Container #: 46537

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	✓		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). *Ensure that the COC record begins once the sample is placed in the container.*	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

***COMMENTS:**

If more space needed - continue on back of sheet.

Date: 02-04-03
Observer: Karen Palmer
Initials: KP
Ton Container #: 14354

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.		✓	
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

***COMMENTS:**

This sample could possibly be contaminated by the use of WD-40.

If more space needed - continue on back of sheet.

Date: 02-05-03
Observer: Karen Palmer
Initials: KP
Ton Container #: 48309

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	✓		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

***COMMENTS:**

If more space needed - continue on back of sheet.

Date: 02-05-03
Observer: Karen Palmer
Initials: KP
Ton Container #: 47125

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	✓		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.	✓ KP		✓
15). Shipments not to exceed 20 samples.			✓

***COMMENTS:**

If more space needed - continue on back of sheet.

Date: 02-06-03
Observer: Karen Palmer
Initials: KP
Ton Container #: 15856

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.		✓	
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

*COMMENTS:
Solid Sample had a very small amount.
Unable to scrape sludge. Tried three Times.

If more space needed - continue on back of sheet.

Date: 02-06-03
Observer: Karen Palmer
Initials: KP
Ton Container #: 14498

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.		✓	
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.	✓		
15). Shipments not to exceed 20 samples.	✓		

*COMMENTS:
Poured too much of the Non Cohesive sample into glass bottle. Poured out the Liquid + left the sludge in the bottle.

If more space needed - continue on back of sheet.

Date: 02-07-03
Observer: Karen Palmer
Initials: KP
Ton Container #: 46491

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	✓		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

***COMMENTS:**

If more space needed - continue on back of sheet.

Date: 2-8-03
Observer: David Lamb
Initials: DL
Ton Container #: 54643

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	X		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	X		
3). Ensure that each sample drawn is within the guidelines set by the test plan.		X	
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	X		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	X		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	X		
7). Verify the color of the sample.	X		
8). Ensure that a new syringe is used for each sample.	X		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	X		
10). Ensure that the COC record begins once the sample is placed in the container.	X		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	X		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	X		
13). Ensure that all deviations are documented and signed by the test team leader.	X		
14). Duplicate every 20th sample.			X
15). Shipments not to exceed 20 samples.			X

*COMMENTS: PTRD would not seal. This ton was opened without sealing, approved by J. Broadbent.

If more space needed - continue on back of sheet.

Date: 2-8-03
Observer: Daniel Leab
Initials: DL
Ton Container #: 85182

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	X		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	X		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	X		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	X		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	X		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	X		
7). Verify the color of the sample.	X		
8). Ensure that a new syringe is used for each sample.	X		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	X		
10). Ensure that the COC record begins once the sample is placed in the container.	X		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	X		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	X		
13). Ensure that all deviations are documented and signed by the test team leader.	X		
14). Duplicate every 20th sample.			X
15). Shipments not to exceed 20 samples.			X

***COMMENTS:**

If more space needed - continue on back of sheet.

Date: 2-8-03
Observer: Daniel Lamb
Initials: DL
Ton Container #: 28506

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	X		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	X		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	X		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	X		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	X		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	X		
7). Verify the color of the sample.	X		
8). Ensure that a new syringe is used for each sample.	X		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	X		
10). Ensure that the COC record begins once the sample is placed in the container.	X		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	X		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	X		
13). Ensure that all deviations are documented and signed by the test team leader.	X		
14). Duplicate every 20th sample.			X
15). Shipments not to exceed 20 samples.			X

***COMMENTS:**

If more space needed - continue on back of sheet.

Date: 02-10-03
Observer: Karen Palmer
Initials: KP
Ton Container #: 83852

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	✓		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.		✓	
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

*COMMENTS:
Samples 55 + 56 were mislabeled. Two #56 and no #55. Changed one of 56 to #55 (N) #56 (S)

If more space needed - continue on back of sheet.

Date: 02-10-03
Observer: Karen Palmer
Initials: KP
Ton Container #: 17164

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	✓		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.	✓ KP		✓
15). Shipments not to exceed 20 samples.			✓

***COMMENTS:**

If more space needed - continue on back of sheet.

Date: 02-11-03
Observer: Karen Palmer
Initials: KP
Ton Container #: 14637

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	✓		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

*COMMENTS:

If more space needed - continue on back of sheet.

NOTE: Samples from this TC were not analyzed at the laboratory. TC Number D48980 was subsequently re-sampled on May 17, 2003, and the samples were analyzed with Sample Set #7.

Date: 02-11-03
Observer: Karen Palmer
Initials: KP
Ton Container #: 48980

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	✓		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

*COMMENTS:

If more space needed - continue on back of sheet.

Date: 2-12-03

Observer: Daniel Lamb

Initials: DL

Ton Container #: 21934

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	X		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	X		
3). Ensure that each sample drawn is within the guidelines set by the test plan.		X	
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	X		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	X		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	X		
7). Verify the color of the sample.	X		
8). Ensure that a new syringe is used for each sample.	X		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	X		
10). Ensure that the COC record begins once the sample is placed in the container.	X		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	X		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	X		
13). Ensure that all deviations are documented and signed by the test team leader.	X		
14). Duplicate every 20th sample.	DL		X
15). Shipments not to exceed 20 samples.			X

*COMMENTS: Non-cohesive sample was pulled twice because of a transfer problem between vial and syringe.

If more space needed - continue on back of sheet.

Date: 9-17-03
Observer: Daniel Lamb
Initials: DL
Ton Container #: 10679

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	X		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	X		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	X		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	X		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	X		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	X		
7). Verify the color of the sample.	X		
8). Ensure that a new syringe is used for each sample.	X		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	X		
10). Ensure that the COC record begins once the sample is placed in the container.	X		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	X		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	X		
13). Ensure that all deviations are documented and signed by the test team leader.	X		
14). Duplicate every 20th sample.			X
15). Shipments not to exceed 20 samples.			X

***COMMENTS:**

If more space needed - continue on back of sheet.

Date: 2-12-03
Observer: David Lamb
Initials: DL
Ton Container #: 81547

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	X		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	X		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	X		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	X		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	X		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	X		
7). Verify the color of the sample.	X		
8). Ensure that a new syringe is used for each sample.	X		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	X		
10). Ensure that the COC record begins once the sample is placed in the container.	X		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	X		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	X		
13). Ensure that all deviations are documented and signed by the test team leader.	X		
14). Duplicate every 20th sample.			X
15). Shipments not to exceed 20 samples.			X

*COMMENTS:

If more space needed - continue on back of sheet.

Date: 02-13-03
Observer: Karen Palmer
Initials: KP
Ton Container #: 41559

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.		✓	
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

*COMMENTS:
NonCohesive sample did not have as much sediment as usual.

If more space needed - continue on back of sheet.

Date: 02-13-03
Observer: Karen Palmer
Initials: KP
Ton Container #: D 147167

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	✓		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

***COMMENTS:**

If more space needed - continue on back of sheet.

Date: 02-14-03
Observer: Karen Palmer
Initials: KP
Ton Container #: 38422

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	✓		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

*COMMENTS:

If more space needed - continue on back of sheet.

Date: 02-14-03
Observer: Karen Palmer
Initials: KP
Ton Container #: 79558

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.		✓	
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

*COMMENTS:
(S) sample was only 1 mL because of the lack of solid in TC.

If more space needed - continue on back of sheet.

Date: 02-18-03
Observer: Karen Palmer
Initials: KP
Ton Container #: 19116

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	X		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	X		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	X		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	X		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	X		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	X		
7). Verify the color of the sample.	X		
8). Ensure that a new syringe is used for each sample.	X		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	X		
10). Ensure that the COC record begins once the sample is placed in the container.	X		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	X		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	X		
13). Ensure that all deviations are documented and signed by the test team leader.	X		
14). Duplicate every 20th sample.			X
15). Shipments not to exceed 20 samples.			X

***COMMENTS:**

If more space needed - continue on back of sheet.

Date: 02-18-03
Observer: Karen Palmer
Initials: KP
Ton Container #: 22757

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	X		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	X		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	X		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	X		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	X		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	X		
7). Verify the color of the sample.	X		
8). Ensure that a new syringe is used for each sample.	X		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	X		
10). Ensure that the COC record begins once the sample is placed in the container.	X		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	X		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	X		
13). Ensure that all deviations are documented and signed by the test team leader.	X		
14). Duplicate every 20th sample.			X
15). Shipments not to exceed 20 samples.			X

***COMMENTS:**

If more space needed - continue on back of sheet.

Date: 02-19-03
Observer: Karen Palmer
Initials: KP
Ton Container #: 93179

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.		✓	
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

*COMMENTS:
- At onset a wire brush was used around plug to try for a better seal. ? on metal flakes in sample.
- (N) non Cohesive sample was only 1 ml because lack of sample

If more space needed - continue on back of sheet.

Date: 02-19-03
Observer: Karen Palmer
Initials: KP
Ton Container #: 79762

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	✓		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

***COMMENTS:**

If more space needed - continue on back of sheet.

Date: 02-20-03
Observer: Karen Palmer
Initials: KP
Ton Container #: 52785

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	✓		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.	✓		
15). Shipments not to exceed 20 samples.	✓		

***COMMENTS:**

If more space needed - continue on back of sheet.

Date: 02-20-03
Observer: Karen Palmer
Initials: KP
Ton Container #: 50034

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	✓		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

***COMMENTS:**

If more space needed - continue on back of sheet.

Date: 02-21-03
Observer: Karen Palmer
Initials: KP
Ton Container #: 563368

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	✓		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

***COMMENTS:**

If more space needed - continue on back of sheet.

Date: 02-21-03
Observer: Karen Palmer
Initials: KP
Ton Container #: 49168

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	✓		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

***COMMENTS:**

If more space needed - continue on back of sheet.

Date: 2-22-03
Observer: Daniel Lamb
Initials: DL
Ton Container #: 17911

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	X		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	X		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	X		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	X		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	X		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	X		
7). Verify the color of the sample.	X		
8). Ensure that a new syringe is used for each sample.	X		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	X		
10). Ensure that the COC record begins once the sample is placed in the container.	X		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	X		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	X		
13). Ensure that all deviations are documented and signed by the test team leader.	X		
14). Duplicate every 20th sample.			X
15). Shipments not to exceed 20 samples.			X

*COMMENTS:

If more space needed - continue on back of sheet.

Date: 7/22/03
Observer: Daniel Lamb
Initials: DL
Ton Container #: 3 5096

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	X		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	X		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	X		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	X		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	X		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	X		
7). Verify the color of the sample.	X		
8). Ensure that a new syringe is used for each sample.	X		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	X		
10). Ensure that the COC record begins once the sample is placed in the container.	X		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	X		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	X		
13). Ensure that all deviations are documented and signed by the test team leader.	X		
14). Duplicate every 20th sample.			X
15). Shipments not to exceed 20 samples.			X

***COMMENTS:**

If more space needed - continue on back of sheet.

Date: 2-22-03
Observer: Daniel Lane
Initials: DL
Ton Container #: 45279

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	X		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	X		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	X		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	X		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	X		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	X		
7). Verify the color of the sample.	X		
8). Ensure that a new syringe is used for each sample.	X		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	X		
10). Ensure that the COC record begins once the sample is placed in the container.	X		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	X		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	X		
13). Ensure that all deviations are documented and signed by the test team leader.	X		
14). Duplicate every 20th sample.			X
15). Shipments not to exceed 20 samples.			X

***COMMENTS:**

If more space needed - continue on back of sheet.

Date: 4-1-03

Observer: Karen Palmer

Initials: KP

Ton Container #: 46690

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area. (D) Core sample	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	✓		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid (D) Core Sample	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). ~~Duplicate every 20th sample.~~ Duplicate sample will be pulled on the first sample every week.	✓		
15). Shipments not to exceed 20 samples.			

*COMMENTS:

N-Cohesive sample - Sample bottle shattered while putting sample into bottle. Will get another sample.

If more space needed - continue on back of sheet.

Date: 4-2-03
Observer: Daniel Lamb
Initials: DL
Ton Container #: SE 56259

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	X		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.		X	
3). Ensure that each sample drawn is within the guidelines set by the test plan.	X		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	X		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	X		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	X		
7). Verify the color of the sample.	X		
8). Ensure that a new syringe is used for each sample.	X		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	X		
10). Ensure that the COC record begins once the sample is placed in the container.	X		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	X		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	X		
13). Ensure that all deviations are documented and signed by the test team leader.	X		
14) Duplicate every 20th sample.			X
15). Shipments not to exceed 20 samples.			X

*COMMENTS:
2) Attempted core sample but solid was mobile. No core sample taken. Solid sample was taken off the bottom, not scraped off the top.
14) Duplicates taken 4-1-03
15) This ton is #2 for the sampling period.

If more space needed - continue on back of sheet.

Date: 04-03-03
Observer: Karen Palmer
Initials: KP
Ton Container #: 47615

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	✓		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

***COMMENTS:**

If more space needed - continue on back of sheet.

Date: 4-3-03

Observer: Karen Palmer

Initials: KP

Ton Container #: 79202

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	✓		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

***COMMENTS:**

If more space needed - continue on back of sheet.

Date: 04-04-03

Observer: Karen Palmer

Initials: KP

Ton Container #: 14409

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.		✓	
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

*COMMENTS:
used Snoop to look for leaks a site of plug on solid Sample

If more space needed - continue on back of sheet.

Date: 4-3-03
Observer: Daniel Lamb
Initials: DL
Ton Container #: 43529

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	X		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.		X	
3). Ensure that each sample drawn is within the guidelines set by the test plan.	X		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	X		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	X		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	X		
7). Verify the color of the sample.	X		
8). Ensure that a new syringe is used for each sample.	X		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	X		
10). Ensure that the COC record begins once the sample is placed in the container.	X		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	X		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	X		
13). Ensure that all deviations are documented and signed by the test team leader.	X		
14). Duplicate every 20th sample.			X
15). Shipments not to exceed 20 samples.	X		

*COMMENTS:
2. 5 40g core samples were pulled, making 8 total samples.
14. Duplicates on 4/1/03
15. This is the sixth and final ton for this shipment.

If more space needed - continue on back of sheet.

Date: 4-14-03
Observer: Karen Palmer
Initials: KP
Ton Container #: 46992 71

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	~~✓~~ KP	✓	
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample. Duplicate sample	✓		
15). Shipments not to exceed 20 samples.			✓

*COMMENTS: Used Snoop w/ Solid Sample

If more space needed - continue on back of sheet.

★ - Agent Handler commented that the N engraved on cap needs to be larger.

Date: 4-15-03
Observer: Karen Palmer
Initials: KP
Ton Container #: 15007 69°

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	✓		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

***COMMENTS:**

If more space needed - continue on back of sheet.

Date: 4-15-03
Observer: Karen Palmer
Initials: KP
Ton Container #: 33724 Temp 74°

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.		✓	
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

*COMMENTS: used scoop on solid sample

If more space needed - continue on back of sheet.

Date: 4-16-03
Observer: Karen Palmer
Initials: KP
Ton Container #: 27815 Temp 77°

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	✓		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

*COMMENTS:

If more space needed - continue on back of sheet.

Date: 4-16-03
Observer: Karen Palmer
Initials: KP
Ton Container #: 8685 Temp 80°

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.		✓	
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

*COMMENTS:
- Pressure was present after the T.C was turned
  Used Scoop on plug to ✓ for pressure
- Unable to get a sample after turning T.C. Solid

If more space needed - continue on back of sheet.

Turned TC to the other plug to gain better access to Solid Sample

Date: 4-17-03
Observer: KPalmer
Initials: KP
Ton Container #: 43499 80°

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
☆ 2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	✓		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

*COMMENTS:
☆ - Agent Handlers complained that the caps to the storage bottles the engraving is to small.

If more space needed - continue on back of sheet.

Date: 4-17-03
Observer: Karen Palmer
Initials: KP
Ton Container #: 17045 78°

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.		✓	
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

*COMMENTS:
Scoop used on Solid Sample

If more space needed - continue on back of sheet.

Date: 4-18-03
Observer: Daniel Lamb
Initials: DL
Ton Container #: 610

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	X		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	X		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	X		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	X		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	X		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	X		
7). Verify the color of the sample.	X		
8). Ensure that a new syringe is used for each sample.	X		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	X		
10). Ensure that the COC record begins once the sample is placed in the container.	X		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	X		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	X		
13). Ensure that all deviations are documented and signed by the test team leader.	X		
14). Duplicate every 20th sample.			X
15). Shipments not to exceed 20 samples.			X

*COMMENTS: * 3) Snoop used on plug for solid sample
14) Duplicates for this shipment on 4-14-03
15) This is not the final sample set for this shipment

If more space needed - continue on back of sheet.

Date: 4-18-03
Observer: Daniel Lamb
Initials: DL
Ton Container #: 16341

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	X		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	X		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	X		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	X		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	X		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	X		
7). Verify the color of the sample.	X		
8). Ensure that a new syringe is used for each sample.	X		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	X		
10). Ensure that the COC record begins once the sample is placed in the container.	X		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	X		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	X		
13). Ensure that all deviations are documented and signed by the test team leader.	X		
14). Duplicate every 20th sample.			X
15). Shipments not to exceed 20 samples.			X

*COMMENTS: * 3) Snap used on pkg for solid sample
14) Duplicates on 4-14-03
15) Not the final sample set for this shipment

If more space needed - continue on back of sheet.

Date: 4-19-03
Observer: Karen Palmer
Initials: KP
Ton Container #: 19186

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	✓		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

***COMMENTS:**

If more space needed - continue on back of sheet.

Date: 4-19-03
Observer: Karen Palmer
Initials: KP
Ton Container #: 52603 81°

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	✓		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

***COMMENTS:**

If more space needed - continue on back of sheet.

Date: 4/28/03
Observer: Karen Palmer
Initials: KP
Ton Container #: 47472 72°

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.		✓	
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.	✓		
15). Shipments not to exceed 20 samples.	✓		

***COMMENTS:**
Used snoop on solid sample.

If more space needed - continue on back of sheet.

Date: ~~17555~~ KP 4-28-03
Observer: Karen Palmer
Initials: KP
Ton Container #: 17555 84°

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.		✓	
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

***COMMENTS:**

If more space needed - continue on back of sheet.

Date: 4-29-03
Observer: [illegible]
Initials: KP
Ton Container #: 41617 77°

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.		✓	
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

*COMMENTS:
Noncohesive sample sat for 3 hrs inbetween entrys before it was seperated & vialed up.

If more space needed - continue on back of sheet.

Date: 4-29-03
Observer: Karen Palmer
Initials: KP 10-23-03
Ton Container #: ~~4549~~ KP Temp 79°
★ 47708

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.		✓	
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

*COMMENTS:

Used Snoop + no pressure was present

If more space needed - continue on back of sheet. KP 10-23-03

★ After reviewing all notes and paperwork my TC# did not coincide w/ COC
This was because the 1st entry of that day was aborted.
I did not correct for the new TC when sampling commenced

Date: 4-30-03
Observer: D Lamb
Initials: DL
Ton Container #: 82228

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	X		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	X		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	X		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	X		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	X		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	X		
7). Verify the color of the sample.	X		
8). Ensure that a new syringe is used for each sample.	X		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	X		
10). Ensure that the COC record begins once the sample is placed in the container.	X		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	X		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	X		
13). Ensure that all deviations are documented and signed by the test team leader.	X		
14). Duplicate every 20th sample.			X
15). Shipments not to exceed 20 samples.			X

*COMMENTS:
14) Duplicates taken on 28 Apr 03 for this shipment.
15) Sampling finishes on 3 May 03 for this shipment.

If more space needed - continue on back of sheet.

Date: 5-1-03

Observer: D Leab

Initials: DL

Ton Container #: 54617

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	X		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	X		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	* X		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	X		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	X		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	X		
7). Verify the color of the sample.	X		
8). Ensure that a new syringe is used for each sample.	X		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	X		
10). Ensure that the COC record begins once the sample is placed in the container.	X		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	X		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	X		
13). Ensure that all deviations are documented and signed by the test team leader.	X		
14). Duplicate every 20th sample.			X
15). Shipments not to exceed 20 samples.			X

*COMMENTS: 3) PTRD did not seal on this ton. Plug was removed by alternate procedure involving shielded ratchet on plug.
14) Duplicates taken 4-28-03.
15) Shipment sampling finishes 3 May.

If more space needed - continue on back of sheet.

Date: 5-1-03
Observer: D Cash
Initials: DC
Ton Container #: 449

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	X		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.		X	
3). Ensure that each sample drawn is within the guidelines set by the test plan.	X		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	X		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	X		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	X		
7). Verify the color of the sample.	X		
8). Ensure that a new syringe is used for each sample.	X		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	X		
10). Ensure that the COC record begins once the sample is placed in the container.	X		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	X		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	X		
13). Ensure that all deviations are documented and signed by the test team leader.	X		
14). Duplicate every 20th sample.			X
15). Shipments not to exceed 20 samples.			X

*COMMENTS:
2) A headspace gas sample was pulled before L, N, and S. #4, #7, etc. do not apply to this sample (as written). This is the first gas sample
14) L, N, and S duplicates taken on 4-28-03. Headspace gas duplicate not taken.
15) Shipment sampling ends 3 May 03.
If more space needed - continue on back of sheet.

Date: 5-2-03
Observer: D Lamb
Initials: DL
Ton Container #: 32252

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	X		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	*X		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	X		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	X		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	X		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	X		
7). Verify the color of the sample.	X		
8). Ensure that a new syringe is used for each sample.	X		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	X		
10). Ensure that the COC record begins once the sample is placed in the container.	X		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	X		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	X		
13). Ensure that all deviations are documented and signed by the test team leader.	X		
14). Duplicate every 20th sample.			X
15). Shipments not to exceed 20 samples.			X

*COMMENTS:
2) Operators were instructed to pull headspace sample if psi > 25, but psi ≈ 0.
14) Duplicates taken 4-28-03
15) Shipment sampling ends 5-3-03
If more space needed - continue on back of sheet.

Date: 5/3/03

Observer: Karen Palmer

Initials: KP

Ton Container #: 6800 Temp 86°

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	✓		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		✓
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

***COMMENTS:**

If more space needed - continue on back of sheet.

Date: 5/3/03
Observer: Karen Palmer
Initials: KP
Ton Container #: 82164 83°

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	✓		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

***COMMENTS:**

If more space needed - continue on back of sheet.

Date: 5-3-03
Observer: Karen Palmer
Initials: KP
Ton Container #: 1841 Temp 83°

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.		✓	
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

***COMMENTS:**

Used Swoop on Solid Sample

If more space needed - continue on back of sheet.

Date: 5-12-03
Observer: Karen Palmer
Initials: KP
Ton Container #: 50373 Temp 67°

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.		✓	
3). Ensure that each sample drawn is within the guidelines set by the test plan.	✓		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.	✓		
15). Shipments not to exceed 20 samples.		✓	

*COMMENTS:
gas samples were included on this shipment.

If more space needed - continue on back of sheet.

Date: 5-12-03
Observer: Karen Palmer
Initials: KP
Ton Container #: 80775 Temp 85°

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	✓		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

*COMMENTS:

If more space needed - continue on back of sheet.

Date: 5-13-03
Observer: Karen Palmer
Initials: KP
Ton Container #: 47810 Temp 82°

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	✓		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

*COMMENTS:

If more space needed - continue on back of sheet.

Date: 5-13-03
Observer: Karen Palmer
Initials: KP
Ton Container #: 48273 Temp 89°

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	KP	✓	
3). Ensure that each sample drawn is within the guidelines set by the test plan.	✓		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

*COMMENTS: gas sample collected in Suma Can.

If more space needed - continue on back of sheet.

Date: 5-14-03
Observer: Karen Palmer
Initials: KP
Ton Container #: 51059 Temp 80°

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓ KP	✓	
3). Ensure that each sample drawn is within the guidelines set by the test plan.	✓		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

*COMMENTS:
gas sample drawn
used scoop on solid sample after TC was turned.

If more space needed - continue on back of sheet.

Date: 5-14-03
Observer: Karen Palmer
Initials: KP
Ton Container #: 27635 Temp 84°

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	✓		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

*COMMENTS:

If more space needed - continue on back of sheet.

Date: 5-15-03
Observer: Karen Palmer
Initials: KP
Ton Container #: 22213 Temp 78°

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.		✓	
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

*COMMENTS:
Gas sample was drawn, but sample was lost
After that removed PTRD. forgot to purge drum.
Reattached PTRD & purged ton.
If more space needed - continue on back of sheet.
Solid Sample could be contaminated because Snoop was used.

Date: 5-15-03
Observer: Karen Palmer
Initials: KP
Ton Container #: 45179 Temp 79°

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	KP ✓	✓	
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			
15). Shipments not to exceed 20 samples.			

*COMMENTS:
Used Snoop on Solid Sample
not able to get PSI because PTRD Broke.

If more space needed - continue on back of sheet.

Date: 5-16-03
Observer: Karen Palmer
Initials: KP
Ton Container #: 19497 Temp 82°

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.		✓	
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

*COMMENTS:

Gas sample was drawn
Used scoop on Solid Sample

If more space needed - continue on back of sheet.

Date: 5-16-03
Observer: Karen Palmer
Initials: KPP
Ton Container #: 43072 80"

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	✓		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

*COMMENTS:
Collected gas sample

If more space needed - continue on back of sheet.

Date: 5-16-03
Observer: Karen Palmer
Initials: KP
Ton Container #: 44007 Temp 80°

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	~~✓~~ KP	✓	
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

*COMMENTS:

Used Snoop on ~~gas~~ KP Solid Sample
Collected gas sample

If more space needed - continue on back of sheet.

Date: 5-16-03
Observer: Karen Pelmer
Initials: KP
Ton Container #: 94138 Temp 83°

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	✓ KP	✓	
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

*COMMENTS:

Used Snoop on Solid Sample
Collected Bar Sample

If more space needed - continue on back of sheet.

Date:	17 May 03
Observer:	D Lamb
Initials:	DL
Ton Container #:	48980

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	X		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	X		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	X		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	X		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	X		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	X		
7). Verify the color of the sample.	X		
8). Ensure that a new syringe is used for each sample.	X		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	X		
10). Ensure that the COC record begins once the sample is placed in the container.	X		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	X		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	X		
13). Ensure that all deviations are documented and signed by the test team leader.	X		
14). Duplicate every 20th sample.			X
15). Shipments not to exceed 20 samples.			X

*COMMENTS: 14) Not Applicable : duplicates on 5-12-03
15) This is not the final ton.
* This sampling is a re-do.

If more space needed - continue on back of sheet.

Date: 17 May 03
Observer: D Lane
Initials: DL
Ton Container #: 70382

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	X		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	X		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	X		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	X		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	X		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	X		
7). Verify the color of the sample.	X		
8). Ensure that a new syringe is used for each sample.	X		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	X		
10). Ensure that the COC record begins once the sample is placed in the container.	X		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	X		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	X		
13). Ensure that all deviations are documented and signed by the test team leader.	X		
14). Duplicate every 20th sample.			X
15). Shipments not to exceed 20 samples.	X		

*COMMENTS: 3) PTRO failed
14) Duplicates on 5/12/03
15) This is the final ton sampled for this shipment, #15.

If more space needed - continue on back of sheet.

Date: 5-27-03
Observer: Karen Palmer
Initials: KP
Ton Container #: 77859 69°

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	✓		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.	✓		
15). Shipments not to exceed 20 samples.	✓		

***COMMENTS:**

If more space needed - continue on back of sheet.

Date: 27 May 2003
Ton Container #: D15990

Sampling Not Witnessed – Checklist Not Available

Date: 5-27-03
Observer: Karen Palmer
Initials: KP
Ton Container #: 92455 85°

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). *Ensure that each sample drawn is within the guidelines set by the test plan.*		✓	
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). *Check the data collection sheet and be sure that all the blank spaces are filled in.* Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample *before it is placed in the container.*	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

***COMMENTS:**
Used Scoop on Solid Sample

If more space needed - continue on back of sheet.

Date: 28 May 2003
Ton Container #: D56861

Sampling Not Witnessed – Checklist Not Available

Date: 5-28-03
Observer: Karen Palmer
Initials: KP
Ton Container #: 43395 88°

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.		✓	
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

*COMMENTS:
used Decon solution on plug to check for pressure on ton for solid sample.
Talked w/ TOC SF about this.

If more space needed - continue on back of sheet.

Date: 5-29-03
Observer: KP
Initials: Karen Palmer
Ton Container #: 49972 77°

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	✓		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

***COMMENTS:**

* gas sample collected * 1071

If more space needed - continue on back of sheet.

Date: 5-29-03

Observer: Karen Palmer

Initials: KP

Ton Container #: 41787 79°

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	✓		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

*COMMENTS:

☆ gor sample collected #1070

If more space needed - continue on back of sheet.

Date: 5-29-03
Observer: KP
Initials: Karen Palmer
Ton Container #: 50997 88°

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	✓		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

*COMMENTS:

gas sample drawn # 1073

If more space needed - continue on back of sheet.

Date: 5-30-03
Observer: Karen Palmer
Initials: KP
Ton Container #: 8633 76°

CHECKLIST FOR TC SAMPLING

	Y	*N	*N/A
1). All ton containers to be sampled should have the arrow mark pointing down. Ensure that the arrow stays down during sampling.	✓		
2). Ensure that three samples are taken. The first area will be marked with an (L). This is the upper level of the T.C. The second area (N) is the non-cohesive level. The third will be marked with (S) for the solid area.	✓		
3). Ensure that each sample drawn is within the guidelines set by the test plan.	✓		
4). Verify that each sample container cap is engraved with the correct letter. (L) liquid, (N) non-cohesive, (S) solid.	✓		
5). Each sample container label shall have the following information: TC serial #, Sample ID#, Sample date, and Sample size.	✓		
6). Check the data collection sheet and be sure that all the blank spaces are filled in. Ensure that only one line is used to cross out mistakes. All mistakes are to be initialed.	✓		
7). Verify the color of the sample.	✓		
8). Ensure that a new syringe is used for each sample.	✓		
9). A signed tamper proof seal marked with the sample ID should be placed on each sample before it is placed in the container.	✓		
10). Ensure that the COC record begins once the sample is placed in the container.	✓		
11). All samples are to be under lock and key unless it is in full view of an authorized test team member.	✓		
12). Every sample shall be accounted for at all times. Documentation shall be kept with the sample at all times.	✓		
13). Ensure that all deviations are documented and signed by the test team leader.	✓		
14). Duplicate every 20th sample.			✓
15). Shipments not to exceed 20 samples.			✓

*COMMENTS:
Gas sample drawn #1075

If more space needed - continue on back of sheet.

Date: 31 May 2003
Ton Container #: D44485

Sampling Not Witnessed – Checklist Not Available

Date: 31 May 2003
Ton Container #: D17698

Sampling Not Witnessed – Checklist Not Available

Appendix E

Analytical Test Report
Tooele Mustard (HD) Ton-Container Analysis: Stability Study

Analytical Test Report
Tooele Mustard (HD) Ton-Container Analysis: Stability Study

Analytical Report for:

Mr. Don Milton
EG&G Defense Materials Division
11600 Stark Road
Tooele, Utah 84074

By:

Analytical Services Group
Battelle Eastern Science and Technology Center
1204 Technology Drive
Aberdeen, MD 21001

11 December 2003

Disclaimer

This report is a work prepared for EG&G and for the United States Government by Battelle. In no event shall EG&G, the United States Government, or Battelle have any responsibility or liability for any consequences of any use, misuse, inability to use, or reliance on the information contained herein, nor does either warrant or otherwise represent in any way the accuracy, adequacy, efficacy, or applicability of the contents hereof.

TABLE OF CONTENTS

1.0 Introduction 4
2.0 Sample Receipt 4
3.0 Sample Preparation and Analysis 5
4.0 Summary of Results 6

ATTACHMENT. 9
Analytical Text Report: Stability Study of Select Analytes in a Liquid HD Matrix Collected from Ton Containers Stored at the Deseret Chemical Depot, Report Number 0033-46-120903SS

TABLE OF CONTENTS

Table 1 - Sample Identifications 5
Table 2 - Analytical Methods 6
Table 3 - Stability Study Results 8

1.0 INTRODUCTION

Deseret Chemical Depot (DCD), Utah holds the largest United States stockpile of chemical weapons. As a result, the Program Manager for Chemical Demilitarization (PMCD) constructed the first disposal facility within the United States, the Tooele Chemical Agent Disposal Facility (TOCDF). PMCD selected EG&G Defense Materials, Inc. (EG&G) as the systems contractor and operator of the facility. As such, EG&G is responsible for the safe and effective disposal of the chemical agent stored at DCD in weapons and ton containers.

Prior to the destruction of the chemical agent munitions, the State of Utah, Department of Environmental Quality, Division of Solid and Hazardous Waste (DSHW) requires characterization of the chemical agent. This characterization includes purity, degradents, impurities, by-products and metals identification. Previously, samples of nerve agents GB and VX from the DCD stockpile were collected and analyzed. The results of the analyses were presented to DSHW prior to the initiation of the destruction of the munitions. Currently, EG&G is conducting a HD characterization program. Samples from selected ton containers are collected and sent for analysis to Battelle Memorial Institute at the Forensic Analytical Center (FAC) at Aberdeen Proving Ground, MD. Once the program is complete, a report, containing the analytical results, will be sent to the DSHW for their review prior to the destruction of the HD chemical weapons and ton containers.

Approximately 90 liquid HD samples from DCD were analyzed by Battelle for purity, volatile, semi-volatile, and non-volatile organic compounds, and metals. In addition, approximately 90 cohesive solid samples and 90 non-cohesive solid samples were analyzed for metals composition.

In addition, Battelle initiated a stability study of a representative subset of target analytes in a liquid HD matrix. The list of target analytes evaluated included all of the organic project analytes and 6 of the 20 project metals. The objective of this study was to evaluate the stability of the selected target analytes over time. The study was initiated in mid-March 2003 and completed in mid-to-late August 2003 (period of approximately five months).

2.0 SAMPLE RECEIPT

The stability study was performed on a composite of three HD liquid samples (21-03-001, 21-03-004 and 21-03-0100) from the Ton Container (TC) number D94550, which were submitted to the FAC as part of the first set of samples for HD characterization. The condition upon receipt for each of the individual samples used to prepare the composite is discussed in the report for Sample Set #1. Collection dates and sample identifications for

the three HD liquid samples used to prepare the stability study composite sample are shown in Table 1.

Table 1 – Sample Identifications

TC Number	Sample ID	Laboratory ID	Matrix	Collect Date
D94550	21-03-001 21-03-004 21-03-010	030004-01424 030004-01425 030004-01426	Liquid Liquid Liquid	1/22/2003 1/22/2003 1/22/2003

3.0 SAMPLE PREPARATION AND ANALYSIS

Battelle prepared the Stability Study composite on 17 March 2003. Aliquots of the composite sample were prepared and spiked on 17 March 2003 as follows:

a. Generally, if the individual samples making up the composite had native concentrations of a target analyte above the method PQL, then no additional analyte was added to the composite. If the target analyte was not detected or detected at low concentrations in the individual samples making up the composite, then additional analyte was added to the composite.
b. Three aliquots of the composite sample (5 grams each) were weighed into three containers. All containers were well mixed after spiking to insure homogeneity.
c. In the first container, the target element mercury was spiked into the sample aliquot. The spiked concentration for mercury plus the native concentrations for arsenic, chromium, copper, mangenese and nickel were monitored[1].
d. In the second container, the target compounds TDG, HCE, T, and Lewisite were spiked into the sample aliquot. The spiked concentrations of these analytes plus the native concentration of Q were monitored.
e. In the third container, the target compounds TCE and 1,1,2,2-TCE were spiked into the sample aliquot. The spiked concentrations of these analytes plus the native concentration of 1,2-DCE were monitored.

[1]Note: Initially, mercury was the only metal to be evaluated during the study and therefore, was the only element spiked. However, after the completion of the study, the client requested that the concentrations for arsenic, copper, chromium, manganese, and nickel, be evaluated. As such, several of the elements (arsenic, chromium, manganese, and nickel) had native concentrations near or below the method PQL and no additional element was added.

Battelle performed initial analyses of the un-spiked and spiked composite sample from 19 March 2003 to 28 March 2003 to establish the initial concentration for each of the

selected target analytes to be evaluated during the stability study.

For the stability study, Battelle used six approved analytical methods to characterize the composite sample. These methods were used to determine the agent purity, volatile compounds, semi-volatile compounds, nonvolatile compound, Lewisite, and metals present in the liquid HD composite. The methods used during the project, their titles, and the analytes that they measured during the study are shown in Table 2. Each of the stability study aliquots were analyzed nine times, including the initial analysis, over the approximate five month study period. The results of those analyses are summarized in Table 3.

Table 2 - Analytical Methods

Method	Title	Analytes
AM-098	Determination of Bis(2-chloroethyl) sulfide (HD) Purity by GC/MS	HD
AM-100	Determination of Selected Non-Volatile Contaminants in HD by GC/MS	Thiodiglycol (TDG)
AM-101	Determination of Selected Volatile Contaminants in HD by GC/MS	1,2-Dichloroethane; 1,1,2,2-Tetrachloroethane; Tetrachloroethylene
AM-117	Determination of Selected Semi-Volatile Contaminants in HD matrix by GC/MS	1,2-Bis(2-chloroethylthio)ethane (Q); Bis[2-(chloroethylthio)ethyl]ether (T); Hexachloroethane
AM-118	Determination of Metals in Chemical Agent/Chemical Agent Sludge by Microwave Digestion ICP/MS	As, Cr, Cu, Mn, Hg, Ni
AM-126	Determination of Chemical Agent Lewisite (L) in neat Chemical Agent Mustard (HD) Matrix by GC/MS	L

4.0 SUMMARY OF RESULTS

With the exception of thiodiglycol (TDG), the concentrations for the target analytes were generally stable over the approximate five month study period (see the attached report for details). This study supports the validity of analytical results that Battelle generated beyond the regulatory holding time of 28 days for the Tooele Mustard (HD) Ton Container and the 155 mm H Projectile analyses.

For TDG, the first five analyses exhibited decreasing concentrations with the second through fifth being very consistent. All were well below the spiked concentration. However, the sixth, seventh, and a duplicate of the eighth exhibited increased TDG concentrations relative to the second through fifth analyses. The eighth and ninth analyses were consistent with the second through fifth analyses. The varying TDG results

were apparently the result of non-homogeneity due to a red, sludge-like precipitate that formed in the spiked composite sample soon after the aliquot was spiked. Apparently, if any of the red precipitate (believed to be sulfonium salt formations) were included in the aliquot used for testing, a higher TDG concentration was detected (see attached report for details on a test performed to verify this conclusion). This likely occurs during the derivatization step of the preparation process, where a silylation solution is added and the sample is heated to 60 ° C for 30 minutes. The sulfonium ion salt formations are not very stable and it is believed that the silylation process degraded the mustard-TDG aggregate, which resulted in the formation of TDG.

Table 3: Stability Study Results (All Dates are 2003)

Analyte	Date	Result	Date	Result	Date	Result	Date	Result	Date	Result
HD	21-Mar	86.8%	16-Apr	85.3%	14-May	94.0%	21-May	87.1%	3-Jun	79.9%
		mg/g		mg/g		mg/g		mg/g		mg/g
TDG	28-Mar	6.69	29-Apr	1.34	7-May	1.21	30-May	1.31	4-Jun	0.86
1,2-DCE	19-Mar	5.73	22-Apr	6.36	6-May	5.03	21-May	5.42	3-Jun	6.06
TCE	19-Mar	10.6	22-Apr	10.6	6-May	9.24	21-May	10.1	3-Jun	10.5
1,1,2,2-TCE	19-Mar	15.4	22-Apr	15.7	6-May	14.0	21-May	15.4	3-Jun	16.2
T	21-Mar	10.4	25-Apr	7.92	10-May	8.46	22-May	8.75	5-Jun	5.76
Q	21-Mar	54.7	25-Apr	52.5	10-May	52.7	22-May	53.7	5-Jun	41.2
HCE	21-Mar	10.5	25-Apr	10.2	10-May	7.93	22-May	9.61	5-Jun	6.57
L	22-Mar	0.232	23-Apr	0.23	7-May	0.16	30-May	0.20	12-Jun	0.2
Hg	26-Mar	0.00441	17-Apr	0.00500	6-May	0.0042	22-May	0.00414	9-Jun	0.0048
As	26-Mar	0.0043 J	16-Apr	0.0026 J	2-May	0.0034 J	22-May	0.0019 J	9-Jun	0.004 J
Cr	26-Mar	0.00822	17-Apr	0.0019 J	2-May	0.0039 J	22-May	0.0158	9-Jun	0.0025 J
Cu	26-Mar	0.0897	17-Apr	0.0862	2-May	0.0739	22-May	0.0814	9-Jun	0.0844
Mn	26-Mar	0.00178	17-Apr	0.00132	2-May	0.00109	22-May	0.0026	9-Jun	0.00124
Ni	26-Mar	0.00552	17-Apr	0.0025 J	2-May	0.0021 J	22-May	0.0078	9-Jun	0.0030 J

Analyte	Date	Result	Date	Result	Date	Result	Date	Result
HD	20-Jun	67.4%	11-Jul	78.4%	28-Jul	87.0%	14-Aug	90.7%
		mg/g		mg/g		mg/g		mg/g
TDG	24-Jun	9.06	9-Jul	6.93	4-Aug	0.724	20-Aug	1.62
1,2-DCE	16-Jun	6.44	8-Jul	5.6	29-Jul	4.97	15-Aug	5.17
TCE	16-Jun	10.2	8-Jul	10.4	29-Jul	9.31	15-Aug	8.39
1,1,2,2-TCE	16-Jun	16.3	8-Jul	15.7	29-Jul	14.8	15-Aug	13.5
T	19-Jun	6.06	14-Jul	6.79	28-Jul	9.4	19-Aug	8.65
Q	19-Jun	43.6	14-Jul	45.3	28-Jul	56.9	19-Aug	52.7
HCE	19-Jun	8.08	14-Jul	8.59	28-Jul	8.68	19-Aug	8.42
L	24-Jun	0.18	11-Jul	0.32	31-Jul	0.201	20-Aug	0.18
Hg	19-Jun	0.0045	2-Jul	0.0046	28-Jul	0.00473	25-Aug	0.00443
As	19-Jun	0.0046 J	2-Jul	0.0044 J	28-Jul	0.0036 J	25-Aug	0.0032 J
Cr	23-Jun	0.0025 J	2-Jul	0.0051 J	28-Jul	< 0.0053	25-Aug	0.0041 J
Cu	19-Jun	0.0776	2-Jul	0.0801	28-Jul	0.0856	25-Aug	0.0809
Mn	19-Jun	0.00122	2-Jul	0.00129	28-Jul	0.00118	25-Aug	0.00123
Ni	19-Jun	0.0041 J	2-Jul	0.0048 J	28-Jul	0.0026 J	25-Aug	0.0027 J

Qualifiers

J = Estimated Value. Result is < PQL but > MDL.

< = Analyte/element not detected at or above MDL. Reported as <PQL.

ATTACHMENT

Edgewood Chemical/Biological Forensic Analytical Center

Report Number 0033-46-120903SS

U.S. Army Soldier and Biological Chemical Command
Edgewood Chemical Biological Center
ATTN: Edgewood Chemical Biological
Forensic Analytical Center
Aberdeen Proving Ground, MD 21010-5424
Phone: (410) 436-8600
Fax: (410) 436-3384

ANALYTICAL TEST REPORT

Report Date: 9 December 2003

Project/Event Title: Stability Study of Select Analytes in a Liquid HD Matrix Collected From Ton Containers Stored at the Deseret Chemical Depot

Project/Event Number: 97P-0033-46

Report Number: 0033-46-120903SS

Report Prepared for:

EG&G Defense Materials Division
Attn.: Mr. Don Milton
11600 Stark Rd
Tooele, UT 84074

This report shall not be reproduced except in full, without the written approval of the laboratory. Test results reported herein refer only to samples tested.

Tooele Samples—Stability Study
Project/Event # 97P-0033-46

Receiving Notes

The stability study was performed on a composite of three HD liquid samples (21-03-001, 21-03-004 and 21-03-010) from the Ton Container (TC) number D94550. The condition upon receipt for each of the individual samples used to prepare the composite is discussed in the report for Sample Set #1 (EC/B FAC Report #: 0033-46-111303B1).

Sample Identifications

Collection dates and sample identifications for the three HD liquid samples used to prepare the stability study composite sample are shown in Table 1.

Table 1 – Sample Identifications

TC Number	Sample ID	Laboratory ID	Matrix	Collect Date
D94550	21-03-001 21-03-004 21-03-010	030004-01424 030004-01425 030004-01426	Liquid Liquid Liquid	1/22/2003 1/22/2003 1/22/2003

Data Quality Objectives

The objective of this study was to evaluate the stability of a representative number of target analytes (see Table 3), in a liquid HD matrix, over time. The study was initiated in mid-March 2003 and completed in mid-to-late August 2003 (period of approximately five months).

Sample Preparation

For the stability study, a composite of three HD liquid samples (21-03-001, 21-03-004 and 21-03-010) was prepared on 17 March 2003. Aliquots of the composite sample were spiked on 17 March 2003 as follows: generally, if the individual samples making up the composite had native concentrations of a target analyte above the method Practical Quantitation Limit (PQL), then no additional analyte was added to the composite. If the target analyte was not detected or detected at low concentrations in the individual samples making up the composite, then additional analyte was added to the composite. An initial analysis of the unspiked and spiked composite sample was performed from 19 March 2003 to 28 March 2003 to establish the initial concentration for each of the selected target analytes to be evaluated during the stability study.

> Note: Initially, mercury was the only metal to be evaluated during the study and therefore, was the only element spiked. However, after the completion of the study, the client requested that the concentrations for arsenic, copper, chromium, manganese, and nickel, be evaluated. As such,

several of the elements (arsenic, chromium, manganese, and nickel) had native concentrations near or below the method PQL and no additional element was added.

The preparation and spiking of the composite sample was performed as follows and is summarized in Table 2:

- Aliquots of the composite sample (5 grams each) were weighed into three (3) containers. All containers were well mixed after spiking to insure homogeneity.
- In the first container, the target element mercury was spiked into the sample aliquot. The spiked concentration for mercury plus the native concentrations for arsenic, chromium, copper, mangenese and nickel were monitored.
- In the second container, the target compounds TDG, HCE, T, and Lewisite were spiked into the sample aliquot. The spiked concentrations of these analytes plus the native concentration of Q were monitored.
- In the third container, the target compounds TCE and 1,1,2,2-TCE were spiked into the sample aliquot. The spiked concentrations of these analytes plus the native concentration of 1,2-DCE were monitored.

Table 2 – Preparation and Spiking of Composite Sample

Method	Target Analyte	Initial Unspiked Concentration	Spike Added?	Initial Spiked Concentration
AM-098	HD	90.9 %	No	86.8 %
AM-100	TDG	<0.25 mg/g	Yes (19.9 mg/g)	6.69 mg/g
AM-101	1,2-DCE	5.85 mg/g	No	5.73 mg/g
	TCE	<0.51 mg/g	Yes (10.3 mg/g)	10.6 mg/g
	1,1,2,2-TCE	<0.51 mg/g	Yes (15.1 mg/g)	15.4 mg/g
AM-117	HCE	<0.27 mg/g	Yes (9.56 mg/g)	10.5 mg/g
	Q	45.9 mg/g	No	54.7 mg/g
	T	2.06 mg/g	Yes (9.87 mg/g)	10.4 mg/g
AM-118	Hg	<0.00054 mg/g	Yes (0.0044 mg/g)	0.0044 mg/g
	As	0.0048 mg/g	No	0.0043 mg/g
	Cr	0.0077 mg/g	No	0.0082 mg/g
	Cu	0.0915 mg/g	No	0.0897 mg/g
	Mn	0.0020 mg/g	No	0.0018 mg/g
	Ni	0.0058 mg/g	No	0.0055 mg/g
AM-126	Lewisite	< 0.005 mg/g	Yes (0.25 mg/g)	0.232 mg/g

Methods

For this study, six analytical methods were used to determine the agent purity, volatile compounds, semi-volatile compounds, nonvolatile compound, Lewisite, and metals present in the liquid HD. The methods used during this study, their titles, and the analytes that they measured are shown in Table 3.

Table 3 - Analytical Methods

Method	Title	Analytes
AM-098	Determination of Bis(2-chloroethyl) sulfide (HD) Purity by GC/MS	HD
AM-100	Determination of Selected Non-Volatile Contaminants in HD by GC/MS	Thiodiglycol (TDG)
AM-101	Determination of Selected Volatile Contaminants in HD by GC/MS	1,2-Dichloroethane (1,2-DCE); 1,1,2,2-Tetrachloroethane (1,1,2,2-TCE); Tetrachloroethylene (TCE)
AM-117	Determination of Selected Semi-Volatile Contaminants in HD matrix by GC/MS	1,2-Bis(2-chloroethylthio)ethane (Q); Bis[2-(chloroethylthio)ethyl]ether (T); Hexachloroethane (HCE)
AM-118	Determination of Metals in Chemical Agent/Chemical Agent Sludge by Microwave Digestion ICP/MS	As, Cr, Cu, Mn, Hg, Ni
AM-126	Determination of Chemical Agent Lewisite (L) in neat Chemical Agent Mustard (HD) Matrix by GC/MS	L

Results

The stability study composite sample was analyzed for the target analytes nine times, including the initial analysis, over the approximate five month study period. The results of those analyses are shown in Table 5 and Charts 1 – 7. The second through seventh analyses were batched with liquid HD samples or liquid Levinstein H samples associated with the various Ton Container or 155 mm projectile sample sets submitted to the EC/B FAC. The QC results for those stability study analyses can be found in the appropriate sample set report as summarized in Table 4. The only QC parameters not available in the sample set reports are the surrogate recoveries for the stability study sample for the Volatiles, Semi-volatiles and TDG analyses. Therefore, the surrogate results for the second through seventh analyses are summarized in Table 6. The first, eighth, and nineth analyses were part of unique analytical batches. The QC results for those analyses are summarized in Tables 7-12.

Deviations

For the second through the seventh analyses of the stability study sample, all deviations are discussed in the Case Narrative of the associated sample set report (see Table 4).

All method or project QC criteria were met for the first, eighth, and ninth analyses with the following exceptions:

Volatiles
A matrix spike (MS) was not analyzed with the eighth analysis. All recoveries were within QC limits for the matrix spike duplicate (MSD) and Laboratory Control Samples (LCSs) indicating acceptable method performance.

Semivolatiles
For the 1st stability analysis, the recoveries for the 2.5 ug/mL, 10 ug/mL, and 50 ug/mL calibration

standards for Q were outside of the 85-115% acceptance criteria at 37%, 52% and 84%%, respectively. Also, the recoveries for the 2.5 ug/mL and 10 ug/mL calibration standards for T were outside of the 85-115% acceptance criteria at 199% and 83%%, respectively.

The batch MS and MSD recoveries for T (41.7% and 42.5%, respectively) for the eighth analysis were below the lower QC limit of 50%. The MS and MSD recoveries for Q and HCE were within QC limits and all recoveries were within QC limits in the LCSs. A slight negative bias may be indicated for T.

TDG

For the 1st stability analysis, the recoveries for the 2.5 ug/mL and 10 ug/mL calibration standards were outside of the 85-115% acceptance criteria at 156% and 117%, respectively.

The relative percent difference (RPD) between the results for the stability study sample and the duplicate analysis of the sample for the eighth analysis was above the QC limit of 25% at 163%. The duplicate result was approximately 10 times higher than the original sample. All other QC parameters for this batch were met. As discussed below, the likely explanation for the difference between the two analyses is non-homogeneity between the two sample aliquots, where one aliquot (the duplicate sample aliquot) included some of the red precipitate.

Metals

The target elements chromium, copper, manganese, mercury, and nickel were detected in the method blank, associated with the 1st stability study analysis, at a level above the MDL. All were detected below the PQL except manganese, which was slightly above the PQL of 0.0010 mg/g at 0.00125 mg/g. A manganese contamination of the method blank was suspected.

The recoveries for chromium, copper, manganese, and nickel were outside of the QC criteria of 75%-125% for the Lab Control Spike (in CASARM Mustard) associated with the 1st stability study analysis. Also, the recovery for copper was outside the QC criteria for the Lab Control Spike Duplicate (in CASARM Mustard). The RPD between the Lab Control Spike and Lab Control Spike Duplicate for chromium, copper, manganese, and nickel were above the QC criteria of 20%. All recoveries in the LCS (Blank Spike), MS, and MSD were within QC limits and the RPDs between the MS and MSD were within QC limits.

Conclusions

Purity: The purity results were consistent throughout the stability study with the exception of the sixth analysis on 20 June 2003, which was lower than all other purity values. This sixth analysis had a purity value of 67.4% while the other eight analyses had purity values ranging from 78.4% to 94.0%. The sixth purity analysis was batched with the original purity preparation batch of Sample Set #8. All of the samples in Sample Set #8 were re-extracted and reanalyzed because of lower than expected results. All of those reanalyses did produce purity results that were higher than the original preparation and were consistent with expected results. The sixth Stability Study Purity sample was not re-extracted and reanalyzed since this study is an evaluation over time. Based on the results for the reanalyses of Sample Set #8, it is likely the lower sixth Purity value was due to analytical technique problems and not a loss of HD, especially since the purity results for the seventh through ninth analyses were consistent with the earlier analyses.

Thiodiglycol (TDG): TDG was not detected in the initial analysis of the composite sample. Therefore, TDG was spiked into the composite aliquot on 17 March 2003 at a known concentration of 19.9 mg/g. The initial analysis of the spiked composite sample was performed 11 days after spiking on 28 March

2003. It was noted at that time that a red, sludge-like material had precipitated out of the spiked composite sample. The TDG concentration was 6.69 mg/g or 33.6% of the expected concentration. The next four analyses, the last being nearly three months from the date of spiking, were very consistent with concentrations ranging from 0.86 mg/g to 1.34 mg/g (4.3% to 6.7% of the expected concentration). The sixth and seventh analyses had elevated TDG concentrations of 9.06 mg/g and 6.93 mg/g, respectively (45.5% and 34.8%, respectively, of the expected concentration). The eighth and ninth analyses showed decreased TDG concentrations (3.6% and 8.1% of the expected concentration) that were consistent with the second through fifth analyses.

The varying concentrations of TDG over time appear to be related to the red precipitate that formed soon after the spiking of TDG into the composite sample. This precipitate was not noted in the unspiked composite sample or in the other two aliquots that were spiked for the metals and volatiles analyses. It is suspected that the red precipitate is sulfonium salt formations (mustard-TDG aggregates), which form when TDG reacts with the sulfonium ion of mustard (degradent of aged mustard). It is believed that the varying concentrations were due to non-homogeneity of the sample aliquot taken for each stability study test. Prior to the weighing out of a sample aliquot for the TDG analyses, the composite sample was inverted several times. Apparently, for some of the sample aliquots, a small amount of the red precipitate was included in the sample aliquot, which resulted in a higher concentration of TDG (as indicated in the 6th, 7th, and the duplicate of the 8th analyses). To support this theory, a test was performed in late October 2003 on the remaining spiked stability study composite sample. An aliquot was taken from the center of the composite without inverting the sample to ensure that no red precipitate was included. A second aliquot was taken from the bottom of the composite that obviously included the red precipitate. Both sample aliquots were prepared and analyzed following the TDG procedure. The aliquot containing the red precipitate had a TDG concentration that was approximately 14 times higher than the aliquot from the center of the sample. This test indicates that TDG is formed if some of the red precipitate is included in the sample aliquot. This likely occurs during the derivatization step of the preparation process, where a silylation solution is added and the sample is heated to 60 ° C for 30 minutes. The sulfonium ion salt formations are not very stable and it is believed that the silylation process degraded the mustard-TDG aggregate, which resulted in the formation of TDG.

Volatiles: The concentrations for all three of the target volatile compounds were consistent throughout the stability study, with no apparent trends. The values for 1,2 –dichloroethane (1,2-DCE) ranged from 4.97 to 6.44 mg/g; the values for tetrachloroethylene (TCE) ranged from 8.39 to 10.6 mg/g; and the values for 1,1,2,2-tetrachloroethane (1,1,2,2-TCE) ranged from 13.5 to 16.3 mg/g.

Semivolatiles: The concentrations for all three of the target semivolatile compounds were consistent throughout the stability study, with no apparent trends. The values for hexachloroethane (HCE) ranged from 6.6 to 10.5 mg/g; the values for Q ranged from 41.2 to 56.9 mg/g; and the values for T ranged from 5.8 to 10.4 mg/g.

Metals: The initial concentrations, after spiking, for the elements copper and mercury were well above method PQLs of 0.0050 mg/g and 0.00050 mg/g, respectively. The initial concentrations for the other four elements were very near the method PQL of 0.0050 mg/g for arsenic, chromium, and nickel, and 0.0010 mg/g for manganese. The values for copper and mercury were consistent throughout the stability study with the values for copper ranging from 0.0739 to 0.0897 mg/g; and the values for mercury ranged from 0.0041 to 0.0050 mg/g. The results for arsenic and manganese were also consistent throughout the study with the values for arsenic ranging from 0.0019 to 0.0046 mg/g (all below the PQL); and the values for manganese ranged from 0.0011 to 0.0026 mg/g. The values for nickel and chromium exhibited a more erratic behavior with values jumping up and down, both above and below the PQL, with chromium having the greatest variation. Both elements exhibited an increase in concentration for the fourth analysis (22 May 2003), relative to the other analyses. Chromium was not detected for the eighth analysis (28 July

2003). However, neither chromium nor nickel exhibited a specific trend that would indicate a gain or loss of the element over time. The varying results for these latter two elements are likely due to the concentrations being so close to the method PQL (many being below the PQL).

Lewisite (L): The concentrations for Lewisite were generally consistent throughout the stability study, with no apparent trends. The seventh analysis (11 July 2003) did have a result that was slightly higher than the other analyses at 0.32 mg/g. The values for the other eight analyses ranged from 0.16 to 0.23 mg/g.

Summary: The concentrations for the target analytes, except as noted above, were generally stable over the approximate five month study. This study supports the validity of analytical results generated beyond the regulatory holding time of 28 days for the Tooele Mustard (HD) Ton Container and the 155 mm H Projectile analyses.

Table 4 – Stability Study QC Summary for the Second through Seventh Analyses

Stability Study Analysis # (Date Ranges)	Associated Sample Set	Test	Prep Batch ID
#2 (16-29 April 2003)	Sample Set #4 (EC/B FAC Report #: 0033-46-060903B4)	Purity TDG Volatiles Semivolatiles Metals Lewisite	5901 6108 5801 5902 5903 6109
#3 (2-14 May 2003)	Sample Set #5 (EC/B FAC Report #: 0033-46-112003B5)	Purity TDG Volatiles Semivolatiles Metals Lewisite	7001 6306 6304 7002 6305 6401
#4 (21-30 May 2003)	Sample Set #6 (EC/B FAC Report #: 0033-46-103103B6)	Purity TDG Volatiles Semivolatiles Metals Lewisite	7502 7203 7202 7503 7611 7703
#5 (3-12 June 2003)	Sample Set #7 (EC/B FAC Report #:0033-46-080603B7)	Purity TDG Volatiles Semivolatiles Metals Lewisite	7909 7906 7901 7910 8201 8101
#6 (16-24 June 2003)	Sample Set #8 (EC/B FAC Report #: 0033-46-091803B8)	Purity TDG Volatiles Semivolatiles Metals Lewisite	* 8503 8306 8402 8612 8614
#7 (2-14 July 2003)	155 mm H Projectiles (EC/B FAC Report #: 0033-46-102103B9)	Purity TDG Volatiles Semivolatiles Metals Lewisite	9104 9106 9103 9105 9102 9107

* The reported Purity results for Sample Set #8 were from a reanalysis which did not include the Stability Study sample. See Table 7 for the QC results associated with the 6th Purity analysis of the Stability Study composite.

Table 5: Stability Study Results (All Dates are 2003)

Analyte	Date	Result	Date	Result	Date	Result	Date	Result	Date	Result
HD	21-Mar	86.8%	16-Apr	85.3%	14-May	94.0%	21-May	87.1%	3-Jun	79.9%
		mg/g		mg/g		mg/g		mg/g		mg/g
TDG	28-Mar	6.69	29-Apr	1.34	7-May	1.21	30-May	1.31	4-Jun	0.86
1,2-DCE	19-Mar	5.73	22-Apr	6.36	6-May	5.03	21-May	5.42	3-Jun	6.06
TCE	19-Mar	10.6	22-Apr	10.6	6-May	9.24	21-May	10.1	3-Jun	10.5
1,1,2,2-TCE	19-Mar	15.4	22-Apr	15.7	6-May	14.0	21-May	15.4	3-Jun	16.2
T	21-Mar	10.4	25-Apr	7.92	10-May	8.46	22-May	8.75	5-Jun	5.76
Q	21-Mar	54.7	25-Apr	52.5	10-May	52.7	22-May	53.7	5-Jun	41.2
HCE	21-Mar	10.5	25-Apr	10.2	10-May	7.93	22-May	9.61	5-Jun	6.57
L	22-Mar	0.232	23-Apr	0.23	7-May	0.16	30-May	0.20	12-Jun	0.2
Hg	26-Mar	0.00441	17-Apr	0.00500	6-May	0.0042	22-May	0.00414	9-Jun	0.0048
As	26-Mar	0.0043 J	16-Apr	0.0026 J	2-May	0.0034 J	22-May	0.0019 J	9-Jun	0.004 J
Cr	26-Mar	0.00822	17-Apr	0.0019 J	2-May	0.0039 J	22-May	0.0158	9-Jun	0.0025 J
Cu	26-Mar	0.0897	17-Apr	0.0862	2-May	0.0739	22-May	0.0814	9-Jun	0.0844
Mn	26-Mar	0.00178	17-Apr	0.00132	2-May	0.00109	22-May	0.0026	9-Jun	0.00124
Ni	26-Mar	0.00552	17-Apr	0.0025 J	2-May	0.0021 J	22-May	0.0078	9-Jun	0.0030 J

Analyte	Date	Result	Date	Result	Date	Result	Date	Result
HD	20-Jun	67.4%	11-Jul	78.4%	28-Jul	87.0%	14-Aug	90.7%
		mg/g		mg/g		mg/g		mg/g
TDG	24-Jun	9.06	9-Jul	6.93	4-Aug	0.724	20-Aug	1.62
1,2-DCE	16-Jun	6.44	8-Jul	5.6	29-Jul	4.97	15-Aug	5.17
TCE	16-Jun	10.2	8-Jul	10.4	29-Jul	9.31	15-Aug	8.39
1,1,2,2-TCE	16-Jun	16.3	8-Jul	15.7	29-Jul	14.8	15-Aug	13.5
T	19-Jun	6.06	14-Jul	6.79	28-Jul	9.4	19-Aug	8.65
Q	19-Jun	43.6	14-Jul	45.3	28-Jul	56.9	19-Aug	52.7
HCE	19-Jun	8.08	14-Jul	8.59	28-Jul	8.68	19-Aug	8.42
L	24-Jun	0.18	11-Jul	0.32	31-Jul	0.201	20-Aug	0.18
Hg	19-Jun	0.0045	2-Jul	0.0046	28-Jul	0.00473	25-Aug	0.00443
As	19-Jun	0.0046 J	2-Jul	0.0044 J	28-Jul	0.0036 J	25-Aug	0.0032 J
Cr	23-Jun	0.0025 J	2-Jul	0.0051 J	28-Jul	< 0.0053	25-Aug	0.0041 J
Cu	19-Jun	0.0776	2-Jul	0.0801	28-Jul	0.0856	25-Aug	0.0809
Mn	19-Jun	0.00122	2-Jul	0.00129	28-Jul	0.00118	25-Aug	0.00123
Ni	19-Jun	0.0041 J	2-Jul	0.0048 J	28-Jul	0.0026 J	25-Aug	0.0027 J

Qualifiers

J = Estimated Value. Result is < PQL but > MDL.
< = Analyte/element not detected at or above MDL. Reported as <PQL.

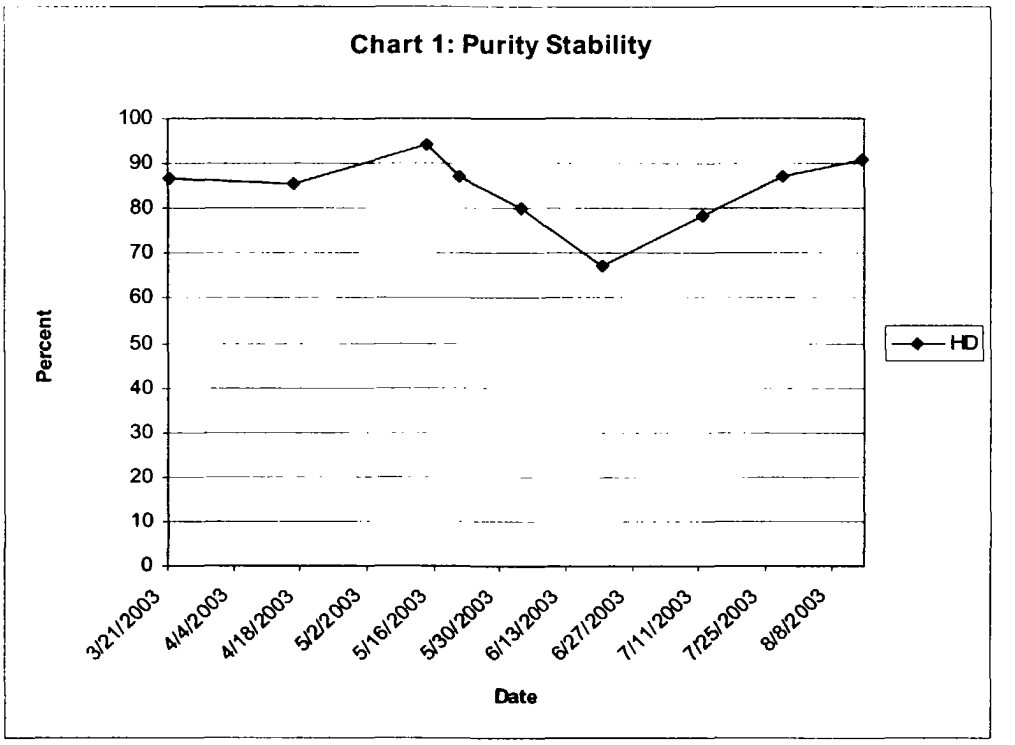
Chart 1: Purity Stability
Percent
100
90
80
70
60
50
40
30
20
10
0
3/21/2003
4/4/2003
4/18/2003
5/2/2003
5/16/2003
5/30/2003
6/13/2003
6/27/2003
7/11/2003
7/25/2003
8/8/2003
Date
HD

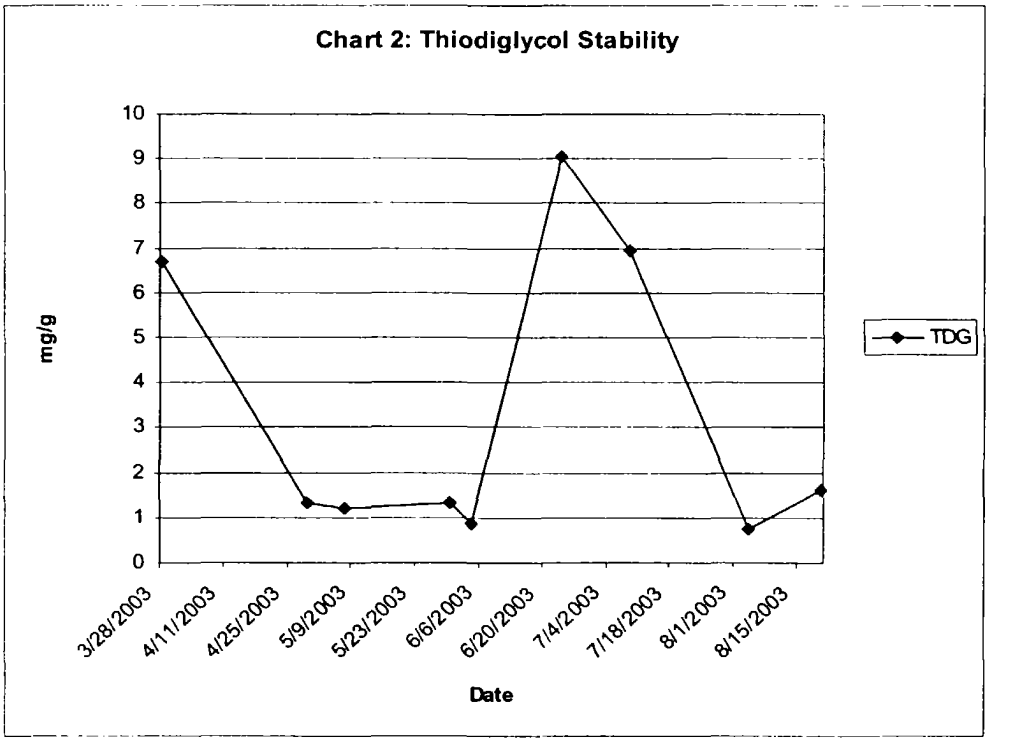
Chart 2: Thiodiglycol Stability
mg/g
10
9
8
7
6
5
4
3
2
1
0
3/28/2003
4/11/2003
4/25/2003
5/9/2003
5/23/2003
6/6/2003
6/20/2003
7/4/2003
7/18/2003
8/1/2003
8/15/2003
Date
TDG

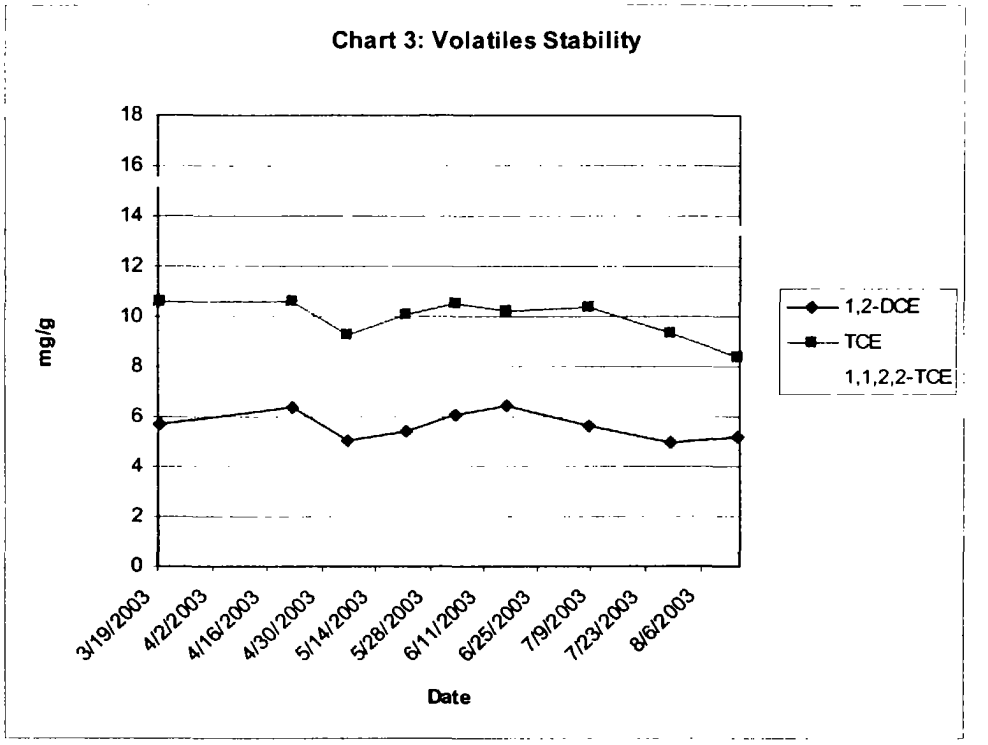
Chart 3: Volatiles Stability
mg/g
18
16
14
12
10
8
6
4
2
0
3/19/2003
4/2/2003
4/16/2003
4/30/2003
5/14/2003
5/28/2003
6/11/2003
6/25/2003
7/9/2003
7/23/2003
8/6/2003
Date
1,2-DCE
TCE
1,1,2,2-TCE

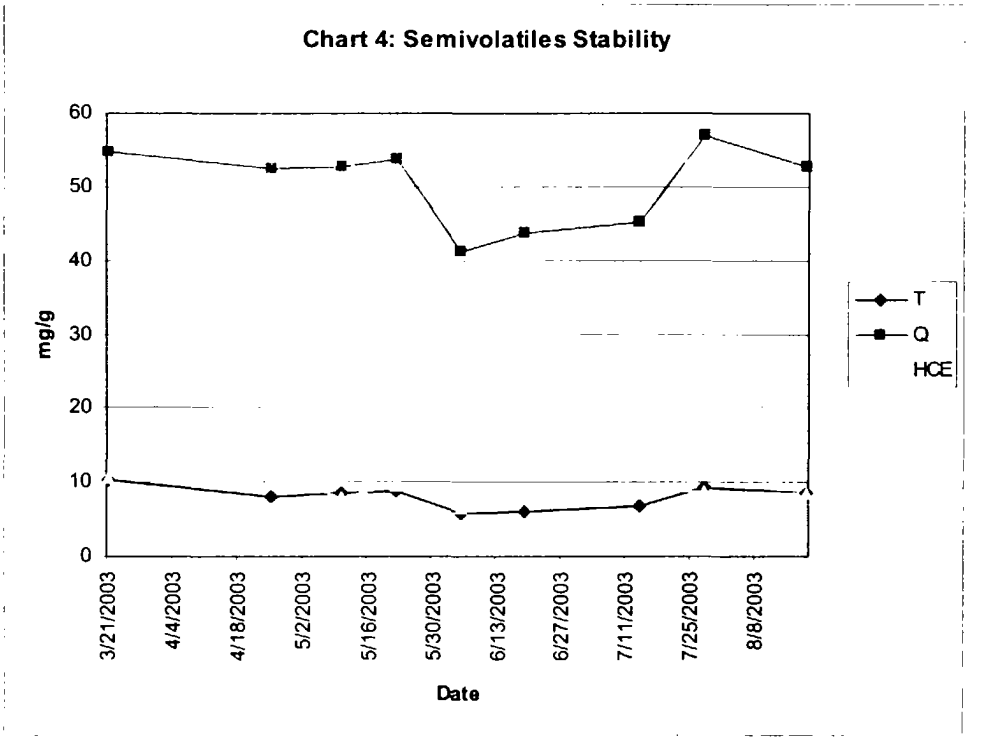
Chart 4: Semivolatiles Stability
mg/g
60
50
40
30
20
10
0
3/21/2003
4/4/2003
4/18/2003
5/2/2003
5/16/2003
5/30/2003
6/13/2003
6/27/2003
7/11/2003
7/25/2003
8/8/2003
Date
T
Q
HCE

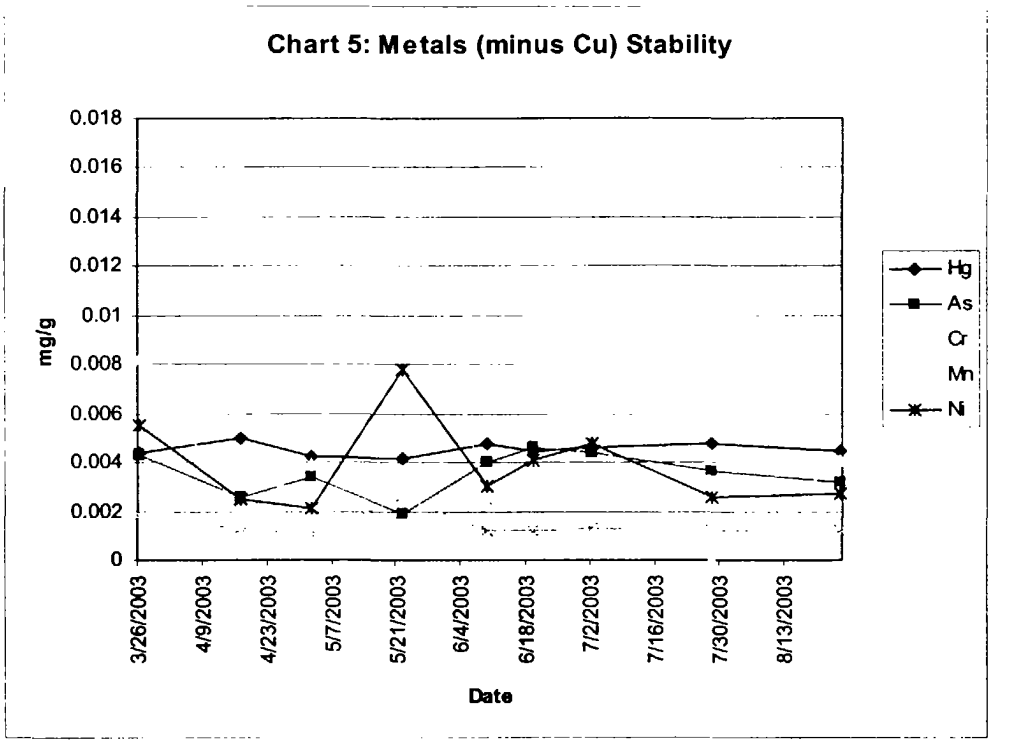
Chart 5: Metals (minus Cu) Stability
0.018
0.016
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
mg/g
3/26/2003
4/9/2003
4/23/2003
5/7/2003
5/21/2003
6/4/2003
6/18/2003
7/2/2003
7/16/2003
7/30/2003
8/13/2003
Date
Hg
As
Cr
Mn
Ni

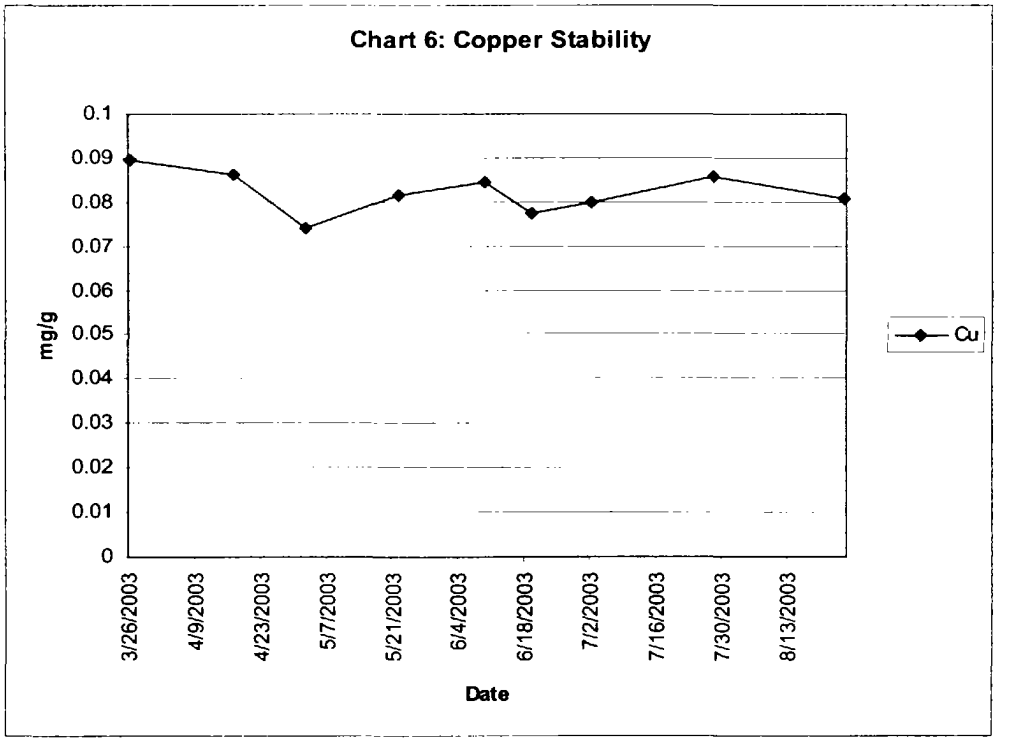
Chart 6: Copper Stability
0.1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
mg/g
3/26/2003
4/9/2003
4/23/2003
5/7/2003
5/21/2003
6/4/2003
6/18/2003
7/2/2003
7/16/2003
7/30/2003
8/13/2003
Date
Cu

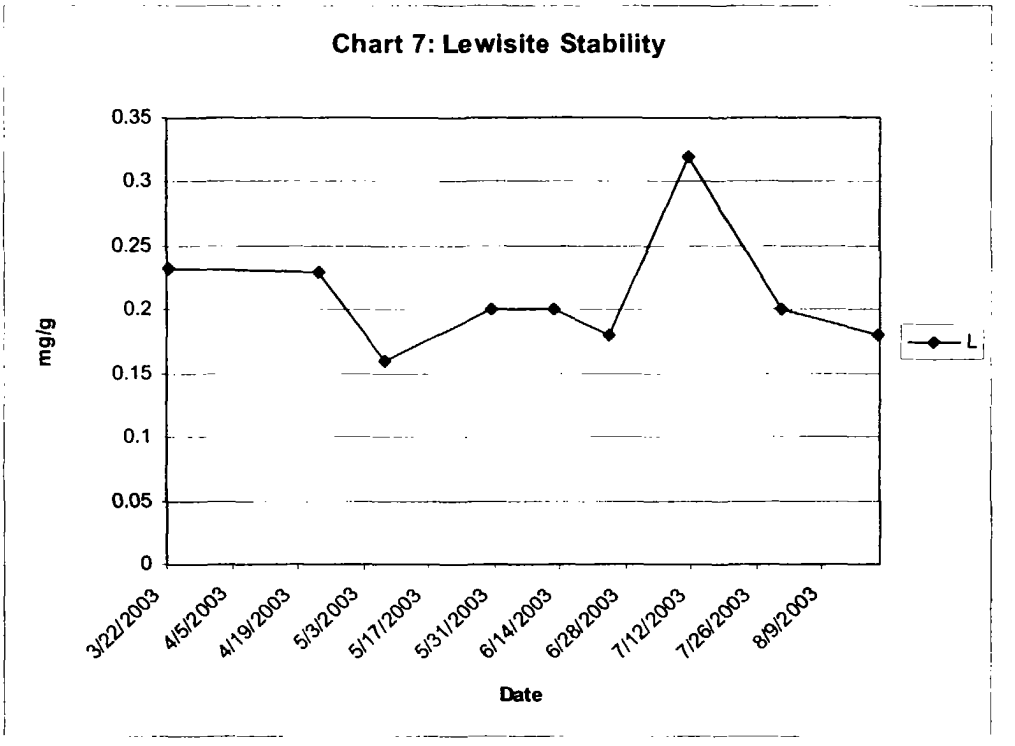

Table 6: Surrogate Recoveries for the 2nd through 7th Analyses of Stability Study Composite

Surrogate	QC Limit	Stability Study Analysis					
		#2	#3	#4	#5	#6	#7
Volatiles							
1,4-Difluorobenzene	50-150%	114%	93.8%	102%	96.8%	105%	108%
Semivolatiles							
1,4-Dithiane-d4	50-150%	100%	103%	106%	91.3%	94.8%	104%
TDG							
Thiodiglycol-d8	50-150%	93.5%	96.2%	107%	80.6%	87.6%	83.0%

Table 7: QC Results for the 1st, 6th, 8th, and 9th Purity (HD) Analysis of Stability Study Composite

QC Parameter	QC Limit	Stability Study Analysis (Date)			
		#1 (3/21/03)	#6 (6/20/03)	#8 (7/28/03)	#9 (8/14/03)
Method Blank					
Result	< PQL	0%	0 %	0%	0%
LCS (BS)					
HD LCS Recovery	85-115%	96.4%	97.6%	96.6%	97.5%
Duplicates					
HD Initial/Dup Result (%)	---	86.8/84.4	78.3/77.7	88.0/92.1	92.5/87.1
HD RPD	0-25%	2.7%	0.8%	4.5%	6.0%

Table 8: QC Results for the 1st, 8th, and 9th TDG Analysis of Stability Study Composite

QC Parameter	QC Limit	Stability Study Analysis (Date)		
		#1 (3/28/03)	#8 (8/4/03)	#9 (8/20/03)
Sample				
Surrogate Recovery *	50-150%	115%	87.9 %	88.3%
Method Blank				
Result	< 250 ug/g	< 250 ug/g	< 250 ug/g	< 250 ug/g
Surrogate Recovery *	50-150%	109%	91.5%	91.9%
LCS (BS)				
TDG LCS Recovery	50-150%	119%	100%	89.4%
TDG LCS Duplicate Recovery	50-150%	121%	97.7%	89.0%
MS/MSD				
TDG MS Recovery	50-150%	128%	97.3%	85.7%
TDG MSD Recovery	50-150%	119%	98.3%	82.8%
TDG RPD	0-25%	7.3%	1.0%	3.4%
Duplicates				
TDG Initial/Dup Result (ug/g)	---	6690/6900	724/7200	0/0
TDG RPD	0-25%	3.1%	163% **	0

* Surrogate = Thiodiglycol-d8 (TDG-d8).
** Value outside of QC limits.

Table 9: QC Results for the 1st, 8th, and 9th Volatiles Analysis of Stability Study Composite

QC Parameter	QC Limit	Stability Study Analysis (Date)		
		#1 (3/19/03)	#8 (7/29/03)	#9 (8/15/03)
Sample				
Surrogate Recovery *	50-150%	108%	97.5%	105%
Method Blank				
1,2-DCE Result	< 500 ug/g	< 500 ug/g	< 500 ug/g	< 500 ug/g
TCE Result	< 500 ug/g	< 500 ug/g	< 500 ug/g	< 500 ug/g
1,1,2,2-TCE Result	< 500 ug/g	< 500 ug/g	< 500 ug/g	< 500 ug/g
Surrogate Recovery *	50-150%	113%	99.5%	100%
LCS (BS)				
1,2-DCE LCS Recovery	50-150%	116%	91.6%	98.5%
TCE LCS Recovery	50-150%	121%	93.6%	94.8%
1,1,2,2-TCE LCS Recovery	50-150%	118%	103%	92.4%
1,2-DCE LCS Dup Recovery	50-150%	117%	138%	97.5%
TCE LCS Dup Recovery	50-150%	125%	100%	94.1%
1,1,2,2-TCE LCS Dup Recovery	50-150%	119%	105%	93.8%
MS/MSD				
1,2-DCE MS Recovery	50-150%	112%	**	103%
TCE MS Recovery	50-150%	121%	**	97.2%
1,1,2,2-TCE MS Recovery	50-150%	113%	**	98.3%
1,2-DCE MSD Recovery	50-150%	111%	98.3%	106%
TCE MSD Recovery	50-150%	118%	101%	97.7%
1,1,2,2-TCE MSD Recovery	50-150%	117%	108%	99.8%
1,2-DCE RPD	0-25%	0.9%	**	2.9%
TCE RPD	0-25%	2.5%	**	0.5%
1,1,2,2-TCE RPD	0-25%	3.5%	**	1.5%
Duplicates				
1,2-DCE Initial/Dup Result (ug/g)	---	5730/5650	4970/5220	4790/4770
TCE Initial/Dup Result (ug/g)	---	10600/10400	9310/9180	0/0
1,1,2,2-TCE Initial/Dup Result (ug/g)	---	15400/15400	14800/15000	0/0
1,2-DCE RPD	0-25%	1.3%	4.9%	0.4%
TCE RPD	0-25%	1.7%	1.5%	0
1,1,2,2-TCE RPD	0-25%	0.3%	1.8%	0

* Surrogate = 1,4-Difluorobenzene.
** MS not analyzed. RPD between MS and MSD could not be determined.

Table 10: QC Results for the 1st, 8th, and 9th Semi-volatiles Analysis of Stability Study Composite

QC Parameter	QC Limit	Stability Study Analysis (Date)		
		#1 (3/21/03)	#8 (7/28/03)	#9 (8/19/03)
Sample				
Surrogate Recovery *	50-150%	105%	95.5%	102%
Method Blank				
HCE Result	< 250 ug/g	< 250 ug/g	< 250 ug/g	< 250 ug/g
Q Result	< 2500 ug/g	< 2500 ug/g	< 2500 ug/g	< 2500 ug/g
T Result	< 2500 ug/g	< 2500 ug/g	< 2500 ug/g	< 2500 ug/g
Surrogate Recovery *	50-150%	107%	98.3%	93.7%
LCS (BS)				
HCE LCS Recovery	50-150%	119%	105%	104%
Q LCS Recovery	50-150%	95.5%	116% (110%)	107% (110%)
T LCS Recovery	50-150%	122%	118%	104%
HCE LCS Dup Recovery	50-150%	119%	102%	106%
Q LCS Dup Recovery	50-150%	99.2%	108% (101%)	111% (106%)
T LCS Dup Recovery	50-150%	140%	108%	99.7%
MS/MSD				
HCE MS Recovery	50-150%	117%	100%	103%
Q MS Recovery	50-150%	59.0%	68.1% (79.1%)	96.1% (81.5%)
T MS Recovery	50-150%	52.7%	41.7% **	50.5%
HCE MSD Recovery	50-150%	122%	101%	103%
Q MSD Recovery	50-150%	65.6%	61.4% (80.5%)	92.1% (88.0%)
T MSD Recovery	50-150%	61.4%	42.5% **	51.5%
HCE RPD	0-25%	4.2%	1.0%	0
Q RPD	0-25%	10.6%	10.3% (1.8%)	4.2% (5.9%)
T RPD	0-25%	15.2%	1.9%	2.0%
Duplicates				
HCE Initial/Dup Result (ug/g)	---	10500/10400	8675/8601	0/0
Q Initial/Dup Result (ug/g)	---	54700/54100	56900/56700	46400/47500
T Initial/Dup Result (ug/g)	---	10400/10700	9399/9367	616/678
HCE RPD	0-25%	1.0%	0.9%	0
Q RPD	0-25%	1.1%	0.4%	2.4%
T RPD	0-25%	2.8%	0.4%	9.4%

* Surrogate = 1, 4-Dithiane-d4.
** Value outside of QC limits.
( ) Values are for an additional Q spiked QC sample at a higher concentration.

Table 11: QC Results for the 1st, 8th, and 9th Metals Analysis of Stability Study Composite

QC Parameter	QC Limit	Stability Study Analysis (Date)		
		#1 (3/26/03)	#8 (7/28/03)	#9 (8/25/03)
Method Blank				
As Result	< 5.00 ug/g	< 5.00 ug/g	< 5.00 ug/g	< 5.00 ug/g
Cr Result	< 5.00 ug/g	2.97 J	< 5.00 ug/g	< 5.00 ug/g
Cu Result	< 5.00 ug/g	2.58 J	< 5.00 ug/g	< 5.00 ug/g
Mn Result	< 1.00 ug/g	1.25 *	< 1.00 ug/g	< 1.00 ug/g
Hg Result	< 0.50 ug/g	0.064 J	< 0.50 ug/g	< 0.50 ug/g
Ni Result	< 5.00 ug/g	2.77 J	< 5.00 ug/g	< 5.00 ug/g
LCS (BS)				
As LCS Recovery	75-125%	105%	109%	106%
Cr LCS Recovery	75-125%	116%	107%	103%
Cu LCS Recovery	75-125%	103%	109%	101%
Mn LCS Recovery	75-125%	108%	109%	108%
Hg LCS Recovery	75-125%	105%	107%	105%
Ni LCS Recovery	75-125%	111%	108%	97.6%
MS/MSD				
As MS Recovery	50-150%	91.4%	104%	108%
Cr MS Recovery	75-125%	87.6%	97.8%	110%
Cu MS Recovery	75-125%	96.7%	90.4%	99.1%
Mn MS Recovery	75-125%	94.1%	97.8%	108%
Hg MS Recovery	50-150%	108%	116%	108%
Ni MS Recovery	75-125%	88.3%	96.6%	96.7%
As MSD Recovery	50-150%	101%	105%	109%
Cr MSD Recovery	75-125%	95.3%	98.8%	113%
Cu MSD Recovery	75-125%	94.3%	92.4%	103%
Mn MSD Recovery	75-125%	102%	100%	114%
Hg MSD Recovery	50-150%	106%	118%	110%
Ni MSD Recovery	75-125%	93.7%	97.7%	98.8%
As RPD	0-20%	9.98%	0.96%	0.92%
Cr RPD	0-20%	8.42%	1.02%	2.69%
Cu RPD	0-20%	2.51%	2.19%	3.86%
Mn RPD	0-20%	8.06%	2.22%	5.41%
Hg RPD	0-20%	1.87%	1.71%	1.83%
Ni RPD	0-20%	5.93%	1.13%	2.15%
Duplicates				
As Initial/Dup Result (ug/g)	---	4.32/4.54	3.59/3.45	3.50/2.20
Cr Initial/Dup Result (ug/g)	---	8.22/21.1	0/0	2.30/2.61
Cu Initial/Dup Result (ug/g)	---	89.7/85.7	85.6/83.4	84.0/82.4
Mn Initial/Dup Result (ug/g)	---	1.78/3.01	1.18/1.16	1.35/1.27
Hg Initial/Dup Result (ug/g)	---	4.41/4.33	4.73/4.58	0/0
Ni Initial/Dup Result (ug/g)	---	5.52/13.5	2.60/2.86	2.86/1.62
As RPD	0-20%	5.0%	4.0%	45.6% **
Cr RPD	0-20%	87.9% **	0	12.6%
Cu RPD	0-20%	4.6%	2.6%	1.92%
Mn RPD	0-20%	51.4% **	1.7%	6.11%
Hg RPD	0-20%	1.8%	3.2%	0
Ni RPD	0-20%	83.9% **	9.5%	55.4% **

* Value outside of QC limits.

** RPD criteria does not apply since results were less than 100 times the IDL.

Table 12: QC Results for the 1st, 8th, and 9th Lewisite (L) Analysis of Stability Study Composite

QC Parameter	QC Limit	Stability Study Analysis (Date)		
		#1 (3/22/03)	#8 (7/31/03)	#9 (8/20/03)
Method Blank				
Result	< 5.00 ug/g	< 5.00 ug/g	< 5.00 ug/g	< 5.00 ug/g
LCS (BS)				
L LCS Recovery	50-150%	87%	117%	114%
L LCS Duplicate Recovery	50-150%	113%	138%	116%
MS/MSD				
L MS Recovery	50-150%	117%	133%	98.9%
L MSD Recovery	50-150%	115%	134%	100%
L RPD	0-25%	1.7%	0.7%	1.1%
Duplicates				
L Initial/Dup Result (ug/g)	---	232/232	201/203	0/0
L RPD	0-25%	0	1.0%	0

Analyst(s) of Record Thomas Rusek (Signature) 12-10-03 (Date) **Thomas Rusek** **Principal Investigator, Battelle Memorial Institute**	**Analyst(s) of Record** Brian L. Boyd (Signature) 12/10/03 (Date) **Brian L. Boyd** **Researcher, Battelle Memorial Institute**
Analyst(s) of Record Robert L. Calloway (Signature) 10 Dec 03 (Date) **Robert L. Calloway** **Physical Science Technican, Edgewood Chemical and Biological Forensic Analytical Center**	**Analyst(s) of Record** James H. Newman (Signature) 12/10/03 (Date) for **Doug S. Nichols** **Researcher, Battelle Memorial Institute**
Analyst(s) of Record Michael W. Wensing (Signature) 12/10/03 (Date) **Michael W. Wensing, Ph.D.** **Principal Research Scientist, Battelle Memorial Institute**	**Analyst(s) of Record** James W. Roelke (Signature) 12/10/03 (Date) **James Roelke** **Researcher, Battelle Memorial Institute**
Analyst(s) of Record Michele A. Maas (Signature) 12/10/03 (Date) **Michelle Maas** **Technician, Battelle Memorial Institute**	**Report Reviewed by** James H. Newman (Signature) 12/10/03 (Date) for **Audrey J. Raunig** **Principal Research Scientist, Battelle Memorial Institute**
Report Reviewed by Walter E. Miller (Signature) 12/10/03 (Date) **Walter E. Miller** **Principal Research Scientist, Battelle Memorial Institute**	**Report Reviewed by** James H. Newman (Signature) 12/10/03 (Date) **James H. Newman** **Laboratory Manager, Battelle Memorial Institute**

Report Reviewed by

Robert L. Calloway (Signature)

11 Dec 03 (Date)

Robert L. Calloway

Designated Authority, Edgewood C/B Forensic Analytical Center

Report Approved by

Dennis J. Reutter (Signature)

11 December 2003 (Date)

Dennis J. Reutter, Ph.D.

Chief, Edgewood C/B Forensic Analytical Center

Appendix F

Analytical Test Report
Composition of HD Ton Container Headspace Gas via Analysis of Silcosteel® Canisters

Analytical Test Report
Composition of HD Ton Container Headspace Gas via Analysis of Silcosteel® Canisters

Analytical Report for:

Mr. Don Milton
EG&G Defense Materials Division
11600 Stark Road
Tooele, Utah 84074

By:

Analytical Services Group
Battelle Eastern Science and Technology Center
1204 Technology Drive
Aberdeen, MD 21001

08 September 2003

Disclaimer

This report is a work prepared for EG&G and for the United States Government by Battelle. In no event shall EG&G, the United States Government, or Battelle have any responsibility or liability for any consequences of any use, misuse, inability to use, or reliance on the information contained herein, nor does either warrant or otherwise represent in any way the accuracy, adequacy, efficacy, or applicability of the contents hereof.

TABLE OF CONTENTS

1.0 Introduction 4
2.0 Methods 4
3.0 Summary of Results 5

ATTACHMENT 6
Analytical Text Report, Composition of HD Ton Container Headspace Gas via Analysis of Silcosteel® Canisters, Report Number 0033-47-072803

LIST OF TABLES

Table 1: Client Sample IDs and EC/B FAC Numbers 4
Table 2: Mass Balances 5

1.0 INTRODUCTION

Pressure buildup has been observed in some chemical agent Mustard (HD) ton containers (TC) stored at the Deseret Chemical Depot (DCD) Tooele, Utah. It has been theorized that the pressure build-up may be the result of evolution of hydrogen or other flammable gases in the TC. Such gases as hydrogen, nitrogen, oxygen, carbon monoxide and possibly some other compounds may cause the pressure buildup seen inside some of the ton containers. Sixteen Silcosteel® canisters containing headspace gas samples from fifteen HD ton containers were delivered and received at the Edgewood Chemical and Biological Forensic Analytical Center (EC/B FAC) in May and June 2003.

The samples were assigned the following EC/B FAC sample number as displayed in Table 1 below:

Table 1: Client Sample IDs and EC/B FAC Numbers

Client Number	EC/B FAC Number
D449	03-0004-053-01
D1841	03-0004-053-02
D-50373	03-0004-057-01
D-50373DUP	03-0004-057-02
D-48273	03-0004-057-03
D-51059	03-0004-057-04
D-19497	03-0004-057-05
D-43072	03-0004-057-06
D-44007	03-0004-057-07
D-94138	03-0004-057-08
D-49972	03-0004-067-01
D-41787	03-0004-067-02
D-50997	03-0004-067-03
D-8633	03-0004-067-04
D-44485	03-0004-067-05
D-17698	03-0004-067-06

2.0 METHODS

Three analytical methods were developed to ensure that all of the theoretically predicted volatile analytes could be measured. The first method, AM-122, provided the quantification of carbon monoxide via GC/TCD using helium as the carrier gas. The second method, AM-123, provided the quantification of hydrogen, oxygen, and nitrogen, via GC/TCD using argon as the carrier gas. Finally the third method, AM-124, provided the quantification of 1,2-dichlorethane, cis-2-butene, chloroethane, trans-2-butene, 1,3-butadiene, isobutylene, isobutane, vinyl chloride, and chloromethane via GC/FID using helium as the carrier gas. These methods were utilized to determine the concentration of the theoretically predicted analytes and thus yield a mass balance for the headspace. The

analyses provided information regarding the composition of the sampled headspace above the stored HD in the ton containers.

3.0 Summary of Results

The headspace of the ton containers consisted mainly of hydrogen and nitrogen, with minor levels of oxygen and carbon monoxide, yielding nearly all of the mass balance (see Table 2). For reasons that are not readily apparent, only the mass balance from sample D-17698 seriously deviated from 100% at approximately 69% (all others ranged from 95% to 105%).

The combined nitrogen and hydrogen concentrations represented between 98.1% to 99.9% of the mass balance for all samples except D-44007 and D-94138, which were 91.2% and 87.8%, respectively, due to higher oxygen concentrations in these two samples (see discussion below). Hydrogen was the dominant parameter (ranging from 70.0% to 97.2% of the mass balance) for all samples except D-51059, D-19497, D-43072, D-44007, and D-94138, where nitrogen was the dominant parameter (ranging from 57.9% to 97.1% of the mass balance).

The oxygen and carbon monoxide concentrations were typically at or less than 1% with the exception of samples D-44007 and D-94138, which had oxygen concentrations at 8.9% and 11%, respectively.

The combined concentrations of the other nine organic parameters tested were less than 0.1% in all samples.

All samples also contained ethane, ethylene, and propane. These analytes were not determined, however they were very small (~100 ppmv) as compared with hydrogen.

Table 2: Mass Balances

Client Number	EC/B FAC Number	Mass Balance (Vol. %)
D449	03-0004-053-01	96.20
D1841	03-0004-053-02	100.03
D-50373	03-0004-057-01	94.76
D-50373DUP	03-0004-057-02	94.80
D-48273	03-0004-057-03	95.84
D-51059	03-0004-057-04	104.53
D-19497	03-0004-057-05	101.00
D-43072	03-0004-057-06	101.51
D-44007	03-0004-057-07	102.61
D-94138	03-0004-057-08	99.97
D-49972	03-0004-067-01	101.37
D-41787	03-0004-067-02	101.18
D-50997	03-0004-067-03	100.95
D-8633	03-0004-067-04	100.66
D-44485	03-0004-067-05	100.98
D-17698	03-0004-067-06	68.61

ATTACHMENT

Edgewood Chemical/Biological Forensic Analytical Center

Report Number 0033-47-072803

U.S. Army Soldier and Biological Chemical Command
Edgewood Chemical Biological Center
ATTN: Edgewood Chemical Biological
Forensic Analytical Center
Aberdeen Proving Ground, MD 21010-5424
Phone: (410) 436-8600
Fax: (410) 436-3384

ANALYTICAL TEST REPORT

Report Date: 18 July 2003

Project/Event Title: Composition of HD Ton Container Headspace Gas via Analysis of Silcosteel® Canisters

Project/Event Number: 97P-0033-47

Report Number: 0033-47-072803

Conducted and Prepared For:
EG&G Defense Materials Division
ATTN: Mr. Don Milton
11600 Stark Rd
Tooele, UT 84074

This report shall not be reproduced except in full, without the written approval of the laboratory. Test results reported herein refer only to samples tested.

Background:
Pressure buildup has been observed in some ton containers (TC) stored at the Deseret Chemical Depot (DCD) Tooele, Utah. It has been theorized that the pressure build-up may be the result of evolution of hydrogen or other flammable gases in the TC. Such gases as hydrogen, nitrogen, oxygen, carbon monoxide and possibly some other compounds may cause the pressure buildup seen inside some of the ton containers. Sixteen Silcosteel® canisters containing headspace gas samples from fifteen HD ton containers were delivered and received at the Edgewood Chemical and Biological Forensic Analytical Center (EC/B FAC) in May and June 2003.

The samples were assigned the following EC/B FAC sample numbers as displayed in Table 1 below:

Table 1- Sample Numbers and Pressures Upon Receipt

Client Number	EC/B FAC Number	Received Pressure PSIG
D449	03-0004-053-01	-2.24
D1841	03-0004-053-02	-4.76
D-50373	03-0004-057-01	-4.11
D-50373DUP	03-0004-057-02	-2.32
D-48273	03-0004-057-03	-3.34
D-51059	03-0004-057-04	-4.31
D-19497	03-0004-057-05	-5.21
D-43072	03-0004-057-06	-3.76
D-44007	03-0004-057-07	-3.23
D-94138	03-0004-057-08	-4.66
D-49972	03-0004-067-01	-6.03
D-41787	03-0004-067-02	-3.99
D-50997	03-0004-067-03	-2.88
D-8633	03-0004-067-04	-3.58
D-44485	03-0004-067-05	-5.64
D-17698	03-0004-067-06	-2.72

The submitted Silcosteel® canisters were analyzed via validated methods. This analysis provided information regarding the composition of the sampled headspace and yielded insight into the pressure build-up seen in the TC's.

Data Quality Objectives:
The objective of this analytical testing was to provide quantitative results yielding insight into the pressure buildup seen in the TC's. The EC/B FAC did demonstrate that the following data quality objective was achieved:

1. Quantified the amount of hydrogen, 1,2-dichloroethane, cis-2-butene, chloroethane, trans-2-butene, 1,3-butadiene, isobutylene, isobutane, vinyl chloride, and chloromethane found in the submitted Silcosteel® canisters.

Equipment Used:
The analytical instruments used to accomplish this work were an Agilent 5890 gas chromatography system with Thermo Conductivity Detector (GC/TCD), and an Agilent 5890 gas chromatography system equipped with a Flame Ionization Detector (GC/FID).

Devices Used:
The following devices were utilized to accomplish the proposed work:
Entech Instruments, Inc.
- 2.5 mL Silonite sampling loop
- 0.5 mL Silonite sampling loop
- 250 µL Silonite sampling loop
- 100 µL Silonite sampling loop

Restek SilcoCan 1L Silcosteel® Canisters
Netech DigiMano Pressure-Vacuum Meter (or equivalent).

Materials Used:

Liquid Argon	BOC Gases	CAS # 7440-37-1
Ultra High Purity Helium	Messer	CAS # 7440-59-7
Ultra High Purity Hydrogen	Messer	CAS # 1333-74-0
100 ppmv Carbon Monoxide	Scott Specialty Gases	CAS # 630-08-0
Balance Nitrogen		CAS # 7727-37-9
100 ppmv trans-2-Butene Standard	Scott Specialty Gases	CAS # 624-64-6
Balance Nitrogen		CAS # 7727-37-9
100 ppmv Isobutylene Standard	Scott Specialty Gases	CAS # 115-11-7
Balance Nitrogen		CAS # 7727-37-9
9 Gas Mix Standard in Nitrogen	Scott Specialty Gases	CAS # 7727-37-9
101ppmv 1,3-Butadiene		106-99-0
100ppmv Chloroethane		75-00-3
100ppmv Cis-2-Butene		590-18-1
100ppmv 1,2-Dichloroethane		107-06-2
100ppmv Isobutane		75-28-5
100ppmv Isobutylene		115-11-7
100ppmv Methylchloride		74-87-3
100ppmv trans-2-Butene		624-64-6
100ppmv Vinyl Chloride		75-01-4

Sample Receipt and Handling:
Sample receipt and handing followed EC/B FAC work instruction (WI-090), "Sample Receipt and Handling". The samples were stored at or below 8° C.

Action Taken and Analysis:

All analyses were performed in accordance with methods AM-123 and AM-124.

- ***Standards and Sample Preparation.***

Standards

The standards used for the calibration and check standards for the methods were of the highest quality available and were prepared in accordance with appropriate standard operating procedures. Stock gas standards were obtained from the vendor and diluted to the appropriate concentration via theoretical calculation in one liter SilcoCans™. The pressures were noted after evacuation (starting pressure), after addition of standard (amt. of standard added), and dilution with the inert gas (diluted pressure). The inert gas used for pressurization/dilution was dependent on the method being employed, for AM-123 argon was used as the dilutants and for AM-124 nitrogen was utilized. The standard dilution factor used to determine the final concentrations of the standards in the SilcoCans™ were determined using the pressures, as discussed above, using the following equation:

$$\text{Standard Dilution} = ABS\left(\frac{\text{Starting Pressure - Standard Added Pressure}}{\text{Diluted Pressure - Starting Pressure}}\right)$$

For example, to prepare a calibration standard at 59.6 ppmv of carbon monoxide from a stock cylinder at 100 ppmv the following calculation would be done. The pressures are recorded as follows:

Evacuated Canister pressure = -14.68 psi
Calibration Gas Added Pressure = 16.93 psi
Helium Dilution Gas Added Pressure = 38.39

$$\text{Standard Dilution} = ABS\left(\frac{(-14.68)-16.93}{38.39-(-14.68)}\right) = 0.596$$

This dilution factor was then multiplied by the stock concentration to yield the concentration in ppmv. The one liter SilcoCan™ containing the standard was then retained for future use.

$$\text{Concentration in ppmv} = 100\text{ ppmv} * 0.596 = 59.6\text{ ppmv}$$

Standards were prepared at the concentrations listed in Table 2 and established the calibration curves used for quantitation of the appropriate analytes. When samples exceeded this range they were brought into the range by the utilization of a smaller loop. This enabled the addition of a smaller amount on column and therefore a back-calculation to the true concentration in the headspace could be done with out diluting the sample further.

Table 2- Concentration Levels for the Calibration Curves

AM-122	AM-123			AM-124
Carbon Monoxide ppmv	*Hydrogen ppmv*	*Oxygen ppmv*	*Nitrogen ppmv*	*Organics ppmv*
13.6	141.3	15,000	58,000	2.8
42.0	706.2	25,000	97,000	8.9
59.6	2,819.0	59,000	235,000	26.0
79.3	8,757.0	76,000	299,000	45.3
100.0	34,130.0	83,000	329,000	100.0
		99,000	389,000	
		115,000	456,000	
		152,000	599,000	
		181,000	713,000	
		200,000	790,000	

Samples

Prior to analysis, the sample canisters had to be pressurized so that the sample gas could charge the sampling loop. The addition of argon to each of the samples achieved this. This pressurization with argon also acted to dilute the original sample contained in the canister and thus a correction had to be made to ascertain the true concentration of the analytes in the canisters as received. The receiving pressure, as well as the diluted pressure were noted so the dilution factors could be calculated. These pressures along with the theoretical evacuated canister pressure of –14.7 psi (since the true pressure was not known) were then used to calculate the dilution factor via the following calculation:

$$\text{Dilution Factor} = ABS\left(\frac{\text{Diluted Pressure - Theoretical Evacuated Canister Pressure}}{\text{Theoretical Evacuated Caniter Pressure - Received Pressure}}\right)$$

The analytical results from the various analyses were corrected for this initial dilution by multiplying the analytical result by the dilution factor, which yielded the true concentration in the canister as received.

To calculate the true value of hydrogen in a sample, the following calculation would be done. The pressures and analytical response as recorded in the notebook were as follows:

Assumed evacuated canister pressure = -14.7 psig
Canister pressure as received = -2.46 psig
Pressure of the canister after addition of Argon diluent = 20.0 psig
Analytical response = 58549.5 ppmv.

$$\text{Dilution Factor} = ABS\left(\frac{(20.0)-(-14.7)}{(-14.7)-(-2.46)}\right) = 2.83$$

This dilution factor was multiplied by the analytical response to yield the sample concentration in ppmv.

$$\text{Hydrogen ppmv} = 58549.5 \text{ ppmv} * 2.83 = 165695.4 \text{ ppmv}$$

This response was divided by 10,000 to yield the value in percent.

$$\%\ \text{Hydrogen} = \left(\frac{165695.4 \text{ ppmv}}{10{,}000}\right) = 16.6\%$$

All Silcosteel® samples received were diluted in this manner using argon as the dilutant and the dilution factor was calculated as shown in the sample above and used to calculate the true concentration of each of the analytes. An initial argon pressurization to approximately 20 psig was sufficient enough to provide a sample size in the canisters to run all analyses without further dilution.

- ***Analysis of the 16 Silcosteel® canisters via GC/TCD.***

Analysis of the SilcoCans™ for the quantitation of hydrogen was accomplished using method AM-123.

- ***Analysis of the 16 Silcosteel® canisters via GC/FID.***

Analysis of the SilcoCans™ for the nine organic compounds was accomplished using method AM-124.

Results:

The SilcoCans™ were analyzed via two distinct methods, which enabled the quantification of hydrogen, 1,2-dichloroethane, cis-2-butene, chloroethane, trans-2-butene, 1,3-butadiene, isobutylene, isobutane, vinyl chloride, and chloromethane. The tables below provide a summary of the results obtained.

In order to achieve reasonable mass balances, nitrogen and oxygen were quantitated using method AM-123 and carbon monoxide was quantitated using method AM-122. These values are displayed in the tables but go beyond the data quality objectives of this project.

Table 3- Hydrogen, Nitrogen, and Oxygen Percentages in the SilcoCans™

Canister #	Date of Analysis Month/Day 2003	Dilution Factor Argon as dilutant	% Hydrogen	% Oxygen	% Nitrogen
D449	6/9	2.80	78.0	0.75 J	17.1
D1841	6/9	3.48	78.9	0.51 J	20.2
D-50373	6/9	3.20	92.1	0.41 J	2.2 J
D-50373DUP	6/9	2.94	85.2	0.54 J	9.0 J
D-48273	6/9	3.16	85.9	0.48 J	8.5 J
D-51059	6/9	3.45	2.32	0.64 J	102
D-19497	6/9	3.79	36.0	0.61 J	64.1
D-43072	6/9	3.28	9.09	1.1 J	91.2
D-44007	6/9	3.06	15.5	8.87	78.2
D-94138	6/9	3.56	29.9	11.0	57.9
D-49972	6/11	4.04	86.7	0.62 J	13 J
D-41787	6/11	3.29	81.6	0.99 J	18 J
D-50997	6/11	3.01	78.1	0.68 J	21.9
D-8633	6/11	3.19	79.7	0.95 J	19.6
D-44485	6/11	3.92	85.1	0.69 J	15 J
D-17698	6/11	2.94	48.0	0.24 J	19.3

J Qualifier = Estimated value. Parameter detected below the lowest calibration concentration.

Table 4- Carbon Monoxide Percentages in the SilcoCans™

Canister #	Date of Analysis Month/Day 2003	Dilution Factor Argon as dilutant	% Carbon Monoxide
D449	6/6	2.80	0.43
D1841	6/6	3.48	0.49
D-50373	6/6	3.20	0.03
D-50373DUP	6/6	2.94	0.03
D-48273	6/6	3.16	0.87
D-51059	6/6	3.45	0.03
D-19497	6/6	3.79	0.24
D-43072	6/6	3.28	0.10
D-44007	6/6	3.06	0.09
D-94138	6/6	3.56	1.17
D-49972	6/18	4.04	0.68
D-41787	6/18	3.29	0.28
D-50997	6/18	3.01	0.27
D-8633	6/18	3.19	0.39
D-44485	6/18	3.92	0.43
D-17698	6/18	2.94	0.97

Table 5- Major Organic Compound Percentages in the SilcoCans™

Canister #	Date of Analysis Month/Day 2003	Dilution Factor Argon as dilutant	% Chloroethane	% Trans-2-Butene	% 1,2-Dichloroethane
D449	5/12	2.80	0.002	0.002	0.015
D1841	5/12	3.48	0.002	0.006	0.013
D-50373	5/28	3.20	< 0.0009	< 0.0009	< 0.0009
D-50373DUP	5/28	2.94	< 0.00082	< 0.00082	0.0009
D-48273	5/28	3.16	0.004	0.024	0.024
D-51059	5/28	3.45	< 0.00097	< 0.00097	< 0.00097
D-19497	5/28	3.79	0.011	0.017	0.025
D-43072	5/28	3.28	0.005	0.012	0.009
D-44007	5/28	3.06	< 0.00086	0.003	0.003
D-94138	5/28	3.56	0.003	0.016	0.026
D-49972	6/10	4.04	0.005	0.030	0.026
D-41787	6/10	3.29	< 0.00092	0.010	0.011
D-50997	6/10	3.01	0.002	< 0.00084	0.007
D-8633	6/10	3.19	0.001	0.006	0.014
D-44485	6/10	3.92	0.007	0.041	0.025
D-17698	6/10	2.94	0.011	0.017	0.039

Table 6- Organic Compound Concentrations in the SilcoCans™

Sample Number	Date Analyzed Month/Day 2003	Dilution Factor Argon as Dilutant	Chloro-methane Calculated Conc. ppmv	Vinyl Chloride Calculated Conc. ppmv	Chloro-ethane Calculated Conc. ppmv	Isobutane Calculated Conc. ppmv	Trans-2-butene Calculated Conc. ppmv	Iso-butylene Calculated Conc. Ppmv	Cis-2-butene Calculated Conc. ppmv	1,3-Butadiene Calculated Conc. ppmv	1,2-Dichloro ethane Calculated Conc. ppmv
D449	5/12	2.80	< 7.8	<7.8	24.6	< 7.8	22.6	<7.8	< 7.8	< 7.8	146
D1841	5/12	3.48	< 9.7	< 9.7	20.0	< 9.7	62.1	< 9.7	25.0	< 9.7	126
D-50373	5/28	3.20	34.0	< 9.0	< 9.0	< 9.0	< 9.0	< 9.0	24.9	< 9.0	< 9.0
D-50373DUP	5/28	2.94	31.3	< 8.2	< 8.2	< 8.2	< 8.2	< 8.2	47.6	< 8.2	9.11
D-48273	5/28	3.16	< 8.8	< 8.8	43.1	< 8.8	240	13.8	89.0	< 8.8	241
D-51059	5/28	3.45	< 9.7	< 9.7	< 9.7	< 9.7	< 9.7	< 9.7	< 9.7	< 9.7	< 9.7
D-19497	5/28	3.79	< 11	< 11	106	< 11	169	< 11	48.4	< 11	251
D-43072	5/28	3.28	< 9.2	< 9.2	46.1	< 9.2	121	< 9.2	33.5	< 9.2	85.7
D-44007	5/28	3.06	< 8.6	< 8.6	< 8.6	< 8.6	28.0	< 8.6	13.7	< 8.6	26.0
D-94138	5/28	3.56	< 10	< 10	33.8	< 10	157	< 10	36.6	< 10	262
D-49972	6/10	4.04	< 11	17.6	46.9	< 11	299	23.6	126	< 11	256
D-41787	6/10	3.29	< 9.2	< 9.2	< 9.2	< 9.2	103	< 9.2	49.7	< 9.2	110
D-50997	6/10	3.01	< 8.4	< 8.4	18.3	< 8.4	< 8.4	< 8.4	< 8.4	< 8.4	66.6
D-8633	6/10	3.19	< 8.9	< 8.9	13.2	< 8.9	64.8	< 8.9	24.2	< 8.9	138
D-44485	6/10	3.92	< 11	19.6	69.6	< 11	410	33.5	162	< 11	253
D-17698	6/10	2.94	< 8.2	< 8.2	108	< 8.2	170	11.4	27.0	< 8.2	386

Table 7- Mass Balances

Client Number	EC/B FAC Number	Mass Balance Volume Percent*
D449	03-0004-053-01	96.20
D1841	03-0004-053-02	100.03
D-50373	03-0004-057-01	94.76
D-50373DUP	03-0004-057-02	94.80
D-48273	03-0004-057-03	95.84
D-51059	03-0004-057-04	104.53
D-19497	03-0004-057-05	101.00
D-43072	03-0004-057-06	101.51
D-44007	03-0004-057-07	102.61
D-94138	03-0004-057-08	99.97
D-49972	03-0004-067-01	101.37
D-41787	03-0004-067-02	101.18
D-50997	03-0004-067-03	100.95
D-8633	03-0004-067-04	100.66
D-44485	03-0004-067-05	100.98
D-17698	03-0004-067-06	68.61

*Sum of the volume percents of all analytes present at levels of at least 0.1% including estimated ("J" qualified) concentrations

Conclusions:
Methods AM-122, AM-123, and AM-124 were utilized to determine the concentration of the theoretically predicted analytes and thus yield a mass balance for the headspace. This analysis provided information regarding the composition of the sampled headspace above the stored HD in the ton containers. As indicated in the tables above, the headspace of the ton containers consisted primarily of hydrogen and nitrogen, with minor levels of oxygen and carbon monoxide, yielding nearly all of the mass balance. For reasons that are not readily apparent, only the mass balance from sample D-17698 seriously deviated from 100% at 69% (all others ranged from 95% to 105%).

All samples also contained ethane, ethylene, and propane. These analytes were not determined, however they were very small (~100 ppmv) as compared with hydrogen.

Analyst(s) of Record	Analyst(s) of Record
_____(Signature) 7/31/03 (Date) **Jessica A. Cox** **Chemist, Edgewood Chemical and Biological Center**	_____(Signature) 7/31/03 (Date) **Stephen C. Chesler** **Research Scientist, Battelle Memorial Institute**
Report Reviewed by _____(Signature) 7/31/03 (Date) **Mary F. Drummond** **Quality Manager, Edgewood Chemical and Biological Center**	

Report Reviewed by

_____(Signature)

7/31/03 (Date)

Jessica A. Cox

Designated Authority, Edgewood C/B Forensic Analytical Center

Report Approved by

_____(Signature)

August 2003 (Date)

Dennis J. Reutter, Ph.D.

Chief, Edgewood C/B Forensic Analytical Center

Appendix G

Analytical Test Report
Tooele 155mm Levinstein Mustard (H) Projectile Analysis

Analytical Test Report
Tooele 155mm Levinstein Mustard (H) Projectile Analysis

Analytical Report for:

Mr. Don Milton
EG&G Defense Materials Division
11600 Stark Road
Tooele, Utah 84074

By:

Analytical Services Group
Battelle Eastern Science and Technology Center
1204 Technology Drive
Aberdeen, MD 21001

03 November 2003

Disclaimer

This report is a work prepared for EG&G and for the United States Government by Battelle. In no event shall EG&G, the United States Government, or Battelle have any responsibility or liability for any consequences of any use, misuse, inability to use, or reliance on the information contained herein, nor does either warrant or otherwise represent in any way the accuracy, adequacy, efficacy, or applicability of the contents hereof.

TABLE OF CONTENTS

1.0 Introduction 1
2.0 Sample Receipt 1
3.0 Sample Analysis 3

ATTACHMENT 9
Analytical Text Report, Analysis of Samples Collected from M155 H Projectiles Stored at the Deseret Chemical Depot-Sample Set 9, Report Number 0033-46-102103B9

TABLE OF CONTENTS

Table 1 - Tooele H 155 mm Projectile Samples 2
Table 2 - Analytical Methods 3
Table 3 – H 155 mm Projectile Samples Summary Results 4
Table 4 – Analytical Results for Lot Numbers EA-4-9, EA-4-2 5
Table 5 – Analytical Results for Lot Numbers EA-4-30, EA-4-17 6
Table 6 – Analytical Results for Lot Numbers EA-4-18, EA-4-14 7
Table 7 – H 155 mm Projectile Samples- Tentatively Identified Compound (TIC) Summary 8

1.0 INTRODUCTION

Deseret Chemical Depot (DCD), Utah holds the largest United States stockpile of chemical weapons. As a result, the Program Manager for Chemical Demilitarization (PMCD) constructed the first disposal facility within the United States, the Tooele Chemical Agent Disposal Facility (TOCDF). PMCD selected EG&G Defense Materials, Inc. (EG&G) as the systems contractor and operator of the facility. As such, EG&G is responsible for the safe and effective disposal of the chemical agent stored at DCD in weapons and ton containers.

Prior to the destruction of the chemical agent munitions, the State of Utah, Department of Environmental Quality, Division of Solid and Hazardous Waste (DSHW) requires characterization of the chemical agent. This characterization includes purity, degradents, impurities, by-products and metals identification. Previously, samples of nerve agents GB and VX from the DCD stockpile were collected and analyzed. The results of the analyses were presented to DSHW prior to the initiation of the destruction of the munitions. Currently, EG&G is conducting a HD characterization program for the ton containers. Samples from selected Levinstein Mustard (H) 155 mm projectiles were collected and sent for analysis to Battelle Memorial Institute at the Forensic Analytical Center (FAC) at Aberdeen Proving Ground, MD. Once the program is complete, a report, containing the analytical results, will be sent to the DSHW for their review prior to the destruction of the HD or H chemical weapons and ton containers.

Twelve liquid H samples from DCD were analyzed by Battelle for purity, volatile, semi-volatile, and non-volatile organic compounds, and metals. In addition, twelve solid samples were analyzed for metals composition.

2.0 SAMPLE RECEIPT

DCD began collecting the set of samples from 155mm H projectiles on 10 June 2003. Twelve 155 mm projectiles were sampled and the collected samples were shipped to the FAC. The samples consisted of two matrices: liquid and solids. The samples arrived on 1 July 2003. The samples were checked and confirmed with the packing list. Once the packing list was checked for completeness and accuracy, they were logged into the FAC's chain-of-custody system for identification and positive tracking. A unique identifier was assigned to each sample, which is shown in Table 1.

Table 1 - Tooele 155mm H Projectile Samples

Lot Number	Sample ID	Laboratory ID	Matrix	Collect Date
EA-4-9	39B-03-013A	030004-084-01	Liquid	6/10/2003
	39B-03-014A	030004-084-02	Liquid	6/10/2003
	39B-03-018	030004-083-01	Solid	6/11/2003
	39B-03-019	030004-083-02	Solid	6/11/2003
EA-4-2	39B-03-025A	030004-084-03	Liquid	6/10/2003
	39B-03-026A	030004-084-04	Liquid	6/10/2003
	39B-03-030	030004-083-03	Solid	6/11/2003
	39B-03-031	030004-083-04	Solid	6/11/2003
EA-4-30	39B-03-033A	030004-084-05	Liquid	6/10/2003
	39B-03-034A	030004-084-06	Liquid	6/10/2003
	39B-03-038	030004-083-05	Solid	6/11/2003
	39B-03-039	030004-083-06	Solid	6/11/2003
EA-4-17	39B-03-041A	030004-084-07	Liquid	6/10/2003
	39B-03-042A	030004-084-08	Liquid	6/10/2003
	39B-03-046	030004-083-07	Solid	6/12/2003
	39B-03-047	030004-083-08	Solid	6/12/2003
EA-4-18	39B-03-048A	030004-084-09	Liquid	6/12/2003
	39B-03-049A	030004-084-10	Liquid	6/12/2003
	39B-03-053	030004-083-09	Solid	6/13/2003
	39B-03-054	030004-083-10	Solid	6/13/2003
EA-4-14	39B-03-055A	030004-084-11	Liquid	6/12/2003
	39B-03-056A	030004-084-12	Liquid	6/12/2003
	39B-03-060	030004-083-11	Solid	6/13/2003
	39B-03-061	030004-083-12	Solid	6/13/2003

3.0 Sample Analysis

For this project, Battelle developed and validated six analytical methods to characterize sulfur mustard. These validated methods were used to determine the agent purity, volatile, semi-volatile, and nonvolatile compounds present in the liquid H samples. Method AM-126 was used for the analysis of Lewisite. The metals method, AM-118, would be used to determine the metals content of the two matrices: liquid and solid. The methods used during the project, their titles, and the analytes that they measured are shown in Table 2.

Table 2 - Analytical Methods

Method	Title	Analytes
AM-098	Determination of Bis(2-chloroethyl) sulfide (HD) Purity by GC/MS	Bis(2-chloroethyl) sulfide
AM-100	Determination of Selected Non-Volatile Contaminants in HD by GC/MS	Thiodiglycol (TDG)
AM-101	Determination of Selected Volatile Contaminants in HD by GC/MS	1,2-Dichloroethane; 1,1,2,2-Tetrachloroethane; Tetrachloroethylene
AM-117	Determination of Selected Semi-Volatile Contaminants in HD matrix by GC/MS	1,2-Bis(2-chloroethylthio)ethane (Q); Bis[2-(chloroethylthio)ethyl]ether (T); Hexachloroethane
AM-118	Determination of Metals in Chemical Agent/Chemical Agent Sludge by Microwave Digestion ICP/MS	Al, Sb, As, Ba, Be, B, Cd, Cr, Co, Cu, Pb, Mn, Hg, Ni, Se, Ag, Sn, Tl, V, Zn
AM-126	Determination of Chemical Agent Lewisite (L) in neat Chemical Agent Mustard (HD) Matrix by GC/MS	L

Table 3 summarizes the results found while Tables 4-6 provide the analytical summary for each sample and each matrix. Table 7 summarizes the tentatively identified compounds (TICs) that met the criteria in the Quality Assurance Project Plan. Peaks were identified in the GC/MS chromatograms that were at least 10% of the area of the nearest internal standard. An agreement with known spectra of at least 80% was used as positive identification as a TIC. The updated Treaty mass spectral library was used to identify the compounds.

Table 3 –155mm H Projectile Samples Summary Results

Organic Compounds						
Bis (2-chloroethyl) sulfide, Wt.%	70.5	83.6	77.0	-	-	-
Thiodiglycol, Wt.%	< 0.025	< 0.026	< 0.026	-	-	-
1,2-Dichloroethane, Wt.%	1.22	2.88	1.93	-	-	-
Tetrachloroethylene, Wt.%	< 0.049	< 0.052	< 0.050	-	-	-
1,1,2,2-Tetrachloroethane, Wt.%	< 0.049	< 0.052	< 0.050	-	-	-
T, Wt.%	< 0.24	< 0.27	< 0.26	-	-	-
Q, Wt.%	4.55	7.34	5.52	-	-	-
Hexachloroethane, Wt.%	< 0.024	< 0.027	< 0.026	-	-	-
Lewisite, mg/Kg	< 4.9	< 5.3	< 5.1	-	-	-
Metals						
Aluminum, mg/Kg	< 48	< 53	< 50	< 49	< 53	< 51
Antimony, mg/Kg	< 4.8	< 5.3	< 5.0	< 4.9	< 5.3	< 5.1
Arsenic, mg/Kg	< 4.8	< 5.3	< 5.0	6.70	61.2	19.6
Barium, mg/Kg	< 4.8	< 5.3	< 5.0	< 4.9	< 5.3	< 5.1
Beryllium, mg/Kg	< 4.8	< 5.3	< 5.0	< 4.9	< 5.3	< 5.1
Boron, mg/Kg	< 9.6	< 11	< 10	< 9.7	< 11	< 10
Cadmium, mg/Kg	< 4.8	< 5.3	< 5.0	< 4.9	< 5.3	< 5.1
Chromium, mg/Kg	< 4.8	6.58	< 5.3	9.64	29.2	20.0
Cobalt, mg/Kg	< 0.96	< 1.1	< 1.0	1.29	6.50	3.80
Copper, mg/Kg	20.5	52.5	35.9	12.4	46.9	26.3
Lead, mg/Kg	< 4.8	< 5.3	< 5.0	< 9.7	36.8	< 14
Manganese, mg/Kg	< 0.96	2.83	< 1.3	147	931	511
Mercury, mg/Kg	< 0.48	< 0.53	< 0.50	< 0.49	< 0.53	< 0.51
Nickel, mg/Kg	< 4.8	< 5.3	< 5.0	< 5.0	22.8	< 13
Selenium, mg/Kg	< 9.6	< 11	< 10	< 24	< 26	< 25
Silver, mg/Kg	< 4.8	< 5.3	< 5.0	< 4.9	< 5.3	< 5.1
Thallium, mg/Kg	< 4.8	< 5.3	< 5.0	< 4.9	< 5.3	< 5.1
Tin, mg/Kg	< 9.6	< 11	< 10	< 9.9	18.2	< 12
Vanadium, mg/Kg	< 4.8	< 5.3	< 5.0	< 4.9	< 5.3	< 5.1
Zinc, mg/Kg	< 9.6	< 11	< 10	< 9.7	< 11	< 10

[a] The <PQL value was used when a not-detected (ND) result or a J-qualifier was found.

[b] The <PQL value was used when all sample results were not-detected (ND) or a J-qualifier was found.

[c] The average value included not-detected (ND) results and J-qualifiers at the PQL.

Table 4 – Analytical Results for Lot Numbers EA-4-9, EA-4-2

Sample Matrix	Liquid	Solid						
Organic Compounds								
Bis (2-chloroethyl) sulfide, Wt.%	78.7 H	77.5 H			77.1 H	80.3 H		
Thiodiglycol, Wt.%	< 0.026	< 0.025			< 0.026	< 0.026 H		
1,2-Dichloroethane, Wt.%	2.06	1.94			1.51	1.53		
Tetrachloroethylene, Wt.%	< 0.049	< 0.051			< 0.051	< 0.050		
1,1,2,2-Tetrachloroethane, Wt.%	< 0.049	< 0.051			< 0.051	< 0.050		
T, Wt.%	0.16 JH	0.17 JH			0.17 JH	0.18 JH		
Q, Wt.%	4.98 H	4.74 H			4.55 H	4.62 H		
Hexachloroethane, Wt.%	< 0.024 H	< 0.026 H			< 0.026 H	< 0.027 H		
Lewisite, mg/Kg	< 5.3 H	< 5.2 H			< 5.2 H	< 5.1 H		
Metals								
Aluminum, mg/Kg	< 49	< 53	< 49	< 51	< 51	< 50	19 J	< 49
Antimony, mg/Kg	< 4.9	< 5.3	1.2 J	1.7 J	< 5.1	< 5.0	0.69 J	2.3 J
Arsenic, mg/Kg	< 4.9	< 5.3	7.04	41.1	< 5.1	< 5.0	12.3	8.43
Barium, mg/Kg	< 4.9	< 5.3	0.041 J	0.047 J	< 5.1	< 5.0	0.087 J	< 4.9
Beryllium, mg/Kg	< 4.9	< 5.3	< 4.9	< 5.1	< 5.1	< 5.0	< 5.2	< 4.9
Boron, mg/Kg	< 9.8	< 11	< 9.7	< 10	< 10	< 9.9	< 10	< 9.8
Cadmium, mg/Kg	< 4.9	< 5.3	0.24 J	0.26 J	< 5.1	< 5.0	0.29 J	0.27 J
Chromium, mg/Kg	5.13	4.7 J	29.2	26.9	5.1 J	5.78	21.7	22.7
Cobalt, mg/Kg	< 0.98	< 1.1	4.57	3.67	< 1.0	< 0.99	3.96	4.43
Copper, mg/Kg	46.2	45.5	46.9	31.9	31.2	31.7	27.5	18.1
Lead, mg/Kg	< 4.9	< 5.3	7.0 J	5.2 J	< 5.1	< 5.0	6.8 J	16.8
Manganese, mg/Kg	0.49 J	0.80 J	531	409	0.34 J	0.34 J	506	521
Mercury, mg/Kg	0.062 J	0.067 J	< 0.49	< 0.51	0.074 J	< 0.50	< 0.52	< 0.49
Nickel, mg/Kg	4.7 J	4.7 J	22.8	14.6	3.9 J	3.8 J	15.7	9.71
Selenium, mg/Kg	< 9.8	< 11	0.85 J	< 26	< 10	1.2 J	< 26	< 25
Silver, mg/Kg	< 4.9	< 5.3	< 4.9	< 5.1	< 5.1	< 5.0	0.081 J	< 4.9
Thallium, mg/Kg	< 4.9	< 5.3	< 4.9	< 5.1	< 5.1	< 5.0	< 5.2	< 4.9
Tin, mg/Kg	< 9.8	< 11	13.1	12.2	< 10	< 9.9	7.2 J	15.0
Vanadium, mg/Kg	< 4.9	< 5.3	< 4.9	1.1 J	< 5.1	1.4 J	1.4 J	1.2 J
Zinc, mg/Kg	< 9.8	4.3 J	2.8 J	3.1 J	< 10	< 9.9	3.3 J	4.1 J

Notes: J - Result estimated since value was between the MDL and the PQL.
H - Result estimated since final analysis conducted after 28-day holding time.

Table 5 – Analytical Results for Lot Numbers EA-4-30, EA-4-17

Organic Compounds								
Bis (2-chloroethyl) sulfide, Wt.%	79.2 H	77.8 H			75.8 H	76.9 H		
Thiodiglycol, Wt.%	< 0.025 H	< 0.026 H			< 0.026 H	< 0.026 H		
1,2-Dichloroethane, Wt.%	1.22	1.30			2.14	2.15		
Tetrachloroethylene, Wt.%	0.012 J	0.011 J			0.014 J	0.013 J		
1,1,2,2-Tetrachloroethane, Wt.%	< 0.052	< 0.050			< 0.050	< 0.050		
T, Wt.%	0.18 JH	0.18 JH			0.18 JH	0.18 JH		
Q, Wt.%	7.34 H	7.26 H			5.55 H	6.48 H		
Hexachloroethane, Wt.%	< 0.025 H	< 0.026 H			< 0.027 H	< 0.026 H		
Lewisite, mg/Kg	< 5.2 H	< 5.0 H			< 5.1 H	< 5.1 H		
Metals								
Aluminum, mg/Kg	< 48	12 J	< 51	< 50	< 51	11 J	< 50	< 49
Antimony, mg/Kg	< 4.8	< 5.0	0.56 J	0.23 J	< 5.1	< 5.1	0.62 J	3.0 J
Arsenic, mg/Kg	2.8 J	3.1 J	8.36	6.70	< 5.1	1.6 J	21.5	61.2
Barium, mg/Kg	< 4.8	< 5.0	< 5.1	< 5.0	< 5.1	< 5.1	0.045 J	< 4.9
Beryllium, mg/Kg	< 4.8	< 5.0	< 5.1	< 5.0	< 5.1	< 5.1	< 5.0	< 4.9
Boron, mg/Kg	< 9.6	< 10	< 10	< 9.9	< 10	< 10	< 10	< 9.8
Cadmium, mg/Kg	< 4.8	< 5.0	0.31 J	0.24 J	< 5.1	< 5.1	0.27 J	0.22 J
Chromium, mg/Kg	2.2 J	2.8 J	22.1	9.64	5.14	4.5 J	17.7	24.8
Cobalt, mg/Kg	< 0.96	< 1.0	3.41	1.29	< 1.0	< 1.0	2.52	3.16
Copper, mg/Kg	28.3	28.0	25.3	12.4	51.6	52.5	44.7	33.2
Lead, mg/Kg	< 4.8	< 5.0	7.8 J	6.0 J	< 5.1	< 5.1	25.3	36.8
Manganese, mg/Kg	0.51 J	0.88 J	412	147	0.40 J	0.51 J	396	409
Mercury, mg/Kg	0.065 J	0.11 J	< 0.51	< 0.50	< 0.51	< 0.51	< 0.50	< 0.49
Nickel, mg/Kg	4.4 J	4.5 J	8.64	4.0 J	4.7 J	4.8 J	12.8	13.8
Selenium, mg/Kg	< 9.6	< 10	0.90 J	1.8 J	< 10	< 10	< 25	< 24
Silver, mg/Kg	< 4.8	< 5.0	< 5.1	< 5.0	< 5.1	< 5.1	< 5.0	< 4.9
Thallium, mg/Kg	< 4.8	< 5.0	< 5.1	< 5.0	< 5.1	< 5.1	< 5.0	< 4.9
Tin, mg/Kg	< 9.6	< 10	5.4 J	2.8 J	< 10	< 10	3.5 J	16.2
Vanadium, mg/Kg	< 4.8	< 5.0	1.2 J	< 5.0	< 5.1	< 5.1	1.2 J	1.3 J
Zinc, mg/Kg	< 9.6	< 10	5.2 J	5.6 J	< 10	< 10	3.3 J	4.8 J

Notes: J - Result estimated since value was between the MDL and the PQL.
H - Result estimated since final analysis conducted after 28-day holding time.

Table 6 – Analytical Results for Lot Numbers EA-4-18, EA-4-14

Organic Compounds								
Bis (2-chloroethyl) sulfide, Wt.%	70.5 H	83.6 H			75.9 H	70.7 H		
Thiodiglycol, Wt.%	< 0.025	< 0.026			< 0.025	< 0.026		
1,2-Dichloroethane, Wt.%	2.88	2.79			1.86	1.77		
Tetrachloroethylene, Wt.%	< 0.050	< 0.050			< 0.050	< 0.049		
1,1,2,2-Tetrachloroethane, Wt.%	< 0.050	< 0.050			< 0.050	< 0.049		
T, Wt.%	0.17 JH	0.17 JH			0.16 JH	0.16 JH		
Q, Wt.%	5.48 H	5.48 H			4.85 H	4.85 H		
Hexachloroethane, Wt.%	< 0.025 H	< 0.026 H			< 0.026 H	< 0.025 H		
Lewisite, mg/Kg	< 4.9 H	< 5.2 H			< 5.0 H	< 5.2 H		
Metals								
Aluminum, mg/Kg	13 J	< 48	< 52	< 52	< 48	15 J	15 J	12 J
Antimony, mg/Kg	< 5.0	< 4.8	< 5.2	0.16 J	< 4.8	< 5.0	1.1 J	1.8 J
Arsenic, mg/Kg	< 5.0	1.5 J	11.6	15.4	< 4.8	< 5.0	28.7	13.2
Barium, mg/Kg	< 5.0	< 4.8	0.096 J	0.092 J	< 4.8	< 5.0	0.11 J	0.090 J
Beryllium, mg/Kg	< 5.0	< 4.8	< 5.2	< 5.2	< 4.8	< 5.0	< 5.3	< 5.2
Boron, mg/Kg	< 9.9	< 9.6	< 10	< 10	< 9.6	< 10	< 11	< 10
Cadmium, mg/Kg	< 5.0	< 4.8	0.27 J	0.23 J	< 4.8	< 5.0	0.25 J	0.28 J
Chromium, mg/Kg	6.29	6.58	14.3	16.8	4.5 J	5.07	18.9	15.0
Cobalt, mg/Kg	< 0.99	< 0.96	3.13	3.72	< 0.96	< 1.0	6.50	5.22
Copper, mg/Kg	20.6	20.5	16.1	13.6	37.1	37.6	23.7	22.2
Lead, mg/Kg	< 5.0	< 4.8	2.7 J	4.1 J	< 4.8	< 5.0	5.0 J	5.4 J
Manganese, mg/Kg	2.83	2.74	505	581	0.51 J	0.47 J	931	785
Mercury, mg/Kg	0.077 J	< 0.48	< 0.52	< 0.52	< 0.48	< 0.50	< 0.53	< 0.52
Nickel, mg/Kg	1.9 J	1.9 J	10.6	9.42	3.3 J	3.2 J	16.7	13.4
Selenium, mg/Kg	< 9.9	< 9.6	< 26	< 26	< 9.6	< 10	< 26	< 26
Silver, mg/Kg	< 5.0	< 4.8	< 5.2	< 5.2	< 4.8	< 5.0	< 5.3	< 5.2
Thallium, mg/Kg	< 5.0	< 4.8	< 5.2	< 5.2	< 4.8	< 5.0	< 5.3	< 5.2
Tin, mg/Kg	< 9.9	< 9.6	0.88 J	1.3 J	< 9.6	< 10	11.1	18.2
Vanadium, mg/Kg	< 5.0	< 4.8	1.4 J	1.6 J	< 4.8	1.1 J	1.5 J	1.3 J
Zinc, mg/Kg	< 9.9	< 9.6	5.0 J	7.6 J	4.8 J	5.0 J	3.6 J	7.9 J

Notes: J - Result estimated since value was between the MDL and the PQL.
H - Result estimated since final analysis conducted after 28-day holding time.

Table 7 –155mm H Projectile Samples - Tentatively Identified Compound (TIC) Summary

Lot Number	EA-4-9	EA-4-9	EA-4-2	EA-4-2	EA-4-30	EA-4-30
Sample Identification	39B-03-013A	39B-03-014A	39B-03-025A	39B-03-026A	39B-03-033A	39B-03-034A
Lab Identification	030004-084-01	030004-084-02	030004-084-03	030004-084-04	030004-084-05	030004-084-06
Compound						
1,4-Thioxane, Wt.%	0.085	0.093	0.11	NR	0.083	NR
1,4-Dithiane, Wt.%	0.42	0.97	0.84	0.75	NR	0.05
2-Chloroethyl 3-chloropropyl sulfide, Wt.%	0.20	0.15	0.19	0.19	0.19	0.19
Bis (3-chloropropyl) sulfide, Wt.%	0.14	0.14	0.18	0.14	0.14	0.14
2-Chloroethyl 4-chlorobutyl sulfide, Wt.%	0.33	0.32	0.31	0.31	0.30	0.30
1,2,5-Trithiepane, Wt.%	0.41	0.38	0.29	0.27	0.20	0.19
Bis (2-chloroethyl) disulfide, Wt.%	NR	NR	NR	NR	NR	NR
Bis (2-chloroethyl) trisulfide, Wt.%	NR	NR	NR	0.50	0.42	0.49

Notes: NR = Not reported since the compound did not meet the criteria for reporting.

Reported results based on peaks in the GC/MS chromatogram that are at least 10% of the area of internal standards and in agreement with known spectra of at least 80%.

Lot Number	EA-4-17	EA-4-17	EA-4-18	EA-4-18	EA-4-14	EA-4-14
Sample Identification	39B-03-041A	39B-03-042A	39B-03-048A	39B-03-049A	39B-03-055A	39B-03-056A
Lab Identification	030004-084-07	030004-084-08	030004-084-09	030004-084-10	030004-084-11	030004-084-12
Compound						
1,4-Thioxane, Wt.%	0.12	0.13	0.14	0.11	NR	0.089
1,4-Dithiane, Wt.%	2.4	0.60	0.40	0.65	1.9	0.31
2-Chloroethyl 3-chloropropyl sulfide, Wt.%	0.19	0.24	0.19	0.19	0.15	0.14
Bis (3-chloropropyl) sulfide, Wt.%	0.14	0.14	0.12	0.15	0.093	NR
2-Chloroethyl 4-chlorobutyl sulfide, Wt.%	0.43	0.44	0.38	0.38	0.32	0.32
1,2,5-Trithiepane, Wt.%	0.29	0.28	0.37	0.35	0.39	0.43
Bis (2-chloroethyl) disulfide, Wt.%	NR	NR	NR	NR	NR	NR
Bis (2-chloroethyl) trisulfide, Wt.%	NR	NR	NR	NR	NR	NR

Notes: NR = Not reported since the compound did not meet the criteria for reporting.

Reported results based on peaks in the GC/MS chromatogram that are at least 10% of the area of internal standards and in agreement with known spectra of at least 80%.

ATTACHMENT

Edgewood Chemical/Biological Forensic Analytical Center

Report Number 0033-46-102103B9

U.S. Army Soldier and Biological Chemical Command
Edgewood Chemical Biological Center
ATTN: Edgewood Chemical Biological
Forens ic Analytical Center
Aberdeen Proving Ground, MD 21010-5424
Phone: (410) 436-8600
Fax: (410) 436-3384

ANALYTICAL TEST REPORT
FINAL

Report Date: 21 October 2003

Project/Event Title: Analysis of Samples Collected From M155 H Projectiles Stored at the Deseret Chemical Depot – Sample Set 9 – FINAL REPORT

Project/Event Number: 97P-0033-46

Report Number: 0033-46-102103B9

Report Prepared for:

EG&G Defense Materials Division
Attn.: Mr. Don Milton
11600 Stark Rd
Tooele, UT 84074

This report shall not be reproduced except in full, without the written approval of the laboratory. Test results reported herein refer only to samples tested.

CASE NARRATIVE

Tooele Samples (155mm H Projectiles)
Project/Event # 97P-0033-46

Receiving Notes

All sample containers were visually checked and compared to sample transfer form 1911. The containers were noted to be in satisfactory condition and all samples were received intact.

Sample Preparatory Notes

No discrepancies.

Analytical Notes:

Data generated for this test report were from methods validated with CASARM HD.

Organic Compounds Analysis

VOLATILE ORGANIC COMPOUNDS

Volatile Organic Compounds (VOCs) were extracted on 2-July-03 and analyzed 7-July-03 through 8-July-03 by method AM-101.

The bromofluorobenzene (BFB) tune and the tune evaluation and performance standard both passed acceptance criteria.

The calibration curves for tetrachloroethylene (TCE), 1,1,2,2-tetrachloroethane (1,1,2,2-TCE), and the surrogate resulted in correlation coefficient (r^2) of 0.999 for linear / (0, 0) curve fits for these compounds. 1,2-dichloroethane (1,2-DCE) had an r^2 of 1.000. The individual calibration curve recovery values for all compounds of interest were within the acceptance criteria of ±15%. All levels had recovery values between 87% and 101% for all compounds.

The Continuing Calibration Verification (CCV) samples were all within acceptance criteria (±25%).

The surrogate (1,4-difluorobenzene) was present and fulfilled the recovery criteria (50%-150%) in all samples.

The Matrix Spike (MS) and Matrix Spike Duplicate (MSD) fulfilled the recovery criteria (50%-150%) in all analytes of interest. Recovery values for the surrogate, 1,2-DCE, TCE, and 1,1,2,2-TCE were 95% to 115%. The Relative Percent Difference (RPD) for the MS and the MSD for 1,2-DCE, TCE, and 1,1,2,2-TCE were <5% with acceptance criteria (±25%) for all analytes of interest.

The Blank Spike (BS) and Blank Spike Duplicate (BSD) fulfilled the recovery criteria (50%-150%) for all analytes of interest. The BS/BSD are identified in the report as the Laboratory Control Sample (LCS).

Results showed that target compounds were not detected in either the Method Blank (MB) or the Reagent Blanks (RB).

The RPD values for the sample and sample duplicate met the specification required in AM-101 of ≤25%.

Sample holding time of 28 days from collection to analysis was met for all samples. Samples were collected starting 10-June-03 through 12-June-03 and analyzed on 7-July-03 through 8-July-03.

SEMI-VOLATILE ORGANIC COMPOUNDS

Semi-Volatiles Organic Compounds (SVOCs) were extracted on 3-July-03 and analyzed on 11-July-03 through 15-July-03 by method AM-117.

The decafluorotriphenylphosphine (DFTPP) tune and the tune evaluation and performance standard both passed acceptance criteria.

The calibration curves for the target compounds along with the surrogate resulted in correlation coefficient (r^2) of 1.000 for all compounds for a linear / (0, 0) curve fit. Compound Q had an r^2 of 1.000 for a linear / (0, 0) curve with a Practical Quantitation Limit (PQL) of 25 µg/ml. Compound T had an r^2 of 1.000 for a linear curve with a PQL of 25 µg/ml.

All analytes in the calibration curve standards were within the method criteria (±15%) except for the 25 ug/mL calibration standard for Q, which was 84%.

The CCV recovery values for HCE, Q, and T, were within the method criteria of ±25%.

It has been shown that the ton container samples contain native Q at approximately 300 µg/mL to 350 µg/mL. The original spiking level for Q was 100 µg/mL; however, it was determined through low spike recoveries that this amount was insufficient when compared to the native concentration of Q. To compensate for the elevated Q levels in the native samples, the spiking level of Q was raised by a factor of five. Due to the higher spiking amount, the samples were diluted to 25 mL (10 mL previously) to be within the range of the calibration curve. See Table 1 for the results.

Table-1. Quality Control Samples for Q (25 mL Dilution)

Quality Control Sample	Recovery, %
Blank Spike	101
Blank Spike Duplicate	76.6
Matrix Spike	55.5
Matrix Spike Duplicate	49.4
RPD (MS/MSD)	11.6

The MS/MSD (10 mL dilution) values for the surrogate and HCE were within the criteria of 50% to 150% and ≤25% for the RPD. The MS/MSD (10 mL dilution) values for T are outside criteria (12.7% and 10.5%). The MSD value for Q at the 25 mL dilution was outside criteria.

The BS recovery values for the surrogate, HCE, Q, and T were within acceptance levels.

When duplicate samples were analyzed, the RPDs for all analytes were below the method criteria of ±25% (<6%). HCE was not detected in the sample or sample duplicate.

Samples 030004-084-05, 030004-084-06, and 030004-084-08 were diluted an additional two-fold and re-analyzed because they were above the highest calibration level for Q.

Results showed that HCE, Q, and T were not detected in either the MB or RB.

Sample holding time of 28 days from collection to analysis was not met for all of the submitted samples. Samples were collected starting 10-June-03 through 12-June-03 and analyzed on 11-July-03 through 15-July-03.

THIODIGLYCOL

Samples for the non-volatile organic compound, thiodiglycol (TDG), were extracted 3-July-03 and analyzed on 8-July-03 through 9-July-03 by method AM-100.

The DFTPP tune and the tune evaluation and performance standard both passed acceptance criteria.

The calibration curves for the surrogate (TDG_{d8}) resulted in correlation coefficient (r^2) of 1.000 and for TDG an (r^2) of 0.998 for linear / (0, 0) curves.

The individual calibration curve levels for TDG (96% to 107%) were within the acceptance criteria of ±15%.

All CCV samples passed acceptance criteria of ±25% for TDG.

When duplicate samples were analyzed, the RPDs for all analytes were below the method criteria of ±25%. TDG was not detected in the sample or sample duplicate.

The MS/MSD for all target compounds passed criteria. The RPD for the MS and the MSD passed acceptance criteria.

The BS/BSD fulfilled the acceptance criteria.

Results showed that target compounds were not detected in either the MB or RB.

Sample holding time of 28 days from collection to analysis was not met for all samples. Samples 030004-084-04 through 030004-084-08 were analyzed on the 29th day after collection. Samples

were collected from 10-June-03 to 12-June-03. The sample analysis dates were 8-July-03 through 9-July-03.

LEWISITE

Lewisite was extracted on 3-July-03 and analyzed on 10-July-03 through 11-July-03 by method AM-126.

The DFTPP tune and the tune evaluation and performance standard both passed acceptance criteria.

The calibration curve for the target compound resulted in a correlation coefficient (r^2) of 1.000 for a quadratic (not forced through 0, 0) curve fit for Lewisite. A quadratic fit was used to determine the calibration curve. Calibration curves behave differently for compounds over large orders of magnitude as well as for instrumental conditions and column types. After investigation, it was determined that a quadratic curve best represented the existing data. Six concentration levels were used in this curve. This meets the minimal requirements specified in EPA SW846 method 8000b. The individual calibration curve levels for Lewisite were within the acceptance criteria of ±15% except for the 50 ng/mL standard at 129%.

The CCV samples (86% to 106%) were all within acceptance criteria (±25%).

The MS/MSD recovery values were not within acceptance limits (194% and 193%); the limit being 50% to 150%. These recoveries are higher than the upper limit of recovery. Samples were not rerun due to holding time issues.

The initial and final BS analyzed resulted in a 115% and a 101% recovery.

Results showed that Lewisite was not detected in either the MB or RB.

Sample holding time of 28 days from collection to analysis was not met for all samples. Samples were collected from 10-June-03 to 12-June-03. The sample analysis dates were 10-July-03 through 11-July-03.

PURITY

Purity samples were extracted on 3-July-03 and analyzed on 11-July-03 by method AM-098.

The DFTPP tune passed acceptance criteria.

The calibration curve using CASARM grade HD resulted in a correlation coefficient (r^2) of 0.997 for a linear curve fit. All individual points of the curve were between 96% and 106%.

The CCV standards all passed the acceptance criteria of ±15%.

The CASARM grade (HD) Laboratory Control Sample (LCS) results showed a purity that was 103% of its true value.

When duplicate samples were analyzed, the RPD for the purity was <1.0%, well below the method criteria of ±25%.

Results showed that H was not detected in either the MB or RB.

Samples were collected starting 10-June-03 through 12-June-03 and analyzed on 11-July-03. Sample holding time of 28 days from collection to analysis was not met for all samples.

METALS ANALYSIS

LIQUIDS:
All samples were analyzed on 2-July-03. All samples were analyzed following Method AM-118.

All elements were within acceptance limits of the CCV when analyzed on 2-July-03.

Zinc was detected in the method blank at a level above the MDL, but below the PQL when analyzed on 2-July-03. No corrective action taken.

The percent recovery (%R) for the MS/MSD, BS, Post Digestion Spike Addition Sample (PDSA), and Lab Control Spike (LCS)/Lab Control Spike Duplicate (LCSD) indicated that all elements met the acceptance criteria of 75%-125%. The MS/MSD and LCS/LCSD RPD met the criterium.

Copper, the only element that had a result above 100 times the Instrument Detection Limit (IDL), had an acceptable RPD for the sample duplicate.

All liquid samples were analyzed within the 28-day holding period.

SOLIDS:
All undiluted and diluted samples were analyzed on 2-July-03. Reruns were analyzed on 03-July-03. All samples were analyzed following Method AM-118.

Antimony, cadmium, and tin were outside the acceptance limits of 90% to 110% for the CCV when analyzed on 2-July-03. Upon reanalysis on 3-July-03 all elements were within acceptance limits.

Cadmium was detected in all reagent blanks at a level above the MDL, but below the PQL when analyzed on 3-July-03. No corrective action was taken. Cadmium was found in the method blank at a level above the MDL, but below the PQL when analyzed on 3-July-03. No corrective action was taken.

The native sample used for the MS (4870) and MSD (4871) had high levels of manganese. Since the spike level was considerably less than the original levels in the sample, the MS/MSD could not be properly evaluated for that element. Chromium in the MS and beryllium in the MSD were slightly lower than the cutoff percentage at 75%. Their recoveries were 74.0% for chromium and 74.3% for beryllium. The RPD for the MS and MSD were within acceptable limits for all elements except for manganese (62.3). All other elements gave acceptable recoveries and RPD's for the MS and MSD.

For elements that had results above 100 times the IDL, chromium, manganese, copper, nickel, and tin had an acceptable RPD for the sample duplicate.

All elements gave acceptable recoveries for the BS, PDSA, CRM/CRMD, and the CRM/CRMD RPD.

All the solid samples were analyzed within the 28-day hold time.

Analyst(s) of Record Thomas F. Rusek (Signature) 10/28/03 (Date) **Thomas Rusek** **Principal Investigator, Battelle Memorial Institute**	**Analyst(s) of Record** Brian L. Boyd (Signature) 10/28/03 (Date) **Brian L. Boyd** **Researcher, Battelle Memorial Institute**
Analyst(s) of Record Robert L. Calloway (Signature) 10/28/03 (Date) **Robert L. Calloway** **Physical Science Technican, Edgewood Chemical & Biological Forensic Analytical Center**	**Analyst(s) of Record** James H Newman (Signature) 10/28/03 (Date) **Stephen S. Houck** **Researcher, Battelle Memorial Institute**
Analyst(s) of Record Doug Nichols (Signature) 10/28/03 (Date) **Doug S. Nichols** **Researcher, Battelle Memorial Institute**	**Analyst(s) of Record** Michael W. Wensing (Signature) 10/28/03 (Date) **Michael W. Wensing, Ph.D.** **Principal Research Scientist, Battelle Memorial Institute**
Analyst(s) of Record James W. Roelke (Signature) 10/28/03 (Date) **James Roelke** **Researcher, Battelle Memorial Institute**	**Analyst(s) of Record** Michele A. Maas (Signature) 10/28/03 (Date) **Michele A. Maas** **Technician, Battelle Memorial Institute**
Report Reviewed by T. K (Signature) 10/28/2003 (Date) **Timothy L. Kehring** **LIMS Technologist, Battelle Memorial Institute**	**Report Reviewed by** James H Newman (Signature) 10/28/03 (Date) **Audrey J. Raunig** **Principal Research Scientist, Battelle Memorial Institute**
Report Reviewed by James H Newman (Signature) 10/28/03 (Date) **James H. Newman** **Laboratory Manager, Battelle Memorial Institute**	

Report Reviewed by
Robert L Calloway (Signature)
01 NOV. 03 (Date)
Robert L. Calloway
Designated Authority, Edgewood C/B Forensic Analytical Center

Report Approved by
Dennis J Reutter (Signature)
3 November 2003 (Date)
Dennis J. Reutter, Ph.D.
Chief, Edgewood C/B Forensic Analytical Center

Appendix A

LIMS DATA REPORT

This appendix contains the 57-page data report produced from the LIMS system. It contains a summary of sample numbers, sample results, method blank results and results of QC samples analyzed. Since the report is generated by the LIMS, the page numbers will begin again at 1, but each page has been identified as part of the appendix so that it may be distinguishable from the main report.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

ANALYTICAL RESULTS

Report Date: 10/27/2003

Work Order: Tooele 155mm H Proj 07/01/2003

Deliver To: Don Milton
EG&G Defense Materials Div.
11600 Stark Road
Tooele, UT 84074

James Newman
Project Manager

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD21010-5424
(410) 436-8600

The following represents qualifications to the associated analytical reports.

1. These descriptors will help identify the specific sample and clarify the report.

   DUP - Matrix Duplicate
   MS - Matrix Spike
   MSD - Matrix Spike Duplicate
   RPD - Relative Percent Difference
   PQL - Practical Quantitiation Limit
   MDL - Method Detection Limit
   ND - Not Detected at the PQL
   * - Indicates a limit was exceeded

   Surrogate - Organic compounds which are similar to analytes of interest in chemical composition, extraction, and chromotography, but which are not normally found in the samples.

2. Qualifier keys - These descriptors will follow individual results for a specific sample and a specific analyte and will help qualify the data.

   J - Indicates an estimated value between the PQL and MDL

NOTE: This document is included as part of the Analytical Report for the above referenced and should be retained as a permanent record thereof.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Client
EG&G Defense Materials Division

Work ID
Tooele 155mm H Proj 07/01/2003

Workorder Sample Summary

Lab ID	Sample ID	Matrix	Collect Date/Time	Receive Date/Time
030004-084-01	39B-03-013A	Liquid	6/10/2003 14:13	7/1/2003 14:13
030004-084-02	39B-03-014A	Liquid	6/10/2003 14:13	7/1/2003 14:13
030004-084-03	39B-03-025A	Liquid	6/10/2003 14:13	7/1/2003 14:13
030004-084-04	39B-03-026A	Liquid	6/10/2003 14:13	7/1/2003 14:13
030004-084-05	39B-03-033A	Liquid	6/10/2003 14:13	7/1/2003 14:13
030004-084-06	39B-03-034A	Liquid	6/10/2003 14:13	7/1/2003 14:13
030004-084-07	39B-03-041A	Liquid	6/10/2003 14:13	7/1/2003 14:13
030004-084-08	39B-03-042A	Liquid	6/10/2003 14:13	7/1/2003 14:13
030004-084-09	39B-03-048A	Liquid	6/12/2003 14:13	7/1/2003 14:13
030004-084-10	39B-03-049A	Liquid	6/12/2003 14:13	7/1/2003 14:13
030004-084-11	39B-03-055A	Liquid	6/12/2003 14:13	7/1/2003 14:13
030004-084-12	39B-03-056A	Liquid	6/12/2003 14:13	7/1/2003 14:13
030004-083-01	39B-03-018	Solid	6/11/2003 12:18	7/1/2003 12:17
030004-083-02	39B-03-019	Solid	6/11/2003 12:18	7/1/2003 12:17
030004-083-03	39B-03-030	Solid	6/11/2003 12:18	7/1/2003 12:17
030004-083-04	39B-03-031	Solid	6/11/2003 12:18	7/1/2003 12:17
030004-083-05	39B-03-038	Solid	6/11/2003 12:18	7/1/2003 12:17
030004-083-06	39B-03-039	Solid	6/11/2003 12:18	7/1/2003 12:17
030004-083-07	39B-03-046	Solid	6/12/2003 12:18	7/1/2003 12:17
030004-083-08	39B-03-047	Solid	6/12/2003 12:18	7/1/2003 12:17
030004-083-09	39B-03-053	Solid	6/13/2003 12:18	7/1/2003 12:17
030004-083-10	39B-03-054	Solid	6/13/2003 12:18	7/1/2003 12:17
030004-083-11	39B-03-060	Solid	6/13/2003 12:18	7/1/2003 12:17
030004-083-12	39B-03-061	Solid	6/13/2003 12:18	7/1/2003 12:17

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-084-01	39B-03-013A	6/10/2003 14:13	7/1/2003 14:13	10/21/2003 14:40	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:27	9104	AM098 HD Purity by GC	1	7/11/2003 14:14	ssh	9115

Parameter	Result	MDL	PQL	Units
bis-(2-Chloroethyl)sulfide	78.7			%

AM100 Non-Vols in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:10	9106	AM100 Non-Vols in HD by GC	1	7/8/2003 21:32	ssh	9119

Parameter	Result	MDL	PQL	Units
Thiodiglycol (TDG)	ND	217	259	ug/g

Surrogates	Expected	Result	Recovery	Limits
Thiodiglycol-d8 (TDG-d8)	1040	974 ug/g	94.1	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/2/2003 10:21	9103	AM101 Vols in Liquid HD by GC	1	7/7/2003 15:43	ssh	9113

Parameter	Result	MDL	PQL	Units
1,2-Dichloroethane	20600	256	492	ug/g
Tetrachloroethylene	ND	98.4	492	ug/g
1,1,2,2-Tetrachloroethane	ND	148	492	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Difluorobenzene	11000	11500 ug/g	105	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/2/2003 08:31	9102	AM118 Metals in Liq HD by ICP	1	7/2/2003 17:53	blb	9111

Parameter	Result	MDL	PQL	Units
Aluminum	ND	9.78	48.9	ug/g
Antimony	ND	0.616	4.89	ug/g
Arsenic	ND	1.19	4.89	ug/g
Barium	ND	0.420	4.89	ug/g
Beryllium	ND	0.880	4.89	ug/g
Boron	ND	3.66	9.78	ug/g
Cadmium	ND	0.401	4.89	ug/g
Chromium	5.13	1.26	4.89	ug/g
Cobalt	ND	0.264	0.978	ug/g
Copper	46.2	2.38	4.89	ug/g
Lead	ND	0.401	4.89	ug/g
Manganese	0.485 J	0.313	0.978	ug/g
Mercury	0.0622 J	0.0489	0.489	ug/g
Nickel	4.69 J	0.342	4.89	ug/g
Selenium	ND	1.14	9.78	ug/g
Silver	ND	0.459	4.89	ug/g

Report of Analysis

Thallium	ND	0.958	4.89	ug/g
Tin	ND	2.43	9.78	ug/g
Vanadium	ND	0.978	4.89	ug/g
Zinc	ND	3.05	9.78	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:33	9105	AM117 Semi-Vols Liq HD by GC	1	7/11/2003 22:28	ssh	9117

Parameter	Result	MDL	PQL	Units
Hexachloroethane	ND	77.8	243	ug/g
Q	49800	49.6	2430	ug/g
T	1630 J	68.1	2430	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Dithiane-d4	973	1040 ug/g	107	50 - 150

AM126 Lewisite in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:04	9107	AM126 Lewisite in HD by GC	1	7/10/2003 19:58	ssh	9121

Parameter	Result	MDL	PQL	Units
Lewisite	ND	2.05	5.25	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-084-02	39B-03-014A	6/10/2003 14:13	7/1/2003 14:13	10/21/2003 14:40	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:27	9104	AM098 HD Purity by GC	1	7/11/2003 15:11	ssh	9115

Parameter	Result	MDL	PQL	Units
bis-(2-Chloroethyl)sulfide	77.5			%

AM100 Non-Vols in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:10	9106	AM100 Non-Vols in HD by GC	1	7/8/2003 23:00	ssh	9119

Parameter	Result	MDL	PQL	Units
Thiodiglycol (TDG)	ND	213	254	ug/g

Surrogates	Expected	Result	Recovery	Limits
Thiodiglycol-d8 (TDG-d8)	1020	942 ug/g	92.7	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/2/2003 10:21	9103	AM101 Vols in Liquid HD by GC	1	7/7/2003 17:02	ssh	9113

Parameter	Result	MDL	PQL	Units
1,2-Dichloroethane	19400	266	511	ug/g
Tetrachloroethylene	ND	102	511	ug/g
1,1,2,2-Tetrachloroethane	ND	153	511	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Difluorobenzene	11400	11400 ug/g	99.5	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/2/2003 08:31	9102	AM118 Metals in Liq HD by ICP	1	7/2/2003 18:31	blb	9111

Parameter	Result	MDL	PQL	Units
Aluminum	ND	10.5	52.7	ug/g
Antimony	ND	0.665	5.27	ug/g
Arsenic	ND	1.29	5.27	ug/g
Barium	ND	0.454	5.27	ug/g
Beryllium	ND	0.949	5.27	ug/g
Boron	ND	3.95	10.5	ug/g
Cadmium	ND	0.432	5.27	ug/g
Chromium	4.74 J	1.36	5.27	ug/g
Cobalt	ND	0.285	1.05	ug/g
Copper	45.5	2.56	5.27	ug/g
Lead	ND	0.432	5.27	ug/g
Manganese	0.797 J	0.338	1.05	ug/g
Mercury	0.0666 J	0.0527	0.527	ug/g
Nickel	4.72 J	0.369	5.27	ug/g
Selenium	ND	1.23	10.5	ug/g
Silver	ND	0.496	5.27	ug/g

Report of Analysis

Thallium	ND	1.03	5.27	ug/g
Tin	ND	2.63	10.5	ug/g
Vanadium	ND	1.05	5.27	ug/g
Zinc	4.26 J	3.29	10.5	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:33	9105	AM117 Semi-Vols Liq HD by GC	1	7/12/2003 0:28	ssh	9117

Parameter	Result	MDL	PQL	Units
Hexachloroethane	ND	82.6	258	ug/g
Q	47400	52.7	2580	ug/g
T	1680 J	72.3	2580	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Dithiane-d4	1030	1120 ug/g	108	50 - 150

AM126 Lewisite in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:04	9107	AM126 Lewisite in HD by GC	1	7/10/2003 21:08	ssh	9121

Parameter	Result	MDL	PQL	Units
Lewisite	ND	2.03	5.20	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-084-03	39B-03-025A	6/10/2003 14:13	7/1/2003 14:13	10/21/2003 14:40	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:27	9104	AM098 HD Purity by GC	1	7/11/2003 15:31	ssh	9115

Parameter	Result	MDL	PQL	Units
bis-(2-Chloroethyl)sulfide	77.1			%

AM100 Non-Vols in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:10	9106	AM100 Non-Vols in HD by GC	1	7/8/2003 23:44	ssh	9119

Parameter	Result	MDL	PQL	Units
Thiodiglycol (TDG)	ND	215	256	ug/g

Surrogates	Expected	Result	Recovery	Limits
Thiodiglycol-d8 (TDG-d8)	1030	962 ug/g	93.8	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/2/2003 10:21	9103	AM101 Vols in Liquid HD by GC	1	7/7/2003 17:42	ssh	9113

Parameter	Result	MDL	PQL	Units
1,2-Dichloroethane	15100	264	508	ug/g
Tetrachloroethylene	ND	102	508	ug/g
1,1,2,2-Tetrachloroethane	ND	152	508	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Difluorobenzene	11300	11800 ug/g	104	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/2/2003 08:31	9102	AM118 Metals in Liq HD by ICP	1	7/2/2003 18:35	blb	9111

Parameter	Result	MDL	PQL	Units
Aluminum	ND	10.2	51.2	ug/g
Antimony	ND	0.645	5.12	ug/g
Arsenic	ND	1.25	5.12	ug/g
Barium	ND	0.440	5.12	ug/g
Beryllium	ND	0.921	5.12	ug/g
Boron	ND	3.83	10.2	ug/g
Cadmium	ND	0.420	5.12	ug/g
Chromium	5.06 J	1.32	5.12	ug/g
Cobalt	ND	0.276	1.02	ug/g
Copper	31.2	2.49	5.12	ug/g
Lead	ND	0.420	5.12	ug/g
Manganese	0.336 J	0.328	1.02	ug/g
Mercury	0.0741 J	0.0512	0.512	ug/g
Nickel	3.88 J	0.358	5.12	ug/g
Selenium	ND	1.20	10.2	ug/g
Silver	ND	0.481	5.12	ug/g

Report of Analysis

Thallium	ND	1.00	5.12	ug/g
Tin	ND	2.55	10.2	ug/g
Vanadium	ND	1.02	5.12	ug/g
Zinc	ND	3.19	10.2	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:33	9105	AM117 Semi-Vols Liq HD by GC	1	7/12/2003 0:00	ssh	9117

Parameter	Result	MDL	PQL	Units
Hexachloroethane	ND	83.2	260	ug/g
Q	45500	53.1	2600	ug/g
T	1740 J	72.8	2600	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Dithiane-d4	1040	1130 ug/g	108	50 - 150

AM126 Lewisite in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:04	9107	AM126 Lewisite in HD by GC	1	7/10/2003 21:42	ssh	9121

Parameter	Result	MDL	PQL	Units
Lewisite	ND	2.02	5.18	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-084-04	39B-03-026A	6/10/2003 14:13	7/1/2003 14:13	10/21/2003 14:40	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:27	9104	AM098 HD Purity by GC	1	7/11/2003 15:51	ssh	9115

Parameter	Result	MDL	PQL	Units
bis-(2-Chloroethyl)sulfide	80.3			%

AM100 Non-Vols in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:10	9106	AM100 Non-Vols in HD by GC	1	7/9/2003 0:29	ssh	9119

Parameter	Result	MDL	PQL	Units
Thiodiglycol (TDG)	ND	216	258	ug/g

Surrogates	Expected	Result	Recovery	Limits
Thiodiglycol-d8 (TDG-d8)	1030	861 ug/g	83.5	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/2/2003 10:21	9103	AM101 Vols in Liquid HD by GC	1	7/7/2003 18:21	ssh	9113

Parameter	Result	MDL	PQL	Units
1,2-Dichloroethane	15300	259	499	ug/g
Tetrachloroethylene	ND	99.8	499	ug/g
1,1,2,2-Tetrachloroethane	ND	150	499	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Difluorobenzene	11100	11800 ug/g	106	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/2/2003 08:31	9102	AM118 Metals in Liq HD by ICP	1	7/2/2003 18:39	blb	9111

Parameter	Result	MDL	PQL	Units
Aluminum	ND	9.89	49.5	ug/g
Antimony	ND	0.623	4.95	ug/g
Arsenic	ND	1.21	4.95	ug/g
Barium	ND	0.425	4.95	ug/g
Beryllium	ND	0.890	4.95	ug/g
Boron	ND	3.70	9.89	ug/g
Cadmium	ND	0.406	4.95	ug/g
Chromium	5.78	1.28	4.95	ug/g
Cobalt	ND	0.267	0.989	ug/g
Copper	31.7	2.40	4.95	ug/g
Lead	ND	0.406	4.95	ug/g
Manganese	0.342 J	0.317	0.989	ug/g
Mercury	ND	0.0495	0.495	ug/g
Nickel	3.82 J	0.346	4.95	ug/g
Selenium	1.17 J	1.16	9.89	ug/g
Silver	ND	0.465	4.95	ug/g

Report of Analysis

Thallium	ND	0.969	4.95	ug/g
Tin	ND	2.46	9.89	ug/g
Vanadium	1.37 J	0.989	4.95	ug/g
Zinc	ND	3.09	9.89	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:33	9105	AM117 Semi-Vols Liq HD by GC	1	7/12/2003 0:00	ssh	9117

Parameter	Result	MDL	PQL	Units
Hexachloroethane	ND	86.9	271	ug/g
Q	46200	55.4	2710	ug/g
T	1750 J	76.0	2710	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Dithiane-d4	1090	1140 ug/g	105	50 - 150

AM126 Lewisite in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:04	9107	AM126 Lewisite in HD by GC	1	7/10/2003 22:17	ssh	9121

Parameter	Result	MDL	PQL	Units
Lewisite	ND	2.01	5.14	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-084-05	39B-03-033A	6/10/2003 14:13	7/1/2003 14:13	10/21/2003 14:40	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:27	9104	AM098 HD Purity by GC	1	7/11/2003 16:10	ssh	9115

Parameter	Result	MDL	PQL	Units
bis-(2-Chloroethyl)sulfide	79.2			%

AM100 Non-Vols in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:10	9106	AM100 Non-Vols in HD by GC	1	7/9/2003 0:00	ssh	9119

Parameter	Result	MDL	PQL	Units
Thiodiglycol (TDG)	ND	209	249	ug/g

Surrogates	Expected	Result	Recovery	Limits
Thiodiglycol-d8 (TDG-d8)	995	868 ug/g	87.2	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/2/2003 10:21	9103	AM101 Vols in Liquid HD by GC	1	7/7/2003 19:00	ssh	9113

Parameter	Result	MDL	PQL	Units
1,2-Dichloroethane	12200	270	520	ug/g
Tetrachloroethylene	122 J	104	520	ug/g
1,1,2,2-Tetrachloroethane	ND	156	520	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Difluorobenzene	11600	12200 ug/g	105	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/2/2003 08:31	9102	AM118 Metals in Liq HD by ICP	1	7/2/2003 18:43	blb	9111

Parameter	Result	MDL	PQL	Units
Aluminum	ND	9.58	47.9	ug/g
Antimony	ND	0.603	4.79	ug/g
Arsenic	2.78 J	1.17	4.79	ug/g
Barium	ND	0.412	4.79	ug/g
Beryllium	ND	0.862	4.79	ug/g
Boron	ND	3.58	9.58	ug/g
Cadmium	ND	0.393	4.79	ug/g
Chromium	2.21 J	1.24	4.79	ug/g
Cobalt	ND	0.259	0.958	ug/g
Copper	28.3	2.33	4.79	ug/g
Lead	ND	0.393	4.79	ug/g
Manganese	0.511 J	0.307	0.958	ug/g
Mercury	0.0645 J	0.0479	0.479	ug/g
Nickel	4.37 J	0.335	4.79	ug/g
Selenium	ND	1.12	9.58	ug/g
Silver	ND	0.450	4.79	ug/g

Report of Analysis

Thallium	ND	0.939	4.79	ug/g	
Tin	ND	2.39	9.58	ug/g	
Vanadium	ND	0.958	4.79	ug/g	
Zinc	ND	2.99	9.58	ug/g	

AM117 Semi-Vols Liq HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:33	9105	AM117 Semi-Vols Liq HD by GC	1	7/12/2003 0:00	ssh	9117

Parameter	Result	MDL	PQL	Units
Hexachloroethane	ND	80.7	252	ug/g
T	1750 J	70.6	2520	ug/g

Surrogates	Expected	Result		Recovery	Limits
1,4-Dithiane-d4	1010	1060	ug/g	105	50 - 150

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:33	9105	AM117 Semi-Vols Liq HD by GC	2	7/15/2003 16:21	ssh	9901

Parameter	Result	MDL	PQL	Units
Q	73400	103	5050	ug/g

AM126 Lewisite in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:04	9107	AM126 Lewisite in HD by GC	1	7/10/2003 22:52	ssh	9121

Parameter	Result	MDL	PQL	Units
Lewisite	ND	2.04	5.24	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-084-06	39B-03-034A	6/10/2003 14:13	7/1/2003 14:13	10/21/2003 14:40	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:27	9104	AM098 HD Purity by GC	1	7/11/2003 16:30	ssh	9115

Parameter	Result	MDL	PQL	Units
bis-(2-Chloroethyl)sulfide	77.8			%

AM100 Non-Vols in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:10	9106	AM100 Non-Vols in HD by GC	1	7/9/2003 0:00	ssh	9119

Parameter	Result	MDL	PQL	Units
Thiodiglycol (TDG)	ND	215	256	ug/g

Surrogates	Expected	Result	Recovery	Limits
Thiodiglycol-d8 (TDG-d8)	1020	965 ug/g	94.2	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/2/2003 10:21	9103	AM101 Vols in Liquid HD by GC	1	7/7/2003 19:39	ssh	9113

Parameter	Result	MDL	PQL	Units
1,2-Dichloroethane	13000	261	503	ug/g
Tetrachloroethylene	109 J	101	503	ug/g
1,1,2,2-Tetrachloroethane	ND	151	503	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Difluorobenzene	11200	12200 ug/g	109	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/2/2003 08:31	9102	AM118 Metals in Liq HD by ICP	1	7/2/2003 18:47	blb	9111

Parameter	Result	MDL	PQL	Units
Aluminum	11.7 J	10.0	50.2	ug/g
Antimony	ND	0.633	5.02	ug/g
Arsenic	3.09 J	1.22	5.02	ug/g
Barium	ND	0.432	5.02	ug/g
Beryllium	ND	0.904	5.02	ug/g
Boron	ND	3.76	10.0	ug/g
Cadmium	ND	0.412	5.02	ug/g
Chromium	2.79 J	1.30	5.02	ug/g
Cobalt	ND	0.271	1.00	ug/g
Copper	28.0	2.44	5.02	ug/g
Lead	ND	0.412	5.02	ug/g
Manganese	0.884 J	0.321	1.00	ug/g
Mercury	0.105 J	0.0502	0.502	ug/g
Nickel	4.51 J	0.351	5.02	ug/g
Selenium	ND	1.17	10.0	ug/g
Silver	ND	0.472	5.02	ug/g

Report of Analysis

Thallium	ND	0.984	5.02	ug/g
Tin	ND	2.50	10.0	ug/g
Vanadium	ND	1.00	5.02	ug/g
Zinc	ND	3.13	10.0	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:33	9105	AM117 Semi-Vols Liq HD by GC	1	7/12/2003 0:00	ssh	9117

Parameter	Result	MDL	PQL	Units
Hexachloroethane	ND	84.5	264	ug/g
T	1830 J	73.9	2640	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Dithiane-d4	1060	1150 ug/g	109	50 - 150

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:33	9105	AM117 Semi-Vols Liq HD by GC	2	7/15/2003 16:57	ssh	9901

Parameter	Result	MDL	PQL	Units
Q	72600	108	5280	ug/g

AM126 Lewisite in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:04	9107	AM126 Lewisite in HD by GC	1	7/10/2003 23:27	ssh	9121

Parameter	Result	MDL	PQL	Units
Lewisite	ND	1.95	5.00	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-084-07	39B-03-041A	6/10/2003 14:13	7/1/2003 14:13	10/21/2003 14:40	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:27	9104	AM098 HD Purity by GC	1	7/11/2003 16:43	ssh	9115

Parameter	Result	MDL	PQL	Units
bis-(2-Chloroethyl)sulfide	75.8			%

AM100 Non-Vols in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:10	9106	AM100 Non-Vols in HD by GC	1	7/9/2003 0:00	ssh	9119

Parameter	Result	MDL	PQL	Units
Thiodiglycol (TDG)	ND	217	259	ug/g

Surrogates	Expected	Result	Recovery	Limits
Thiodiglycol-d8 (TDG-d8)	1030	949 ug/g	91.8	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/2/2003 10:21	9103	AM101 Vols in Liquid HD by GC	1	7/7/2003 20:18	ssh	9113

Parameter	Result	MDL	PQL	Units
1,2-Dichloroethane	21400	261	502	ug/g
Tetrachloroethylene	144 J	100	502	ug/g
1,1,2,2-Tetrachloroethane	ND	151	502	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Difluorobenzene	11200	12300 ug/g	110	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/2/2003 08:31	9102	AM118 Metals in Liq HD by ICP	1	7/2/2003 18:51	blb	9111

Parameter	Result	MDL	PQL	Units
Aluminum	ND	10.3	51.3	ug/g
Antimony	ND	0.647	5.13	ug/g
Arsenic	ND	1.25	5.13	ug/g
Barium	ND	0.441	5.13	ug/g
Beryllium	ND	0.924	5.13	ug/g
Boron	ND	3.84	10.3	ug/g
Cadmium	ND	0.421	5.13	ug/g
Chromium	5.14	1.32	5.13	ug/g
Cobalt	ND	0.277	1.03	ug/g
Copper	51.6	2.49	5.13	ug/g
Lead	ND	0.421	5.13	ug/g
Manganese	0.402 J	0.329	1.03	ug/g
Mercury	ND	0.0513	0.513	ug/g
Nickel	4.68 J	0.359	5.13	ug/g
Selenium	ND	1.20	10.3	ug/g
Silver	ND	0.483	5.13	ug/g

Report of Analysis

Thallium	ND	1.01	5.13	ug/g
Tin	ND	2.56	10.3	ug/g
Vanadium	ND	1.03	5.13	ug/g
Zinc	ND	3.20	10.3	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:33	9105	AM117 Semi-Vols Liq HD by GC	1	7/14/2003 13:42	ssh	9117

Parameter	Result	MDL	PQL	Units
Hexachloroethane	ND	85.0	266	ug/g
Q	55500	54.2	2660	ug/g
T	1800 J	74.4	2660	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Dithiane-d4	1060	1170 ug/g	110	50 - 150

AM126 Lewisite in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:04	9107	AM126 Lewisite in HD by GC	1	7/11/2003 0:02	ssh	9121

Parameter	Result	MDL	PQL	Units
Lewisite	ND	1.99	5.11	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-084-08	39B-03-042A	6/10/2003 14:13	7/1/2003 14:13	10/21/2003 14:40	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:27	9104	AM098 HD Purity by GC	1	7/11/2003 17:40	ssh	9115

Parameter	Result	MDL	PQL	Units
bis-(2-Chloroethyl)sulfide	76.9			%

AM100 Non-Vols in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:10	9106	AM100 Non-Vols in HD by GC	1	7/9/2003 0:00	ssh	9119

Parameter	Result	MDL	PQL	Units
Thiodiglycol (TDG)	ND	217	259	ug/g

Surrogates	Expected	Result	Recovery	Limits
Thiodiglycol-d8 (TDG-d8)	1030	962 ug/g	93	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/2/2003 10:21	9103	AM101 Vols in Liquid HD by GC	1	7/7/2003 20:57	ssh	9113

Parameter	Result	MDL	PQL	Units
1,2-Dichloroethane	21500	262	504	ug/g
Tetrachloroethylene	131 J	101	504	ug/g
1,1,2,2-Tetrachloroethane	ND	151	504	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Difluorobenzene	11200	12400 ug/g	110	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/2/2003 08:31	9102	AM118 Metals in Liq HD by ICP	1	7/2/2003 18:56	blb	9111

Parameter	Result	MDL	PQL	Units
Aluminum	10.5 J	10.2	50.9	ug/g
Antimony	ND	0.642	5.09	ug/g
Arsenic	1.57 J	1.24	5.09	ug/g
Barium	ND	0.438	5.09	ug/g
Beryllium	ND	0.916	5.09	ug/g
Boron	ND	3.81	10.2	ug/g
Cadmium	ND	0.418	5.09	ug/g
Chromium	4.52 J	1.31	5.09	ug/g
Cobalt	ND	0.275	1.02	ug/g
Copper	52.5	2.47	5.09	ug/g
Lead	ND	0.418	5.09	ug/g
Manganese	0.514 J	0.326	1.02	ug/g
Mercury	ND	0.0509	0.509	ug/g
Nickel	4.75 J	0.356	5.09	ug/g
Selenium	ND	1.19	10.2	ug/g
Silver	ND	0.479	5.09	ug/g

Report of Analysis

Thallium	ND	0.998	5.09	ug/g
Tin	ND	2.54	10.2	ug/g
Vanadium	ND	1.02	5.09	ug/g
Zinc	ND	3.18	10.2	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:33	9105	AM117 Semi-Vols Liq HD by GC	1	7/14/2003 14:22	ssh	9117

Parameter	Result	MDL	PQL	Units
Hexachloroethane	ND	83.5	261	ug/g
T	1790 J	73.1	2610	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Dithiane-d4	1040	1110 ug/g	107	50 - 150

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:33	9105	AM117 Semi-Vols Liq HD by GC	2	7/15/2003 17:38	ssh	9901

Parameter	Result	MDL	PQL	Units
Q	64800	106	5220	ug/g

AM126 Lewisite in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:04	9107	AM126 Lewisite in HD by GC	1	7/11/2003 0:36	ssh	9121

Parameter	Result	MDL	PQL	Units
Lewisite	ND	1.97	5.05	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-084-09	39B-03-048A	6/12/2003 14:13	7/1/2003 14:13	10/21/2003 14:40	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:27	9104	AM098 HD Purity by GC	1	7/11/2003 17:59	ssh	9115

Parameter	Result	MDL	PQL	Units
bis-(2-Chloroethyl)sulfide	70.5			%

AM100 Non-Vols in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:10	9106	AM100 Non-Vols in HD by GC	1	7/9/2003 0:00	ssh	9119

Parameter	Result	MDL	PQL	Units
Thiodiglycol (TDG)	ND	209	249	ug/g

Surrogates	Expected	Result	Recovery	Limits
Thiodiglycol-d8 (TDG-d8)	996	925 ug/g	92.9	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/2/2003 10:21	9103	AM101 Vols in Liquid HD by GC	1	7/7/2003 21:35	ssh	9113

Parameter	Result	MDL	PQL	Units
1,2-Dichloroethane	28800	259	498	ug/g
Tetrachloroethylene	ND	99.6	498	ug/g
1,1,2,2-Tetrachloroethane	ND	149	498	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Difluorobenzene	11100	12000 ug/g	108	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/2/2003 08:31	9102	AM118 Metals in Liq HD by ICP	1	7/2/2003 19:00	blb	9111

Parameter	Result	MDL	PQL	Units
Aluminum	12.5 J	9.89	49.5	ug/g
Antimony	ND	0.623	4.95	ug/g
Arsenic	ND	1.21	4.95	ug/g
Barium	ND	0.425	4.95	ug/g
Beryllium	ND	0.890	4.95	ug/g
Boron	ND	3.70	9.89	ug/g
Cadmium	ND	0.406	4.95	ug/g
Chromium	6.29	1.28	4.95	ug/g
Cobalt	ND	0.267	0.989	ug/g
Copper	20.6	2.40	4.95	ug/g
Lead	ND	0.406	4.95	ug/g
Manganese	2.83	0.317	0.989	ug/g
Mercury	0.0766 J	0.0495	0.495	ug/g
Nickel	1.87 J	0.346	4.95	ug/g
Selenium	ND	1.16	9.89	ug/g
Silver	ND	0.465	4.95	ug/g

Report of Analysis

Thallium	ND	0.969	4.95	ug/g
Tin	ND	2.46	9.89	ug/g
Vanadium	ND	0.989	4.95	ug/g
Zinc	ND	3.09	9.89	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:33	9105	AM117 Semi-Vols Liq HD by GC	1	7/14/2003 15:02	ssh	9117

Parameter	Result	MDL	PQL	Units
Hexachloroethane	ND	80.2	251	ug/g
Q	54800	51.2	2510	ug/g
T	1740 J	70.2	2510	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Dithiane-d4	1000	1070 ug/g	107	50 - 150

AM126 Lewisite in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:04	9107	AM126 Lewisite in HD by GC	1	7/11/2003 0:00	ssh	9121

Parameter	Result	MDL	PQL	Units
Lewisite	ND	1.91	4.90	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-084-10	39B-03-049A	6/12/2003 14:13	7/1/2003 14:13	10/21/2003 14:40	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:27	9104	AM098 HD Purity by GC	1	7/11/2003 18:19	ssh	9115

Parameter	Result	MDL	PQL	Units
bis-(2-Chloroethyl)sulfide	83.6			%

AM100 Non-Vols in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:10	9106	AM100 Non-Vols in HD by GC	1	7/9/2003 0:00	ssh	9119

Parameter	Result	MDL	PQL	Units
Thiodiglycol (TDG)	ND	216	257	ug/g

Surrogates	Expected	Result	Recovery	Limits
Thiodiglycol-d8 (TDG-d8)	1030	944 ug/g	91.9	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/2/2003 10:21	9103	AM101 Vols in Liquid HD by GC	1	7/7/2003 22:13	ssh	9113

Parameter	Result	MDL	PQL	Units
1,2-Dichloroethane	27900	257	495	ug/g
Tetrachloroethylene	ND	99.0	495	ug/g
1,1,2,2-Tetrachloroethane	ND	149	495	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Difluorobenzene	11100	11800 ug/g	107	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/2/2003 08:31	9102	AM118 Metals in Liq HD by ICP	1	7/2/2003 19:12	blb	9111

Parameter	Result	MDL	PQL	Units
Aluminum	ND	9.60	48.0	ug/g
Antimony	ND	0.605	4.80	ug/g
Arsenic	1.47 J	1.17	4.80	ug/g
Barium	ND	0.413	4.80	ug/g
Beryllium	ND	0.864	4.80	ug/g
Boron	ND	3.59	9.60	ug/g
Cadmium	ND	0.393	4.80	ug/g
Chromium	6.58	1.24	4.80	ug/g
Cobalt	ND	0.259	0.960	ug/g
Copper	20.5	2.33	4.80	ug/g
Lead	ND	0.393	4.80	ug/g
Manganese	2.74	0.307	0.960	ug/g
Mercury	ND	0.0480	0.480	ug/g
Nickel	1.89 J	0.336	4.80	ug/g
Selenium	ND	1.12	9.60	ug/g
Silver	ND	0.451	4.80	ug/g

Report of Analysis

Thallium	ND	0.940	4.80	ug/g
Tin	ND	2.39	9.60	ug/g
Vanadium	ND	0.960	4.80	ug/g
Zinc	ND	2.99	9.60	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
7/3/2003 11:33	9105	AM117 Semi-Vols Liq HD by GC	1	7/14/2003 15:42	ssh	9117

Parameter	*Result*	*MDL*	*PQL*	*Units*
Hexachloroethane	ND	82.4	257	ug/g
Q	54800	52.5	2570	ug/g
T	1710 J	72.1	2570	ug/g

Surrogates	*Expected*	*Result*	*Recovery*	*Limits*
1,4-Dithiane-d4	1030	1100 ug/g	107	50 - 150

AM126 Lewisite in HD by GC

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
7/3/2003 11:04	9107	AM126 Lewisite in HD by GC	1	7/11/2003 0:00	ssh	9121

Parameter	*Result*	*MDL*	*PQL*	*Units*
Lewisite	ND	2.04	5.23	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-084-11	39B-03-055A	6/12/2003 14:13	7/1/2003 14:13	10/21/2003 14:40	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:27	9104	AM098 HD Purity by GC	1	7/11/2003 18:38	ssh	9115

Parameter	Result	MDL	PQL	Units
bis-(2-Chloroethyl)sulfide	75.9			%

AM100 Non-Vols in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:10	9106	AM100 Non-Vols in HD by GC	1	7/9/2003 0:00	ssh	9119

Parameter	Result	MDL	PQL	Units
Thiodiglycol (TDG)	ND	211	252	ug/g

Surrogates	Expected	Result	Recovery	Limits
Thiodiglycol-d8 (TDG-d8)	1010	849 ug/g	84.3	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/2/2003 10:21	9103	AM101 Vols in Liquid HD by GC	1	7/8/2003 0:07	ssh	9113

Parameter	Result	MDL	PQL	Units
1,2-Dichloroethane	18600	257	495	ug/g
Tetrachloroethylene	ND	98.9	495	ug/g
1,1,2,2-Tetrachloroethane	ND	148	495	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Difluorobenzene	11000	11900 ug/g	107	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/2/2003 08:31	9102	AM118 Metals in Liq HD by ICP	1	7/2/2003 19:17	blb	9111

Parameter	Result	MDL	PQL	Units
Aluminum	ND	9.59	47.9	ug/g
Antimony	ND	0.604	4.79	ug/g
Arsenic	ND	1.17	4.79	ug/g
Barium	ND	0.412	4.79	ug/g
Beryllium	ND	0.863	4.79	ug/g
Boron	ND	3.59	9.59	ug/g
Cadmium	ND	0.393	4.79	ug/g
Chromium	4.46 J	1.24	4.79	ug/g
Cobalt	ND	0.259	0.959	ug/g
Copper	37.1	2.33	4.79	ug/g
Lead	ND	0.393	4.79	ug/g
Manganese	0.510 J	0.307	0.959	ug/g
Mercury	ND	0.0479	0.479	ug/g
Nickel	3.32 J	0.336	4.79	ug/g
Selenium	ND	1.12	9.59	ug/g
Silver	ND	0.451	4.79	ug/g

Report of Analysis

Thallium	ND	0.940	4.79	ug/g
Tin	ND	2.39	9.59	ug/g
Vanadium	ND	0.959	4.79	ug/g
Zinc	4.79 J	2.99	9.59	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:33	9105	AM117 Semi-Vols Liq HD by GC	1	7/14/2003 19:44	ssh	9117

Parameter	Result	MDL	PQL	Units
Hexachloroethane	ND	84.1	263	ug/g
Q	48500	53.6	2630	ug/g
T	1630 J	73.6	2630	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Dithiane-d4	1050	1110 ug/g	105	50 - 150

AM126 Lewisite in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:04	9107	AM126 Lewisite in HD by GC	1	7/11/2003 0:00	ssh	9121

Parameter	Result	MDL	PQL	Units
Lewisite	ND	1.94	4.97	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-084-12	39B-03-056A	6/12/2003 14:13	7/1/2003 14:13	10/21/2003 14:40	Liquid

(Results reported as received basis)

AM098 HD Purity by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:27	9104	AM098 HD Purity by GC	1	7/11/2003 18:57	ssh	9115

Parameter	Result	MDL	PQL	Units
bis-(2-Chloroethyl)sulfide	70.7			%

AM100 Non-Vols in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:10	9106	AM100 Non-Vols in HD by GC	1	7/9/2003 0:00	ssh	9119

Parameter	Result	MDL	PQL	Units
Thiodiglycol (TDG)	ND	217	259	ug/g

Surrogates	Expected	Result	Recovery	Limits
Thiodiglycol-d8 (TDG-d8)	1030	876 ug/g	84.7	50 - 150

AM101 Vols in Liquid HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/2/2003 10:21	9103	AM101 Vols in Liquid HD by GC	1	7/8/2003 0:45	ssh	9113

Parameter	Result	MDL	PQL	Units
1,2-Dichloroethane	17700	257	494	ug/g
Tetrachloroethylene	ND	98.8	494	ug/g
1,1,2,2-Tetrachloroethane	ND	148	494	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Difluorobenzene	11000	11800 ug/g	107	50 - 150

AM118 Metals in Liq HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/2/2003 08:31	9102	AM118 Metals in Liq HD by ICP	1	7/2/2003 19:21	blb	9111

Parameter	Result	MDL	PQL	Units
Aluminum	14.6 J	10.1	50.3	ug/g
Antimony	ND	0.633	5.03	ug/g
Arsenic	ND	1.23	5.03	ug/g
Barium	ND	0.432	5.03	ug/g
Beryllium	ND	0.905	5.03	ug/g
Boron	ND	3.76	10.1	ug/g
Cadmium	ND	0.412	5.03	ug/g
Chromium	5.07	1.30	5.03	ug/g
Cobalt	ND	0.271	1.01	ug/g
Copper	37.6	2.44	5.03	ug/g
Lead	ND	0.412	5.03	ug/g
Manganese	0.470 J	0.322	1.01	ug/g
Mercury	ND	0.0503	0.503	ug/g
Nickel	3.24 J	0.352	5.03	ug/g
Selenium	ND	1.18	10.1	ug/g
Silver	ND	0.472	5.03	ug/g

Report of Analysis

Thallium	ND	0.985	5.03	ug/g
Tin	ND	2.50	10.1	ug/g
Vanadium	1.12 J	1.01	5.03	ug/g
Zinc	4.97 J	3.14	10.1	ug/g

AM117 Semi-Vols Liq HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:33	9105	AM117 Semi-Vols Liq HD by GC	1	7/14/2003 20:24	ssh	9117

Parameter	Result	MDL	PQL	Units
Hexachloroethane	ND	80.8	253	ug/g
Q	48500	51.5	2530	ug/g
T	1610 J	70.7	2530	ug/g

Surrogates	Expected	Result	Recovery	Limits
1,4-Dithiane-d4	1010	1050 ug/g	104	50 - 150

AM126 Lewisite in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:04	9107	AM126 Lewisite in HD by GC	1	7/11/2003 0:00	ssh	9121

Parameter	Result	MDL	PQL	Units
Lewisite	ND	2.04	5.23	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-083-01	39B-03-018	6/11/2003 12:18	7/1/2003 12:17	10/27/2003 15:47	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/1/2003 17:01	9101	AM118 Metals in Sld HD by ICP	1	7/2/2003 12:42	blb	9109

Parameter	Result	MDL	PQL	Units
Aluminum	ND	9.72	48.6	ug/g
Arsenic	7.04	0.554	4.86	ug/g
Barium	0.0412 J	0.0389	4.86	ug/g
Beryllium	ND	0.0486	4.86	ug/g
Boron	ND	3.89	9.72	ug/g
Chromium	29.2	0.972	4.86	ug/g
Cobalt	4.57	0.117	0.972	ug/g
Copper	46.9	3.14	9.72	ug/g
Lead	6.99 J	1.84	9.72	ug/g
Manganese	531	3.21	9.72	ug/g
Mercury	ND	0.0680	0.486	ug/g
Nickel	22.8	0.603	4.86	ug/g
Selenium	0.847 J	0.690	24.3	ug/g
Silver	ND	0.0583	4.86	ug/g
Thallium	ND	0.321	4.86	ug/g
Vanadium	ND	0.972	4.86	ug/g
Zinc	2.80 J	2.14	9.72	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/1/2003 17:01	9101	AM118 Metals in Sld HD by ICP	1	7/3/2003 12:50	blb	9301

Parameter	Result	MDL	PQL	Units
Antimony	1.18 J	0.126	4.86	ug/g
Cadmium	0.239 J	0.0194	4.86	ug/g
Tin	13.1	0.428	9.72	ug/g

Comments: Sample diluted an addtional 2 fold for manganese.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-083-02	39B-03-019	6/11/2003 12:18	7/1/2003 12:17	10/27/2003 15:47	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/1/2003 17:01	9101	AM118 Metals in Sld HD by ICP	1	7/2/2003 13:05	blb	9109

Parameter	Result	MDL	PQL	Units
Aluminum	ND	10.2	51.1	ug/g
Arsenic	41.1	0.583	5.11	ug/g
Barium	0.0472 J	0.0409	5.11	ug/g
Beryllium	ND	0.0511	5.11	ug/g
Boron	ND	4.09	10.2	ug/g
Chromium	26.9	1.02	5.11	ug/g
Cobalt	3.67	0.123	1.02	ug/g
Copper	31.9	3.30	10.2	ug/g
Lead	5.23 J	1.93	10.2	ug/g
Manganese	409	3.37	10.2	ug/g
Mercury	ND	0.0716	0.511	ug/g
Nickel	14.6	0.634	5.11	ug/g
Selenium	ND	0.726	25.6	ug/g
Silver	ND	0.0613	5.11	ug/g
Thallium	ND	0.337	5.11	ug/g
Vanadium	1.10 J	1.02	5.11	ug/g
Zinc	3.05 J	2.25	10.2	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/1/2003 17:01	9101	AM118 Metals in Sld HD by ICP	1	7/3/2003 13:11	blb	9301

Parameter	Result	MDL	PQL	Units
Antimony	1.68 J	0.133	5.11	ug/g
Cadmium	0.260 J	0.0204	5.11	ug/g
Tin	12.2	0.450	10.2	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-083-03	39B-03-030	6/11/2003 12:18	7/1/2003 12:17	10/27/2003 15:47	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/1/2003 17:01	9101	AM118 Metals in Sld HD by ICP	1	7/2/2003 13:10	blb	9109

Parameter	Result	MDL	PQL	Units
Aluminum	19.1 J	10.4	52.2	ug/g
Arsenic	12.3	0.596	5.22	ug/g
Barium	0.0866 J	0.0418	5.22	ug/g
Beryllium	ND	0.0522	5.22	ug/g
Boron	ND	4.18	10.4	ug/g
Chromium	21.7	1.04	5.22	ug/g
Cobalt	3.96	0.125	1.04	ug/g
Copper	27.5	3.38	10.4	ug/g
Lead	6.77 J	1.97	10.4	ug/g
Manganese	506	3.45	10.4	ug/g
Mercury	ND	0.0731	0.522	ug/g
Nickel	15.7	0.648	5.22	ug/g
Selenium	ND	0.742	26.1	ug/g
Silver	0.0807 J	0.0627	5.22	ug/g
Thallium	ND	0.345	5.22	ug/g
Vanadium	1.42 J	1.04	5.22	ug/g
Zinc	3.25 J	2.30	10.4	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/1/2003 17:01	9101	AM118 Metals in Sld HD by ICP	1	7/3/2003 13:15	blb	9301

Parameter	Result	MDL	PQL	Units
Antimony	0.688 J	0.136	5.22	ug/g
Cadmium	0.294 J	0.0209	5.22	ug/g
Tin	7.20 J	0.460	10.4	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-083-04	39B-03-031	6/11/2003 12:18	7/1/2003 12:17	10/27/2003 15:47	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/1/2003 17:01	9101	AM118 Metals in Sld HD by ICP	1	7/2/2003 13:15	blb	9109

Parameter	Result	MDL	PQL	Units
Aluminum	ND	9.83	49.2	ug/g
Arsenic	8.43	0.560	4.92	ug/g
Barium	ND	0.0393	4.92	ug/g
Beryllium	ND	0.0492	4.92	ug/g
Boron	ND	3.93	9.83	ug/g
Chromium	22.7	0.983	4.92	ug/g
Cobalt	4.43	0.118	0.983	ug/g
Copper	18.1	3.18	9.83	ug/g
Lead	16.8	1.86	9.83	ug/g
Manganese	521	3.24	9.83	ug/g
Mercury	ND	0.0688	0.492	ug/g
Nickel	9.71	0.610	4.92	ug/g
Selenium	ND	0.698	24.6	ug/g
Silver	ND	0.0590	4.92	ug/g
Thallium	ND	0.324	4.92	ug/g
Vanadium	1.19 J	0.983	4.92	ug/g
Zinc	4.13 J	2.16	9.83	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/1/2003 17:01	9101	AM118 Metals in Sld HD by ICP	1	7/3/2003 13:20	blb	9301

Parameter	Result	MDL	PQL	Units
Antimony	2.33 J	0.128	4.92	ug/g
Cadmium	0.269 J	0.0197	4.92	ug/g
Tin	15.0	0.433	9.83	ug/g

Comments: Sample diluted an addtional 2 fold for manganese.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-083-05	39B-03-038	6/11/2003 12:18	7/1/2003 12:17	10/27/2003 15:47	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/1/2003 17:01	9101	AM118 Metals in Sld HD by ICP	1	7/2/2003 13:20	blb	9109

Parameter	Result	MDL	PQL	Units
Aluminum	ND	10.1	50.7	ug/g
Arsenic	8.36	0.578	5.07	ug/g
Barium	ND	0.0406	5.07	ug/g
Beryllium	ND	0.0507	5.07	ug/g
Boron	ND	4.06	10.1	ug/g
Chromium	22.1	1.01	5.07	ug/g
Cobalt	3.41	0.122	1.01	ug/g
Copper	25.3	3.28	10.1	ug/g
Lead	7.78 J	1.92	10.1	ug/g
Manganese	412	3.35	10.1	ug/g
Mercury	ND	0.0710	0.507	ug/g
Nickel	8.64	0.629	5.07	ug/g
Selenium	0.897 J	0.720	25.4	ug/g
Silver	ND	0.0609	5.07	ug/g
Thallium	ND	0.335	5.07	ug/g
Vanadium	1.15 J	1.01	5.07	ug/g
Zinc	5.18 J	2.23	10.1	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/1/2003 17:01	9101	AM118 Metals in Sld HD by ICP	1	7/3/2003 13:24	blb	9301

Parameter	Result	MDL	PQL	Units
Antimony	0.555 J	0.132	5.07	ug/g
Cadmium	0.306 J	0.0203	5.07	ug/g
Tin	5.44 J	0.446	10.1	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-083-06	39B-03-039	6/11/2003 12:18	7/1/2003 12:17	10/27/2003 15:47	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/1/2003 17:01	9101	AM118 Metals in Sld HD by ICP	1	7/2/2003 13:24	blb	9109

Parameter	Result	MDL	PQL	Units
Aluminum	ND	9.89	49.5	ug/g
Arsenic	6.70	0.564	4.95	ug/g
Barium	ND	0.0396	4.95	ug/g
Beryllium	ND	0.0495	4.95	ug/g
Boron	ND	3.96	9.89	ug/g
Chromium	9.64	0.989	4.95	ug/g
Cobalt	1.29	0.119	0.989	ug/g
Copper	12.4	3.19	9.89	ug/g
Lead	5.98 J	1.87	9.89	ug/g
Manganese	147	3.26	9.89	ug/g
Mercury	ND	0.0692	0.495	ug/g
Nickel	4.01 J	0.613	4.95	ug/g
Selenium	1.78 J	0.702	24.7	ug/g
Silver	ND	0.0593	4.95	ug/g
Thallium	ND	0.326	4.95	ug/g
Vanadium	ND	0.989	4.95	ug/g
Zinc	5.59 J	2.18	9.89	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/1/2003 17:01	9101	AM118 Metals in Sld HD by ICP	1	7/3/2003 13:28	blb	9301

Parameter	Result	MDL	PQL	Units
Antimony	0.228 J	0.129	4.95	ug/g
Cadmium	0.241 J	0.0198	4.95	ug/g
Tin	2.79 J	0.435	9.89	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-083-07	39B-03-046	6/12/2003 12:18	7/1/2003 12:17	10/27/2003 15:47	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/1/2003 17:01	9101	AM118 Metals in Sld HD by ICP	1	7/2/2003 13:29	blb	9109

Parameter	Result	MDL	PQL	Units
Aluminum	ND	10.0	50.1	ug/g
Arsenic	21.5	0.571	5.01	ug/g
Barium	0.0450 J	0.0401	5.01	ug/g
Beryllium	ND	0.0501	5.01	ug/g
Boron	ND	4.01	10.0	ug/g
Chromium	17.7	1.00	5.01	ug/g
Cobalt	2.52	0.120	1.00	ug/g
Copper	44.7	3.24	10.0	ug/g
Lead	25.3	1.89	10.0	ug/g
Manganese	396	3.31	10.0	ug/g
Mercury	ND	0.0701	0.501	ug/g
Nickel	12.8	0.621	5.01	ug/g
Selenium	ND	0.711	25.1	ug/g
Silver	ND	0.0601	5.01	ug/g
Thallium	ND	0.331	5.01	ug/g
Vanadium	1.21 J	1.00	5.01	ug/g
Zinc	3.33 J	2.20	10.0	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/1/2003 17:01	9101	AM118 Metals in Sld HD by ICP	1	7/3/2003 13:32	blb	9301

Parameter	Result	MDL	PQL	Units
Antimony	0.622 J	0.130	5.01	ug/g
Cadmium	0.269 J	0.0200	5.01	ug/g
Tin	3.54 J	0.441	10.0	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-083-08	39B-03-047	6/12/2003 12:18	7/1/2003 12:17	10/27/2003 15:47	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/1/2003 17:01	9101	AM118 Metals in Sld HD by ICP	1	7/2/2003 13:34	blb	9109

Parameter	Result	MDL	PQL	Units
Aluminum	ND	9.78	48.9	ug/g
Arsenic	61.2	0.557	4.89	ug/g
Barium	ND	0.0391	4.89	ug/g
Beryllium	ND	0.0489	4.89	ug/g
Boron	ND	3.91	9.78	ug/g
Chromium	24.8	0.978	4.89	ug/g
Cobalt	3.16	0.117	0.978	ug/g
Copper	33.2	3.16	9.78	ug/g
Lead	36.8	1.85	9.78	ug/g
Manganese	409	3.23	9.78	ug/g
Mercury	ND	0.0684	0.489	ug/g
Nickel	13.8	0.606	4.89	ug/g
Selenium	ND	0.694	24.4	ug/g
Silver	ND	0.0587	4.89	ug/g
Thallium	ND	0.323	4.89	ug/g
Vanadium	1.26 J	0.978	4.89	ug/g
Zinc	4.81 J	2.15	9.78	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/1/2003 17:01	9101	AM118 Metals in Sld HD by ICP	1	7/3/2003 13:36	blb	9301

Parameter	Result	MDL	PQL	Units
Antimony	3.02 J	0.127	4.89	ug/g
Cadmium	0.224 J	0.0196	4.89	ug/g
Tin	16.2	0.430	9.78	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-083-09	39B-03-053	6/13/2003 12:18	7/1/2003 12:17	10/27/2003 15:47	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/1/2003 17:01	9101	AM118 Metals in Sld HD by ICP	1	7/2/2003 13:39	blb	9109

Parameter	Result	MDL	PQL	Units
Aluminum	ND	10.4	52.2	ug/g
Arsenic	11.6	0.595	5.22	ug/g
Barium	0.0956 J	0.0418	5.22	ug/g
Beryllium	ND	0.0522	5.22	ug/g
Boron	ND	4.18	10.4	ug/g
Chromium	14.3	1.04	5.22	ug/g
Cobalt	3.13	0.125	1.04	ug/g
Copper	16.1	3.37	10.4	ug/g
Lead	2.74 J	1.97	10.4	ug/g
Manganese	505	3.44	10.4	ug/g
Mercury	ND	0.0731	0.522	ug/g
Nickel	10.6	0.647	5.22	ug/g
Selenium	ND	0.741	26.1	ug/g
Silver	ND	0.0626	5.22	ug/g
Thallium	ND	0.344	5.22	ug/g
Vanadium	1.44 J	1.04	5.22	ug/g
Zinc	4.99 J	2.30	10.4	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/1/2003 17:01	9101	AM118 Metals in Sld HD by ICP	1	7/3/2003 13:41	blb	9301

Parameter	Result	MDL	PQL	Units
Antimony	ND	0.136	5.22	ug/g
Cadmium	0.269 J	0.0209	5.22	ug/g
Tin	0.878 J	0.459	10.4	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-083-10	39B-03-054	6/13/2003 12:18	7/1/2003 12:17	10/27/2003 15:47	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/1/2003 17:01	9101	AM118 Metals in Sld HD by ICP	1	7/2/2003 13:43	blb	9109

Parameter	Result	MDL	PQL	Units
Aluminum	ND	10.4	52.1	ug/g
Arsenic	15.4	0.594	5.21	ug/g
Barium	0.0924 J	0.0417	5.21	ug/g
Beryllium	ND	0.0521	5.21	ug/g
Boron	ND	4.17	10.4	ug/g
Chromium	16.8	1.04	5.21	ug/g
Cobalt	3.72	0.125	1.04	ug/g
Copper	13.6	3.36	10.4	ug/g
Lead	4.09 J	1.97	10.4	ug/g
Manganese	581	3.44	10.4	ug/g
Mercury	ND	0.0729	0.521	ug/g
Nickel	9.42	0.646	5.21	ug/g
Selenium	ND	0.740	26.0	ug/g
Silver	ND	0.0625	5.21	ug/g
Thallium	ND	0.344	5.21	ug/g
Vanadium	1.63 J	1.04	5.21	ug/g
Zinc	7.58 J	2.29	10.4	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/1/2003 17:01	9101	AM118 Metals in Sld HD by ICP	1	7/3/2003 13:45	blb	9301

Parameter	Result	MDL	PQL	Units
Antimony	0.156 J	0.135	5.21	ug/g
Cadmium	0.227 J	0.0208	5.21	ug/g
Tin	1.27 J	0.458	10.4	ug/g

Comments: Sample diluted an addtional 2 fold for manganese.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-083-11	39B-03-060	6/13/2003 12:18	7/1/2003 12:17	10/27/2003 15:47	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/1/2003 17:01	9101	AM118 Metals in Sld HD by ICP	1	7/2/2003 13:58	blb	9109

Parameter	Result	MDL	PQL	Units
Aluminum	15.4 J	10.5	52.5	ug/g
Arsenic	28.7	0.599	5.25	ug/g
Barium	0.113 J	0.0420	5.25	ug/g
Beryllium	ND	0.0525	5.25	ug/g
Boron	ND	4.20	10.5	ug/g
Chromium	18.9	1.05	5.25	ug/g
Cobalt	6.50	0.126	1.05	ug/g
Copper	23.7	3.39	10.5	ug/g
Lead	4.97 J	1.99	10.5	ug/g
Manganese	931	3.47	10.5	ug/g
Mercury	ND	0.0735	0.525	ug/g
Nickel	16.7	0.651	5.25	ug/g
Selenium	ND	0.746	26.3	ug/g
Silver	ND	0.0630	5.25	ug/g
Thallium	ND	0.347	5.25	ug/g
Vanadium	1.51 J	1.05	5.25	ug/g
Zinc	3.64 J	2.31	10.5	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/1/2003 17:01	9101	AM118 Metals in Sld HD by ICP	1	7/3/2003 13:57	blb	9301

Parameter	Result	MDL	PQL	Units
Antimony	1.06 J	0.137	5.25	ug/g
Cadmium	0.253 J	0.0210	5.25	ug/g
Tin	11.1	0.462	10.5	ug/g

Comments: Sample diluted an addtional 2 fold for manganese.

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Lab ID	Sample ID	Collected	Received	Reported	Matrix
030004-083-12	39B-03-061	6/13/2003 12:18	7/1/2003 12:17	10/27/2003 15:47	Solid

(Results reported as received basis)

AM118 Metals in Sld HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/1/2003 17:01	9101	AM118 Metals in Sld HD by ICP	1	7/2/2003 14:02	blb	9109

Parameter	Result	MDL	PQL	Units
Aluminum	12.3 J	10.4	52.0	ug/g
Arsenic	13.2	0.593	5.20	ug/g
Barium	0.0895 J	0.0416	5.20	ug/g
Beryllium	ND	0.0520	5.20	ug/g
Boron	ND	4.16	10.4	ug/g
Chromium	15.0	1.04	5.20	ug/g
Cobalt	5.22	0.125	1.04	ug/g
Copper	22.2	3.36	10.4	ug/g
Lead	5.43 J	1.97	10.4	ug/g
Manganese	785	3.43	10.4	ug/g
Mercury	ND	0.0728	0.520	ug/g
Nickel	13.4	0.645	5.20	ug/g
Selenium	ND	0.739	26.0	ug/g
Silver	ND	0.0624	5.20	ug/g
Thallium	ND	0.343	5.20	ug/g
Vanadium	1.34 J	1.04	5.20	ug/g
Zinc	7.87 J	2.29	10.4	ug/g

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/1/2003 17:01	9101	AM118 Metals in Sld HD by ICP	1	7/3/2003 14:02	blb	9301

Parameter	Result	MDL	PQL	Units
Antimony	1.83 J	0.135	5.20	ug/g
Cadmium	0.275 J	0.0208	5.20	ug/g
Tin	18.2	0.458	10.4	ug/g

Comments: Sample diluted an addtional 2 fold for manganese.

Report of Analysis

Method Blank

Lab ID	Sample ID	Reported
4897	MB for HBN 9103 [PREP/1479]	7/29/2003 17:00
	(Results reported on a wet weight basis)	

AM101 Vols in Liquid HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/2/2003 10:21	9103	AM101 Vols in Liquid HD by GC	1	7/7/2003 14:26	ssh	9113

Surrogates	Expected	Result	Recovery	Limits
1,4-Difluorobenzene	112	119 ug/mL	107	50 - 150

Method Blank

Lab ID	Sample ID	Reported
4906	MB for HBN 9105 [PREP/1481]	7/29/2003 17:00
	(Results reported on a wet weight basis)	

AM117 Semi-Vols Liq HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:33	9105	AM117 Semi-Vols Liq HD by GC	1	7/11/2003 20:28	ssh	9117

Surrogates	Expected	Result	Recovery	Limits
1,4-Dithiane-d4	1000	1050 ug/mL	105	50 - 150

Method Blank

Lab ID	Sample ID	Reported
4917	MB for HBN 9106 [PREP/1482]	7/29/2003 17:00
	(Results reported on a wet weight basis)	

AM100 Non-Vols in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:10	9106	AM100 Non-Vols in HD by GC	1	7/8/2003 20:03	ssh	9119

Surrogates	Expected	Result	Recovery	Limits
Thiodiglycol-d8 (TDG-d8)	10	10.1 ug/mL	101	50 - 150

Report of Analysis

Method Blank

Lab ID	Sample ID	Reported
4903	MB for HBN 9104 [PREP/1480]	7/29/2003 17:00

(Results reported on a wet weight basis)

AM098 HD Purity by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:27	9104	AM098 HD Purity by GC	1	7/11/2003 13:35	ssh	9115

Parameter	Result	MDL	PQL	Units
bis-(2-Chloroethyl)sulfide	0.00			%

Method Blank

Lab ID	Sample ID	Reported
4923	MB for HBN 9107 [PREP/1483]	7/29/2003 17:00

(Results reported on a wet weight basis)

AM126 Lewisite in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:04	9107	AM126 Lewisite in HD by GC	1	7/10/2003 18:48	ssh	9121

Parameter	Result	MDL	PQL	Units
Lewisite	ND	1.95	5.00	ug/g

Report of Analysis

Method Blank

Lab ID	Sample ID	Reported
4867	MB for HBN 9101 [PREP/1477]	7/29/2003 17:00

(Results reported on a wet weight basis)

AM118 Metals in Sld HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/1/2003 17:01	9101	AM118 Metals in Sld HD by ICP	1	7/2/2003 12:28	blb	9109

Parameter	Result	MDL	PQL	Units
Aluminum	ND	10.0	50.0	ug/g
Arsenic	ND	0.570	5.00	ug/g
Barium	ND	0.0400	5.00	ug/g
Beryllium	ND	0.0500	5.00	ug/g
Boron	ND	4.00	10.0	ug/g
Chromium	ND	1.00	5.00	ug/g
Cobalt	ND	0.120	1.00	ug/g
Copper	ND	3.23	10.0	ug/g
Lead	ND	1.89	10.0	ug/g
Manganese	ND	3.30	10.0	ug/g
Mercury	ND	0.0700	0.500	ug/g
Nickel	ND	0.620	5.00	ug/g
Selenium	ND	0.710	25.0	ug/g
Silver	ND	0.0600	5.00	ug/g
Thallium	ND	0.330	5.00	ug/g
Vanadium	ND	1.00	5.00	ug/g
Zinc	ND	2.20	10.0	ug/g

Method Blank

Lab ID	Sample ID	Reported
4889	MB for HBN 9102 [PREP/1478]	7/29/2003 17:00

(Results reported on a wet weight basis)

AM118 Metals in Liq HD by ICP

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/2/2003 08:31	9102	AM118 Metals in Liq HD by ICP	1	7/2/2003 17:41	blb	9111

Parameter	Result	MDL	PQL	Units
Aluminum	ND	10.0	50.0	ug/g
Antimony	ND	0.630	5.00	ug/g
Arsenic	ND	1.22	5.00	ug/g
Barium	ND	0.430	5.00	ug/g
Beryllium	ND	0.900	5.00	ug/g
Boron	ND	3.74	10.0	ug/g
Cadmium	ND	0.410	5.00	ug/g
Chromium	ND	1.29	5.00	ug/g
Cobalt	ND	0.270	1.00	ug/g
Copper	ND	2.43	5.00	ug/g
Lead	ND	0.410	5.00	ug/g
Manganese	ND	0.320	1.00	ug/g
Mercury	ND	0.0500	0.500	ug/g

Report of Analysis

9102 9111 Method Blank

Nickel	ND	0.350	5.00	ug/g
Selenium	ND	1.17	10.0	ug/g
Silver	ND	0.470	5.00	ug/g
Thallium	ND	0.980	5.00	ug/g
Tin	ND	2.49	10.0	ug/g
Vanadium	ND	1.00	5.00	ug/g
Zinc	6.54 J	3.12	10.0	ug/g

Method Blank

Lab ID	*Sample ID*	*Reported*
4867	MB for HBN 9101 [PREP/1477]	8/11/2003 14:24

(Results reported on a wet weight basis)

AM118 Metals in Sld HD by ICP

Prep Date	*Prep Batch*	*Prep Method*	*Dilution*	*Analysis Date*	*By*	*Analytical Batch*
7/1/2003 17:01	9101	AM118 Metals in Sld HD by ICP	1	7/3/2003 12:38	blb	9301

Parameter	*Result*	*MDL*	*PQL*	*Units*
Antimony	ND	0.130	5.00	ug/g
Cadmium	0.207 J	0.0200	5.00	ug/g
Tin	ND	0.440	10.0	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Method Blank

Lab ID	Sample ID	Reported
4917	MB for HBN 9106 [PREP/1482]	7/29/2003 17:00

(Results reported on a wet weight basis)

AM100 Non-Vols in HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:10	9106	AM100 Non-Vols in HD by GC	1	7/8/2003 20:03	ssh	9119

Parameter	Result	MDL	PQL	Units
Thiodiglycol (TDG)	ND	210	250	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Method Blank

Lab ID	Sample ID	Reported
4906	MB for HBN 9105 [PREP/1481]	7/29/2003 17:00

(Results reported on a wet weight basis)

AM117 Semi-Vols Liq HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/3/2003 11:33	9105	AM117 Semi-Vols Liq HD by GC	1	7/11/2003 20:28	ssh	9117

Parameter	Result	MDL	PQL	Units
Hexachloroethane	ND	80.0	250	ug/g
Q	ND	51.0	2500	ug/g
T	ND	70.0	2500	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

Method Blank

Lab ID	Sample ID	Reported
4897	MB for HBN 9103 [PREP/1479]	7/29/2003 17:00

(Results reported on a wet weight basis)

AM101 Vols in Liquid HD by GC

Prep Date	Prep Batch	Prep Method	Dilution	Analysis Date	By	Analytical Batch
7/2/2003 10:21	9103	AM101 Vols in Liquid HD by GC	1	7/7/2003 14:26	ssh	9113

Parameter	Result	MDL	PQL	Units
1,2-Dichloroethane	ND	260	500	ug/g
Tetrachloroethylene	ND	100	500	ug/g
1,1,2,2-Tetrachloroethane	ND	150	500	ug/g

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

QC Summary

LCS Lab ID: 4904 | Original Lab ID: | Prep Batch: 9104
Matrix: Liquid | Analytical: 9115

AM098 HD Purity by GC	Expected	Result	Recovery	Rec Limits
bis-(2-Chloroethyl)sulfide	98.2 %	101	103	85 - 115

DUP Lab ID: 4905 | Original Lab ID: 030004-084-01 | Prep Batch: 9104
Matrix: Liquid | Analytical: 9115

AM098 HD Purity by GC	Original Result	Result	RPD	RPD Limits
bis-(2-Chloroethyl)sulfide	78.7	79.5	0.983	0 - 25

LCS Lab ID: 4924 | Original Lab ID: | Prep Batch: 9107
Matrix: Liquid | Analytical: 9121

AM126 Lewisite in HD by GC	Expected	Result	Recovery	Rec Limits
Lewisite	25.2 ug/g	29.1	115	50 - 150

DUP Lab ID: 4925 | Original Lab ID: 030004-084-01 | Prep Batch: 9107
Matrix: Liquid | Analytical: 9121

AM126 Lewisite in HD by GC	Original Result	Result	RPD	RPD Limits
Lewisite	0	0	0	0 - 25

MS Lab ID: 4926 | Original Lab ID: 030004-084-01 | Prep Batch: 9107
Matrix: Liquid | Analytical: 9121

AM126 Lewisite in HD by GC	Original Result	Expected	Result	Recovery	Rec Limits
Lewisite	0	25.4 ug/g	49.2	194 *	50 - 150

MSD Lab ID: 4927 | Original Lab ID: 030004-084-01 | Prep Batch: 9107
Matrix: Liquid | Analytical: 9121

AM126 Lewisite in HD by GC	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits
Lewisite	26.2 ug/g	50.7	193 *	50 - 150	0.517	0 - 25

LCS Lab ID: 4928 | Original Lab ID: | Prep Batch: 9107
Matrix: Liquid | Analytical: 9121

AM126 Lewisite in HD by GC	Expected	Result	Recovery	Rec Limits
Lewisite	25.2 ug/g	25.4	101	50 - 150

Report of Analysis

QC Summary

LCS Lab ID: 4868 | Original Lab ID: 4867 | Matrix: Solid | Prep Batch: 9101 | Analytical: 9109

AM118 Metals in Sld HD by ICP	Expected	Result	Recovery	Rec Limits
Aluminum	500 ug/g	453	89.7	75 - 125
Arsenic	50 ug/g	53.6	107	75 - 125
Barium	50 ug/g	52.3	105	75 - 125
Beryllium	50 ug/g	41.5	82.9	75 - 125
Boron	500 ug/g	396	79.2	75 - 125
Chromium	50 ug/g	48.1	96.1	75 - 125
Cobalt	50 ug/g	47.5	95	75 - 125
Copper	50 ug/g	49.2	98.2	75 - 125
Lead	50 ug/g	52.7	105	75 - 125
Manganese	50 ug/g	48.9	97.8	75 - 125
Mercury	2.5 ug/g	2.82	113	75 - 125
Nickel	50 ug/g	46.9	93.6	75 - 125
Selenium	50 ug/g	54.9	110	75 - 125
Silver	50 ug/g	52.3	105	75 - 125
Thallium	50 ug/g	50.1	100	75 - 125
Vanadium	50 ug/g	48.5	97	75 - 125
Zinc	50 ug/g	52.8	103	75 - 125

DUP Lab ID: 4869 | Original Lab ID: 030004-083-01 | Matrix: Solid | Prep Batch: 9101 | Analytical: 9109

AM118 Metals in Sld HD by ICP	Original Result	Result	RPD	RPD Limits
Aluminum	3.17	27	158 *	0 - 20
Arsenic	7.04	3.25	73.7 *	0 - 20
Barium	0.0412	0.258	145 *	0 - 20
Beryllium	0.00391	0	200 *	0 - 20
Boron	0	0.337	200 *	0 - 20
Chromium	29.2	29.5	1.12	0 - 20
Cobalt	4.57	4.76	4.14	0 - 20
Copper	46.9	42.9	8.91	0 - 20
Lead	6.99	7.21	3.09	0 - 20
Manganese	531	562	5.68	0 - 20
Mercury	0	0	0	0 - 20
Nickel	22.8	20.7	9.68	0 - 20
Selenium	0.847	0.541	44.1 *	0 - 20
Silver	0.05	0.0437	13.4	0 - 20
Thallium	0.0689	0.0277	85.2 *	0 - 20
Vanadium	0.876	1.39	45.2 *	0 - 20
Zinc	2.8	3.65	26.5 *	0 - 20

MS Lab ID: 4870 | Original Lab ID: 030004-083-01 | Matrix: Solid | Prep Batch: 9101 | Analytical: 9109

AM118 Metals in Sld HD by ICP	Original Result	Expected	Result	Recovery	Rec Limits
Aluminum	3.17	530 ug/g	462	86.6	75 - 125
Arsenic	7.04	53 ug/g	59	97.9	50 - 150
Barium	0.0412	53 ug/g	51.6	97.2	75 - 125

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

MS Lab ID: 4870 | Original Lab ID: 030004-083-01 | Matrix: Solid | Prep Batch: 9101 | Analytical: 9109

AM118 Metals in Sld HD by ICP	Original Result	Expected	Result	Recovery	Rec Limits
Beryllium	0.00391	53 ug/g	41.4	78.1	75 - 125
Boron	0	530 ug/g	438	82.6	75 - 125
Chromium	29.2	53 ug/g	68.4	74 *	75 - 125
Cobalt	4.57	53 ug/g	51	87.6	75 - 125
Copper	46.9	53 ug/g	92.9	86.8	75 - 125
Lead	6.99	53 ug/g	66.9	113	75 - 125
Manganese	531	53 ug/g	573	79.3	75 - 125
Mercury	0	2.65 ug/g	3.09	117	50 - 150
Nickel	22.8	53 ug/g	66.2	81.8	75 - 125
Selenium	0.847	53 ug/g	55.3	103	50 - 150
Silver	0.05	53 ug/g	48.7	91.8	50 - 150
Thallium	0.0689	53 ug/g	58	109	75 - 125
Vanadium	0.876	53 ug/g	49.2	91.1	75 - 125
Zinc	2.8	53 ug/g	52.5	93.7	50 - 150

MSD Lab ID: 4871 | Original Lab ID: 030004-083-01 | Matrix: Solid | Prep Batch: 9101 | Analytical: 9109

AM118 Metals in Sld HD by ICP	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits
Aluminum	541 ug/g	477	87.6	75 - 125	1.15	0 - 25
Arsenic	54.1 ug/g	59	96	50 - 150	1.96	0 - 25
Barium	54.1 ug/g	51.7	95.4	75 - 125	1.87	0 - 25
Beryllium	54.1 ug/g	40.2	74.3 *	75 - 125	4.99	0 - 25
Boron	541 ug/g	446	82.4	75 - 125	0.242	0 - 25
Chromium	54.1 ug/g	70.3	75.9	75 - 125	2.54	0 - 25
Cobalt	54.1 ug/g	53.5	90.5	75 - 125	3.26	0 - 25
Copper	54.1 ug/g	90.6	80.7	75 - 125	7.28	0 - 25
Lead	54.1 ug/g	68.1	113	75 - 125	0	0 - 25
Manganese	54.1 ug/g	613	151 *	75 - 125	62.3 *	0 - 25
Mercury	2.71 ug/g	3.19	118	50 - 150	0.851	0 - 25
Nickel	54.1 ug/g	67.9	83.3	75 - 125	1.82	0 - 25
Selenium	54.1 ug/g	57.7	105	50 - 150	1.92	0 - 25
Silver	54.1 ug/g	48.8	90.1	50 - 150	1.87	0 - 25
Thallium	54.1 ug/g	58.2	107	75 - 125	1.85	0 - 25
Vanadium	54.1 ug/g	51	92.5	75 - 125	1.53	0 - 25
Zinc	54.1 ug/g	52.7	92.2	50 - 150	1.61	0 - 25

LCS Lab ID: 4872 | Original Lab ID: 4867 | Matrix: Solid | Prep Batch: 9101 | Analytical: 9109

AM118 Metals in Sld HD by ICP	Expected	Result	Recovery	Rec Limits
Aluminum	6000 ug/g	4810	80	75 - 125
Arsenic	141 ug/g	138	98	75 - 125
Barium	58.2 ug/g	56.9	97.8	75 - 125
Chromium	111 ug/g	100	90.2	75 - 125
Cobalt	11.1 ug/g	10.1	91.2	75 - 125
Copper	398 ug/g	323	81.2	75 - 125
Lead	5.73 ug/g	6.11	106	75 - 125

Report of Analysis

LCS Lab ID: 4872 | Original Lab ID: 4867 | Prep Batch: 9101
Matrix: Solid | Analytical: 9109

AM118 Metals in Sld HD by ICP	Expected	Result	Recovery	Rec Limits
Manganese	480 ug/g	427	89	75 - 125
Nickel	195 ug/g	167	85.5	75 - 125
Vanadium	11.9 ug/g	12.4	104	75 - 125
Zinc	249 ug/g	213	84.9	75 - 125

LCSD Lab ID: 4873 | Original Lab ID: 4867 | Prep Batch: 9101
Matrix: Solid | Analytical: 9109

AM118 Metals in Sld HD by ICP	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits
Aluminum	6000 ug/g	4720	78.6	75 - 125	1.77	0 - 25
Arsenic	141 ug/g	137	97.4	75 - 125	0.614	0 - 25
Barium	58.2 ug/g	55.8	95.8	75 - 125	2.07	0 - 25
Chromium	111 ug/g	100	90.2	75 - 125	0	0 - 25
Cobalt	11.1 ug/g	10	90.3	75 - 125	0.992	0 - 25
Copper	398 ug/g	324	81.4	75 - 125	0.246	0 - 25
Lead	5.73 ug/g	6.09	106	75 - 125	0	0 - 25
Manganese	480 ug/g	422	88	75 - 125	1.13	0 - 25
Nickel	195 ug/g	167	85.4	75 - 125	0.117	0 - 25
Vanadium	11.9 ug/g	12.2	102	75 - 125	1.94	0 - 25
Zinc	249 ug/g	213	85	75 - 125	0.118	0 - 25

LCS Lab ID: 4890 | Original Lab ID: 4889 | Prep Batch: 9102
Matrix: Liquid | Analytical: 9111

AM118 Metals in Liq HD by ICP	Expected	Result	Recovery	Rec Limits
Aluminum	500 ug/g	512	101	75 - 125
Antimony	50 ug/g	48.9	97.7	75 - 125
Arsenic	50 ug/g	53.1	106	75 - 125
Barium	50 ug/g	52.5	105	75 - 125
Beryllium	50 ug/g	49.5	98.9	75 - 125
Boron	500 ug/g	449	89.2	75 - 125
Cadmium	50 ug/g	53.7	107	75 - 125
Chromium	50 ug/g	51	102	75 - 125
Cobalt	50 ug/g	50.4	101	75 - 125
Copper	50 ug/g	53.3	105	75 - 125
Lead	50 ug/g	50.6	101	75 - 125
Manganese	50 ug/g	50.7	101	75 - 125
Mercury	2.5 ug/g	2.76	109	75 - 125
Nickel	50 ug/g	50.4	100	75 - 125
Selenium	50 ug/g	52.4	105	75 - 125
Silver	50 ug/g	53	106	75 - 125
Thallium	50 ug/g	48.4	96.6	75 - 125
Tin	50 ug/g	51.3	103	75 - 125
Vanadium	50 ug/g	50.8	102	75 - 125
Zinc	50 ug/g	53.7	94.3	75 - 125

DUP Lab ID: 4891 | Original Lab ID: 030004-084-01 | Prep Batch: 9102
Matrix: Liquid | Analytical: 9111

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

DUP Lab ID: 4891 | Original Lab ID: 030004-084-01 | Prep Batch: 9102
Matrix: Liquid | Analytical: 9111

AM118 Metals in Liq HD by ICP	Original Result	Result	RPD		RPD Limits
Aluminum	7.43	21.5	97.4	*	0 - 20
Antimony	0.195	0.0825	81.1	*	0 - 20
Arsenic	0.671	0.775	14.4		0 - 20
Barium	0.0729	0.44	143	*	0 - 20
Beryllium	0.039	0.0352	10.2		0 - 20
Boron	2.23	2.66	17.5		0 - 20
Cadmium	0.205	0.201	1.88		0 - 20
Chromium	5.13	5.15	0.449		0 - 20
Cobalt	0.043	0.0486	12.1		0 - 20
Copper	46.2	44.6	3.43		0 - 20
Lead	0.095	0.105	10.3		0 - 20
Manganese	0.485	0.581	17.9		0 - 20
Mercury	0.0622	0.0722	14.9		0 - 20
Nickel	4.69	4.58	2.44		0 - 20
Selenium	0.589	0.47	22.4	*	0 - 20
Silver	0.0326	0.0286	13		0 - 20
Thallium	0.112	0.0777	36.3	*	0 - 20
Tin	0.0491	0.047	4.2		0 - 20
Vanadium	0.761	0.863	12.6		0 - 20
Zinc	2.48	1.68	38.5	*	0 - 20

MS Lab ID: 4892 | Original Lab ID: 030004-084-01 | Prep Batch: 9102
Matrix: Liquid | Analytical: 9111

AM118 Metals in Liq HD by ICP	Original Result	Expected	Result	Recovery	Rec Limits
Aluminum	7.43	500 ug/g	484	95.3	75 - 125
Antimony	0.195	50 ug/g	46.3	92.2	75 - 125
Arsenic	0.671	50 ug/g	53.7	106	50 - 150
Barium	0.0729	50 ug/g	50.9	102	75 - 125
Beryllium	0.039	50 ug/g	47.1	94	75 - 125
Boron	2.23	500 ug/g	428	85.2	75 - 125
Cadmium	0.205	50 ug/g	49.6	98.7	75 - 125
Chromium	5.13	50 ug/g	54.1	98	75 - 125
Cobalt	0.043	50 ug/g	48.5	96.9	75 - 125
Copper	46.2	50 ug/g	96.2	100	75 - 125
Lead	0.095	50 ug/g	53.8	107	75 - 125
Manganese	0.485	50 ug/g	49.4	97.7	75 - 125
Mercury	0.0622	2.5 ug/g	2.85	112	50 - 150
Nickel	4.69	50 ug/g	52.8	96.3	75 - 125
Selenium	0.589	50 ug/g	54.6	108	50 - 150
Silver	0.0326	50 ug/g	50.9	102	50 - 150
Thallium	0.112	50 ug/g	51.8	103	75 - 125
Tin	0.0491	50 ug/g	48.1	96.1	75 - 125
Vanadium	0.761	50 ug/g	49.2	96.9	75 - 125
Zinc	2.48	50 ug/g	51.4	97.8	50 - 150

MSD Lab ID: 4893 | Original Lab ID: 030004-084-01 | Prep Batch: 9102
Matrix: Liquid | Analytical: 9111

Report of Analysis

MSD Lab ID: 4893 | Original Lab ID: 030004-084-01 | Prep Batch: 9102
Matrix: Liquid | Analytical: 9111

AM118 Metals in Liq HD by ICP	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits
Aluminum	495 ug/g	464	92.3	75 - 125	3.2	0 - 25
Antimony	49.5 ug/g	48.4	97.4	75 - 125	5.49	0 - 25
Arsenic	49.5 ug/g	52	104	50 - 150	1.9	0 - 25
Barium	49.5 ug/g	49.5	99.9	75 - 125	2.08	0 - 25
Beryllium	49.5 ug/g	46.3	93.5	75 - 125	0.533	0 - 25
Boron	495 ug/g	439	88.3	75 - 125	3.57	0 - 25
Cadmium	49.5 ug/g	48.4	97.4	75 - 125	1.33	0 - 25
Chromium	49.5 ug/g	52.8	96.4	75 - 125	1.65	0 - 25
Cobalt	49.5 ug/g	46.8	94.5	75 - 125	2.51	0 - 25
Copper	49.5 ug/g	94	96.6	75 - 125	3.46	0 - 25
Lead	49.5 ug/g	51.8	105	75 - 125	1.89	0 - 25
Manganese	49.5 ug/g	48.1	96.3	75 - 125	1.44	0 - 25
Mercury	2.47 ug/g	2.78	110	50 - 150	1.8	0 - 25
Nickel	49.5 ug/g	50.8	93.3	75 - 125	3.16	0 - 25
Selenium	49.5 ug/g	53.7	107	50 - 150	0.93	0 - 25
Silver	49.5 ug/g	49.8	101	50 - 150	0.985	0 - 25
Thallium	49.5 ug/g	50.1	101	75 - 125	1.96	0 - 25
Tin	49.5 ug/g	49.4	99.8	75 - 125	3.78	0 - 25
Vanadium	49.5 ug/g	48.2	95.9	75 - 125	1.04	0 - 25
Zinc	49.5 ug/g	50.6	97.2	50 - 150	0.615	0 - 25

LCS Lab ID: 4868 | Original Lab ID: 4867 | Prep Batch: 9101
Matrix: Solid | Analytical: 9301

AM118 Metals in Sld HD by ICP	Expected	Result	Recovery	Rec Limits
Antimony	50 ug/g	52.5	105	75 - 125
Cadmium	50 ug/g	54.6	109	75 - 125
Tin	50 ug/g	52.1	104	75 - 125

DUP Lab ID: 4869 | Original Lab ID: 030004-083-01 | Prep Batch: 9101
Matrix: Solid | Analytical: 9301

AM118 Metals in Sld HD by ICP	Original Result	Result	RPD	RPD Limits
Antimony	1.18	1.11	5.98	0 - 20
Cadmium	0.239	0.257	7.39	0 - 20
Tin	13.1	12.7	3.68	0 - 20

MS Lab ID: 4870 | Original Lab ID: 030004-083-01 | Prep Batch: 9101
Matrix: Solid | Analytical: 9301

AM118 Metals in Sld HD by ICP	Original Result	Expected	Result	Recovery	Rec Limits
Antimony	1.18	53 ug/g	57.4	106	75 - 125
Cadmium	0.239	53 ug/g	55.9	105	75 - 125
Tin	13.1	53 ug/g	69.8	107	75 - 125

MSD Lab ID: 4871 | Original Lab ID: 030004-083-01 | Prep Batch: 9101
Matrix: Solid | Analytical: 9301

AM118 Metals in Sld HD by ICP	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits
Antimony	54.1 ug/g	57.5	104	75 - 125	1.9	0 - 25

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

MSD Lab ID: 4871

Original Lab ID: 030004-083-01
Matrix: Solid

Prep Batch: 9101
Analytical: 9301

AM118 Metals in Sld HD by ICP	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits
Cadmium	54.1 ug/g	56.1	103	75 - 125	1.92	0 - 25
Tin	54.1 ug/g	70.1	105	75 - 125	1.89	0 - 25

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

QC Summary

LCS Lab ID: 4918 | Original Lab ID: | Prep Batch: 9106
Matrix: Liquid | Analytical: 9119

AM100 Non-Vols in HD by GC	Expected	Result	Recovery	Rec Limits
Thiodiglycol (TDG)	1020 ug/g	1170	115	50 - 150

DUP Lab ID: 4919 | Original Lab ID: 030004-084-01 | Prep Batch: 9106
Matrix: Liquid | Analytical: 9119

AM100 Non-Vols in HD by GC	Original Result	Result	RPD	RPD Limits
Thiodiglycol (TDG)	0	0	0	0 - 25

MS Lab ID: 4920 | Original Lab ID: 030004-084-01 | Prep Batch: 9106
Matrix: Liquid | Analytical: 9119

AM100 Non-Vols in HD by GC	Original Result	Expected	Result	Recovery	Rec Limits
Thiodiglycol (TDG)	0	1050 ug/g	964	91.8	50 - 150

MSD Lab ID: 4921 | Original Lab ID: 030004-084-01 | Prep Batch: 9106
Matrix: Liquid | Analytical: 9119

AM100 Non-Vols in HD by GC	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits
Thiodiglycol (TDG)	1060 ug/g	912	85.8	50 - 150	6.76	0 - 25

LCS Lab ID: 4922 | Original Lab ID: | Prep Batch: 9106
Matrix: Liquid | Analytical: 9119

AM100 Non-Vols in HD by GC	Expected	Result	Recovery	Rec Limits
Thiodiglycol (TDG)	1020 ug/g	1280	126	50 - 150

Report of Analysis

QC Summary

LCS Lab ID: 4907 | Original Lab ID: | Prep Batch: 9105
Matrix: Liquid | Analytical: 9117

AM117 Semi-Vols Liq HD by GC	Expected	Result	Recovery	Rec Limits
Hexachloroethane	950 ug/g	1030	109	50 - 150
Q	9950 ug/g	9850	99	50 - 150
T	9120 ug/g	9300	102	50 - 150

LCS Lab ID: 4908 | Original Lab ID: | Prep Batch: 9105
Matrix: Liquid | Analytical: 9117

AM117 Semi-Vols Liq HD by GC	Expected	Result	Recovery	Rec Limits
Q	50300 ug/g	51000	101	50 - 150

DUP Lab ID: 4909 | Original Lab ID: 030004-084-01 | Prep Batch: 9105
Matrix: Liquid | Analytical: 9117

AM117 Semi-Vols Liq HD by GC	Original Result	Result	RPD	RPD Limits
Hexachloroethane	0	0	0	0 - 25
Q	49800	47600	4.52	0 - 25
T	1630	1690	3.45	0 - 25

MS Lab ID: 4911 | Original Lab ID: 030004-084-01 | Prep Batch: 9105
Matrix: Liquid | Analytical: 9117

AM117 Semi-Vols Liq HD by GC	Original Result	Expected	Result	Recovery	Rec Limits
Hexachloroethane	0	951 ug/g	1060	112	50 - 150
Q	49800	9960 ug/g	48700	-10.7 *	50 - 150
T	1630	9130 ug/g	2790	12.7 *	50 - 150

MS Lab ID: 4912 | Original Lab ID: 4910 | Prep Batch: 9105
Matrix: Liquid | Analytical: 9117

AM117 Semi-Vols Liq HD by GC	Original Result	Expected	Result	Recovery	Rec Limits
Q	62700	49300 ug/g	90100	55.5	50 - 150

MSD Lab ID: 4913 | Original Lab ID: 030004-084-01 | Prep Batch: 9105
Matrix: Liquid | Analytical: 9117

AM117 Semi-Vols Liq HD by GC	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits
Hexachloroethane	929 ug/g	1050	113	50 - 150	0.889	0 - 25
Q	9730 ug/g	49300	-5.67 *	50 - 150	-61.5 *	0 - 25
T	8910 ug/g	2570	10.5 *	50 - 150	19	0 - 25

MSD Lab ID: 4914 | Original Lab ID: 4910 | Prep Batch: 9105
Matrix: Liquid | Analytical: 9117

AM117 Semi-Vols Liq HD by GC	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits
Q	49800 ug/g	87300	49.4 *	50 - 150	11.6	0 - 25

LCS Lab ID: 4915 | Original Lab ID: | Prep Batch: 9105
Matrix: Liquid | Analytical: 9117

AM117 Semi-Vols Liq HD by GC	Expected	Result	Recovery	Rec Limits
Hexachloroethane	950 ug/g	1060	112	50 - 150
Q	9950 ug/g	7600	76.4	50 - 150

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

LCS Lab ID: 4915	Original Lab ID:		Prep Batch: 9105	
	Matrix: Liquid		Analytical: 9117	
AM117 Semi-Vols Liq HD by GC	*Expected*	*Result*	*Recovery*	*Rec Limits*
T	9120 ug/g	6500	71.3	50 - 150
LCS Lab ID: 4916	Original Lab ID:		Prep Batch: 9105	
	Matrix: Liquid		Analytical: 9117	
AM117 Semi-Vols Liq HD by GC	*Expected*	*Result*	*Recovery*	*Rec Limits*
Q	50300 ug/g	38600	76.6	50 - 150

ECB Forensic Analytical Center
Edgewood Chemical and Biological Center
Aberdeen Proving Ground, MD 21010-5424
(410) 436-8600

Report of Analysis

QC Summary

LCS Lab ID: 4898 | Original Lab ID: | Prep Batch: 9103
Matrix: Liquid | Analytical: 9113

AM101 Vols in Liquid HD by GC	Expected	Result	Recovery	Rec Limits
1,2-Dichloroethane	9880 ug/g	8850	89.6	50 - 150
Tetrachloroethylene	10100 ug/g	10100	99.2	50 - 150
1,1,2,2-Tetrachloroethane	10400 ug/g	9940	95.9	50 - 150

DUP Lab ID: 4899 | Original Lab ID: 030004-084-01 | Prep Batch: 9103
Matrix: Liquid | Analytical: 9113

AM101 Vols in Liquid HD by GC	Original Result	Result	RPD	RPD Limits
1,2-Dichloroethane	20600	20300	1.75	0 - 25
Tetrachloroethylene	0	0	0	0 - 25
1,1,2,2-Tetrachloroethane	0	0	0	0 - 25

MS Lab ID: 4900 | Original Lab ID: 030004-084-01 | Prep Batch: 9103
Matrix: Liquid | Analytical: 9113

AM101 Vols in Liquid HD by GC	Original Result	Expected	Result	Recovery	Rec Limits
1,2-Dichloroethane	20600	9840 ug/g	30000	94.9	50 - 150
Tetrachloroethylene	0	10100 ug/g	11600	115	50 - 150
1,1,2,2-Tetrachloroethane	0	10300 ug/g	11900	115	50 - 150

MSD Lab ID: 4901 | Original Lab ID: 030004-084-01 | Prep Batch: 9103
Matrix: Liquid | Analytical: 9113

AM101 Vols in Liquid HD by GC	Expected	Result	Recovery	Rec Limits	RPD	RPD Limits
1,2-Dichloroethane	10100 ug/g	30600	98.8	50 - 150	4.03	0 - 25
Tetrachloroethylene	10300 ug/g	11900	115	50 - 150	0	0 - 25
1,1,2,2-Tetrachloroethane	10600 ug/g	12100	115	50 - 150	0	0 - 25

LCS Lab ID: 4902 | Original Lab ID: | Prep Batch: 9103
Matrix: Liquid | Analytical: 9113

AM101 Vols in Liquid HD by GC	Expected	Result	Recovery	Rec Limits
1,2-Dichloroethane	9880 ug/g	8810	89.1	50 - 150
Tetrachloroethylene	10100 ug/g	10300	101	50 - 150
1,1,2,2-Tetrachloroethane	10400 ug/g	10300	99	50 - 150