N00164.AR.000523
NSWC CRANE
5090.3a

DEPARTMENT OF THE NAVY
CRANE DIVISION
NAVAL SURFACE WARFARE CENTER
300 HIGHWAY 361
CRANE, INDIANA 47522-5000

IN REPLY REFER TO:

5090
Ser 095/1103

21 MAR 2001

U.S. Environmental Protection Agency, Region V
Waste, Pesticides, & Toxics Division
Waste Management Branch
Illinois, Indiana, and Michigan Section
ATTN: Mr. Peter Ramanauskas (DW-8J)
77 West Jackson Blvd.
Chicago, IL 60604

Dear Mr. Ramanauskas:

Enclosure (1) contains Laucks Testing Laboratories' general comments on sample delivery groups (SDGs) C3805 and C3806. Crane Division, Naval Surface Warfare Center (NSWC Crane) submits this information in response to your questions on the fourth quarter 1999 Ammunition Burning Grounds ground water data. Please let us know whether or not this answers your questions. The permit required Certification Statement is provided as enclosure (2).

NSWC Crane point of contact is Mr. Thomas J. Brent, Code 09510, telephone 812-854-6160.

Sincerely,

Nancy J. Albertson (Acting)
FOR:
James M. Hunsicker
Director, Environmental
Protection Department
By direction of the Commander

Encl:
(1) Laucks General Comments on SDGs C3805 and C3806
(2) Certification Statement

Copy to:
ADMINISTRATIVE RECORD
SOUTHNAVFACENGCOM (Code 1864) (w/o encl)
IDEM (Doug Griffin) (w/o encl)
SAIC (Kim Hughes) (w/o encl)

LAUCKS TESTING LABORATORIES
SAMPLE DATA PACKAGE

COMARCO

LABORATORY NO.: 9912532, 9912557, 9912573, 0001012, 0001072, 0001098, 0001121

SDG NO.: C3805

MARCH 03, 2000

LAUCKS TESTING LABORATORIES
940 S. Harney
Seattle, WA 98108

To: Comarco Systems
Project No. : CTO 38 7651
Laboratory Numbers: 9912532, 9912557, 9912573, 0001012, 0001072, 0001098, 0001121
SDG No. : C3805
Date of Report: March 3, 2000

SAMPLE RECEIPT, IDENTIFICATION, AND GENERAL COMMENTS:

Sample Receipt and Identification:

The samples submitted under the laboratory number(s) indicated above were identified and analyzed as tabulated below. The samples were collected and received on the dates noted on the enclosed chain-of-custody copies, Attachment A.

Client Sample Identification	Laucks Sample Identification	Testing Analytical Request
AC124A99	9912532-01	VOA/MET1/ORD1/CN/TOX/TOC/S2/S04/TP/CL
	9912532-02	DMET/DTP
AC124A99F		
AC154A99	9912532-03	VOA/MET2/ORD2/CN/TOX/TOC/S04/TP/CL
AC154A99F	9912532-04	DMET/DTP
TB12279901	9912532-05	VOA
ACRB4A99	9912557-01	VOA/MET1/ORD1/CN/TOX/TOC/S2/S04/TP/CL
ACRB4A99F	9912557-02	DMET/DTP
FD12289901	9912557-03	VOA/MET1/ORD1/CN/TOX/TOC/S2/S04/TP/CL
FD12289901F	9912557-04	DMET/DTP
TB12289901	9912557-05	VOA
AB024A99	9912573-01	VOA/MET1/ORD1/CN/TOX/TOC/S2/S04/TP/CL
AB024A99F	9912573-02	DMET/DTP
TB12299901	9912573-03	VOA
AC074A99	0001012-01	VOA/MET2/ORD2/CN/TOX/TOC/S04/TP/CL
AC074A99F	0001012-02	DMET/DTP
TB01030001	0001012-03	VOA
TB01040001	0001072-01	VOA
AC08P24A99	0001072-02	VOA/MET2/ORD2/CN/TOX/TOC/S04/TP/CL
AC08P24A99F	0001072-03	DMET/DTP
AC304A99	0001098-01	VOA/MET2/ORD2/CN/TOX/TOC/S04/TP/CL
AC304A99F	0001098-02	DMET/DTP
TB01050001	0001098-03	VOA
AC204A99	0001121-01	VOA/MET2/ORD2/CN/TOX/TOC/S04/TP/CL
AC204A99F	0001121-02	DMET/DTP
TB01060001	0001121-03	VOA

LAUCKS TESTING LABORATORIES
940 S. Harney
Seattle, WA 98108

Analytical Request Key:

VOA =	Volatile Organics (8260B)
ORD1 =	Ordnance (8330), PETN/Nitroglycerin, Picric Acid, Nitrocellulose, 6 Attenuation Compounds
ORD2 =	Ordnance (8330), PETN/ Nitroglycerin, Nitrocellulose
MET1 =	Total Appendix IX Metals + Fe, Mn (6020/7470)
MET2 =	Total Appendix IX Metals + Mn (6020/7470)
DMET =	Diss. App. IX Metals plus Ca, Mg, Mn, Na, K (6010/6020/7470)
CN =	Cyanide (9012A)
TOX =	Total Organic Halogens (9020B)
TOC =	Total Organic Carbon (9060)
CL =	Chloride (EPA 9056)
S04 =	Sulfate (EPA 9056)
S2 =	Sulfide (9030B/9034)
TP =	Total Phosphorus (365.2)
DTP =	Dissolved Total Phosphorus (365.2)

Sample Receipt Comments:

Samples FD12289901 and AB024A99 had a bottle received for chloride and/or sulfate analyses but were not listed on the COC. The test were requested for analysis through the lab. The following samples were received with air bubbles in the VOA vials.

Sample ID	Comments	Sample ID	Comments
TB12289901	2 of 3<1/4"	TB1229901	2 of 3 <1/4"
TB01030001	3 of 3 <1/4"	TB01040001	3 of 3 <1/4"
TB01050001	3 of 3 <1/4"	TB01060001	2 of 3 <1/4"

Sample Identification on Forms:

When completing forms created through the CLP software, every attempt is made to use both your sample IDs as well as the laboratory sample IDs. The forms have varied default sizes to their sample identification fields, and are not amenable to alteration or editing. When it is not possible to use your complete sample ID because of field length limitations, Laucks will usually do one of two things: 1) use as much of your ID as will fit, beginning from the RIGHT hand side of the sample ID number; or 2) select some sub-set of your sample identifier if it is clearly a discrete number. In addition, all forms will contain our sample IDs, which can be cross-referenced from the table above.

GENERAL REMARKS ON ORGANIC ANALYSES:

The following comments describe general analysis conditions. For remarks specific to the samples reported in this case, see "SPECIFIC REMARKS ON ORGANIC ANALYSIS."

Manual Integration:
One or more analytes may have been manually integrated on the data system quantitation reports. The manual integrations have been flagged, initialed and dated by the analyst. A list of the manual integration flags is detailed below.

M	Manual integration due to irregular peak shape
MS	Manual integration due to split peak
MR	Manual integration due to retention time shift
MI	Manual integration of correct isomer or peak
MT	Manual integration due to peak tailing
MB	Manual integration due to irregular baseline

All GC/MS Fractions:

The computerized printout for sample analysis may tabulate values for target analytes that are not reported on the relevant Form I. In that case, we have manually searched the mass spectral data and have eliminated the compound(s) as reportable based on this search.

Volatile Fraction:

The instrument used in the determination of volatile organic compounds in this SDG was fitted with the following column and trap:

Instrument	Column Name	ID, mm	Film thickness, µm	Trap
URSULA	DB-624	0.45	1.4	OI Vocarb 3000

SPECIFIC REMARKS ON ORGANIC ANALYSES:

Holding Time Compliance:

Following the Contract Laboratory Program (CLP) model, Laucks calculates holding time compliance for organic determinations based on the first injection and/or analysis of an extract or sample. Subsequent analyses (for instance, for the purpose of dilution) are not tabulated.

Volatile Organic Compounds:

The holding time is 14 days calculated from date of collection in both soil and water samples. All samples were analyzed within holding time.

Ordnance, Attenuation Compounds, Nitroglycerin/PETN, Picric Acid:

The holding time to extraction is 7 days in water and 14 days in soil calculated from date of collection. The holding time from extraction to analysis is 40 days. All samples were extracted and analyzed within holding time.

Volatile Fraction:

Initial Calibration Standards:
The standard concentration levels for the initial calibration standards are 1, 5, 10, 25 and 50 µg/L for all analytes, with the exception of m,p-xylene and methylene chloride. The standard concentration levels for m,p-xylene are 2, 10, 20, 50 and 100 µg/L. the standard concentration levels for methylene chloride are 5, 10, 25, 50 and 100 µg/L. The Form 6A does not accommodate the variability of these standards so the nominal value for most standards is used.

Continuing Calibration Standard Analyses:
Analysis of the continuing calibration standard performed on 01/06/00 yielded a percent difference value for methylene chloride which exceeded 20%. Analysis of the continuing calibration standard performed on 01/11/00 yielded a percent difference value for methylene chloride, tetrachloroethene and 1,2-dichloroethene which exceeded 20%. Since a full 8260 compound list yielded the average %D less than 20 percent, and the SPCC and CCC compounds were in control, the standard is compliant and no further action was required.

Sample Reporting Limits:
The most current version of SW 846 requires that the low level standard define the reporting limit. The laboratory's low level standard is 1 µg/L. The client has given express permission to report below the laboratory's low level standard for this project for specific compounds.

Quality Control Analyses:
MS/MSD analyses performed on sample AC154A99 yielded all spiking analyte recovery values within the control limits.

Sample Analyses:
Analyses of samples AC08P24A99 and AC204A99 resulted in the detection of trichloroethene at concentration levels which exceeded the calibration range. The samples were diluted accordingly and reanalyzed. All internal standard area responses and surrogate recoveries were in control in both analyses. However, the concentration value for trichloroethene in the diluted analysis of AC204A99 was significantly higher than the concentration value in the undiluted analysis. This discrepancy is most likely due to chromatographic overload and/or detector saturation. Data from both analyses have been submitted and are located in the Sample Data section of the data package.

Ordnance Fraction:

Analytical Comments:
Samples were analyzed for ordnance compounds in accordance with method SW 8330 utilizing a UV detector. A C18 (octadecyl) analytical column was used as the quantitation column. CN and C8 (cyano + octyl phase) columns in series were used for confirming any positive analyte responses detected on the C18 column.

C18 Column:
The target analytes for method SW8330 and the 6 Attenuation Compounds are analyzed simultaneously on the primary column. There are no co-elution issues on the primary column. Standards forms and data sheets from the primary column will display all target analytes from both lists in the retention time order. The data packages are separated due to different confirmation techniques.

CN-C8 Columns:
The confirmation column demonstrates coelution for the following target analytes: nitrobenzene and MNX; 1,2-dinitrobenzene, 2,4,6-trinitrotoluene and 3,5-DNA 2-nitrotoluene and 4-nitrotoluene; and 2-amino-4,6-dinitrotoluene and 4-amino-2,6-dinitrotoluene. The responses of the eluting compounds are summed and reported as one peak. When the presence of these compounds are indicated on the C18 column, CN-C8 columns concentration values can not be accurately determined due to the coeluting peaks, they are reported using the quantitation column, and the results are flagged appropriately.

Data Qualifiers:
A "Z" flag on sample report forms indicates coelution has occurred between two or more target analytes on the confirmation CN column. For this reason, quantitative confirmation is not possible.

The "P" flag indicates that the percent difference between the concentration values on the two columns is greater than 25 percent.

Initial Calibration Standard Analyses:
Initial calibrations on the confirmation column yielded %RSD values for tetryl and 4,4'-TN-AZOXY which exceeded the control limit. Because the average %RSD was in control, the initial calibration is considered compliant with SW 846 and since these analytes were not detected in the associated samples on the quantitation column, no further action was taken.

Initial and Continuing Calibration Verification Analyses:
Analyses of ICV files 4207021 and 4207027 yielded %D values for several analytes which exceeded the control limits on the confirmation column. Because the average %D values were in control, the continuing calibrations are considered compliant with SW 846, and since these analytes were not detected in the associated samples on the quantitation column, no further action was taken.

Analyses of CCV files 4207032 and 4207040 yielded %D values for several analytes which exceeded the control limits on the confirmation column. Because the average %D values were in control, the continuing calibration standards are considered compliant with SW 846, and since these analytes were not detected in the associated samples (on the quantitation column) no further action was taken.

Quality Control Samples:
Analyses of the BS/BSD samples (S010300HORWLC and S010300HORWLD) yielded recovery values for tetryl which fell below the lower control limit. Method 8330 indicates that tetryl decomposes rapidly in methanol/water solutions, as well as with heat. Care was taken during both the extraction process and analysis not to expose the samples to temperatures above room temperature. Since tetryl was not detected in any of the samples associated with this QC set, and since all other QC criteria were in control, no further action was taken.

Ordnance Attenuation Compounds Fraction:

Analytical Comments:
Samples were analyzed for ordnance compounds in accordance with modified form of method SW 8330 utilizing a UV detector. A C18 (octadecyl) analytical column was used as the quantitation column. CN and C8 (cyano + octyl phase) columns in series were used for confirming any positive analyte responses detected on the C18 column.

C18 Column:
The target analytes for method SW8330 and the 6 Attenuation Compounds are analyzed simultaneously on the primary column. There are no co-elution issues on the primary column. Standards forms and data sheets from the primary column will display all target analytes from both lists in the retention time order. The data packages are separated due to different confirmation techniques.

There were no co-elution issues for those attenuation compounds which needed confirmation analysis.

Standard Sources:
All ordnance attenuation compounds used in these analyses have two certified sources available with the exception of MNX, TNX and 4,4'-TN-AZOXY. MNX and TNX currently have only one, uncertified source available to the laboratory. 4,4'-TN-AZOXY currently has only one certified source available to the laboratory. Due to the low concentration of the certified source, an uncertified source available to the laboratory is cross checked and used. Therefore, any reported results for these compounds may be viewed as estimates. The ordnance attenuation compounds 2,4-DA-6-NT, 2,6-DA-4-NT and 3,5-DNA are available from one certified source from two different lot numbers.

Nitroglycerin/PETN Fraction:

Analytical Comments:
Samples were analyzed for nitroglycerin and PETN in accordance with modified method SW 8332. The samples were analyzed using a HPLC system utilizing a UV detector and a C18 (octadecyl) primary and CN (cyano phase) confirmation analytical columns.

There were no out of control events or problems associated with this SDG.

Picric Acid Fraction:

Analytical Comments:
Samples were analyzed for picric acid utilizing a HPLC system with a UV detector. A PAH (polyaromatic hydrocarbon) analytical column was used as the quantitation column. A CN (cyano phase) column is used for confirming any positive analyte responses detected on the primary column.

There were no out of control events or problems associated with this SDG.

GENERAL REMARKS ON INORGANIC ANALYSES:

The following comments describe general analysis conditions. For remarks specific to the samples reported in this case, see "SPECIFIC REMARKS ON INORGANIC ANALYSES."

ICP and ICP-MS Metals:

EPA SW846 method 3015 was used for the digestion of the samples. Method 6010B was used for the determination of calcium, magnesium, potassium and sodium, and method 6020 was used for the determination of antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, iron, lead, nickel, selenium, silver, thallium, vanadium, zinc and tin.

On the first timed and dated page of each ICP and ICP-MS run, the data to be reported or rejected will be tabulated for that run.

The true value of the calcium, potassium, magnesium, and sodium initial calibration verification (ICV) solution is 300,000 µg/L. This value is larger than the available field size on Form 2A. Therefore, a "true value" of 30,000 µg/L (1/10 the actual true value) has been entered and results for these elements have similarly been entered at 1/10 the actual value on Form 2A.

Mercury:

Laucks purchases a 1000 mg/L Hg stock solution from Inorganic Ventures. The 1.0 mg/L working standard is made by diluting 100 µL to 100 mL with 2% HNO_3. The calibration curve is made by placing 0, 20, 50, 100, 200, 500 and 1000 µL of the working standard in BOD bottles and diluting up to 100 mL. The standard curve is equivalent to 0, 0.2, 0.5, 1.0, 2.0, 5.0 and 10.0 µg/L.

SPECIFIC REMARKS ON INORGANIC ANALYSES:

Holding Time Compliance:

Laucks calculates holding time compliance for inorganic determinations using the date on which reportable data were acquired.

Metals:

The holding time for metals is six months from the date of collection, excepting mercury, which is 28 days. All analyses were performed within holding time.

Miscellaneous:

The holding times tabulated below derive from the relevant EPA methods and are applicable when the sample was appropriately preserved and/or cooled. All samples submitted followed the preservation guidelines unless explicitly noted otherwise.

Analyte	Holding Time	Violations
Phosphate	28 days	None
Sulfate	28 days	56%
Total Organic Carbon	28 days	44%
Total Organic Halogens	28 days	22%
Chloride	28 days	56%
CN	14 days	None
Sulfide	7 days	None
Nitrocellulose	7 days filter, 40 days analysis	100%

Holding time exceedances were mainly caused by instrument or QC problems or analyst error.

Samples AC124A99 and AC154A99 were analyzed for sulfate and chloride seven days outside holding time. They were also analyzed for TOC two days outside holding time and TOX three days outside holding time.

Samples ACRB4A99 and FD12289901 were analyzed for sulfate and chloride six days outside holding time. They were also analyzed for TOC one day outside holding time.

Sample AB024A99 was analyzed for sulfate and chloride five days outside holding time.

All samples were originally filtered for Nitrocellulose within holding time. However, during the hydrolysis step, these samples were dried in an oven in which nitric acid was used previously, which contaminated all the samples. Samples were re-filtered outside the 7 day holding time, but were analyzed within 40 days of being filtered. Corrective action was performed in alerting all analysts involved to the issue of selecting the appropriate oven to use. This issue will also be discussed in the next update of the SOP.

Metals:

The serial dilution for barium did not agree within 10% of the original determination after correction for dilution for sample ACRB4A99F. No further corrective action was required. All relevant data have been flagged with an "E" on the applicable Forms I and IX.

Conventionals:

Total Phosphorus, prepared 01/11/00, analyzed 01/13/00:
The preparation blank was detected at 0.02 mg/L, which was did not exceed the Laucks action level of 0.02 mg/L, therefore no corrective action was required.

The RPD for the MS/MSD pair exceeded control limits. Both the MS and the MSD were in control, as were all other QC samples, therefore no corrective action was taken.

Total Phosphorus, prepared 01/14/00, analyzed 01/17/00:
The MS and MSD recoveries and associated RPD were outside control limits. All other QC results were in control, therefore no corrective action was taken.

Sulfide, analyzed 01/03/00:
The blank spike for this analysis recovered below the control limits which had been established by Laucks, but was within limits outlined in the method. Therefore, no corrective action was taken.

TOX, analyzed 01/27/00:
The MSD recovery and associated RPD exceeded control limits. The MS and all other QC results were in control, therefore no corrective action was taken.

TOX, analyzed 02/02/00:
The MSD recovery and associated RPD exceeded control limits. The MS and all other QC results were in control, therefore no corrective action was taken.

Nitrocellulose, analyzed 02/02/00:
Currently, we are analyzing both matrix duplicates and post-filtration laboratory-fortified blanks for our QC samples for this method. This is due to the solubility of nitrocellulose in acetone, which is the solvent of the nitrocellulose spiking mixture. We are researching how to properly spike a sample, without allowing the spiked (dissolved) nitrocellulose to pass through the filter. Smaller pore-size filters, suggested in earlier (related) corrective actions, were used with no apparent effect. When the solution to this issue is determined, it will also be included in the next SOP revision.

LAUCKS TESTING LABORATORIES
940 S. Harney
Seattle, WA 98108

ABBREVIATIONS

Several abbreviations can appear in our reports. The most commonly employed abbreviations are as follows:

U The analyte of interest was not detected to the limit of detection indicated.

SDL Sample Detection Limit. The SDL can vary from sample to sample, depending on sample size, matrix interferences, moisture content and other sample-specific conditions.

PQL Practical Quantitation Limit. The limit is drawn from the test method and usually represents the SDL multiplied by a matrix-specific factor.

DB Dry Basis. The value reported has been back-calculated to normalize for the moisture content of the sample.

AR As-Received. The value has not been normalized for moisture.

ORGANIC ANALYSES:

B When used in relation to organics fractions, the "B" flag indicates the analyte of interest was detected in the method blank associated with the sample, as well as in the sample itself. The "B" flag is applied without regard to the relative concentrations detected in the blank and sample.

J The analyte of interest was detected below the routine reporting limit. This value should be regarded as an estimate.

T The flagged values represent the SUM of two co-eluting compounds. The SUM of these two values is shown as though it were a result for each of them. The two figures should not be added together.

E The flagged value was reported from an analysis which exceeded the linear range of the instrument. See additional comments for further discussion of the circumstances. Values so flagged should be considered estimates.

D The value reported derives from analysis of a diluted sample of sample extract.

P When a dual column GC technique is employed, this flag indicates that test results from the two columns differ by more than 25%. Generally, we report the higher value.

C The flagged analyte has been confirmed by GC/MS analysis. The value reported may be derived from either the initial of confirmatory (GC/MS) analysis. See specific report comments for details.

CRQL Client Requested Quantitation Limit, usually the limit of detection specified at your request. Might also be referred to as Contract Required Quantitation Limit.

LAUCKS TESTING LABORATORIES
940 S. Harney
Seattle, WA 98108

INORGANIC ANALYSES:

B The reported value was obtained from a reading that was less than the Contract Required Detection Limit (CRDL) but greater than or equal to the Instrument Detection Limit (IDL). If the analyte was analyzed for but not detected, a "U" shall be entered.

E The reported value is estimated because of the presence of interference. An explanatory note shall be included under Comments on the Cover Page (if the problem applies to all samples) or on the specific Form I-IN (if it is an isolated problem).

M Duplicate injection precision not met.

N Spiked sample recovery not within control limits.

S The reported value was determined by the Method of Standard Additions (MSA)

W Post-digestion spike for Furnace AA analysis is out of control limits (85-115%), while sample absorbance is less than 50 % of spike absorbance.

* Duplicate analysis not within control limits.

+ Correlation coefficient for the MSA is less than 0.995.

Entering "S", "W" or "+" is mutually exclusive. No combination of these qualifiers can appear in the same field for an analyte.

CRDL Client Requested Detection Limit, usually the limit of detection specified at your request. Might also be referred to as Contract required Detection Limit.

LAUCKS TESTING LABORATORIES
940 S. Harney
Seattle, WA 98108

RELEASE OF DATA

"I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the Laboratory Manager or his designee, as verified by the following signature."

Respectfully submitted,

Hugh Prentice
Project Manager

6 March 2000
(DATE)

Mike Nelson
Technical Director

6 Mar 2000
(DATE)

HOW TO CONTACT US:

All Laucks Testing Laboratories staff members can be reached at the same telephone and facsimile numbers: (206) 767-5060 by phone, (206) 767-5063 by FAX.

REQUESTS FOR DUPLICATE COPIES:

This packet has been checked for accuracy. All pages are present and in sequential order. Please see Attachment B for a detailed record.

In the event that duplicate data copies are needed, Laucks will accommodate your request at a fee of twenty-five cents ($0.25) per copy, plus shipping. If the data are in storage, there will also be a fee for retrieval.

LAUCKS TESTING LABORATORIES
SAMPLE DATA PACKAGE

COMARCO SYSTEMS INC.

LABORATORY NO.: 0001197, 0001213, 0001282, 0001445

SDG NO.: C3806

MARCH 15, 2000

LAUCKS TESTING LABORATORIES
940 S. Harney
Seattle, WA 98108

To: Comarco Systems
Project No. : CTO 38 7651
Laboratory Numbers: 0001197, 0001213, 0001282, 0001445
SDG No. : C3806
Date of Report: March 11, 2000

SAMPLE RECEIPT, IDENTIFICATION, AND GENERAL COMMENTS:

Sample Receipt and Identification:

The samples submitted under the laboratory number(s) indicated above were identified and analyzed as tabulated below. The samples were collected and received on the dates noted on the enclosed chain-of-custody copies, Attachment A.

Client Sample Identification	Laucks Sample Identification	Testing Analytical Request
ACRA4A99	0001197-01	VOA/ORD1/MET1/CN/TOX/TOC/S2/S04/TP/CL
ACRA4A99F	0001197-02	DTP/DMET
TB01100001	0001197-03	VOA
ACO44A99	0001197-04	VOA/ORD1/MET1/CN/TOX/TOC/S2/S04/TP/CL
ACO44A99F	0001197-05	DTP/DMET
TB01070001	0001197-06	VOA
ASPA4A99	0001213-01	VOA/ORD1/MET1/CN/TOX/TOC/S2/S04/TP/CL
ASPA4A99F	0001213-02	DTP/DMET
AB044A99	0001213-03	VOA/ORD1/MET1/CN/TOX/TOC/S2/S04/TP/CL
AB044A99F	0001213-04	DTP/DMET
ASPC4A99	0001213-05	VOA/ORD1/MET1/CN/TOX/TOC/S2/S04/TP/CL
ASPC4A99F	0001213-06	DTP/DMET
FD01110001	0001213-07	VOA/ORD1/MET1/CN/TOX/TOC/S2/S04/TP/CL
FD01110001F	0001213-08	DTP/DMET
TB01110001	0001213-09	VOA
AC174A99	0001282-01	VOA/ORD2/MET2/CN/TOX/TOC/CL/S04/TP
AC174A99F	0001282-02	DTP/DMET
TB01120001	0001282-03	VOA
AC264A99	0001445-01	VOA/ORD2/MET2/CN/TOX/TOC/CL/S04/TP
AC264A99F	0001445-02	DTP/DMET
TB01190001	0001445-03	VOA

Analytical Request Key:

VOA =	Volatile Organics - TCE Degradation (8260B)
ORD1 =	Ordnance (8330), PETN/Nitroglycerin, Picric Acid, Nitrocellulose, 6 Attenuation Compounds
ORD2 =	Ordnance (8330), PETN/ Nitroglycerin, Nitrocellulose

LAUCKS TESTING LABORATORIES
940 S. Harney
Seattle, WA 98108

MET1 =	Total Appendix IX Metals + Fe, Mn (6020/7470)
MET2 =	Total Appendix IX Metals + Mn (6020/7470)
DMET =	Diss. App. IX Metals plus Ca, Mg, Mn, Na, K (6010/6020/7470)
CN =	Cyanide (9012A)
TOX =	Total Organic Halogens (9020B)
TOC =	Total Organic Carbon (9060)
CL =	Chloride (EPA 9056)
S04 =	Sulfate (EPA 9056)
S2 =	Sulfide (9030B/9034)
TP =	Total Phosphorus (365.2)
DTP =	Dissolved Total Phosphorus (365.2)

Sample Receipt Comments:

Sample AC044A99 was collected over several days (1/4 through 1/8) and logged in as one sample with a collection date of 1/6/00. We have asked the field team to ship the sample daily with shortened request list to avoid future confusion. One of two samples vials of AB044A99 for TOC arrived broken, analysis was performed on the other vial. The following samples were received with air bubbles in the VOA vials.

Sample ID	Comments	Sample ID	Comments
AC044A99	2 of 3<1/4"	TB0107001	3 of 3 <1/4"
TB01110001	2 of 9 <1/4"	ASPA4A99	3 of 3 <1/4"
TB01120001	3 of 3 <1/4"	TB01190001	2 of 2 <1/4"

Sample Identification on Forms:

When completing forms created through the CLP software, every attempt is made to use both your sample IDs as well as the laboratory sample IDs. The forms have varied default sizes to their sample identification fields, and are not amenable to alteration or editing. When it is not possible to use your complete sample ID because of field length limitations, Laucks will usually do one of two things: 1) use as much of your ID as will fit, beginning from the RIGHT hand side of the sample ID number; or 2) select some sub-set of your sample identifier if it is clearly a discrete number. In addition, all forms will contain our sample IDs, which can be cross-referenced from the table above.

GENERAL REMARKS ON ORGANIC ANALYSES:

The following comments describe general analysis conditions. For remarks specific to the samples reported in this case, see "SPECIFIC REMARKS ON ORGANIC ANALYSIS."

Manual Integration:
One or more analytes may have been manually integrated on the data system quantitation reports. The manual integrations have been flagged, initialed and dated by the analyst. A list of the manual integration flags is detailed below.

M	Manual integration due to irregular peak shape
MS	Manual integration due to split peak
MR	Manual integration due to retention time shift
MI	Manual integration of correct isomer or peak
MT	Manual integration due to peak tailing
MB	Manual integration due to irregular baseline

All GC/MS Fractions:

The computerized printout for sample analysis may tabulate values for target analytes that are not reported on the relevant Form I. In that case, we have manually searched the mass spectral data and have eliminated the compound(s) as reportable based on this search.

Volatile Fraction:

The instrument used in the determination of volatile organic compounds in this SDG was fitted with the following column and trap:

Instrument	Column Name	ID, mm	Film thickness, µm	Trap
URSULA	DB-624	0.45	1.4	OI Vocarb 3000

SPECIFIC REMARKS ON ORGANIC ANALYSES:

Holding Time Compliance:

Following the Contract Laboratory Program (CLP) model, Laucks calculates holding time compliance for organic determinations based on the first injection and/or analysis of an extract or sample. Subsequent analyses (for instance, for the purpose of dilution) are not tabulated.

Volatile Organic Compounds:

The holding time is 14 days calculated from date of collection in both soil and water samples. All samples were analyzed within holding time.

LAUCKS TESTING LABORATORIES
940 S. Harney
Seattle, WA 98108

Ordnance, Attenuation Compounds, Nitroglycerin/PETN, Picric Acid:

The holding time to extraction is 7 days in water and 14 days in soil calculated from date of collection. The holding time from extraction to analysis is 40 days. All samples were originally extracted and analyzed within holding time. However the entire picric acid fraction needed to be re-extracted after the holding time had expired, and all ordnance confirmations were analyzed after the holding time had expired (see detailed comments below).

Volatile Fraction:

Initial Calibration Standards:
The standard concentration levels for the initial calibration standards are 1, 5, 10, 25 and 50 µg/L for all analytes, with the exception of m,p-xylene and methylene chloride. The standard concentration levels for m,p-xylene are 2, 10, 20, 50 and 100 µg/L. the standard concentration levels for methylene chloride are 5, 10, 25, 50 and 100 µg/L. The Form 6A does not accommodate the variability of these standards so the nominal value for most standards is used.

Sample Reporting Limits:
The most current version of SW 846 requires that the low level standard define the reporting limit. The laboratory's low level standard is 1 µg/L. The client has given express permission to report below the laboratory's low level standard for this project for specific compounds.

Quality Control Analyses:
MS/MSD analyses performed on sample ASPA4A99 yielded all spiking analyte recovery values within the control limits.

Ordnance Fraction:

Analytical Comments:
Samples were analyzed for ordnance compounds in accordance with method SW 8330 utilizing a UV detector. A C18 (octadecyl) analytical column was used as the quantitation column. CN and C8 (cyano + octyl phase) columns in series were used for confirming any positive analyte responses detected on the C18 column.

C18 Column:
The target analytes for method SW8330 and the 6 Attenuation Compounds are analyzed simultaneously on the primary column. There are no co-elution issues on the primary column. Standards forms and data sheets from the primary column will display all target analytes from both lists in the retention time order. The data packages are separated due to different confirmation techniques.

CN-C8 Columns:
The confirmation column demonstrates coelution for the following target analytes: 4-amino-2,6-dinitrotoluene and tetryl. The responses of the eluting compounds are summed and reported as one peak. When the presence of these compounds are indicated on the C18 column, CN-C8 columns concentration values can not be accurately determined due to the coeluting peaks, they are reported using the quantitation column, and the results are flagged appropriately.

Data Qualifiers:
A "Z" flag on sample report forms indicates coelution has occurred between two or more target analytes on the confirmation CN column.

The "P" flag indicates that the percent difference between the concentration values on the two columns is greater than 25 percent.

Holding Time:
Due to instrument failure the confirmation analyses were performed after the holding time expired. The primary quantitations were all analyzed within holding time. All results were reported from the primary analyses.

Ordnance Attenuation Compounds Fraction:

Analytical Comments:
Samples were analyzed for ordnance compounds in accordance with modified form of method SW 8330 utilizing a UV detector. A C18 (octadecyl) analytical column was used as the quantitation column. CN and C8 (cyano + octyl phase) columns in series were used for confirming any positive analyte responses detected on the C18 column.

C18 Column:
The target analytes for method SW8330 and the 6 Attenuation Compounds are analyzed simultaneously on the primary column. There are no co-elution issues on the primary column. Standards forms and data sheets from the primary column will display

all target analytes from both lists in the retention time order. The data packages are separated due to different confirmation techniques.

There were no co-elution issues for those attenuation compounds which needed confirmation analysis.

Standard Sources:
All ordnance attenuation compounds used in these analyses have two certified sources available with the exception of MNX, TNX and 4,4'-TN-AZOXY. MNX and TNX currently have only one, uncertified source available to the laboratory. 4,4'-TN-AZOXY currently has only one certified source available to the laboratory. Due to the low concentration of the certified source, an uncertified source available to the laboratory is cross checked and used. Therefore, any reported results for these compounds may be viewed as estimates. The ordnance attenuation compounds 2,4-DA-6-NT, 2,6-DA-4-NT and 3,5-DNA are available from one certified source from two different lot numbers.

Nitroglycerin/PETN Fraction:

Analytical Comments:
Samples were analyzed for nitroglycerin and PETN in accordance with modified method SW 8332. The samples were analyzed using a HPLC system utilizing a UV detector and a C18 (octadecyl) primary and CN (cyano phase) confirmation analytical columns.

The retention time windows for the nitroglycerin/PETN analyses were administratively set because the 72-hour threshold has not been met.

There were no out of control events or problems associated with this SDG.

Picric Acid Fraction:

Analytical Comments:
Samples were analyzed for picric acid utilizing a HPLC system with a UV detector. A PAH (polyaromatic hydrocarbon) analytical column was used as the quantitation column. A CN (cyano phase) column is used for confirming any positive analyte responses detected on the primary column.

Holding Time:
Analyses of the extracts resulted in a lack of surrogate and spike recoveries. Corrective action was taken in the form of sample re-extraction which was performed after the holding time expired. Due to the lack of surrogate recovery values from the initial analyses, only data from the re-extracted samples have been submitted. Data from the initial analyses have been submitted for review and are located in the Bench Sheet section of the data package.

Surrogate Recoveries:
Analyses of the extracts for samples ASPA4A99RE, ASPA4A99MS and ASPA4A99MSD yielded recovery values for 4,6-dinitro-o-cresol which exceeded the upper control limit due to matrix interference. Since picric acid was not detected in any samples in this SDG, and all other surrogate recoveries were in control, no further action was taken.

GENERAL REMARKS ON INORGANIC ANALYSES:

The following comments describe general analysis conditions. For remarks specific to the samples reported in this case, see "SPECIFIC REMARKS ON INORGANIC ANALYSES."

ICP and ICP-MS Metals:

EPA SW846 method 3015 was used for the digestion of the samples. Method 6010B was used for the determination of calcium, magnesium, potassium and sodium, and method 6020 was used for the determination of antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, iron, lead, nickel, selenium, silver, thallium, vanadium, zinc and tin.

On the first timed and dated page of each ICP and ICP-MS run, the data to be reported or rejected will be tabulated for that run.

The true value of the calcium, potassium, magnesium, and sodium initial calibration verification (ICV) solution is 300,000 µg/L. This value is larger than the available field size on Form 2A. Therefore, a "true value" of 30,000 µg/L (1/10 the actual true value) has been entered and results for these elements have similarly been entered at 1/10 the actual value on Form 2A.

Mercury:

Laucks purchases a 1000 mg/L Hg stock solution from Inorganic Ventures. The 1.0 mg/L working standard is made by diluting 100 µL to 100 mL with 2% HNO_3. The calibration curve is made by placing 0, 20, 50, 100, 200, 500 and 1000 µL of the working standard in BOD bottles and diluting up to 100 mL. The standard curve is equivalent to 0, 0.2, 0.5, 1.0, 2.0, 5.0 and 10.0 µg/L.

SPECIFIC REMARKS ON INORGANIC ANALYSES:

Holding Time Compliance:

Laucks calculates holding time compliance for inorganic determinations using the date on which reportable data were acquired.

Metals:

The holding time for metals is six months from the date of collection, excepting mercury, which is 28 days. All analyses were performed within holding time.

Miscellaneous:

The holding times tabulated below derive from the relevant EPA methods and are applicable when the sample was appropriately preserved and/or cooled. All samples submitted followed the preservation guidelines unless explicitly noted otherwise.

Analyte	Holding Time	Violations
Phosphate	28 days	None
Sulfate	28 days	None
Total Organic Carbon	28 days	None
Total Organic Halogens	28 days	None
Chloride	28 days	None
CN	14 days	None
Sulfide	7 days	None
Nitrocellulose	7 days filter, 40 days analysis	100%

All samples were originally filtered for Nitrocellulose within holding time. However, during the hydrolysis step, these samples were dried in an oven in which nitric acid was used previously, which contaminated all the samples. Samples were re-filtered outside the 7 day holding time, but were analyzed within 40 days of being filtered. Corrective action was performed in alerting all analysts involved to the issue of selecting the appropriate oven to use. This issue will also be discussed in the next update of the SOP.

Metals:

No comments.

Mercury:

Samples chosen for QC for mercury (ASPA4A99 and ASPA4A99F) were analyzed for MS/MSD rather than MS/Duplicate. The results for the MS/MSD are reported here with this data package.

LAUCKS TESTING LABORATORIES
940 S. Harney
Seattle, WA 98108

Conventionals:

Sulfide, analyzed 01/13/00:
The blank spike for this analysis recovered below the control limits which had been established by Laucks, but was within limits outlined in the method. Therefore, no corrective action was taken.

Sulfide, analyzed 01/18/00:
Both the matrix spike and the blank spike for this analysis recovered below the control limits which had been established by Laucks, but were within limits outlined in the method. Therefore, no corrective action was taken.

Total Phosphorus, prepared 01/14/00, analyzed 01/17/00:
The MS and MSD recoveries and associated RPD were outside control limits. All other QC results were in control, therefore no corrective action was taken.

Total Phosphorus, prepared 01/19/00, analyzed 01/20/00:
The MS recovery and associated RPD were outside control limits. The MSD and all other QC results were in control, therefore no corrective action was taken.

Total Phosphorus, prepared 01/26/00, analyzed 01/27/00:
The samples were analyzed on 01/27/00, but the associated MS/MSD pair was re-analyzed on 02/02/00. The RPD for the MS/MSD pair exceeded control limits. Both the MS and the MSD were in control, as were all other QC samples, therefore no corrective action was taken.

TOX, analyzed 01/18/00:
The MSD recovery exceeded control limits. The MS, the associated RPD and all other QC results were in control, therefore no corrective action was taken.

Nitrocellulose, analyzed 02/02/00:
Currently, we are analyzing both matrix duplicates and post-filtration laboratory-fortified blanks for our QC samples for this method. This is due to the solubility of nitrocellulose in acetone, which is the solvent of the nitrocellulose spiking mixture. We are researching how to properly spike a sample, without allowing the spiked (dissolved) nitrocellulose to pass through the filter. Smaller pore-size filters, suggested in earlier (related) corrective actions, were used with no apparent effect. When the solution to this issue is determined, it will also be included in the next SOP revision.

LAUCKS TESTING LABORATORIES
940 S. Harney
Seattle, WA 98108

ABBREVIATIONS

Several abbreviations can appear in our reports. The most commonly employed abbreviations are as follows:

U — The analyte of interest was not detected to the limit of detection indicated.

SDL — Sample Detection Limit. The SDL can vary from sample to sample, depending on sample size, matrix interferences, moisture content and other sample-specific conditions.

PQL — Practical Quantitation Limit. The limit is drawn from the test method and usually represents the SDL multiplied by a matrix-specific factor.

DB — Dry Basis. The value reported has been back-calculated to normalize for the moisture content of the sample.

AR — As-Received. The value has not been normalized for moisture.

ORGANIC ANALYSES:

B — When used in relation to organics fractions, the "B" flag indicates the analyte of interest was detected in the method blank associated with the sample, as well as in the sample itself. The "B" flag is applied without regard to the relative concentrations detected in the blank and sample.

J — The analyte of interest was detected below the routine reporting limit. This value should be regarded as an estimate.

T — The flagged values represent the SUM of two co-eluting compounds. The SUM of these two values is shown as though it were a result for each of them. The two figures should not be added together.

E — The flagged value was reported from an analysis which exceeded the linear range of the instrument. See additional comments for further discussion of the circumstances. Values so flagged should be considered estimates.

D — The value reported derives from analysis of a diluted sample of sample extract.

P — When a dual column GC technique is employed, this flag indicates that test results from the two columns differ by more than 25%. Generally, we report the higher value.

C — The flagged analyte has been confirmed by GC/MS analysis. The value reported may be derived from either the initial of confirmatory (GC/MS) analysis. See specific report comments for details.

CRQL — Client Requested Quantitation Limit, usually the limit of detection specified at your request. Might also be referred to as Contract Required Quantitation Limit.

LAUCKS TESTING LABORATORIES
940 S. Harney
Seattle, WA 98108

INORGANIC ANALYSES:

B The reported value was obtained from a reading that was less than the Contract Required Detection Limit (CRDL) but greater than or equal to the Instrument Detection Limit (IDL). If the analyte was analyzed for but not detected, a "U" shall be entered.

E The reported value is estimated because of the presence of interference. An explanatory note shall be included under Comments on the Cover Page (if the problem applies to all samples) or on the specific Form I-IN (if it is an isolated problem).

M Duplicate injection precision not met.

N Spiked sample recovery not within control limits.

S The reported value was determined by the Method of Standard Additions (MSA)

W Post-digestion spike for Furnace AA analysis is out of control limits (85-115%), while sample absorbance is less than 50 % of spike absorbance.

* Duplicate analysis not within control limits.

+ Correlation coefficient for the MSA is less than 0.995.

Entering "S", "W" or "+" is mutually exclusive. No combination of these qualifiers can appear in the same field for an analyte.

CRDL Client Requested Detection Limit, usually the limit of detection specified at your request. Might also be referred to as Contract required Detection Limit.

LAUCKS TESTING LABORATORIES
940 S. Harney
Seattle, WA 98108

RELEASE OF DATA

"I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the Laboratory Manager or his designee, as verified by the following signature."

Respectfully submitted,

Hugh Prentice
Project Manager

16 March 2000
(DATE)

Mike Nelson
Technical Director

16 Mar 2000
(DATE)

HOW TO CONTACT US:

All Laucks Testing Laboratories staff members can be reached at the same telephone and facsimile numbers: (206) 767-5060 by phone, (206) 767-5063 by FAX.

REQUESTS FOR DUPLICATE COPIES:

This packet has been checked for accuracy. All pages are present and in sequential order. Please see Attachment B for a detailed record.

In the event that duplicate data copies are needed, Laucks will accommodate your request at a fee of twenty-five cents ($0.25) per copy, plus shipping. If the data are in storage, there will also be a fee for retrieval.

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.

Nancy L. Albertson (acting)

SIGNATURE

Environmental Protection Department Manager — 21 MARCH 2001

TITLE — DATE