



ROY F. WESTON, INC.
ESAT PROJECT
LANDMARK ONE
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BURLINGTON, MA 01803
(617) 229-2050
FAX: (617) 229-0046

August 29, 1989
C-9-8-18

Split Sample Survey
Savage Municipal Well Site
Milford, New Hampshire

Mr. John Carlson
ESAT DPO
Environmental Services Division
U.S. EPA - Region I
60 Westview Street
Lexington, Massachusetts 02173

Re: TID No. 01-8907-14/01-8907-43

Split Sample Survey
Savage Municipal Well Site
Milford, New Hampshire

Dear Mr. Carlson:

Environmental Services Assistance Team (ESAT) members Jay Markarian and Michael Choquette have completed the PRP/EPA split sampling survey and PRP sampling methodology audit at the Savage Municipal Well site in Milford, New Hampshire. This task was authorized by you, the EPA Task Monitor, under Technical Instruction Document (TID) number 01-8907-09, issued on July 5, 1989. Due to the completion of the base contract period, the TID was reauthorized under TID number 01-8907-43 on July 27, 1989. The task was initiated on July 6, 1989 and completed on August 29, 1989.

On July 26 and 27, 1989, HMM Associates, Inc. (HMM), consultants for the Potentially Responsible Party (PRP), collected samples from site monitoring wells. The following split samples were accepted on behalf of the U.S. EPA by ESAT member Jay Markarian and submitted to Contract Laboratory Program (CLP) laboratories for analysis:

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Mr. John Carlson
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<u>WELL NUMBER</u>	<u>PARAMETERS OF ANALYSIS</u>
MW-2B	Method 624 - Volatile Organics
MI MW -12	Method 624 - Volatile Organics
MW-15B	Method 624 - Volatile Organics
MW-24B	Method 624 - Volatile Organics
MW-23B	Method 624 - Volatile Organics
MW-16B	Method 624 - Volatile Organics
	Method 625 - Semi-Volatile Organics
	Method 6010 - Dissolved Metals; Al, Ba, Sb, Cd, Cr, Cu, Fe, Mg, Ni, Vd, Zn
	Method 7060 - Dissolved Metals; Arsenic
	Method 7421 - Dissolved Metals; Lead

Trip blanks and performance evaluation samples prepared by the U.S. EPA Environmental Services Division - Chemistry Section were delivered to HMM and State of New Hampshire field personnel by Mr. Markarian. An identical set accompanied the U.S. EPA split samples to the CLP laboratory.

ESAT provided copies of Chain-of-Custody forms and Special Analytical Services (SAS) packing list forms to the Region I Sample Control Coordinator, Ms. Heidi Ellis and Ms. Cindy Schreyer, CLP Sample Management Office (SMO). A copy of sample documentation required by the Environmental Studies Section (sample cards), the forms listed above, a copy of the Chain-of-Custody form for QA/QC samples delivered to the State of New Hampshire and HMM, and a copy of the Sample Work/QA Plan are enclosed.



Mr. John Carlson
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Mr. Markarian provided on-site technical comment to the state of New Hampshire field representatives and the U.S. EPA Remedial Project Manager (RPM), Richard Goelhart, regarding HMMs sampling methodologies. No significant problems were noted.

The following report summarizes the sample survey activities and includes comments provided to the RPM and the state of New Hampshire representatives.

If there are any further questions regarding this matter, please feel free to contact us at our office.

Very truly yours,

ROY F. WESTON, INC.

A handwritten signature in cursive script that reads "Jay S. Markarian".

Jay S. Markarian, P.G., CHMM
Senior Investigation
Coordinator

A handwritten signature in cursive script that reads "Joseph D. Mastone".

Joseph D. Mastone
ESAT Team Manager
Region I

JSM/cmw
Enclosures

cc: R. Goelhart, U.S. EPA



ENVIRONMENTAL SERVICES ASSISTANCE TEAM
U.S. EPA REGION I

SPLIT SAMPLE SURVEY
SAVAGE MUNICIPAL WELL SITE
Milford, New Hampshire

TID No. 01-8907-14/01-8907-43

Submitted to:

Mr. John Carlson
Deputy Project Officer
Environmental Services Division
U.S. EPA - Region I
60 Westview Street
Lexington, Massachusetts 02173

Submitted by:

Jay Markarian, P.G., CHMM
Senior Investigation Coordinator
ESAT - Region I
ROY F. WESTON, INC.
One Van de Graaff Drive
Burlington, Massachusetts 01803

August 29, 1989
EPA Contract 68-01-7443



SUMMARY OF ACTIVITIES

On July 26, 1989, ESAT members Jay Markarian and Michael Choquette met with U.S. EPA Remedial Project Manager (RPM), Mr. Richard Goelhart, State of New Hampshire Representative Richard Pease, and Jeff Siedell, Field Team Leader for HMM Associates, consultants for the Responsible Party, at the Savage Municipal Well site in Milford, New Hampshire. Mr. Markarian transferred chain-of-custody of trip blanks and performance evaluation samples to Mr. Siedell and Mr. Pease. All personnel, including HMM sampling support personnel Patrick Aurthor and Jean Lee, proceeded to monitoring well MW-12.

Monitoring Well MW-12

The sampling team adequately decontaminated the downhole tape measure and purging equipment and calibrated the pH meter. The well cap was opened and HNU readings indicated background levels at the well head. The total purge volume was calculated from downhole measurements. Purging proceeded at approximately 2 to 3 gallons per minute with a Boston Gear variable occlusion peristaltic pump until 3 volumes had been evacuated and temperature, conductivity, and pH parameters stabilized. A pre-cleaned bailer was used to collect a split volatile organic analysis sample at 10:54 hours.

Notable concerns expressed to Mr. Goelhart regarding the sample collection methodology included the following:

- the placement on the ground of the peristaltic pump's hose just prior to place into the well;
- impact to ground of the bailer's line during bailing activities; and
- the lowering of the bailer too quickly into the well.



Monitoring Well MW-15B

The sampling team adequately decontaminated the downhole tape measure and purging equipment, and calibrated the pH meter. The well cap was opened and HNU readings reported 1 unit over background levels at the well head. The total well purge volume was calculated by measuring from the top of the well casing to the water table, with the depth to the well bottom assumed from a drilling log. The well was bailed dry after 5.5 of the 12 gallons required. Two pH measurements collected reported high readings of 12.0 and 12.2. A decision was made to allow recharge overnight and proceed to monitoring well MW-2B.

Monitoring well MW-15A, immediately adjacent to MW-15B, was sampled at approximately the same time. No EPA split samples were collected, but HMM did prepare an equipment blank for the bailer after sampling 15-A.

Notable concerns expressed to Mr. Goelhart regarding the sample collection methodology included the following:

- the well may be contaminated with grout;
- sample equipment was staged directly on the ground and should have been staged on plastic; and
- the bailer's teflon-coated leader line was damaged and needed replacement.

Monitoring Well MW-2B

The sampling team adequately decontaminated the downhole tape measure, sampling equipment, and purging equipment, and calibrated the pH meter. The well cap was opened and the HNU readings reported 20 units (full scale deflection at 0-20 scale) at the well head and 14 units in the ambient air away from the well head. Readings later stabilized to background levels and it was determined by HMM field personnel that initial readings were unreliable. The total purge volume was calculated as 48-gallons by measuring from the top of the



well casing to the water table with the well bottom depth assumed from a drilling log. Purging proceeded at approximately 0.5 gallons per minute with the peristaltic pump until three well volumes had been evacuated and temperature, conductivity, and pH parameters stabilized. A new purge line was installed in the pump during the purging. A split volatile organic analysis sample was collected at 18:23 hours.

A notable concern expressed to Mr. Goelher regarding the sample collection methodology included HMM's assumption of well depth in lieu of making the actual measurement.

On July 27, 1989, ESAT members Jay Markarian and Michael Choquette met with the U.S. EPA RPM, State of New Hampshire representative Michael Robinette and the field sampling team from HMM at the site of monitoring well 15-B. All personnel prepared to collect and complete the split sample survey on this day.

Monitoring Well MW-15B

The sampling team adequately decontaminated the sampling equipment. The well cap was opened and the HNU readings reported background levels at the well head. The bailer's leader line was replaced and a split volatile organic analysis sample was collected at 09:05 hours.

Monitoring Well MW-23

The sampling team adequately decontaminated the downhole tape measure, purging equipment, and sampling equipment. The well cap was opened and the HNU readings reported 15 units and 8 units (on the 0-20 scale) at the well head with background levels in the breathing zone. The total purge volume was calculated as 25-gallons by measuring from the top of the well casing to the water table with the well bottom depth assumed from a drilling log. Purging proceeded at approximately 2.25 gallons per minute with the peristaltic pump until three well volumes had been evacuated and temperature, conductivity, and pH parameters stabilized. A split



volatile organic analysis sample was collected at 10:24 hours.

Monitoring Well MW-24B

The sampling team adequately decontaminated the downhole measuring tape, purging equipment and sampling equipment and calibrated the pH meter. The well cap was opened and the HNU readings reported 35 units (on the 0-200 scale) at the well head then quickly approached background levels. The total purge volume was calculated as 18-gallons by measuring from the top of the well casing to the water table with the well bottom depth assumed from a drilling log. Purging proceeded with the peristaltic pump until three well volumes had been evacuated and temperature, conductivity, and pH parameters stabilized. A split volatile organic analysis sample was collected at 12:00 hours.

Monitoring Well MW-16B

The sampling team adequately decontaminated the downhole tape measure, purging equipment and sampling equipment and calibrated the pH meter. The well cap was open and the HNU readings reported background levels at the well head. The total purge volume was calculated as 40-gallons by measuring from the top of the well casing to the water table with the well bottom depth assumed from a drilling log. Purging proceeded with the peristaltic pump until three well volumes had been evacuated and temperature, conductivity, and pH parameters stabilized. Split samples for volatile organic analysis, semi-volatile organic analysis, and dissolved metals were collected between 14:45 and 14:55 hours. Dissolved metals samples were filtered and preserved in the field with addition of HNO_3 to pH >2.



CONCLUSIONS

No significant incidents were observed by ESAT personnel that would jeopardize sample integrity. It is recommended that prior to any future sampling activities, HMM should address the following concerns:

- stage all sampling equipment on plastic sheeting and not on the ground during sample activities;
- decontaminate any downhole sampling equipment and/or measuring devices that have impacted the ground prior to placement into a well;
- avoid lowering bailers too quickly into wells to avoid unnecessary water agitation;
- ensure that defective or damaged equipment is replaced; and
- all well depths should be verified upon each sampling event, not assumed from drilling logs.

DRAFT

Sample Work/QA Plan
(Short Form)

SAVAGE WELL SITE
Milford, New Hampshire

U.S. EPA - Region I
Environmental Services Division
Water Section

(Project Officer's Signature) _____

Project Officer's Name Richard Goehlert

Office of Quality Assurance Acceptance:

Signature _____

Date _____

1. Project Name: Savage Well Site PRP Split Sample Survey
2. Project Requested By: Richard Goehlert
3. Date of Request: 7/6/89
4. Date of Project Initiation: 7/6/89
5. Project Officer: Richard Goehlert
6. Quality Assurance Officer: Charles Porfert
7. Project Description

A. Objective and Scope Statement:

The project objective is to collect split groundwater samples at six groundwater monitoring well locations with the consultant (HMM Associates, Inc.) for the PRPs at the site. The ESD will provide sampling containers; HMM will split samples into the sampling containers provided by ESD (ESAT) personnel. ESD will send the samples to a CLP Laboratory for SAS analyses.

The analytical results generated by CLP will be compared to those generated by the PRP's contractor's laboratory, in order to evaluate the PRP's contractor's laboratory analyses.

A total of six samples will be split. These include:

- 6 groundwater samples for VOA (volatile organic analysis)
- 1 groundwater sample for BNA (Base-Neutral Acid Extractables)
- 1 groundwater for dissolved metals (Al, Sb, As, Ba, Cd, Cr, Cu, Fe, Pb, Mg, Ni, V, Zn).

B. Data Usage:

The data will be used for quality control purposes by comparing results generated by the CLP Laboratory to those generated by the laboratory for the PRP's consultant. The analytical methods requested in the SAS are the same ~~to~~ (NS)

those to be utilized by the laboratory for the PRP's consultant:

- EPA Method 624 for VOAs
- EPA Method 8270 for BNAs
- EPA Method 6010 for Al, Sb, Ba, Cd, Cr, Cu, Fe, Mg, Ni, V, Zn
- EPA Method 7060 for As
- EPA Method 7421 for Pb

Comparing CLP and PRP analytical results will allow for evaluation of PRP's consultants laboratory analyses.

C. Monitoring Network Design and Rationale:

Groundwater samples are to be collected at six groundwater monitoring wells at the site. The RPM and HMM project manager have determined which wells will be sampled. The monitoring wells will be sampled according to methods in the October 1989 and addended November 1989 POP (QAPjP), prepared by HMM.

<u>Parameter</u>	<u>Number of Samples</u>	<u>Sample Matrix</u>	<u>Analytical Method Reference</u>	<u>Sample Preservation</u>	<u>Holding Time</u>
BNAs	1 plus 2 duplicates (MS, MSD), 1 trip blank	ground water	EPA Method 8270; SW-846 3rd Ed. 9/86 (CLP SAS)	ice, 4°	14 days
Metals, dissolved - (Al, Sb, Ba, Cd, Cr, Cu, Fe, Mg, Ni, V, Zn)	1 plus 2 duplicates (MS, MSD), 1 trip blank	ground water	EPA Method 6010; SW-846 3rd Ed. 9/86 (CLP SAS)	filter on-site, HNO ₃ to pH <2	6 mos.
- Arsenic		ground water	EPA Method 7060, SW-846, 3rd Ed. 9/86 (CLP SAS)	filter on-site HNO ₃ to pH <2	6 mos.
- Lead		ground water	EPA Method 7421, SW-846, 3rd Ed. 9/86 (CLP SAS)	filter on-site HNO ₃ to pH <2	6 mos.
VOAs	6 plus 2 duplicates (MS, MSD), 1 trip blank	ground water	*EPA Method 624 (CLP SAS)	ice, 4°C	14 days

* Not the original Method approved in the addended November 1989 HMM QAPjP. The approved method was 8240, SW-846, 3rd Ed. 9/86. However, method 624 will be utilized for analyses by CLP and Laboratory for HMM.

8. Schedule of Tasks and Products:

<u>Date</u>	<u>Activity</u>
07/06/89	Scoping Meeting at ESD
07/26-27/89	Conduct Sampling
07/27/89	Send Samples to Laboratory
Week of 07/24/89	Analysis by CLP Laboratory
08/23/89	Data Validation
09/01/89	Final Report Submitted to Project Manager

9. Project Organization and Responsibility

The following is a list of key project personnel and their corresponding responsibilities:

Sampling Operations - Richard Goehlert (U.S. EPA)

Sampling QC - John Hagopian (WESTON-ESAT)

Laboratory Analysis - TBA

Laboratory QC - TBA

Data Processing Activities - CLP Laboratory

Data Processing QC - CLP Laboratory

Data Quality Review - ESD/QAO

Performance Auditing - N/A

Systems Auditing - N/A

Overall QA - Charles Porfert

Overall Project Coordination - Richard Goehlert

(Note: An organizational chart is to be supplied with this plan) - N/A

10. Data Quality Requirements and Assessments

<u>Parameter</u>	<u>Sample Matrix</u>	<u>Detection Limit</u>	<u>Quantitation Limit</u>	<u>Estimated Accuracy</u>	<u>Accuracy Protocol</u>	<u>Estimated Precision</u>	<u>Precision Protocol</u>
1. BNAs	groundwater:	CLP Method Requirements					
2. Metals	groundwater:	CLP Method Requirements					
3. VOAs	groundwater:	CLP Method Requirements					
4.							
5.							
6.							
7.							
8.							

Data Representativeness:

Assess representativeness of PRPs consultants samples. A sample will be collected as a split if sufficient volume is recovered; if not, the sample will be collected as a duplicate (sampling methodology to be noted in field).

Data Comparability:

The data must be comparable for all sampling locations using the same analytical method; however, data may not be comparable when different analytical methods are used.

11. Sampling Procedures:

The groundwater will be sampled according to the methods outlined in the Project Operations Plan (Quality Assurance Project Plan) prepared by HMM, October 1989, Addended November 23, 1989, reviewed with coordination signature for the Office of Quality Assurance by Charles Porfert.

12. Sample Custody Procedures: SOP prepared by ESD.

13. Calibration Procedures and Preventive Maintenance: N/A

14. Documentation, Data Reduction, and Reporting

A. Documentation:

Documentation will be provided in the field, and for all aspects of this project via a logbook, as well as required CLP forms and data cards.

B. Data Reduction and Reporting:

CLP Laboratories will report data to ESD where it will be validated and reported to the Program Manager.

15. Data Validation: Completed by ESD.

16. Performance and Systems Audits: N/A

17. Corrective Action:

If results of the project are of questionable validity due to field or laboratory problems, the valid portion of the data will be reported to the Project Manager. Additional field and analytical work may be scheduled if insufficient information has been provided to the project managers as field and laboratory time is available.

18. Reports:

Will be sent to:

Richard Goehlert
U.S. EPA - Waste Management Division
90 Canal Street
Boston, Massachusetts

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07/20/89

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7-10-89

U.S. ENVIRONMENTAL PROTECTION AGENCY
CLP Sample Management Office
P.O. Box 818 - Alexandria, Virginia 22313
Phone: 703/557-2490 - FTS/337-2490

SAS Number

SPECIAL ANALYTICAL SERVICES

Client Request

Regional Transmittal

Telephone Request

- A. EPA Region/Clients: Region 1 EPA
- B. RSCC Representatives: Heidi Ellis
- C. Telephone Number: (617) 573-5798
- D. Date of Request: 7-7-89
- E. Site Name: Savage Wells, Milford, NH

Please provide below description of your request for Special Analytical Services under the Contract Laboratory Program. In order to most efficiently obtain laboratory capability for your request, please address the following considerations, if applicable. Incomplete or erroneous information may result in a delay in the processing of your request. Please continue response on additional sheets, or attach supplementary information as needed.

1. General description of analytical service requested: Analysis of B/N/A and Volatile compounds utilizing the Code of Federal Regulations, July 1, 1978, revision; Methods 635 and 624. Metals analysis utilizing SW-846, 3rd edition.
2. Definition and number of work units involved (specify whether whole samples or fractions; whether organics or inorganics; whether aqueous or soil and sediments; and whether low, medium or high concentration):
1 water sample; B/N/A analysis
7 water sample; VOA analysis
1 water sample; Metals analysis
3. Purpose of analysis (specify whether Superfund (enforcement or remedial action), RCRA, NPDES, etc.): Remedial Investigation

- 8. Estimated date(s) of collection: Week of July 24, 1989
- 9. Estimated date(s) and method of shipment: Week of July 24, 1989;
Overnight delivery with Airborne
- 6. Number of days analysis and data required after laboratory receipt of samples: See Attachment I
- 7. Analytical protocol required (attach copy if other than a protocol currently used in this program): Code of Federal Regulations, July 1, 1988;
Revision - Organic Analyses; Methods 624 and 625 BNA
SW-846 - 3rd Edition - Inorganic Analyses; See
Attachment II
- 8. Special technical instructions (if outside protocol requirements, specify compound names, CAS numbers, detection limits, etc.): Methods 624 and 625,
the internal standard technique will be used. See
Attachment IV.
- 9. Analytical results required (if known, specify format for data sheets, QA/QC reports, Chain-of-Custody documentation, etc.) If not completed, format of results will be left to program discretion. See Attachment V
- 10. Other (use additional sheets or attach supplementary information, as needed):
- 11. Name of sampling/shipping contact: John Haseman
Phone: (617) 229-2050

12. Data Requirements

<u>Parameter</u>	<u>Detection Limit</u>	<u>Precision Desired (% or Concentration)</u>
See Attachment V.		

13. QC Requirements

<u>Audits Required</u>	<u>Frequency of Audits</u>	<u>Limits (Percent or Concentration)</u>
See Attachments III Inorganics		
See Attachment IV Organics		

14. Action Required if Limits are Exceeded

IF limits are exceeded or technical questions arise contact first, SAND and second, Deb Szabo (617) 860-4312 or Vicki Maynard (617) 860-4375.

Please return this request to the Sample Management Office as soon as possible to expedite processing of your request for special analytical services. Should you have any questions or need any assistance, please contact your Regional representative at the Sample Management Office.

07/20/89

12:30

E.P.A.

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Attachment I

Method 624

The samples must be analyzed ⁷ days from date of collection; data due 30 days after laboratory receipt of samples.

Method 625

The samples must be extracted within 7 days of sample collection and analyzed within forty days of extraction; data due 30 days after laboratory receipt of samples.

Metals Analysis

The samples must be analyzed within 6 months of sample receipt by the laboratory; data due 30 days after laboratory receipt of samples.

Attachment II-Methods¹

<u>Parameter</u>	<u>Analytical Method</u>	<u>Digestion Method</u>
Aluminum	6010	3010
Antimony	6010	3010
Arsenic	7060	3020
Barium	6010	3010
Cadium	6010	3010
Chromium	6010	3010
Copper	6010	3010
Iron	6010	3010
Lead	7421	3020
Magnesium	6010	3010
Nickel	6010	3010
Vanadium	6010	3010
Zinc	6010	3010

1. All methods are from Test Methods for Evaluating Solid Waste, SW- 846, third edition.

Attachment III- QC Requirements

<u>Audits Required</u>	<u>Frequency</u>	<u>Limits</u>
Preparation blank	1 per digestion batch	< IDL
Duplicate	1 in 20 samples	± 20 percent
Matrix Spike	1 in 20 samples	± 20 percent
Initial calibration	Each time instrument is set up	Correlation coefficient < 0.995
Calibration verification	5 percent	± 10 % Metals
Laboratory control sample	1 per batch of 20 samples	± 20 percent
Single spike analyses for graphite furnace		85-115 % (if outside limits, MSA is required)

Attachment IV

Method 624

- o Internal Standards: Bromochloromethane, 1,4-Difluorobenzene, and Chlorobenzene-d5. (concentration of 50 ug/L at time of purge)
- o Surrogate Compounds: 1,2-Dichloroethane-d4, 4-Bromofluorobenzene, and 4-Bromofluorobenzene. (50 ug in sample at the time of injection)

Method 625

- o Internal Standards: 1,4-Dichlorobenzene-d4, Naphthalene-d8, Acenaphthend-d10, Phenanthrene-d10, Chrysene-d12, and Perylene-d12. (a resulting concentration of 40ng/UL in each sample upon analysis)
- o Surrogate Compounds: Nitrobenzene-d5, 2-Fluorobiphenyl, Terphenyl-d14, Phenol-d5, 2-Fluorophenol, and 2,4,6-Tribromophenol. (a resulting concentration of 50 ug injected base/neutral and 100 ug injected acids)

Organic Methods 624 & 625

- o The GC/MS system must be tuned to meet the DFTPP specifications in Method 625 Table 9 or BFB specifications in Method 624 Table 2.
- o There must be an initial calibration of the GC/MS system as specified in Methods 625 Section 7 or Method 624, Section 7.
- o The GC/MS system must meet the 2/88 Organic SOW criteria for SPCC and CCC criteria compounds established. The minimum RF and average RF criteria and %RSD and %D criteria specified in the 2/88 Organic SOW will be applied. The daily calibration check will utilize the medium level standard analyzed in the initial calibration.
- o To establish the ability to generate acceptable accuracy and precision, the analyst must perform the procedures specified in Method 625, Sections 9, 12, 13 and 624 Sections 8, 10, 11, 14.
- o The laboratory must analyze a reagent blank, a matrix spike, and a matrix spike duplicate for each batch extracted (up to a maximum of 20 samples/batch). The concentration of the spike which must be utilized is VOA 50 ug/L and Base/Neutral 100 ug/ml and Acids 200 ug/ml.

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Attachment V

The data package deliverables should resemble as closely as possible the RAS data package.

- o A narrative must be provided describing the procedure performed by the laboratory and any deviations from the methods. Problems encountered during analysis must be addressed and any factors which may influence the data. The sample SAS request, SAS packing list and chain of custody must also be included.
- o Record of the daily analytical scheme (run log and/or instrument log) which includes the samples and standards order of analysis.
- o Raw data for all blanks, spikes, standards and samples. The raw data must include the reconstructed ion chromatogram, the instrument quantitation sheet, and spectra; raw and enhanced for all positive results reported, a standard reference spectrum must also be included, and the date and time of analysis must be clearly labelled on the instrument quantitation sheet.
- o The tuning results must be tabulated in a format similar to the RAS Form V. The instrument normalized mass listing must also be provided.
- o The calibration results must also be reported in a tabulated format similar to the RAS Form VI for the daily calibration. The relative response factors and the percent relative standard deviation must be calculated for each days' calibration. The concentration of the standards analyzed and the raw data must be provided. If additional standards were analyzed due to positive results not within the calibration curve, these standards must also be provided; the raw data and tabulated results. The minimum response factor is 0.300 and the maximum relative standard deviation is 30 percent for the three point calibration. Quantitation of positive results will utilize the average daily RF for a compound.

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Attachment V cont.

- o The surrogate results must be provided in a tabulated format similar to the RAS Form II. The compounds which are not within criteria must be flagged. All blanks, samples and QC samples which were analyzed must be reported. The blanks analyzed to demonstrate the cartridges contained no contamination should be summarized on this form also.
- o Provide the internal standards results in a format similar to the RAS Form VIII. The samples internal standards and retention times must be reported in respect to the average of the daily three point calibration results.
- o The samples, blanks and any QC samples analyzed must be included. The results must be tabulated on a form similar to the RAS Form I with the accompanying raw data. The blanks which were analyzed to verify the cartridges were clean prior to sample collection must be tabulated and the raw data provided.
- o The data supporting the development of the detection limits must be included. The results must be in a tabulated format with the raw data provided.

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: 7-10-89 : 9:21AM :

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**Attachment V cont.
DELIVERABLES**

Inorganic

- o Summary of positive results and detection limits of non-detects with all raw data. (Form 1)
- o Record of daily analytical scheme (run log, and instrument log) which includes samples and standards order of analysis.
- o Raw data for all method blanks, duplicates, and spikes.
- o Calibration results (initial and continuing) with all raw data including the concentration of the standards etc. (Forms 2A and 2B)
- o All information including raw data for all LCS samples required by the method. (Form 7)
- o Sample prep information including amount digested and final volume.
- o Tabulated spike recovery results and raw data (Forms 5A and B)
- o Tabulated duplicate results with raw data. (Form 6)
- o Tabulated standard addition results when required and raw data. (Form 8)
- o Tabulated instrument detection limits results. (Form 11)
- o Narrative summary of the methods and any problems encountered with the methods.
- o Chain of custody for the sample shipment, SAS packing lists and SAS request form.

NOTE: Raw data includes the associated instrument quantitation printouts and associated strip charts.

U.S. ENVIRONMENTAL PROTECTION AGENCY
 CLP Sample Management Office
 P.O. Box 818 - Alexandria, Virginia 22313
 Phone: 703/557-2490 - FTS/557-2490

SAS Number 4799 A

**SPECIAL ANALYTICAL SERVICE
 PACKING LIST**

Sampling Office: <u>Region I</u>	Sampling Date(s): <u>7/26-27-89</u>	Ship To: <u>REVET ENVIRONMENTAL AND ANALYTICAL 305 PLANTATION ST. WORCESTER, MA. 06105</u>	For Lab Use Only Date Samples Rec'd: <hr/> Received By: <hr/>
Sampling Contact: <u>M. Z. KARLAN</u> (name)	Date Shipped: <u>7-27-89</u>	Attn: <u>DAVID LAKE</u>	
<u>703-557-2490</u> (phone)	Site Name/Code: <u>#45 (EPA ID#)</u>		

Sample Numbers	Sample Description i.e., Analysis, Matrix, Concentration	Sample Condition on Receipt at Lab
1. <u>201 (MW-16B)</u>	<u>625 water, low conc</u>	
2. <u>203 (MW-16B)</u>	<u>10A 624 water, low conc</u>	
3. <u>204 (MW-2B)</u>	<u>10A 624 water, LOW CONC</u>	
4. <u>205 (MW-15B)</u>	<u>10A 624 water, LOW CONC</u>	
5. <u>206 (MW-23B)</u>	<u>10A 624 water, LOW CONC</u>	
6. <u>207 (MW-24B)</u>	<u>10A 624 water, LOW CONC</u>	
7. <u>208 (MW-12)</u>	<u>10A 624 water, LOW CONC</u>	
8. <u>209 (Trip Blank)</u>	<u>10A 624 water, LOW CONC</u>	
9. <u>210 (Blind Spike)</u>	<u>10A 624 water, LOW CONC.</u>	
10.		
11.		
12.		
13.		
14.		
15.		
16.		
17.		
18.		
19.		
20.		

For Lab Use Only

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME		DATE	TIME	COM	GRAB	STATION LOCATION	NO. OF CON-TAINERS	REMARKS
	EPA ID #45								
	SPILL Sample Survey July 26-27 1987								
SAMPLERS: (Signature) <i>Joy M. Anton</i>									
001	7-27-87	14:50		X	MW-16B	6-80ml.	X		Additional volumes for MS & MSD
003	7-27-87	14:45		X	MW-16B	6-40ml.	X		Additional volumes for MS & MSD
004	7-26-87	18:23		X	MW-2B	2-40ml.	X		
005	7-27-87	09:05		X	MW-15B	2-40ml.	X		
006	7-27-87	10:23		X	MW-23B	2-40ml.	X		
007	7-27-87	12:00		X	MW-24B	2-40ml.	X		
008	7-26-87	10:54		X	MW-12	2-40ml.	X		
009	7-25-87	15:30		X	TRIP BLANK	2-40ml.	X		
010	7-25-87	15:30		X	QA-1	2-40ml.	X		
RELINQUISHED BY: (Signature) <i>Joy M. Anton</i> 7-27-87 17:55									
RECEIVED BY: (Signature) _____ DATE / TIME _____									
RELINQUISHED BY: (Signature) _____ DATE / TIME _____									
RECEIVED BY: (Signature) _____ DATE / TIME _____									
REMARKS: SAN # 4799 A AIR BORNE AIRBILL # 430532546 CUSTODY VOUCHER ON BOOK: ESD 16, ESD 17 FCS 18									

U.S. ENVIRONMENTAL PROTECTION AGENCY
 CLP Sample Management Office
 P.O. Box 818 - Alexandria, Virginia 22313
 Phone: 703/557-2490 - FTS/557-2490

SAS Number 4799A

**SPECIAL ANALYTICAL SERVICE
 PACKING LIST**

Sampling Office: <u>Region I</u>	Sampling Date(s): 7/24 <u>7/27-89</u>	Ship To: <u>Silver Valley</u> <u>1 Government Gulch</u> <u>Kellogg, IN. 83837</u>	For Lab Use Only Date Samples Rec'd: <hr/> Received By: <hr/>
Sampling Contact: <u>Jay Markarian</u> (name)	Date Shipped: <u>7/27-89</u>	Attn: <u>Coleen Braun</u>	
<u>617-960-4375</u> (phone)	Site Name/Code: <u>#45 (EPA ID #)</u>		

Sample Numbers	Sample Description i.e., Analysis, Matrix, Concentration	Sample Condition on Receipt at Lab
1. <u>002</u>	<u>Diss. Metals; 6010 - For Al, Antimony</u>	
2. _____	<u>Pb, Cd, Cr, Cu, Fe, Mg, Ni, Vanadium, Zn;</u>	
3. _____	<u>7060 - Arsenic; 7421 - Pb; water,</u>	
4. _____	<u>low conc.</u>	
5. _____		
6. _____		
7. _____		
8. _____		
9. _____		
10. _____		
11. _____		
12. _____		
13. _____		
14. _____		
15. _____		
16. _____		
17. _____		
18. _____		
19. _____		
20. _____		

For Lab Use Only

CHAIN OF CUSTODY RECORD

PROJ. NO.		PROJECT NAME		NO. OF CONTAINERS	REMARKS
EPA ID# 45 Sept Sample Survey July 26-27 1989		Savage Well Vite			
SAMPLERS: Jo Maffei		STATION LOCATION		Drs. Metals - SAS	
STA. NO.	DATE	TIME	GRAB		
002	7-27-89	14:55	X	2-1-lit X	Drs. Metals Analysis as follows:
					Method 6010 for Al, Ba, Antimony, Cd, Cr, Cu, Fe, Hg, Ni, Selenic acid, Zinc
					Method 7060 for Arsenic
					Method 7482 for Pb
					Additional volume for Ni, Mn, Pb

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Date / Time	Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Date / Time
Jo Maffei	7-27-89 17:55						

Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks
				Remarks: SA # 4799 A AIR BORNE AIR BIOT # 43053 2664 CARBONY VELOCIMETER COOLER: ESD 13 ESD 14, ESD 15

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME		STATION LOCATION			NO. OF CON-TAINERS	REMARKS
	DATE	TIME	COMP	GRAB			
	<i>Savage well vite Mill Ford N.H.</i>						
SAMPLERS: (Signature) <i>Jay Matasovian</i>							
STA. NO.	DATE	TIME	COMP	GRAB			
	7-25-89	15:30		X	X	2-40ml	Proposed by EPA Region IESD
	7-25-89	15:30		X	X	2-40ml	" " " "
	Relinquished by: (Signature)	Date / Time	Received by: (Signature)				Received by: (Signature)
	<i>Jay Matasovian</i>	7-26-89 09:15	<i>Stephen L... [Signature]</i>				
	Relinquished by: (Signature)	Date / Time	Received by: (Signature)				Received by: (Signature)
	Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)				Received by: (Signature)
	Remarks	Date / Time	Remarks				
	Environment & Samples for AHM		Sample Survey July 26 1989				

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION I

PROJECT Savage Well Site STATE N.H.
Sample Split Survey July 26-27 1989
COLLECTOR JAY MARKARIAN ESAT FOR EPA WMD

FIELD OBSERVATIONS: CLEAR OVERCAST, RAIN, SNOW, FOG
PARTIAL CLOUDS (CIRCLE ONE)

AIR TEMP 95°F TIDE: HIGH, EBB, LOW, FLOOD

PARAMETERS (CHECK APPROPRIATE) *Sample # 001 - SEMI VOL 625*
002 - METALS
003 - VOA-624 SAS

Bacti	<input type="checkbox"/>	NH ₃	<input type="checkbox"/>	COD	<input type="checkbox"/>
BOD	<input type="checkbox"/>	NO ₂ + 3	<input type="checkbox"/>	PCB	<input type="checkbox"/>
SS	<input type="checkbox"/>	TKN	<input type="checkbox"/>	X-Ray	<input type="checkbox"/>
Turb	<input type="checkbox"/>	T-P	<input type="checkbox"/>	Other	_____
Organics	<input checked="" type="checkbox"/>	O & G	<input type="checkbox"/>		
VOA's	<input checked="" type="checkbox"/>				

METALS Total Dissolved *HNO₃ to pH > 2*

Cd	<input checked="" type="checkbox"/>	Fe	<input checked="" type="checkbox"/>	Pb	<input checked="" type="checkbox"/>
Cu	<input checked="" type="checkbox"/>	Hg	<input type="checkbox"/>	Sn	<input checked="" type="checkbox"/>
Cr (T)	<input checked="" type="checkbox"/>	Mn	<input type="checkbox"/>	Zn	<input checked="" type="checkbox"/>
*Cr (+6)	<input type="checkbox"/>	Ni	<input checked="" type="checkbox"/>	Other	<u>Hg, ARSENIC Fe, URANIUM, ANTIMONY</u>

*Unpreserved Sample

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION I

PROJECT Savage Well Site STATE N.H.
Sample Split Survey July 26-27 1989
COLLECTOR JAY MARKARIAN ESAT FOR EPA WMD

FIELD OBSERVATIONS: CLEAR OVERCAST, RAIN, SNOW, FOG
PARTIAL CLOUDS (CIRCLE ONE)

AIR TEMP 89°F TIDE: HIGH, EBB, LOW, FLOOD

PARAMETERS (CHECK APPROPRIATE) *Sample # 004 - 624 SAS*

Bacti	<input type="checkbox"/>	NH ₃	<input type="checkbox"/>	COD	<input type="checkbox"/>
BOD	<input type="checkbox"/>	NO ₂ + 3	<input type="checkbox"/>	PCB	<input type="checkbox"/>
SS	<input type="checkbox"/>	TKN	<input type="checkbox"/>	X-Ray	<input type="checkbox"/>
Turb	<input type="checkbox"/>	T-P	<input type="checkbox"/>	Other	_____
Organics	<input checked="" type="checkbox"/>	O & G	<input type="checkbox"/>		
VOA's	<input checked="" type="checkbox"/>				

METALS Total Dissolved

Cd	<input type="checkbox"/>	Fe	<input type="checkbox"/>	Pb	<input type="checkbox"/>
Cu	<input type="checkbox"/>	Hg	<input type="checkbox"/>	Sn	<input type="checkbox"/>
Cr (T)	<input type="checkbox"/>	Mn	<input type="checkbox"/>	Zn	<input type="checkbox"/>
*Cr (+6)	<input type="checkbox"/>	Ni	<input type="checkbox"/>	Other	_____

LAB CODE **NO** 78839

PROJECT #

STATION # MW168

Y Y M M D D

DATE 890727

COLLECTION TIME 1430

SAMPLE TEMP °C

PROBE-D.O. (mg/l) .

pH - S.U. .

CONDUCTIVITY (micromhos/cm) .

SALINITY (0/00) .

TOTAL DEPTH (ft)

SAMPLING DEPTH (ft) .

PA R-1 7500-30

LAB CODE **NO** 78840

PROJECT #

STATION # MW25

Y Y M M D D

DATE 890726

COLLECTION TIME 1823

SAMPLE TEMP °C

PROBE-D.O. (mg/l) .

pH - S.U. .

CONDUCTIVITY (micromhos/cm) .

SALINITY (0/00) .

TOTAL DEPTH (ft)

SAMPLING DEPTH (ft) .

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION I

PROJECT Savage Well Site STATE N.H.
Sample Split Survey July 26-27 1989
COLLECTOR JAY MARKARIAN ESAT FOR EPA WDJ/WMD

FIELD OBSERVATIONS: CLEAR, OVERCAST, RAIN, SNOW, FOG
PARTIAL CLOUDS (CIRCLE ONE)

AIR TEMP °C 95°F TIDE: HIGH, EBB, LOW, FLOOD

PARAMETERS (CHECK APPROPRIATE)

Sample 006-624 SA

Bacti	<input type="checkbox"/>	NH ₃	<input type="checkbox"/>	COD	<input type="checkbox"/>
BOD	<input type="checkbox"/>	NO ₂ + 3	<input type="checkbox"/>	PCB	<input type="checkbox"/>
TSS	<input type="checkbox"/>	TKN	<input type="checkbox"/>	X-Ray	<input type="checkbox"/>
Turb	<input type="checkbox"/>	T-P	<input type="checkbox"/>	Other	_____
Organics	<input checked="" type="checkbox"/>	O & G	<input type="checkbox"/>		
VOA's	<input checked="" type="checkbox"/>				

METALS

Total

Dissolved

Cd
Cu
Cr (T)
*Cr (+6)

Fe
Hg
Mn
Ni

Pb
Sn
Zn
Other _____

EPA R-1 7500-30

*Unpreserved Sample

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION I

PROJECT Savage Well Site STATE N.H.
Sample Split Survey July 26-27 1989
COLLECTOR JAY MARKARIAN ESAT FOR EPA WMD

FIELD OBSERVATIONS: CLEAR, OVERCAST, RAIN, SNOW, FOG
PARTIAL CLOUDS (CIRCLE ONE)

AIR TEMP °C 95°F TIDE: HIGH, EBB, LOW, FLOOD

PARAMETERS (CHECK APPROPRIATE)

Sample #005-624 SA

Bacti	<input type="checkbox"/>	NH ₃	<input type="checkbox"/>	COD	<input type="checkbox"/>
BOD	<input type="checkbox"/>	NO ₂ + 3	<input type="checkbox"/>	PCB	<input type="checkbox"/>
TSS	<input type="checkbox"/>	TKN	<input type="checkbox"/>	X-Ray	<input type="checkbox"/>
Turb	<input type="checkbox"/>	T-P	<input type="checkbox"/>	Other	_____
Organics	<input type="checkbox"/>	O & G	<input type="checkbox"/>		
VOA's	<input type="checkbox"/>				

METALS

Total

Dissolved

Cd
Cu
Cr (T)
*Cr (+6)

Fe
Hg
Mn
Ni

Pb
Sn
Zn
Other _____

LAB CODE NO 78842

PROJECT #

STATION # MAW233

Y Y M M D D

DATE 890727

COLLECTION TIME 1024

SAMPLE TEMP °C

PROBE-D.O. (mg/l) .

pH - S.U. .

CONDUCTIVITY (micromhos/cm) .

SALINITY (0/00) .

TOTAL DEPTH (ft)

SAMPLING DEPTH (ft) .

LAB CODE NO 78841

PROJECT #

STATION # MAW153

Y Y M M D D

DATE 890727

COLLECTION TIME 0905

SAMPLE TEMP °C

PROBE-D.O. (mg/l) .

pH - S.U. .

CONDUCTIVITY (micromhos/cm) .

SALINITY (0/00) .

TOTAL DEPTH (ft)

SAMPLING DEPTH (ft) .

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION I

PROJECT Savage Well Site STATE N.H.
Sample Split Survey July 26-27 1989
COLLECTOR JAY MARKARIAN EIAT FOR EPA WMD

FIELD OBSERVATIONS: CLEAR, OVERCAST, RAIN, SNOW, FOG
PARTIAL CLOUDS (CIRCLE ONE)

AIR TEMP °S 95°F TIDE: HIGH, EBB, LOW, FLOOD

PARAMETERS (CHECK APPROPRIATE)

008-624 SAH

Bacti	<input type="checkbox"/>	NH ₃	<input type="checkbox"/>	COD	<input type="checkbox"/>
BOD	<input type="checkbox"/>	NO ₂ + 3	<input type="checkbox"/>	PCB	<input type="checkbox"/>
TSS	<input type="checkbox"/>	TKN	<input type="checkbox"/>	X-Ray	<input type="checkbox"/>
Turb	<input type="checkbox"/>	T-P	<input type="checkbox"/>	Other	_____
Organics	<input checked="" type="checkbox"/>	O & G	<input type="checkbox"/>		
VOA's	<input checked="" type="checkbox"/>				

METALS

Total

Dissolved

Cd
Cu
Cr (T)
*Cr (+6)

Fe
Hg
Mn
Ni

Pb
Sn
Zn
Other _____

EPA R-1 7500-30

*Unpreserved Sample

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION I

PROJECT Savage Well Site STATE N.H.
Sample Split Survey July 26-27 1989
COLLECTOR JAY MARKARIAN EIAT FOR EPA WMD

FIELD OBSERVATIONS: CLEAR, OVERCAST, RAIN, SNOW, FOG
PARTIAL CLOUDS (CIRCLE ONE)

AIR TEMP °S 95°F TIDE: HIGH, EBB, LOW, FLOOD

PARAMETERS (CHECK APPROPRIATE)

007-624 SAH

Bacti	<input type="checkbox"/>	NH ₃	<input type="checkbox"/>	COD	<input type="checkbox"/>
BOD	<input type="checkbox"/>	NO ₂ + 3	<input type="checkbox"/>	PCB	<input type="checkbox"/>
TSS	<input type="checkbox"/>	TKN	<input type="checkbox"/>	X-Ray	<input type="checkbox"/>
Turb	<input type="checkbox"/>	T-P	<input type="checkbox"/>	Other	_____
Organics	<input checked="" type="checkbox"/>	O & G	<input type="checkbox"/>		
VOA's	<input checked="" type="checkbox"/>				

METALS

Total

Dissolved

Cd
Cu
Cr (T)
*Cr (+6)

Fe
Hg
Mn
Ni

Pb
Sn
Zn
Other _____

LAB CODE N0 79727

PROJECT #

STATION # MW12

Y Y M M D D

DATE 890726

COLLECTION TIME 1059

SAMPLE TEMP °C

PROBE-D.O. (mg/l) -

pH - S.U. -

CONDUCTIVITY -
(micromhos/cm)

SALINITY (0/00) -

TOTAL DEPTH (ft)

SAMPLING DEPTH (ft) -

LAB CODE N0 79726

PROJECT #

STATION # MW24B

Y Y M M D D

DATE 890727

COLLECTION TIME 1200

SAMPLE TEMP °C

PROBE-D.O. (mg/l) -

pH - S.U. -

CONDUCTIVITY -
(micromhos/cm)

SALINITY (0/00) -

TOTAL DEPTH (ft)

SAMPLING DEPTH (ft) -

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION I

PROJECT Savage Well Site STATE N.H.
Sample Split Survey July 26-27 1989
COLLECTOR JAY MARKARIAN ESAT FOR EPA WMI

FIELD OBSERVATIONS: CLEAR OVERCAST, RAIN, SNOW, FOG
PARTIAL CLOUDS (CIRCLE ONE)

AIR TEMP 95°F TIDE: HIGH, EBB, LOW, FLOOD

PARAMETERS (CHECK APPROPRIATE)

Bacti
BOD
TSS
Turb
Organics
VOA's

NH₃
NO₂ + 3
TKN
T-P
O & G

COD
PCB
X-Ray
Other _____

*009- EPA prepared
TRIP BLANK
6/24/89*

METALS

Total

Dissolved

Cd
Cu
Cr (T)
*Cr (+6)

Fe
Hg
Mn
Ni

Pb
Sn
Zn
Other _____

EPA R-1 7500-30

*Unpreserved Sample

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION I

PROJECT Savage Well Site STATE N.H.
Sample Split Survey July 26-27 1989
COLLECTOR JAY MARKARIAN ESAT FOR EPA WMI

FIELD OBSERVATIONS: CLEAR OVERCAST, RAIN, SNOW, FOG
PARTIAL CLOUDS (CIRCLE ONE)

AIR TEMP 95°F TIDE: HIGH, EBB, LOW, FLOOD

PARAMETERS (CHECK APPROPRIATE)

Bacti
BOD
TSS
Turb
Organics
VOA's

NH₃
NO₂ + 3
TKN
T-P
O & G

COD
PCB
X-Ray
Other _____

*010- EPA prepared
Blind Spike
QA-1
6/24/89*

METALS

Total

Dissolved

Cd
Cu
Cr (T)
*Cr (+6)

Fe
Hg
Mn
Ni

Pb
Sn
Zn
Other _____

LAB CODE N0 79728

PROJECT #

STATION #

Y Y M M D D

DATE 890725

COLLECTION TIME 1530

SAMPLE TEMP °C

PROBE-D.O. (mg/l)

pH - S.U.

CONDUCTIVITY (micromhos/cm)

SALINITY (0/00)

TOTAL DEPTH (ft)

SAMPLING DEPTH (ft)

LAB CODE N0 79728

PROJECT #

STATION #

Y Y M M D D

DATE 890725

COLLECTION TIME 1530

SAMPLE TEMP °C

PROBE-D.O. (mg/l)

pH - S.U.

CONDUCTIVITY (micromhos/cm)

SALINITY (0/00)

TOTAL DEPTH (ft)

SAMPLING DEPTH (ft)