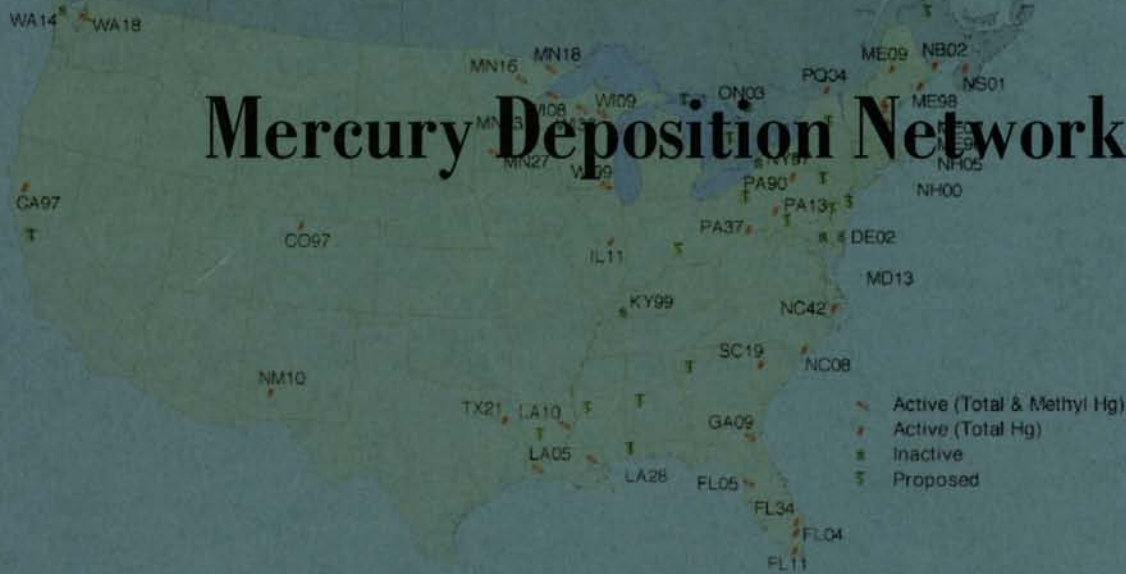


1999 Annual Quality Assurance Report

Mercury Deposition Network



Prepared by:

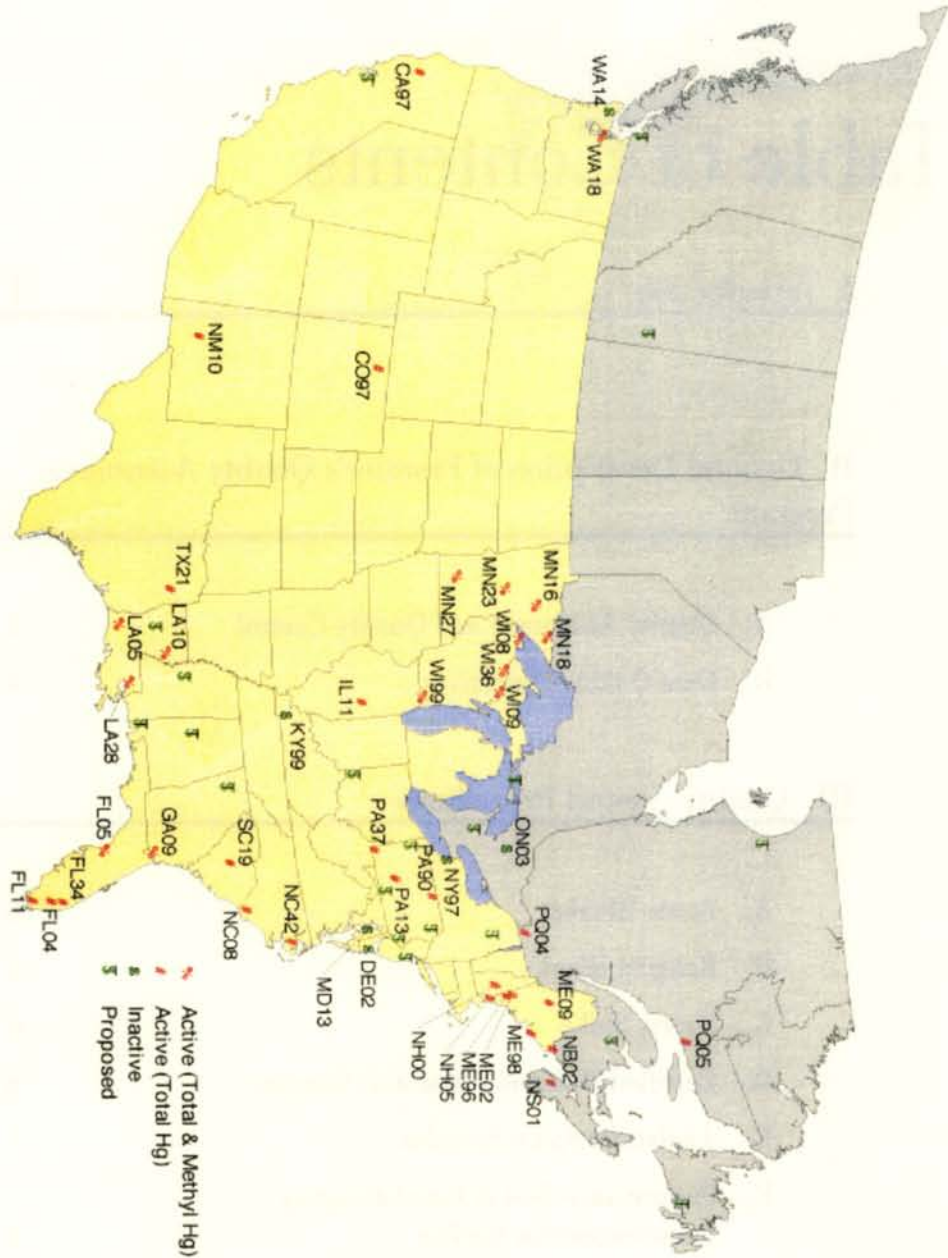
Beverly H. van Buren,
Quality Assurance Officer

With

Paul E. Laskowski,
Senior Analyst

July 23, 2000

1999 MDN Sites



■ Active (Total & Methyl Hg)
■ Active (Total Hg)
■ Inactive
■ Proposed

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I. Introduction

Since January of 1996, Frontier Geosciences Inc. (Frontier) has served as the Hg Analytical Lab (HAL) and Site Liaison center for the Mercury Deposition Network (MDN). The MDN, coordinated through the National Atmospheric Deposition Program (NADP), was designed with the primary objective of quantifying the wet deposition of mercury in North America to determine long-term geographic and temporal distributions. The Network has grown to incorporate 44 sites in the United States and Canada. In 2000, the MDN is expected to add 10 new sites.

As the HAL, Frontier receives weekly precipitation samples to be analyzed for total mercury. The analytical technique—Modified EPA Method 1631 Revision B—was developed by Nicolas S Bloom, one of Frontier's Senior Research Scientists. Frontier also served as the referee lab for the Method 1631 final validation study.

Robert Brunette, Project Investigator, oversees Frontier's involvement in the MDN. He serves as the MDN Liaison, HAL contact for the multiple agencies currently sponsoring the MDN, and as Chair of the Data Management and Analysis Subcommittee for the NADP. His multiple roles require him to provide guidance and direction to all HAL staff, and to maintain his proficiency at all aspects of HAL activities, including MDN site selection and equipment installation, MDN equipment troubleshooting, field and laboratory training, analysis and report writing, as well as research on new MDN initiatives including Trace Metals (in addition to Hg) in Wet Deposition. Mr. Brunette is supported by an analytical laboratory staff skilled in processing incoming samples, analyzing sample sets, cleaning glassware, shipping weekly field equipment, and entering data. Senior Research Scientist, Eric M. Prestbo, serves as Science Advisor for the HAL, and helps support MDN related research initiatives. The Project Investigator also works closely with Frontier's





II. General Description of Frontier's Quality Assurance Program

A. Quality Assurance and Quality Control

Frontier has a strong and vital commitment to its Quality Assurance Program, viewing quality assurance as a program and a philosophy. We begin quality control at the bench level, and continuously work to improve our processes at the management level. Our management style is to solicit process improvements and problem-solving from our laboratory technicians and analysts, then utilize management to help implement these improvements — rather than the traditional management style of issuing orders which may or may not have much bearing on how things actually work in the laboratory.

Our Quality Assurance Program is a system for ensuring that all information, data and interpretation resulting from an analytical procedure are technically sound, statistically valid, and appropriately documented. Our quality control parameters are the mechanisms used to achieve quality assurance.

Due to our growth and increase in employees, the QA department at Frontier has expanded and added one position. This addition will help in maintaining our quality control parameters to ensure we continue to achieve quality assurance as we grow.

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B. Data Quality Objectives

Data quality is achieved through Frontier's Data Quality Objectives (DQO's). Our DQO's consist of five components: precision, accuracy, representativeness, comparability and completeness (PARCC).

- Precision is a measure of data reproducibility; it is measured by utilizing sample replicates.
- Accuracy is a measure of how close the data is to the actual, or real value, and is measured by certified reference materials and matrix spikes.
- Representativeness is a measure of how typical a sample is compared to the sample population. It is achieved by accurate, artifact-free sampling procedures and appropriate sample homogenization.
- Comparability is a measure of how variable one set of data is to another.
- Completeness is a measure of how many data points collected are usable; Frontier strives for at least 95% completeness.

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III. Quality Control Procedures

A. Bottle Blanks

Bottle blanks are expected to be at or near the method detection limit (MDL). In cases where the blanks are significantly higher, the situation is investigated. Possible contamination sources are researched and identified. Once the problem has been found and corrected, the run is continued. Control charts for bottle blanks are maintained on an ongoing basis, helping to identify trends or anomalies.

The mean for the 1999 lab sample bottle blanks is 0.52 ng/Bottle (n=69) with a standard deviation of 0.051 ng/Bottle. Numbers can be found in tabular format in Appendix A. Control charts are listed in Appendix B.

B. Reagent Blanks

Reagent blanks consist of 1% (v/v) 0.2N bromine monochloride, 0.2 mL 20% hydroxylamine hydrochloride, and 0.3 mL 20% stannous chloride in 100 mL of reagent water. Reagent blanks are a measure of how much analyte may be found in the bromine monochloride used for oxidizing the samples. Reagent blanks help when researching possible sources of contamination.

The mean for 1999 reagent blanks is 0.072 ng/L (n=73) with a standard deviation of 0.047 ng/L. Numbers can be found in tabular format within the Analytical Run data in Appendix A. Control charts are listed in Appendix B.

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C. Matrix Duplicates

A matrix duplicate sample is run with each analytical set. The relative percent difference (RPD) is calculated, and is expected to be less than 25%. If the result is higher than 25%, the samples are re-run. If the result is still higher than 25%, then the problem is investigated and possible causes are identified and noted in the report.

The mean for 1999 RPD's is 6.4% (n=207) with a standard deviation of 16.6%. All but four matrix duplicate relative percent difference values fell within the designed parameters in 1999. Numbers can be found in tabular format in Appendix A. Control charts are listed in Appendix B.

D. Certified Reference Material Samples

Certified reference material (CRM) samples are used to compare sample results with a known, certified value. This is a useful tool for validating the analytical curve. The acceptance range for the reference samples is 75-125%. If the percent recovery lies out of this range, the sample CRM is rerun for more acceptable results. If the percent recovery is within the acceptance range, analysis continues. The CRM used is DORM-2—a fish tissue.

The mean for 1999 CRMs is 92.9% recovery (n=148) with a standard of 11.5%. Four of the recoveries were out of control. As detailed in the 1998 report, Frontier continued to see a trend where the mean recovery dropped from approximately 98% in 1997 to approximately 92% near the end of May 1998. This observation was noted lab-wide, and is attributed to sample digestion of the DORM-2. Although the CRM percent recovery mean dropped, all samples were well within control parameters.

All reference samples fell within the designated parameters in 1999. Numbers can be found in tabular format in Appendix A. Control charts are listed in Appendix B.

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E. Analytical Spike Samples

Analytical spikes are a tool for determining if, and how, the sample matrix interferes with analyte quantification. Analytical spikes help answer two questions:

- 1) Does the analyte in the sample go through the analytical system the same way analyte in the standards does?
- 2) Are we able to carry the analyte throughout the analytical system without significant losses?

Analytical spikes falling within 75-125% recovery are considered valid. Analytical spikes falling outside these parameters must be re-run. If the spike continues to fall outside 75-125% recovery then possible causes must be looked for and identified. The MDN matrix (rainwater) is spiked with 1.00 ng of Hg (II).

The mean for 1999 matrix spikes is 101.2% recovery (n=208) with a standard deviation of 17.0%. There were three incidents of a matrix spike exceeding quality control limits. Numbers can be found in tabular format in Appendix A. Control charts are listed in Appendix B.

F. Performance Test and Interlaboratory Intercomparison Studies

Performance evaluation and interlaboratory intercomparison studies are a vital part of our Quality Assurance Program. Frontier is a regular participant in studies prepared by the Analytical Products Group, National Water Research Institute (Canada), National Oceanic and Atmospheric Administration (US), National Research Council (Canada), US Geological Survey, the Institute for National Measurement Standards (Canada), and New York State PT samples. Results from the January 2000 New York State Department of Health PE sample trial have been included in Appendix C. Results from the HAL MDN 1999 Laboratory Intercomparison Study are in Appendix D.

Frontier currently holds certifications in six states, they are: Washington, Wisconsin, Florida, California, New York, and New Jersey. We are also pursuing certification status with the state of Louisiana, however, that application is still pending. Acquiring NELAP certification is also in the processing stages here at Frontier. We are hoping to be compliant by Fall of 2000.





IV. 2000 Outlook

The Mercury Deposition Network continues to gain attention as the largest and longest-running National Hg wet deposition network in North America. This increased exposure will lead to significant growth in 1999-2000. With this growth, the HAL will continue to look for ways to improve the program to ensure the highest quality.

The following are goals the HAL has set to maintain and improve quality throughout 2000:

- In 1998, Frontier created an Access Data Base which has greatly improved data handling and coordination. The HAL will continue to improve this data management system in 2000 and expand the Database to include MMHg data.
- The HAL upgraded MDN facilities in order to stay ahead of the projected growth of the Network in 1999 and will continue to improve these facilities in 2000.
- The HAL continued trace metals in wet deposition research in 1999 and is expected to launch a Trace Metals in Wet Deposition initiative in 2000 due to increased interest by MDN site sponsors.
- The HAL will continue—and work to increase the frequency of mercury laboratory intercomparison studies in 2000.
- The HAL will implement the new MDN Field System Blank program in 2000.

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V. Appendix A

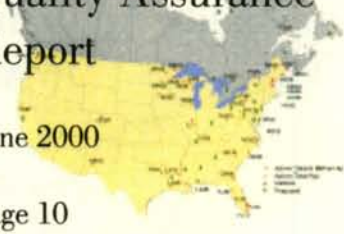
Quality Control Tables

A. Analytical Run Data

Data Set	FGSSetID	AnalysisDate	InstrumentID	CF	BB	R	BrCl Bik
1999-01	THG41-990106	1/6/99	CVAFS-4	473.4 units/ng	1.98 units	0.99976	0.058 ng/L
1999-02	THG51-990106	1/6/99	CVAFS-5	1226.1 units/ng	3.50 units	0.99984	0.045 ng/L
1999-03	THG51-990118	1/18/99	CVAFS-5	1181.7 units/ng	2.00 units	0.99990	0.068 ng/L
1999-04	THG41-990118	1/18/99	CVAFS-4	449.8 units/ng	1.36 units	0.99993	0.064 ng/L
1999-05	THG51-990201	2/1/99	CVAFS-5	1253.6 units/ng	4.85 units	0.99985	0.125 ng/L
1999-06	THG41-990201	2/1/99	CVAFS-4	404.3 units/ng	2.10 units	0.99949	0.047 ng/L
1999-07	THG51-990204	2/4/99	CVAFS-5	1281.4 units/ng	4.27 units	0.99962	0.061 ng/L
1999-08	THG41-990204	2/4/99	CVAFS-4	409.1 units/ng	1.39 units	0.99964	0.043 ng/L
1999-09	THG51-990215	2/15/99	CVAFS-5	1342.1 units/ng	2.86 units	0.99900	0.084 ng/L
1999-10	THG41-990215	2/15/99	CVAFS-4	447.1 units/ng	1.55 units	0.99969	0.082 ng/L
1999-11	THG51-990223	2/23/99	CVAFS-5	1131.3 units/ng	2.53 units	0.99968	0.073 ng/L
1999-12	THG41-990223	2/23/99	CVAFS-4	432.3 units/ng	1.22 units	0.99996	0.072 ng/L
1999-13	THG51-990308	3/8/99	CVAFS-5	1157.8 units/ng	4.89 units	0.99904	0.128 ng/L
1999-14	THG41-990308	3/8/99	CVAFS-4	469.1 units/ng	1.58 units	0.99934	0.054 ng/L
1999-15	THG51-990312	3/12/99	CVAFS-5	1207.8 units/ng	3.45 units	0.99994	0.074 ng/L
1999-16	THG41-990312	3/12/99	CVAFS-4	448.5 units/ng	2.19 units	0.99990	0.104 ng/L
1999-17	THG51-990330	3/30/99	CVAFS-5	1104.7 units/ng	4.13 units	0.99943	-0.001 ng/L
1999-18	THG41-990330	3/30/99	CVAFS-4	1635.8 units/ng	5.21 units	0.99915	0.010 ng/L
1999-19	THG51-990331	3/31/99	CVAFS-5	1044.2 units/ng	3.65 units	0.99895	0.035 ng/L
1999-20	THG41-990331	3/31/99	CVAFS-4	1615.8 units/ng	7.80 units	0.99994	0.020 ng/L
1999-21	THG51-990413	4/13/99	CVAFS-5	1014.1 units/ng	11.81 units	0.99953	0.081 ng/L
1999-22	THG41-990413	4/13/99	CVAFS-4	1604.6 units/ng	11.39 units	0.99989	0.083 ng/L
1999-23	THG51-990422	4/22/99	CVAFS-5	1049.2 units/ng	6.60 units	0.99537	0.098 ng/L
1999-24	THG41-990422	4/22/99	CVAFS-4	1612.2 units/ng	9.16 units	0.99947	0.051 ng/L
1999-25	THG51-990510	5/10/99	CVAFS-5	1202.3 units/ng	24.15 units	0.99852	0.016 ng/L
1999-26	THG41-990510	5/10/99	CVAFS-4	783.9 units/ng	8.67 units	0.99922	0.020 ng/L

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Data Set	FGSetID	AnalysisDate	InstrumentID	CF	BB	R	BrCl Blk
1999-27	THG51-990518	5/18/99	CVAFS-5	991.1 units/ng	12.00 units	0.99828	0.133 ng/L
1999-28	THG41-990518	5/18/99	CVAFS-4	798.9 units/ng	9.79 units	0.99995	0.129 ng/L
1999-29	THG51-990419	4/19/99	CVAFS-5	965.4 units/ng	9.65 units	0.99792	0.083 ng/L
1999-30	THG41-990519	5/19/99	CVAFS-4	752.4 units/ng	7.01 units	0.99978	0.083 ng/L
1999-31	THG51-990614	6/14/99	CVAFS-5	1199.6 units/ng	11.29 units	0.99681	0.129 ng/L
1999-32	THG41-990614	6/14/99	CVAFS-4	219.0 units/ng	2.24 units	0.99984	0.081 ng/L
1999-33	THG51-990617	6/17/99	CVAFS-5	1125.7 units/ng	10.82 units	0.99546	0.077 ng/L
1999-34	THG41-990617	6/17/99	CVAFS-4	208.9 units/ng	1.42 units	0.99972	0.055 ng/L
1999-35	THG51-990628	6/28/99	CVAFS-5	1091.1 units/ng	11.59 units	0.99822	0.134 ng/L
1999-36	THG41-990628	6/28/99	CVAFS-4	210.8 units/ng	1.62 units	0.99965	0.073 ng/L
1999-37	THG51-990712	7/12/99	CVAFS-5	1055.8 units/ng	19.70 units	0.99827	0.048 ng/L
1999-38	THG41-990712	7/12/99	CVAFS-4	206.4 units/ng	3.75 units	0.99972	0.033 ng/L
1999-39	THG51-990426	7/26/99	CVAFS-5	1362.4 units/ng	15.69 units	0.99471	0.195 ng/L
1999-40	THG41-990726	7/26/99	CVAFS-4	212.9 units/ng	1.75 units	0.99249	0.077 ng/L
1999-41	THG51-990730	7/30/99	CVAFS-5	1002.0 units/ng	5.70 units	0.99966	0.049 ng/L
1999-42	THG41-990730	7/30/99	CVAFS-4	190.2 units/ng	1.09 units	0.99883	0.031 ng/L
1999-43	THG51-990809	8/9/99	CVAFS-5	1025.4 units/ng	13.44 units	0.99957	0.089 ng/L
1999-44	THG41-990809	8/9/99	CVAFS-4	190.1 units/ng	1.74 units	0.99964	0.087 ng/L
1999-45	THG51-990812	8/12/99	CVAFS-5	1009.7 units/ng	9.89 units	0.99963	0.239 ng/L
1999-46	THG41-990812	8/12/99	CVAFS-4	190.6 units/ng	1.48 units	0.99951	0.050 ng/L
1999-47	THG51-990820	8/20/99	CVAFS-5	1057.4 units/ng	9.33 units	0.99844	0.065 ng/L
1999-48	THG41-990820	8/20/99	CVAFS-4	195.5 units/ng	1.26 units	0.99909	0.057 ng/L
1999-49	THG51-990910	9/10/99	CVAFS-5	1082.9 units/ng	11.85 units	0.99978	0.076 ng/L
1999-50	THG41-990910	9/10/99	CVAFS-4	207.4 units/ng	1.51 units	0.99995	0.107 ng/L
1999-51	THG51-990917	9/17/99	CVAFS-5	1011.8 units/ng	4.68 units	0.99769	0.049 ng/L
1999-52	THG41-990917	9/17/99	CVAFS-4	370.6 units/ng	3.39 units	0.99593	-0.012 ng/L
1999-53	THG51-990930	9/30/99	CVAFS-5	1167.1 units/ng	9.55 units	0.99975	0.070 ng/L

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Data Set	FGSSetID	AnalysisDate	InstrumentID	CF	BB	R	BrCl Blk	
1999-54	THG41-990930	9/30/99	CVAFS-4	184.2 units/ng	1.56 units	0.99935	0.050 ng/L	
1999-55	THG51-991008	10/8/99	CVAFS-5	1131.3 units/ng	6.99 units	0.99950	0.069 ng/L	
1999-56	THG41-991008	10/8/99	CVAFS-4	185.1 units/ng	1.30 units	0.99860	0.053 ng/L	
1999-57	THG51-991022	10/22/99	CVAFS-5	1291.8 units/ng	7.40 units	0.99975	0.076 ng/L	
1999-58	THG41-991022	10/22/99	CVAFS-4	365.1 units/ng	1.76 units	0.99992	0.054 ng/L	
1999-59	THG51-991026	10/26/99	CVAFS-5	1327.7 units/ng	9.25 units	0.99950	0.154 ng/L	
1999-60	THG41-991026	10/26/99	CVAFS-4	358.6 units/ng	1.90 units	0.99942	0.087 ng/L	
1999-61	THG41-991116	11/16/99	CVAFS-4	413.6 units/ng	3.38 units	0.99977	0.088 ng/L	
1999-62	THG51-991116	11/16/99	CVAFS-5	1159.4 units/ng	7.20 units	0.99925	0.124 ng/L	
1999-63	THG41-991119	11/19/99	CVAFS-4	431.4 units/ng	3.14 units	0.99969	0.102 ng/L	
1999-64	THG51-991203	12/3/99	CVAFS-5	967.2 units/ng	8.16 units	0.99951	0.137 ng/L	
1999-65	THG41-991203	12/3/99	CVAFS-4	420.8 units/ng	2.81 units	0.99995	0.140 ng/L	
1999-66	THG51-991210	12/10/99	CVAFS-5	1047.8 units/ng	25.40 units	0.99570	-0.070 ng/L	
1999-67	THG41-991210	12/10/99	CVAFS-4	366.9 units/ng	4.20 units	0.97432	0.037 ng/L	
1999-68	THG41-991215	12/15/99	CVAFS-4	442.5 units/ng	1.49 units	0.99983	0.034 ng/L	
1999-69	THG51-991216	12/16/99	CVAFS-5	1141.7 units/ng	19.58 units	0.99850	-0.044 ng/L	
1999-70	THG41-991216	12/16/99	CVAFS-4	429.5 units/ng	1.93 units	0.99961	0.073 ng/L	
1999-71	THG41-991221	12/21/99	CVAFS-4	421.0 units/ng	1.45 units	0.99962	0.089 ng/L	
1999-72	THG51-991231	12/31/99	CVAFS-5	1114.7 units/ng	14.76 units	0.99858	0.042 ng/L	
1999-73	THG41-991231	12/31/99	CVAFS-4	425.5 units/ng	1.88 units	0.99954	0.062 ng/L	
							Mean	0.072 ng/L
							St Dev	0.047 ng/L

B. Bottle Blanks

Quarter	MDN Data Set ID	Sample ID	BottleBlk
1-1999	1999-01	MDN821	0.013 ng/Bottle
1-1999	1999-02	MDN357	0.011 ng/Bottle
1-1999	1999-05	MDN320	0.010 ng/Bottle
1-1999	1999-07	MDN843	0.027 ng/Bottle
1-1999	1999-07	MDN738	0.074 ng/Bottle
1-1999	1999-07	MDN860	0.031 ng/Bottle
1-1999	1999-08	MDN763	0.048 ng/Bottle
1-1999	1999-08	MDN774	0.053 ng/Bottle
1-1999	1999-08	MDN796	0.025 ng/Bottle
1-1999	1999-09	MDN843	0.014 ng/Bottle
1-1999	1999-10	MDN915	0.027 ng/Bottle
1-1999	1999-11	MDN875	0.021 ng/Bottle
1-1999	1999-12	MDN860	0.029 ng/Bottle
1-1999	1999-16	MDN696	0.012 ng/Bottle
1-1999	1999-17	MDN963	0.020 ng/Bottle
1-1999	1999-18	MDN487	0.015 ng/Bottle
2-1999	1999-22	MDN945	0.045 ng/Bottle
2-1999	1999-22	MDN775	0.121 ng/Bottle
2-1999	1999-23	MDN638	0.048 ng/Bottle
2-1999	1999-23	MDN159	0.116 ng/Bottle
2-1999	1999-26	MDN943	0.020 ng/Bottle
2-1999	1999-26	MDN842	0.060 ng/Bottle
2-1999	1999-26	MDN643	0.056 ng/Bottle
2-1999	1999-27	MDN138	0.182 ng/Bottle
2-1999	1999-29	MDN981	0.017 ng/Bottle
2-1999	1999-29	MDN148	0.038 ng/Bottle
2-1999	1999-31	MDN479	0.036 ng/Bottle
2-1999	1999-31	MDN739	0.064 ng/Bottle
2-1999	1999-32	MDN113	-0.003 ng/Bottle
2-1999	1999-32	MDN797	0.021 ng/Bottle
2-1999	1999-33	MDN814	0.005 ng/Bottle
2-1999	1999-35	MDN914	0.019 ng/Bottle
3-1999	1999-37	MDN757	0.029 ng/Bottle
3-1999	1999-37	MDN892	0.026 ng/Bottle
3-1999	1999-37	MDN494	0.055 ng/Bottle
3-1999	1999-40	MDN761	0.018 ng/Bottle
3-1999	1999-42	MDN957	0.031 ng/Bottle
3-1999	1999-44	MDN949	0.029 ng/Bottle
3-1999	1999-45	MDN802	0.174 ng/Bottle
3-1999	1999-46	MDN971	0.051 ng/Bottle
3-1999	1999-46	MDN784	0.030 ng/Bottle
3-1999	1999-48	MDN165	0.042 ng/Bottle
3-1999	1999-48	MDN856	0.132 ng/Bottle
3-1999	1999-49	MDN660	0.051 ng/Bottle
3-1999	1999-50	MDN955	0.019 ng/Bottle

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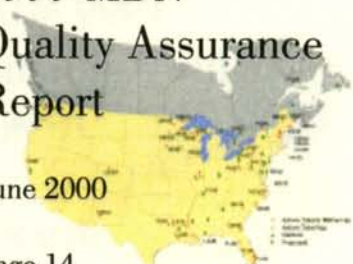
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Quarter	MDN Data Set ID	Sample ID	BottleBik	
3-1999	1999-51	MDN981	0.118 ng/Bottle	
3-1999	1999-52	MDN164	0.096 ng/Bottle	
3-1999	1999-52	MDN968	0.030 ng/Bottle	
3-1999	1999-53	MDN658	0.030 ng/Bottle	
4-1999	1999-55	MDN280	0.038 ng/Bottle	
4-1999	1999-55	MDN178	0.039 ng/Bottle	
4-1999	1999-56	MDN494	0.045 ng/Bottle	
4-1999	1999-56	MDN955	0.012 ng/Bottle	
4-1999	1999-57	MDN828	0.033 ng/Bottle	
4-1999	1999-58	MDN675	0.029 ng/Bottle	
4-1999	1999-59	MDN173	0.027 ng/Bottle	
4-1999	1999-59	MDN162	0.023 ng/Bottle	
4-1999	1999-62	MDN928	0.200 ng/Bottle	
4-1999	1999-63	MDN668	0.222 ng/Bottle	
4-1999	1999-63	MDN487	0.188 ng/Bottle	
4-1999	1999-64	MDN258	0.078 ng/Bottle	
4-1999	1999-68	MDN295	0.039 ng/Bottle	
4-1999	1999-69	MDN757	0.167 ng/Bottle	
4-1999	1999-71	MDN980	0.050 ng/Bottle	
4-1999	1999-71	MDN091	0.064 ng/Bottle	
4-1999	1999-71	MDN283	0.054 ng/Bottle	
4-1999	1999-73	MDN0498	0.011 ng/Bottle	
4-1999	1999-73	MDN0754	0.020 ng/Bottle	
4-1999	1999-73	MDN0760	0.009 ng/Bottle	
			Mean	0.052 ng/Bottle
			Std Dev	0.051 ng/Bottle

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C. Certified Reference Materials

Quarter	MDN Data Set ID	Sample ID	Aliquot Vol	Hg In Aliquot	DormConc	Recovery
1-1999	1999-01	DORM-2	0.2 mL	0.848 ng	4.242 ng/mL	91.4%
1-1999	1999-01	DORM-2	0.2 mL	0.855 ng	4.277 ng/mL	92.2%
1-1999	1999-02	DORM-2	0.2 mL	0.874 ng	4.368 ng/mL	94.1%
1-1999	1999-02	DORM-2	0.2 mL	0.872 ng	4.358 ng/mL	93.9%
1-1999	1999-03	DORM-2	0.2 mL	0.841 ng	4.204 ng/mL	90.6%
1-1999	1999-03	DORM-2	0.2 mL	0.855 ng	4.275 ng/mL	92.1%
1-1999	1999-04	DORM-2	0.2 mL	0.860 ng	4.301 ng/mL	92.7%
1-1999	1999-04	DORM-2	0.2 mL	0.851 ng	4.254 ng/mL	91.7%
1-1999	1999-05	DORM-2	0.2 mL	0.866 ng	4.331 ng/mL	93.3%
1-1999	1999-05	DORM-2	0.2 mL	0.871 ng	4.354 ng/mL	93.8%
1-1999	1999-06	DORM-2	0.2 mL	0.880 ng	4.400 ng/mL	94.8%
1-1999	1999-06	DORM-2	0.2 mL	0.854 ng	4.271 ng/mL	92.0%
1-1999	1999-07	DORM-2	0.2 mL	0.882 ng	4.411 ng/mL	95.1%
1-1999	1999-07	DORM-2	0.2 mL	0.855 ng	4.274 ng/mL	92.1%
1-1999	1999-08	DORM-2	0.2 mL	0.897 ng	4.486 ng/mL	96.7%
1-1999	1999-08	DORM-2	0.2 mL	0.814 ng	4.072 ng/mL	87.8%
1-1999	1999-09	DORM-2	0.2 mL	0.903 ng	4.516 ng/mL	97.3%
1-1999	1999-09	DORM-2	0.2 mL	0.866 ng	4.328 ng/mL	93.3%
1-1999	1999-10	DORM-2	0.2 mL	0.885 ng	4.424 ng/mL	95.3%
1-1999	1999-10	DORM-2	0.2 mL	0.872 ng	4.359 ng/mL	93.9%
1-1999	1999-11	DORM-2	0.2 mL	0.871 ng	4.354 ng/mL	93.8%
1-1999	1999-11	DORM-2	0.2 mL	0.871 ng	4.355 ng/mL	93.9%
1-1999	1999-12	DORM-2	0.2 mL	0.866 ng	4.329 ng/mL	93.3%

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Quarter	MDN Data Set ID	Sample ID	Aliquot Vol	Hg In Aliquot	DormConc	Recovery
1-1999	1999-12	DORM-2	0.2 mL	0.842 ng	4.212 ng/mL	90.8%
1-1999	1999-13	DORM-2	0.2 mL	0.916 ng	4.581 ng/mL	98.7%
1-1999	1999-13	DORM-2	0.2 mL	0.884 ng	4.420 ng/mL	95.3%
1-1999	1999-14	DORM-2	0.2 mL	0.883 ng	4.415 ng/mL	95.2%
1-1999	1999-14	DORM-2	0.2 mL	0.880 ng	4.401 ng/mL	94.8%
1-1999	1999-15	DORM-2	0.2 mL	0.869 ng	4.346 ng/mL	93.7%
1-1999	1999-15	DORM-2	0.2 mL	0.848 ng	4.241 ng/mL	91.4%
1-1999	1999-16	DORM-2	0.2 mL	0.855 ng	4.273 ng/mL	92.1%
1-1999	1999-16	DORM-2	0.2 mL	0.852 ng	4.259 ng/mL	91.8%
1-1999	1999-17	DORM-2	0.2 mL	0.899 ng	4.496 ng/mL	96.9%
1-1999	1999-17	DORM-2	0.2 mL	0.873 ng	4.366 ng/mL	94.1%
1-1999	1999-18	DORM-2	0.2 mL	0.883 ng	4.417 ng/mL	95.2%
1-1999	1999-18	DORM-2	0.2 mL	0.859 ng	4.293 ng/mL	92.5%
1-1999	1999-19	DORM-2	0.2 mL	0.889 ng	4.447 ng/mL	95.8%
1-1999	1999-19	DORM-2	0.2 mL	0.939 ng	4.696 ng/mL	101.2%
1-1999	1999-20	DORM-2	0.2 mL	0.884 ng	4.419 ng/mL	95.2%
1-1999	1999-20	DORM-2	0.2 mL	0.872 ng	4.358 ng/mL	93.9%
2-1999	1999-21	DORM-2	0.2 mL	0.898 ng	4.491 ng/mL	96.8%
2-1999	1999-21	DORM-2	0.2 mL	0.916 ng	4.579 ng/mL	98.7%
2-1999	1999-22	DORM-2	0.2 mL	0.872 ng	4.362 ng/mL	94.0%
2-1999	1999-22	DORM-2	0.2 mL	0.874 ng	4.371 ng/mL	94.2%
2-1999	1999-23	DORM-2	0.2 mL	0.860 ng	4.298 ng/mL	92.6%
2-1999	1999-23	DORM-2	0.2 mL	1.004 ng	5.021 ng/mL	108.2%
2-1999	1999-24	DORM-2	0.2 mL	0.876 ng	4.379 ng/mL	94.4%
2-1999	1999-24	DORM-2	0.2 mL	0.881 ng	4.405 ng/mL	94.9%
2-1999	1999-25	DORM-2	0.2 mL	0.903 ng	4.514 ng/mL	97.3%

Quarter	MDN Data Set ID	Sample ID	Aliquot Vol	Hg In Aliquot	DormConc	Recovery
Feb-99	1999-26	DORM-2	0.2 mL	0.855 ng	4.274 ng/mL	92.1%
2-1999	1999-26	DORM-2	0.2 mL	0.869 ng	4.343 ng/mL	93.6%
2-1999	1999-27	DORM-2	0.2 mL	0.895 ng	4.475 ng/mL	96.4%
2-1999	1999-27	DORM-2	0.2 mL	0.907 ng	4.534 ng/mL	97.7%
2-1999	1999-28	DORM-2	0.2 mL	0.844 ng	4.222 ng/mL	91.0%
2-1999	1999-28	DORM-2	0.2 mL	0.852 ng	4.259 ng/mL	91.8%
2-1999	1999-29	DORM-2	0.2 mL	0.840 ng	4.200 ng/mL	90.5%
2-1999	1999-29	DORM-2	0.2 mL	0.913 ng	4.564 ng/mL	98.4%
2-1999	1999-30	DORM-2	0.2 mL	0.887 ng	4.437 ng/mL	95.6%
2-1999	1999-30	DORM-2	0.2 mL	0.888 ng	4.439 ng/mL	95.7%
2-1999	1999-31	DORM-2	0.4 mL	1.636 ng	4.089 ng/mL	88.1%
2-1999	1999-31	DORM-2	0.2 mL	0.939 ng	4.694 ng/mL	101.2%
2-1999	1999-32	DORM-2	0.2 mL	0.865 ng	4.324 ng/mL	93.2%
2-1999	1999-32	DORM-2	0.2 mL	0.847 ng	4.234 ng/mL	91.2%
2-1999	1999-33	DORM-2	0.2 mL	0.858 ng	4.292 ng/mL	92.5%
2-1999	1999-33	DORM-2	0.2 mL	0.927 ng	4.634 ng/mL	99.9%
2-1999	1999-34	DORM-2	0.2 mL	0.873 ng	4.364 ng/mL	94.1%
2-1999	1999-34	DORM-2	0.2 mL	0.842 ng	4.209 ng/mL	90.7%
2-1999	1999-35	DORM-2	0.2 mL	0.879 ng	4.396 ng/mL	94.8%
2-1999	1999-35	DORM-2	0.2 mL	0.902 ng	4.512 ng/mL	97.2%
2-1999	1999-36	DORM-2	0.2 mL	0.871 ng	4.355 ng/mL	93.8%
2-1999	1999-36	DORM-2	0.2 mL	0.843 ng	4.213 ng/mL	90.8%
3-1999	1999-37	DORM-2	0.2 mL	0.828 ng	4.140 ng/mL	89.2%
3-1999	1999-37	DORM-2	0.2 mL	0.918 ng	4.588 ng/mL	98.9%
3-1999	1999-38	DORM-2	0.2 mL	0.879 ng	4.393 ng/mL	94.7%

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Quarter	MDN Data Set ID	Sample ID	Aliquot Vol	Hg In Aliquot	DormConc	Recovery
3-1999	1999-38	DORM-2	0.2 mL	0.833 ng	4.164 ng/mL	89.7%
3-1999	1999-39	DORM-2	0.2 mL	0.788 ng	3.942 ng/mL	85.0%
3-1999	1999-39	DORM-2	0.2 mL	0.894 ng	4.470 ng/mL	96.3%
3-1999	1999-40	DORM-2	0.2 mL	0.798 ng	3.989 ng/mL	86.0%
3-1999	1999-41	DORM-2	0.2 mL	0.905 ng	4.523 ng/mL	97.5%
3-1999	1999-41	DORM-2	0.2 mL	0.943 ng	4.713 ng/mL	101.6%
3-1999	1999-42	DORM-2	0.2 mL	0.918 ng	4.590 ng/mL	98.9%
3-1999	1999-42	DORM-2	0.2 mL	0.841 ng	4.203 ng/mL	90.6%
3-1999	1999-43	DORM-2	0.2 mL	0.889 ng	4.447 ng/mL	95.8%
3-1999	1999-43	DORM-2	0.2 mL	0.946 ng	4.728 ng/mL	101.9%
3-1999	1999-44	DORM-2	0.2 mL	0.885 ng	4.427 ng/mL	95.4%
3-1999	1999-44	DORM-2	0.2 mL	0.842 ng	4.210 ng/mL	90.7%
3-1999	1999-45	DORM-2	0.2 mL	0.885 ng	4.424 ng/mL	95.3%
3-1999	1999-45	DORM-2	0.2 mL	0.925 ng	4.624 ng/mL	99.7%
3-1999	1999-46	DORM-2	0.2 mL	0.891 ng	4.455 ng/mL	96.0%
3-1999	1999-46	DORM-2	0.2 mL	0.867 ng	4.333 ng/mL	93.4%
3-1999	1999-47	DORM-2	0.2 mL	0.852 ng	4.262 ng/mL	91.8%
3-1999	1999-47	DORM-2	0.2 mL	0.897 ng	4.483 ng/mL	96.6%
3-1999	1999-48	DORM-2	0.2 mL	0.883 ng	4.417 ng/mL	95.2%
3-1999	1999-48	DORM-2	0.2 mL	0.815 ng	4.077 ng/mL	87.9%
3-1999	1999-49	DORM-2	0.2 mL	0.881 ng	4.405 ng/mL	94.9%
3-1999	1999-49	DORM-2	0.2 mL	0.897 ng	4.487 ng/mL	96.7%
3-1999	1999-50	DORM-2	0.2 mL	0.878 ng	4.392 ng/mL	94.6%
3-1999	1999-50	DORM-2	0.2 mL	0.870 ng	4.351 ng/mL	93.8%
3-1999	1999-51	DORM-2	0.2 mL	0.901 ng	4.505 ng/mL	97.1%
3-1999	1999-51	DORM-2	0.2 mL	0.963 ng	4.814 ng/mL	103.8%

Quarter	MDN Data Set ID	Sample ID	Aliquot Vol	Hg In Aliquot	DormConc	Recovery
4-1999	1999-64	DORM-2	0.2 mL	0.925 ng	4.624 ng/mL	99.7%
4-1999	1999-64	DORM-2	0.2 mL	0.845 ng	4.226 ng/mL	91.1%
4-1999	1999-65	DORM-2	0.2 mL	0.883 ng	4.417 ng/mL	95.2%
4-1999	1999-65	DORM-2	0.2 mL	0.900 ng	4.500 ng/mL	97.0%
4-1999	1999-66	DORM-2	0.2 mL	0.955 ng	4.777 ng/mL	102.9%
4-1999	1999-66	DORM-2	0.2 mL	0.998 ng	4.989 ng/mL	107.5%
4-1999	1999-67	DORM-2	0.2 mL	1.040 ng	5.198 ng/mL	112.0%
4-1999	1999-67	DORM-2	0.2 mL	1.012 ng	5.062 ng/mL	109.1%
4-1999	1999-68	DORM-2	0.2 mL	0.834 ng	4.169 ng/mL	89.9%
4-1999	1999-68	DORM-2	0.2 mL	0.856 ng	4.281 ng/mL	92.3%
4-1999	1999-69	DORM-2	0.2 mL	0.894 ng	4.471 ng/mL	96.4%
4-1999	1999-69	DORM-2	0.2 mL	0.826 ng	4.129 ng/mL	89.0%
4-1999	1999-70	DORM-2	0.2 mL	0.859 ng	4.296 ng/mL	92.6%
4-1999	1999-70	DORM-2	0.2 mL	0.903 ng	4.514 ng/mL	97.3%
4-1999	1999-71	DORM-2	0.2 mL	0.878 ng	4.392 ng/mL	94.6%
4-1999	1999-71	DORM-2	0.2 mL	0.874 ng	4.369 ng/mL	94.2%
4-1999	1999-72	DORM-2	0.2 mL	0.923 ng	4.616 ng/mL	99.5%
4-1999	1999-72	DORM-2	0.2 mL	0.844 ng	4.220 ng/mL	91.0%
4-1999	1999-73	DORM-2	0.2 mL	0.903 ng	4.516 ng/mL	97.3%
4-1999	1999-73	DORM-2	0.2 mL	0.864 ng	4.320 ng/mL	93.1%
				Mean	4.385 ng/mL	94.5%
				St Dev	0.208 ng/mL	4.5%

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Quarter	MDN Data Set ID	BottleID	Rep 1	Rep 2	RPD
2-1999	1999-21	MDN736	0.880 ng	0.792 ng	10.5%
2-1999	1999-21	MDN797	0.439 ng	0.393 ng	11.1%
2-1999	1999-21	MDN987	0.248 ng	0.245 ng	1.2%
2-1999	1999-22	MDN777	0.726 ng	0.695 ng	4.4%
2-1999	1999-22	MDN921	0.742 ng	0.726 ng	2.2%
2-1999	1999-22	MDN964	0.909 ng	0.889 ng	2.2%
2-1999	1999-23	MDN809	0.561 ng	0.548 ng	2.4%
2-1999	1999-23	MDN837	1.259 ng	1.083 ng	15.0%
2-1999	1999-23	MDN958	0.575 ng	0.573 ng	0.5%
2-1999	1999-24	MDN659	0.960 ng	0.945 ng	1.5%
2-1999	1999-24	MDN695	1.375 ng	1.362 ng	0.9%
2-1999	1999-24	MDN781	1.418 ng	1.361 ng	4.2%
2-1999	1999-25	MDN165	1.117 ng	1.070 ng	4.3%
2-1999	1999-25	MDN824	1.299 ng	1.298 ng	0.0%
2-1999	1999-25	MDN833	0.226 ng	0.223 ng	1.5%
2-1999	1999-26	MDN116	1.732 ng	1.720 ng	0.7%
2-1999	1999-26	MDN480	1.539 ng	1.500 ng	2.6%
2-1999	1999-26	MDN841	0.532 ng	0.513 ng	3.7%
2-1999	1999-27	MDN651	0.986 ng	0.899 ng	9.2%
2-1999	1999-27	MDN844	1.497 ng	1.480 ng	1.1%
2-1999	1999-27	MDN896	0.679 ng	0.671 ng	1.1%
2-1999	1999-28	MDN765	1.212 ng	1.201 ng	0.9%
2-1999	1999-28	MDN950	0.523 ng	0.513 ng	2.1%
2-1999	1999-28	MDN984	0.950 ng	0.923 ng	2.9%
2-1999	1999-29	MDN758	1.264 ng	1.263 ng	0.1%
2-1999	1999-29	MDN846	1.029 ng	1.022 ng	0.7%
2-1999	1999-29	MDN918	0.573 ng	0.531 ng	7.7%
2-1999	1999-30	MDN162	1.146 ng	1.123 ng	2.1%
2-1999	1999-30	MDN867	0.379 ng	0.374 ng	1.2%
2-1999	1999-30	MDN935	1.265 ng	1.252 ng	1.0%
2-1999	1999-31	MDN757	1.183 ng	1.073 ng	9.8%
2-1999	1999-31	MDN792	1.376 ng	1.369 ng	0.5%
2-1999	1999-31	MDN851	0.627 ng	0.625 ng	0.2%
2-1999	1999-32	MDN818	0.535 ng	0.533 ng	0.4%
2-1999	1999-32	MDN924	0.624 ng	0.600 ng	3.9%
2-1999	1999-33	MDN642	1.381 ng	1.362 ng	1.4%
2-1999	1999-33	MDN689	0.621 ng	0.606 ng	2.6%
2-1999	1999-33	MDN761	0.702 ng	0.637 ng	9.7%
2-1999	1999-34	MDN114	0.597 ng	0.569 ng	4.9%
2-1999	1999-34	MDN826	0.642 ng	0.627 ng	2.4%
2-1999	1999-34	MDN946	1.340 ng	1.333 ng	0.5%
2-1999	1999-35	MDN120	1.337 ng	1.130 ng	16.8%
2-1999	1999-35	MDN668	1.122 ng	1.095 ng	2.5%
2-1999	1999-36	MDN140	0.626 ng	0.593 ng	5.4%
2-1999	1999-36	MDN778	1.813 ng	1.777 ng	2.0%
2-1999	1999-36	MDN890	0.606 ng	0.598 ng	1.3%
3-1999	1999-37	MDN149	1.324 ng	1.290 ng	2.6%
3-1999	1999-37	MDN160	0.856 ng	0.837 ng	2.3%
3-1999	1999-37	MDN771	0.727 ng	0.681 ng	6.6%
3-1999	1999-38	MDN756	1.145 ng	1.120 ng	2.2%
3-1999	1999-38	MDN769	1.670 ng	1.651 ng	1.1%
3-1999	1999-38	MDN806	1.597 ng	1.576 ng	1.3%
3-1999	1999-39	MDN127	1.380 ng	1.362 ng	1.4%
3-1999	1999-39	MDN751	1.607 ng	1.549 ng	3.7%
3-1999	1999-40	MDN118	0.819 ng	0.736 ng	10.6%

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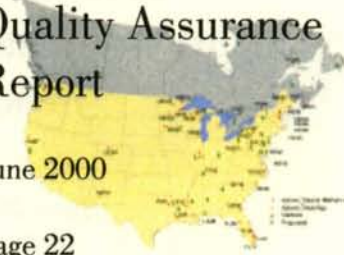


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Quarter	MDN Data Set ID	BottleID	Rep 1	Rep 2	RPD
3-1999	1999-40	MDN934	0.573 ng	0.564 ng	1.5%
3-1999	1999-41	MDN170	0.394 ng	0.372 ng	5.9%
3-1999	1999-41	MDN682	1.673 ng	1.628 ng	2.8%
3-1999	1999-41	MDN709	0.847 ng	0.795 ng	6.3%
3-1999	1999-42	MDN483	1.156 ng	1.077 ng	7.1%
3-1999	1999-42	MDN675	0.961 ng	0.942 ng	2.1%
3-1999	1999-42	MDN787	1.152 ng	1.077 ng	6.7%
3-1999	1999-43	MDN760	0.324 ng	0.313 ng	3.2%
3-1999	1999-43	MDN797	0.048 ng	0.040 ng	19.5%
3-1999	1999-43	MDN818	0.043 ng	0.034 ng	23.0%
3-1999	1999-44	MDN129	1.531 ng	1.426 ng	7.1%
3-1999	1999-44	MDN153	3.482 ng	3.370 ng	3.3%
3-1999	1999-44	MDN791	0.531 ng	0.500 ng	6.1%
3-1999	1999-45	MDN841	1.491 ng	1.367 ng	8.7%
3-1999	1999-45	MDN844	1.204 ng	1.120 ng	7.3%
3-1999	1999-45	MDN915	1.082 ng	1.021 ng	5.8%
3-1999	1999-46	MDN146	0.832 ng	0.824 ng	0.9%
3-1999	1999-46	MDN152	1.887 ng	1.854 ng	1.7%
3-1999	1999-46	MDN833	1.141 ng	1.140 ng	0.1%
3-1999	1999-47	MDN125	1.615 ng	1.471 ng	9.3%
3-1999	1999-47	MDN142	1.661 ng	1.590 ng	4.4%
3-1999	1999-47	MDN665	0.317 ng	0.300 ng	5.4%
3-1999	1999-48	MDN672	1.046 ng	0.982 ng	6.3%
3-1999	1999-48	MDN689	2.237 ng	2.144 ng	4.2%
3-1999	1999-48	MDN785	1.001 ng	0.986 ng	1.6%
3-1999	1999-49	MDN114	1.369 ng	1.359 ng	0.7%
3-1999	1999-49	MDN647	1.613 ng	1.606 ng	0.5%
3-1999	1999-49	MDN895	0.903 ng	0.884 ng	2.2%
3-1999	1999-50	MDN144	1.284 ng	1.261 ng	1.8%
3-1999	1999-50	MDN193	2.107 ng	2.082 ng	1.2%
3-1999	1999-50	MDN919	1.451 ng	1.435 ng	1.1%
3-1999	1999-51	MDN145	1.160 ng	1.095 ng	5.8%
3-1999	1999-51	MDN894	1.456 ng	1.426 ng	2.1%
3-1999	1999-51	MDN962	0.624 ng	0.589 ng	5.8%
3-1999	1999-52	MDN185	0.713 ng	0.651 ng	9.2%
3-1999	1999-52	MDN678	2.274 ng	1.924 ng	16.6%
3-1999	1999-52	MDN783	1.128 ng	1.009 ng	11.2%
3-1999	1999-53	MDN180	0.381 ng	0.375 ng	1.7%
3-1999	1999-53	MDN846	1.262 ng	1.250 ng	1.0%
3-1999	1999-53	MDN940	0.312 ng	0.296 ng	5.2%
3-1999	1999-54	MDN483	0.608 ng	0.572 ng	6.0%
3-1999	1999-54	MDN809	0.487 ng	0.443 ng	9.4%
3-1999	1999-54	MDN979	1.066 ng	1.007 ng	5.7%
4-1999	1999-55	MDN163	1.154 ng	1.136 ng	1.5%
4-1999	1999-55	MDN665	0.338 ng	0.308 ng	9.4%
4-1999	1999-55	MDN780	1.285 ng	1.273 ng	1.0%
4-1999	1999-56	MDN633	0.815 ng	0.736 ng	10.2%
4-1999	1999-56	MDN785	0.345 ng	0.320 ng	7.7%
4-1999	1999-56	MDN820	1.061 ng	1.058 ng	0.3%
4-1999	1999-57	MDN187	0.439 ng	0.409 ng	7.0%
4-1999	1999-57	MDN674	0.450 ng	0.418 ng	7.4%
4-1999	1999-57	MDN939	0.795 ng	0.786 ng	1.2%
4-1999	1999-58	MDN956	0.896 ng	0.892 ng	0.4%
4-1999	1999-58	MDN966	0.435 ng	0.426 ng	2.0%
4-1999	1999-58	MDN972	1.407 ng	1.362 ng	3.2%

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Quarter	MDN Data Set ID	BottleID	Rep 1	Rep 2	RPD
4-1999	1999-59	MDN142	0.919 ng	0.894 ng	2.8%
4-1999	1999-59	MDN696	0.328 ng	0.289 ng	12.8%
4-1999	1999-59	MDN947	0.431 ng	0.419 ng	2.8%
4-1999	1999-60	MDN136	0.272 ng	0.265 ng	2.7%
4-1999	1999-60	MDN495	0.877 ng	0.837 ng	4.7%
4-1999	1999-60	MDN683	0.995 ng	0.987 ng	0.8%
4-1999	1999-61	MDN121	0.268 ng	0.249 ng	7.3%
4-1999	1999-61	MDN196	0.553 ng	0.551 ng	0.5%
4-1999	1999-61	MDN927	0.434 ng	0.423 ng	2.6%
4-1999	1999-62	MDN270	0.247 ng	0.232 ng	6.1%
4-1999	1999-62	MDN282	0.160 ng	0.155 ng	3.2%
4-1999	1999-62	MDN643	0.461 ng	0.449 ng	2.8%
4-1999	1999-63	MDN193	0.233 ng	0.208 ng	11.5%
4-1999	1999-63	MDN480	0.358 ng	0.358 ng	0.0%
4-1999	1999-63	MDN691	0.884 ng	0.884 ng	0.1%
4-1999	1999-64	MDN128	0.213 ng	0.205 ng	3.9%
4-1999	1999-64	MDN155	0.429 ng	0.411 ng	4.3%
4-1999	1999-64	MDN735	0.354 ng	0.288 ng	20.4%
4-1999	1999-65	MDN114	0.287 ng	0.278 ng	2.9%
4-1999	1999-65	MDN756	0.518 ng	0.425 ng	19.8%
4-1999	1999-65	MDN912	0.327 ng	0.306 ng	6.4%
4-1999	1999-66	MDN779	0.944 ng	0.887 ng	6.3%
4-1999	1999-66	MDN923	0.211 ng	0.183 ng	13.8%
4-1999	1999-66	MDN960	0.386 ng	0.372 ng	3.7%
4-1999	1999-68	MDN270	0.730 ng	0.720 ng	1.4%
4-1999	1999-68	MDN811	0.419 ng	0.400 ng	4.6%
4-1999	1999-68	MDN869	0.833 ng	0.799 ng	4.2%
4-1999	1999-69	MDN636	0.654 ng	0.614 ng	6.3%
4-1999	1999-69	MDN700	0.781 ng	0.736 ng	6.0%
4-1999	1999-69	MDN866	0.435 ng	0.404 ng	7.4%
4-1999	1999-70	MDN136	0.307 ng	0.299 ng	2.9%
4-1999	1999-70	MDN277	0.528 ng	0.509 ng	3.6%
4-1999	1999-70	MDN947	0.326 ng	0.320 ng	1.9%
4-1999	1999-71	MDN151	0.378 ng	0.376 ng	0.5%
4-1999	1999-71	MDN159	0.916 ng	0.825 ng	10.4%
4-1999	1999-71	MDN821	0.589 ng	0.549 ng	7.0%
4-1999	1999-72	MDN0171	0.670 ng	0.646 ng	3.7%
4-1999	1999-72	MDN0709	0.492 ng	0.465 ng	5.5%
4-1999	1999-72	MDN0893	0.639 ng	0.610 ng	4.6%
4-1999	1999-73	MDN0170	0.343 ng	0.333 ng	2.9%
4-1999	1999-73	MDN0196	0.941 ng	0.912 ng	3.2%
4-1999	1999-73	MDN0939	0.553 ng	0.541 ng	2.3%
Mean					4.3%
St. Dev					4.1%

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Quarter	MDN Data Set ID	BottleID	MaxOfAliquotHg	MinOfAliquotHg	Rec
2-1999	1999-22	MDN964	1.949 ng	0.889 ng	106.0%
2-1999	1999-23	MDN809	1.614 ng	0.548 ng	106.6%
2-1999	1999-23	MDN837	2.444 ng	1.083 ng	136.1%
2-1999	1999-23	MDN958	1.477 ng	0.573 ng	90.4%
2-1999	1999-24	MDN659	1.905 ng	0.945 ng	96.0%
2-1999	1999-24	MDN695	2.355 ng	1.375 ng	98.1%
2-1999	1999-24	MDN781	2.435 ng	1.361 ng	107.4%
2-1999	1999-25	MDN165	2.031 ng	1.117 ng	91.4%
2-1999	1999-25	MDN824	2.408 ng	1.299 ng	111.0%
2-1999	1999-25	MDN833	1.258 ng	0.226 ng	103.2%
2-1999	1999-26	MDN116	2.758 ng	1.732 ng	102.6%
2-1999	1999-26	MDN480	2.546 ng	1.500 ng	104.6%
2-1999	1999-26	MDN841	1.561 ng	0.513 ng	104.9%
2-1999	1999-27	MDN651	1.996 ng	0.899 ng	109.7%
2-1999	1999-27	MDN844	2.493 ng	1.497 ng	99.7%
2-1999	1999-27	MDN896	1.586 ng	0.671 ng	91.5%
2-1999	1999-28	MDN765	2.262 ng	1.201 ng	106.1%
2-1999	1999-28	MDN950	1.523 ng	0.513 ng	101.0%
2-1999	1999-28	MDN984	1.906 ng	0.923 ng	98.4%
2-1999	1999-29	MDN758	2.198 ng	1.264 ng	93.5%
2-1999	1999-29	MDN846	1.887 ng	1.022 ng	86.5%
2-1999	1999-29	MDN918	1.602 ng	0.531 ng	107.1%
2-1999	1999-30	MDN162	2.210 ng	1.123 ng	108.7%
2-1999	1999-30	MDN867	1.389 ng	0.374 ng	101.5%
2-1999	1999-30	MDN935	2.284 ng	1.265 ng	102.0%
2-1999	1999-31	MDN757	2.235 ng	1.073 ng	116.2%
2-1999	1999-31	MDN792	2.230 ng	1.376 ng	85.4%
2-1999	1999-31	MDN851	1.558 ng	0.625 ng	93.3%
2-1999	1999-32	MDN924	1.336 ng	0.600 ng	73.6%
2-1999	1999-32	MDN941	1.714 ng	0.735 ng	97.9%
2-1999	1999-33	MDN642	2.279 ng	1.362 ng	91.8%
2-1999	1999-33	MDN689	1.606 ng	0.621 ng	98.4%
2-1999	1999-33	MDN761	1.764 ng	0.637 ng	112.7%
2-1999	1999-34	MDN114	1.598 ng	0.597 ng	100.1%
2-1999	1999-34	MDN826	1.653 ng	0.627 ng	102.6%
2-1999	1999-34	MDN946	2.415 ng	1.340 ng	107.5%
2-1999	1999-35	MDN120	2.331 ng	1.130 ng	120.2%
2-1999	1999-35	MDN668	1.919 ng	1.122 ng	79.7%
2-1999	1999-35	MDN850	3.208 ng	2.316 ng	89.2%
2-1999	1999-36	MDN140	1.571 ng	0.593 ng	97.7%
2-1999	1999-36	MDN778	2.820 ng	1.813 ng	100.7%
2-1999	1999-36	MDN890	1.611 ng	0.598 ng	101.3%
3-1999	1999-37	MDN149	2.268 ng	1.290 ng	97.8%
3-1999	1999-37	MDN160	1.887 ng	0.837 ng	105.0%
3-1999	1999-37	MDN771	1.771 ng	0.681 ng	109.0%
3-1999	1999-38	MDN756	2.139 ng	1.145 ng	99.4%
3-1999	1999-38	MDN769	2.789 ng	1.651 ng	113.9%
3-1999	1999-38	MDN806	2.651 ng	1.576 ng	107.5%
3-1999	1999-39	MDN127	2.160 ng	1.380 ng	77.9%
3-1999	1999-39	MDN751	2.495 ng	1.549 ng	94.6%
3-1999	1999-40	MDN118	1.764 ng	0.819 ng	94.5%
3-1999	1999-40	MDN934	1.461 ng	0.564 ng	89.7%
3-1999	1999-41	MDN170	1.199 ng	0.394 ng	80.5%
3-1999	1999-41	MDN682	2.420 ng	1.673 ng	74.6%
3-1999	1999-41	MDN709	1.843 ng	0.795 ng	104.8%
3-1999	1999-42	MDN483	1.987 ng	1.156 ng	83.1%
3-1999	1999-42	MDN675	1.891 ng	0.961 ng	92.9%
3-1999	1999-42	MDN787	2.224 ng	1.077 ng	114.7%
3-1999	1999-43	MDN760	1.329 ng	0.324 ng	100.5%
3-1999	1999-43	MDN797	0.991 ng	0.040 ng	95.1%

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Quarter	MDN Data Set ID	BottleID	MaxOfAliquotHg	MinOfAliquotHg	Rec
4-1999	1999-64	MDN128	1.169 ng	0.205 ng	96.4%
4-1999	1999-64	MDN155	1.349 ng	0.411 ng	93.8%
4-1999	1999-64	MDN735	1.302 ng	0.288 ng	101.3%
4-1999	1999-65	MDN114	1.145 ng	0.278 ng	86.6%
4-1999	1999-65	MDN756	1.454 ng	0.518 ng	93.6%
4-1999	1999-65	MDN912	1.295 ng	0.327 ng	96.8%
4-1999	1999-66	MDN779	1.879 ng	0.887 ng	99.2%
4-1999	1999-66	MDN923	1.206 ng	0.211 ng	99.5%
4-1999	1999-66	MDN960	1.276 ng	0.386 ng	89.0%
4-1999	1999-68	MDN270	1.788 ng	0.730 ng	105.8%
4-1999	1999-68	MDN811	1.438 ng	0.419 ng	101.8%
4-1999	1999-68	MDN869	1.786 ng	0.799 ng	98.7%
4-1999	1999-69	MDN636	1.610 ng	0.654 ng	95.6%
4-1999	1999-69	MDN700	1.758 ng	0.781 ng	97.7%
4-1999	1999-69	MDN866	1.440 ng	0.435 ng	100.5%
4-1999	1999-70	MDN136	1.272 ng	0.307 ng	96.4%
4-1999	1999-70	MDN277	1.518 ng	0.528 ng	99.0%
4-1999	1999-70	MDN947	1.373 ng	0.320 ng	105.3%
4-1999	1999-71	MDN151	1.358 ng	0.376 ng	98.2%
4-1999	1999-71	MDN159	1.948 ng	0.916 ng	103.2%
4-1999	1999-71	MDN821	1.684 ng	0.549 ng	113.5%
4-1999	1999-72	MDN0171	1.699 ng	0.670 ng	102.9%
4-1999	1999-72	MDN0709	1.454 ng	0.492 ng	96.2%
4-1999	1999-72	MDN893	1.662 ng	0.639 ng	102.3%
4-1999	1999-73	MDN0170	1.354 ng	0.343 ng	101.2%
4-1999	1999-73	MDN0196	1.995 ng	0.912 ng	108.3%
4-1999	1999-73	MDN0939	1.592 ng	0.553 ng	103.9%
				Mean	99.8%
				St Dev	8.9%

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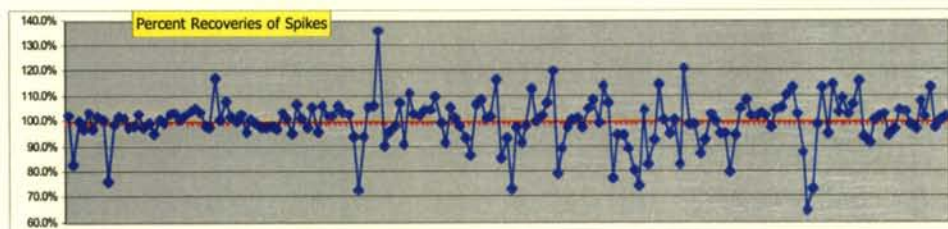
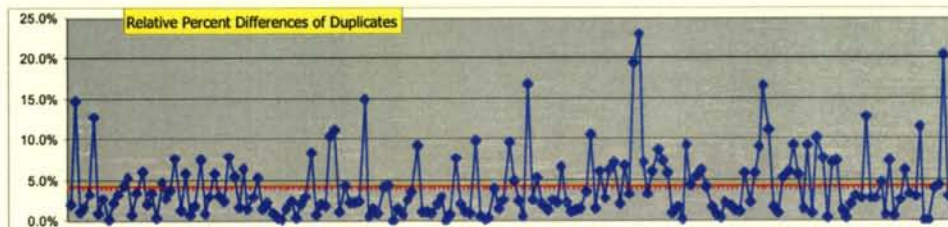
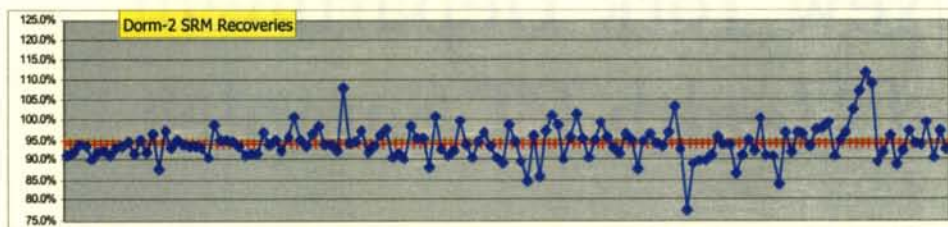
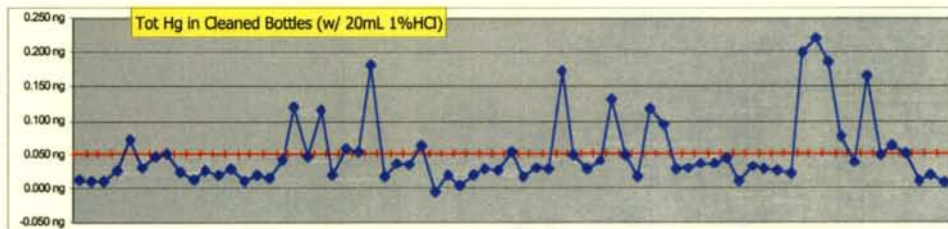
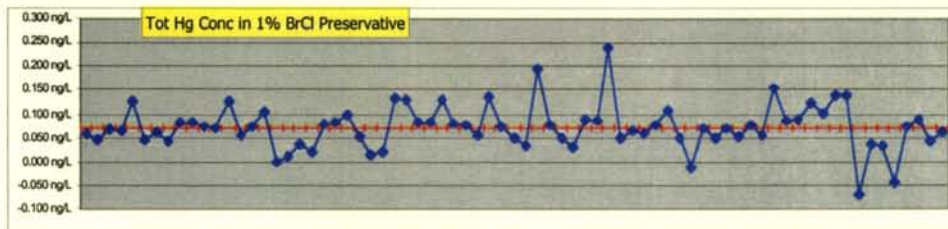
VI. Appendix B Control Charts

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VII. Appendix C

New York Department of Health PT Samples

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LAB 11662 FRONTIER GEOSCIENCES INC EPA Lab ID: WA01127
 Proficiency Test Report

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Analite	Sample ID	Result	Meas/Unit	Reference Limits	Method	Score
Asbestos Approved Category: Non Potable Water Sample: Mercury	2311	23.8	24.9	18.8 - 31.1	Asbestos Mercury	Satisfactory
Mercury, Total 126 passed out of 127 reported results.	2311	23.8	24.9	18.8 - 31.1	Mercury	Satisfactory
Burden, Total 127 passed out of 126 reported results	2311	1330	1190	1000 - 1700	EPA 200.8	Satisfactory
Cadmium, Total 126 passed out of 124 reported results.	2311	126	120	102 - 127	EPA 200.8	Satisfactory
Chromium, Total 140 passed out of 170 reported results.	2311	60.2	60.9	76.1 - 104	EPA 200.8	Satisfactory
Copper, Total 154 passed out of 150 reported results.	2311	215	201	179 - 222	EPA 200.8	Satisfactory
Nickel, Total 151 passed out of 146 reported results.	2311	214	202	621 - 763	EPA 200.8	Satisfactory
Lead, Total 167 passed out of 180 reported results.	2311	198	200	170 - 230	EPA 200.8	Satisfactory
Selenium, Total 120 passed out of 126 reported results.	2311	409	360	310 - 494	EPA 200.8	Satisfactory
Zinc, Total 152 passed out of 151 reported results.	2311	671	623	500 - 676	EPA 200.8	Satisfactory

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Proficiency Test Report

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Lab # 11662 FRONTIER GEOSCIENCES INC
 Shipment 223 Non Potable Water Chemistry
 Shipment Date 24-Jan-2000

ANALYTE	APPROVAL CATEGORY	ANALYTE ID	RESULT	EXPECTED	REFERENCE RANGE	METHOD	SCORE
Approved Category: Non Potable Water							
Sample	Method IV	2311	47	49	343 - 456	EPA 200.8	Satisfactory
130 passed out of 130 reported results.							
Analysis, Total		2311	93	93	504 - 702	EPA 200.8	Satisfactory
120 passed out of 142 reported results.							
Analysis, Total		2311	91	99	609 - 946	EPA 200.8	Satisfactory
114 passed out of 121 reported results.							
Approved Category: Solid and Hazardous Waste							
Sample	Method	2322	44.7	36.6	18.2 - 54.6	NH 3046	Satisfactory
103 passed out of 114 reported results.							
Analysis, Total		2322	99	93	129 - 231	SW 646 3051	Satisfactory
50 passed out of 122 reported results.							
Analysis, Total		2322	236	308	151 - 485	SW 646 3051	Satisfactory
160 passed out of 112 reported results.							
Analysis, Total		2322	50.4	33.2	22.8 - 43.8	SW 646 3051	Satisfactory
112 passed out of 119 reported results.							
Analysis, Total		2322	45.9	77.8	26.2 - 79	SW 646 3051	Satisfactory
117 passed out of 118 reported results.							
Analysis, Total		2322	400	489	251 - 555	SW 948 3051	Satisfactory
109 passed out of 117 reported results.							

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LAB 11662 FRONTIER GEOSCIENCES INC EPA Lab Id WAO1127
 Shipment 223 Non Potable Water Chemistry
 Shipment Date 24-Jan-2000

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Sample	Sample ID	Brand	Manufacturer	Substance/Matrix	Method	Score
Agarose						
Agarose Category						
Sample	W0001	237	245	128 - 304	601-661 3031	Satisfactory
Label Total	2122					
113 passed out of 120 reported results						
Agarose, Total	2228	617	248	311 - 615	162 Score/Std	Unsatisfactory *****
88 passed out of 93 reported results						
Substratum, Total	2122	302	216	616 - 97	301-340 3021	Satisfactory
86 passed out of 101 reported results						

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VIII. Appendix D 1999 Laboratory Intercomparison Results

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HAL Summary					Comparison Lab Summary	
DataSet	BottleID	ng/Aliquot	THg Conc.	Sum Stats	Lab	Comp. Lab Results
1998-25	MDN068	0.843 ng	8.43 ng/L	8.59 ng/L	A1	9.20 ng/l
1998-25	MDN068D	0.858 ng	8.58 ng/L	0.162 ng/l (stdev)		
1998-25	MDN068S	0.852 ng	8.52 ng/L	1.9% (%RSD)		1.1% (%RSD)
1998-50	MDN068T	0.881 ng	8.81 ng/L			
1998-23	MDN544	1.527 ng	15.27 ng/L	14.99 ng/L	A2	13.80 ng/l
1998-23	MDN544D	1.501 ng	15.01 ng/L	0.311 ng/l (stdev)		
1998-23	MDN544S	1.512 ng	15.12 ng/L	2.1%		1.4% (%RSD)
1998-50	MDN544T	1.455 ng	14.55 ng/L			
1998-25	MDN571	0.505 ng	5.05 ng/L	5.05 ng/L	A3	5.40 ng/l
1998-25	MDN571D	0.502 ng	5.02 ng/L	0.095 ng/l (stdev)		
1998-25	MDN571S	0.494 ng	4.94 ng/L	1.9%		3.7% (%RSD)
1998-50	MDN571T	0.517 ng	5.17 ng/L			
1998-53	MDN628	0.322 ng	3.22 ng/L	3.41 ng/L	A4	3.80 ng/l
1998-53	MDN628D	0.345 ng	3.45 ng/L	0.178		
1998-53	MDN628S	0.357 ng	3.57 ng/L	5.2%		13.2% (%RSD)
1998-50	MDN847	1.099 ng	10.99 ng/L	10.59 ng/L	A5	10.70 ng/l
1998-50	MDN847D	1.099 ng	10.99 ng/L	0.687		
1998-50	MDN847S	0.980 ng	9.80 ng/L	6.5%		4.7% (%RSD)
1998-33	MDN074	2.264 ng	22.64 ng/L	22.74 ng/L	B1	22.31 ng/l
1998-33	MDN074D	2.304 ng	23.04 ng/L	0.956		
1998-33	MDN074S	2.378 ng	23.78 ng/L	4.2%		3.4% (%RSD)
1998-51	MDN074T	2.149 ng	21.49 ng/L			
1998-53	MDN366	0.258 ng	2.58 ng/L	2.40 ng/L	B2	2.45 ng/l
1998-53	MDN366D	0.254 ng	2.54 ng/L	0.284		
1998-53	MDN366S	0.207 ng	2.07 ng/L	11.8%		10.6% (%RSD)
1998-25	MDN559	0.877 ng	8.77 ng/L	9.01 ng/L	B3	8.55 ng/l
1998-25	MDN559D	0.892 ng	8.92 ng/L	0.241		
1998-25	MDN559S	0.901 ng	9.01 ng/L	2.7%		4.7% (%RSD)
1998-50	MDN559T	0.934 ng	9.34 ng/L			
1998-52	MDN814	1.192 ng	11.92 ng/L	11.85 ng/L	B4	12.62 ng/l
1998-52	MDN814D	1.253 ng	12.53 ng/L	0.712		
1998-52	MDN814S	1.111 ng	11.11 ng/L	6.0%		5.4% (%RSD)
1998-51	MDN841	0.643 ng	6.43 ng/L	6.26 ng/L	B5	6.65 ng/l
1998-51	MDN841D	0.632 ng	6.32 ng/L	0.207		
1998-51	MDN841S	0.603 ng	6.03 ng/L	3.3%		8.3% (%RSD)
1998-52	MDN203	0.573 ng	5.73 ng/L	5.74 ng/L	C1	6.56 ng/l
1998-52	MDN203D	0.594 ng	5.94 ng/L	0.190		
1998-52	MDN203S	0.556 ng	5.56 ng/L	3.3%		4.1% (%RSD)
1998-26	MDN226	0.760 ng	7.60 ng/L	7.91 ng/L	C2	7.55 ng/l
1998-26	MDN226D	0.771 ng	7.71 ng/L	0.551		
1998-26	MDN226S	0.873 ng	8.73 ng/L	7.0%		0.4% (%RSD)
1998-51	MDN226T	0.759 ng	7.59 ng/L			
1998-26	MDN233	0.838 ng	8.38 ng/L	8.07 ng/L	C3	8.19 ng/l
1998-26	MDN233D	0.797 ng	7.97 ng/L	0.206		
1998-26	MDN233S	0.794 ng	7.94 ng/L	2.6%		3.3% (%RSD)
1998-51	MDN233T	0.800 ng	8.00 ng/L			
1998-52	MDN587	0.490 ng	4.90 ng/L	4.73 ng/L	C4	4.76 ng/l
1998-52	MDN587D	0.452 ng	4.52 ng/L	0.192		
1998-52	MDN587S	0.476 ng	4.76 ng/L	4.1%		1.1% (%RSD)
1998-53	MDN840	1.582 ng	15.82 ng/L	15.38 ng/L	C5	15.81 ng/l
1998-53	MDN840D	1.490 ng	14.90 ng/L	0.461		
1998-53	MDN840S	1.541 ng	15.41 ng/L	3.0%		2.0% (%RSD)

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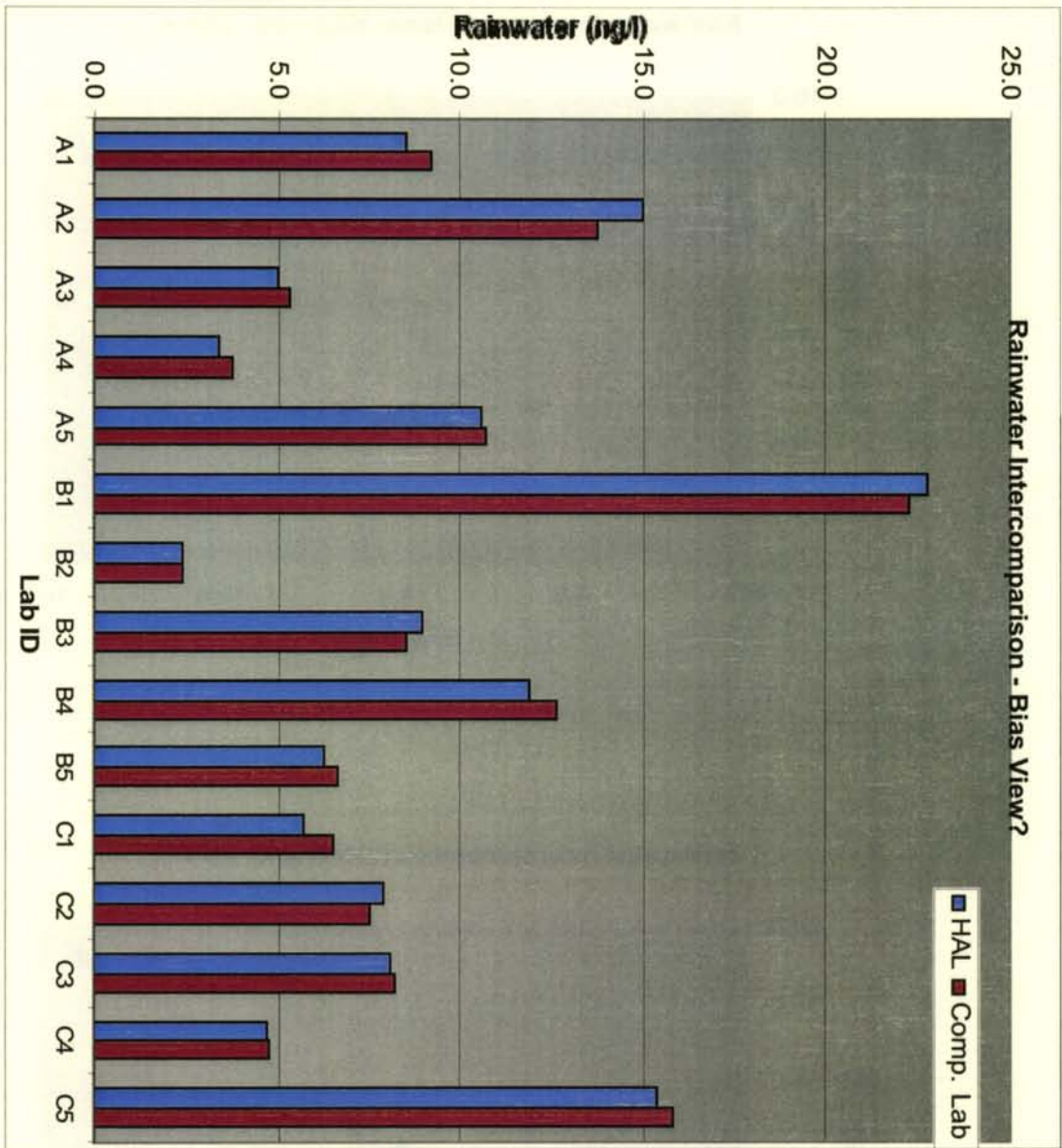
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OVERALL SUMMARY				
Bottle ID	HAL (ng/l)	Comp. Lab (ng/l)	Comp Lab ID	RPD
MDN068	8.59	9.20	A1	6.9%
MDN544	14.99	13.80	A2	8.3%
MDN571	5.05	5.40	A3	6.7%
MDN628	3.41	3.80	A4	10.8%
MDN847	10.59	10.70	A5	1.0%
MDN074	22.74	22.31	B1	1.9%
MDN366	2.40	2.45	B2	2.1%
MDN559	9.01	8.55	B3	5.2%
MDN814	11.85	12.62	B4	6.3%
MDN841	6.26	6.65	B5	6.0%
MDN203	5.74	6.56	C1	13.3%
MDN226	7.91	7.55	C2	4.7%
MDN233	8.07	8.19	C3	1.5%
MDN587	4.73	4.76	C4	0.6%
MDN840	15.38	15.81	C5	2.8%
			Average	5.2%

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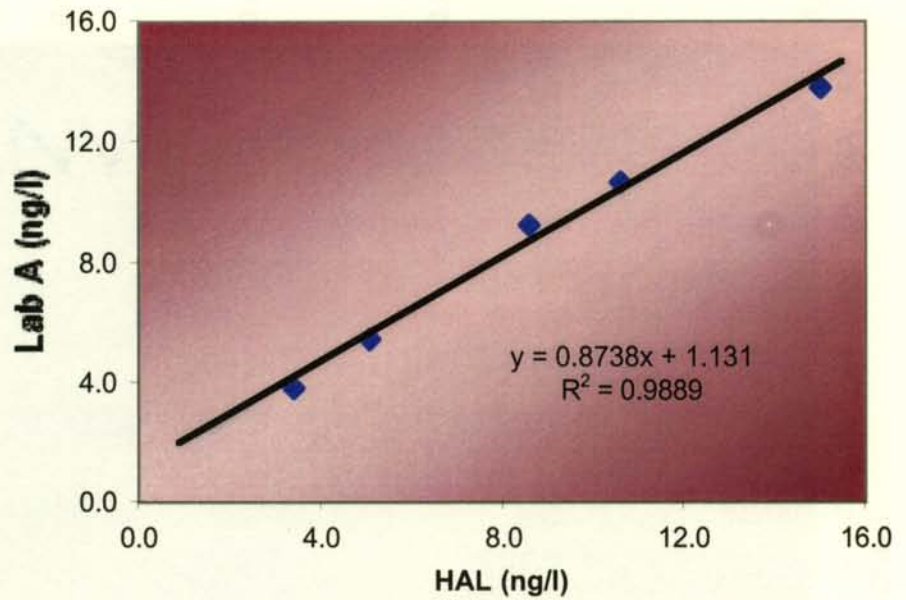


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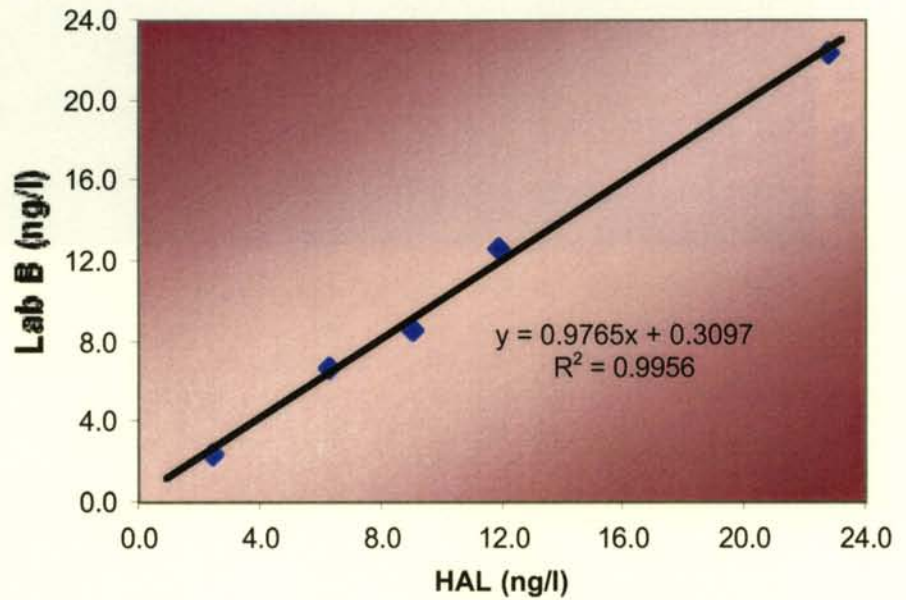


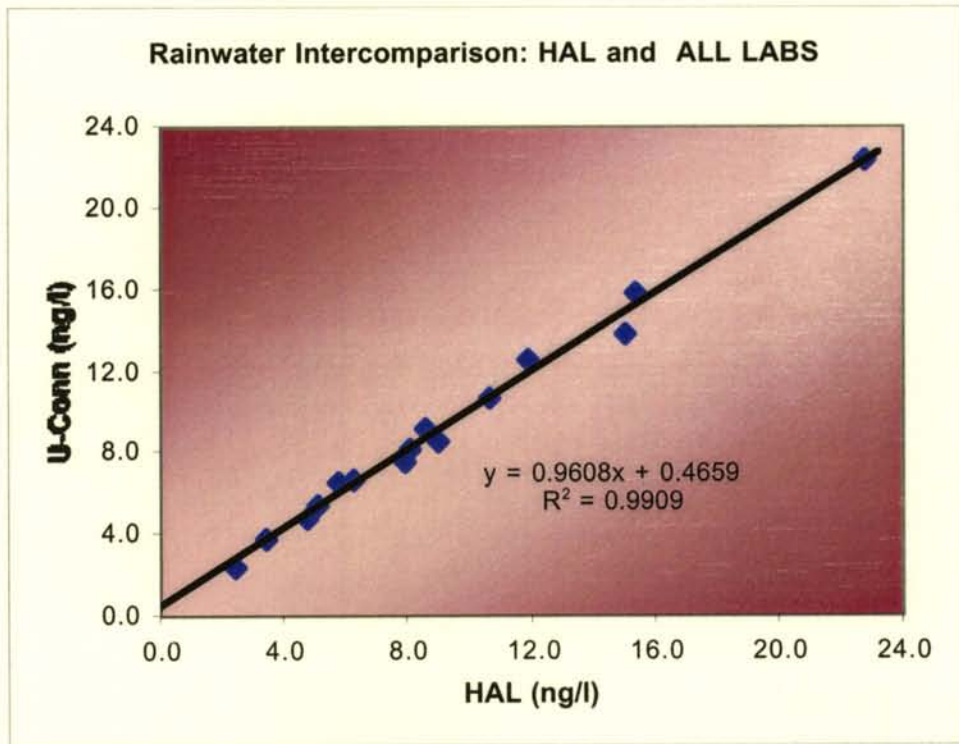
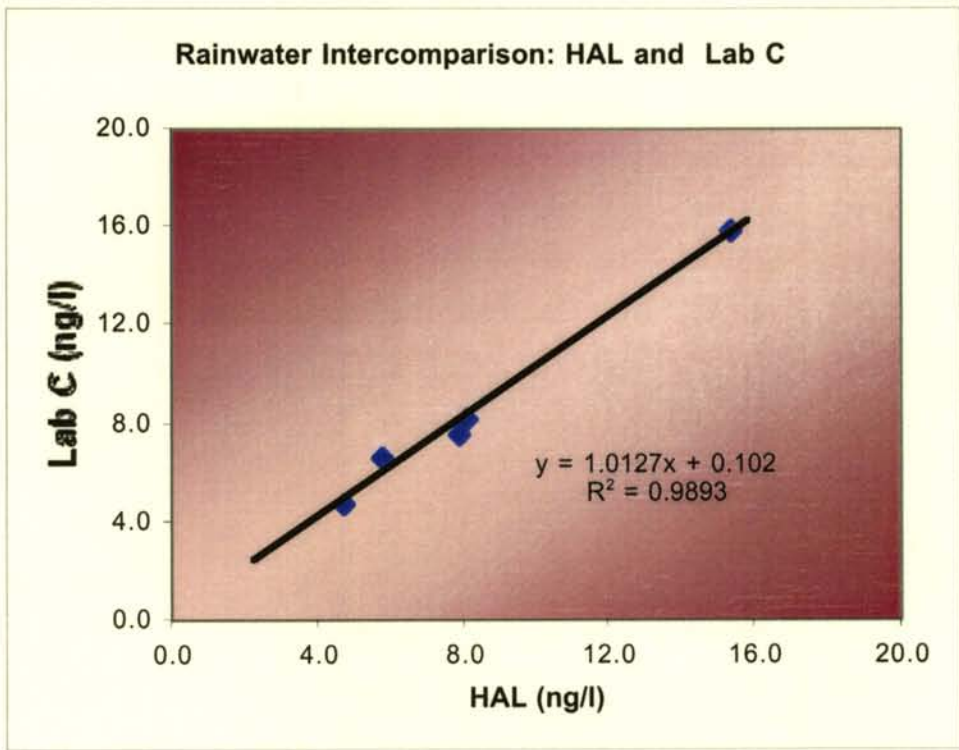
June 2000

Rainwater Intercomparison: HAL and Lab A



Rainwater Intercomparison: HAL and Lab B







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