National Atmospheric Deposition Program

Mercury Deposition Network

Mercury Analytical Laboratory
2003 Annual Quality Assurance Report

Prepared by:
Gerard Van der Jagt

Frontier GeoSciences Inc.
414 Pontius Ave. N.
Seattle WA 98109
206.622.6960
www.frontiergeosciences.com

Table of Contents

Definitions of Acronyms and Abbreviations

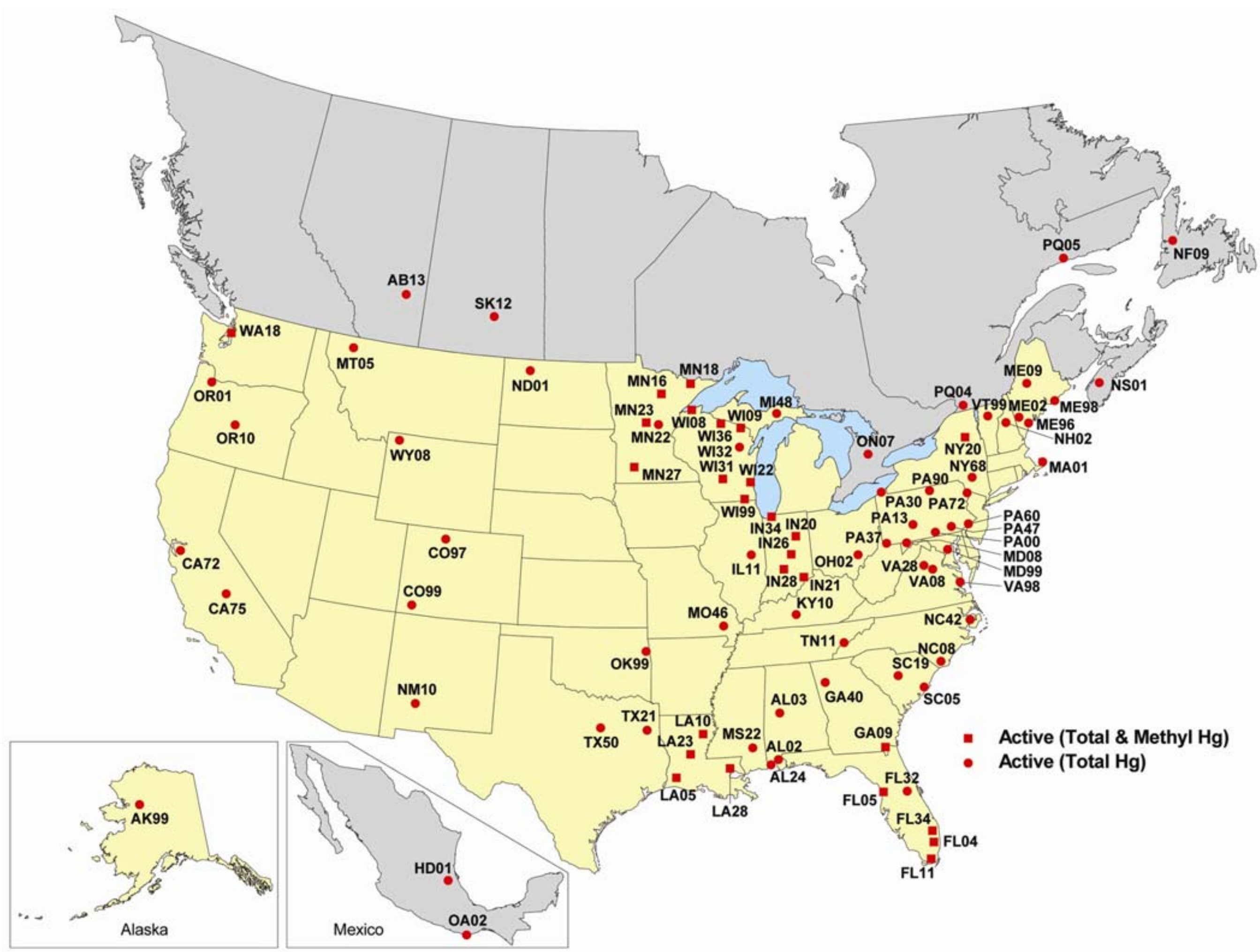
CAL	Central Analytical Lab
CCB	Continued Calibration Blank
CCV	Continued Calibration Verification
COC	Chain of Custody
CRM	Certified Reference Material
CVAFS	Cold Vapor Atomic Fluorescence Spectrometry
DQO	Data Quality Objectives
EMOF	Electronic Mercury Observer Form
HAL	Mercury (Hg) Analytical Lab
ICB	Initial Calibration Blank
ICV	Initial Calibration Verification
MD	Matrix Duplicate
MDL	Method Detection Limit
MDN	Mercury Deposition Network
MOF	Mercury Observer Form
MS	Matrix Spike
MSD	Matrix Spike Duplicate
NADP	National Atmospheric Deposition Program
NED	Network Equipment Depot
PB	Preparation Blanks
PE	Performance Evaluation
PT	Proficiency Test
QA/QC	Quality Assurance/Quality Control
QAP	Quality Assurance Plan
QR	Quality Rating Code
RL	Reporting Limit
RPD	Relative Percent Difference
SOP	Standard Operating Procedure
SRM	Standard Reference Material

1. Introduction

Since January 1996, Frontier GeoSciences Inc. (FGS) has served as the Mercury Analytical Laboratory (HAL) and Site Liaison Center for the Mercury Deposition Network (MDN). 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. MDN has grown to incorporate over 82 sites in the United States, Canada, and Mexico. In 2003, MDN is expected to incorporate 5-10 additional new sites.

As HAL, FGS receives weekly precipitation samples to be analyzed for total mercury. HAL also analyzes samples for methylmercury from selected sites participating in the methylmercury program. The analytical technique — Modified EPA Method 1631 Revision B — was developed by Nicolas S Bloom, one of FGS' founders. FGS also served as the referee lab for the Method 1631 final validation study.

Robert Brunette, Principle Investigator and HAL Director, oversees FGS's involvement in MDN. He serves as the HAL contact for the multiple agencies currently sponsoring MDN. His multiple roles require him to provide guidance and direction to all HAL staff and to maintain his proficiency in 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 mercury) in Wet Deposition.



Mr. Brunette is assisted by Gerard Van der Jagt - the MDN Group Leader, and 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 a Science Advisor for HAL, and helps support MDN related research initiatives. The Project Investigator also works closely with FGS' Laboratory Manager, Eric Wyse and FGS' Quality Assurance Program Director, Carl Hensman Ph.D., to ensure that all Quality Control (QC) parameters are consistently maintained, and that FGS' standards of professional and scientific quality are met.

FGS continued to maintain and demonstrate acceptable quality control in 2003. Due to the addition of new MDN sites, the number of quality control points increased from 1,214 in 2002, to more than 1,400 quality control measurements in 2003. FGS demonstrated consistency and reproducibility in bottle blanks, preparation blanks, certified reference materials, matrix duplicates, and matrix spikes. All of these parameters are plotted control charts in this report.

Outlook

The MDN continues to gain attention as the largest and longest-running national mercury wet deposition network in North America. Feedback from sponsors and other interested organizations indicates that MDN will experience significant growth in 2003-2004. With this growth, HAL will continue to look for ways to improve the program to ensure the highest quality. The following are goals HAL has set to maintain and improve quality throughout 2003-2004:

- HAL will continue to improve our database in 2003.
- HAL and the NADP Program Office will incorporate dual data entry verification to all database operations.
- HAL will continue trace metals in wet deposition research in 2004. There is a strong indication that there are many sponsors that will want to participate in a combined mercury and trace metals program. In 2003, five MDN sites were collecting samples for trace metals following HAL's retrofit and trace metal standard operating procedures.
- HAL research in dry deposition of mercury and trace metals in sites in the southern U.S. will continue, likely through 2003. HAL expects this research to lay the groundwork for a potential non-NADP product for interested MDN sponsors.

2. Quality Assurance

2.1. Philosophy and Objectives

Frontier GeoSciences Inc. (FGS) is committed to a rigorous quality assurance program and philosophy. Quality control begins at the bench level. Process improvements are solicited from laboratory technicians and analysts. Management implements the improvements. The 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.

HAL data quality is assessed against FGS' Data Quality Objectives (DQO). Our DQOs consist of five components: precision, accuracy, representativeness, comparability, and completeness.

- *Precision* is a measure of data reproducibility. HAL assesses analytical precision using matrix duplicates. The acceptance criterion for matrix duplicates is ≤ 25 RPD.
- *Accuracy* is a measure of how close experimental data is to a "true" value. HAL assesses accuracy using certified reference materials and matrix spikes. The acceptance criterion for reference materials and matrix spikes is 75-125% recovery.
- *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. Control charts enable HAL to assess comparability over the course of an ongoing monitoring project such as MDN.
- *Completeness* is measured by the number of usable data points compared to the number of possible data points. HAL DQO for MDN project is at least 95% completeness.

2.2. Method Detection Limits

Method detection limit (MDL) studies are maintained for most matrix/analyte combinations available at FGS. Studies are performed using the protocols in 40 CFR, Section 136, Appendix A. Specifically; seven or more low-level, matrix-specific spikes are processed according to preparation and analytical method protocols. MDL is determined as t*SD of the replicates (where t is the Student's T-value for the number of replicates and SD is the standard deviation). The HAL updates MDL studies periodically for the MDN project. See Appendix A for the latest MDL study results.

2.3. Accreditations

FGS currently holds certifications through departments in eight states: the California Department of Health, the Florida Department of Health, the Louisiana Department of Environmental Quality, the Minnesota Department of Health, the New Jersey Department of Environmental Protection, the New York Department of Health, the Washington Department of Ecology, and the Wisconsin Department of Natural Resources. The Florida Department of Health acts as FGS' primary accreditor under the National Environmental Laboratory Accreditation Program (NELAP).

3. Quality Control

Quality Control (QC) samples each have an expected target value that can be used to objectively assess preparation and analytical method performance. If performance on these known samples is acceptable, client sample results and other *unknowns* are assumed to be acceptable, as well. Conversely, unacceptable QC results require immediate troubleshooting and re-assessment of affected sample results. The HAL utilizes eight types of QC samples for the MDN project: laboratory bottle blanks, preparation blanks, ongoing calibration standards, ongoing calibration blanks, matrix duplicates, matrix spikes, certified reference materials, field blanks, and system blanks.

3.1. Laboratory Bottle Blanks

3.1.1. Description

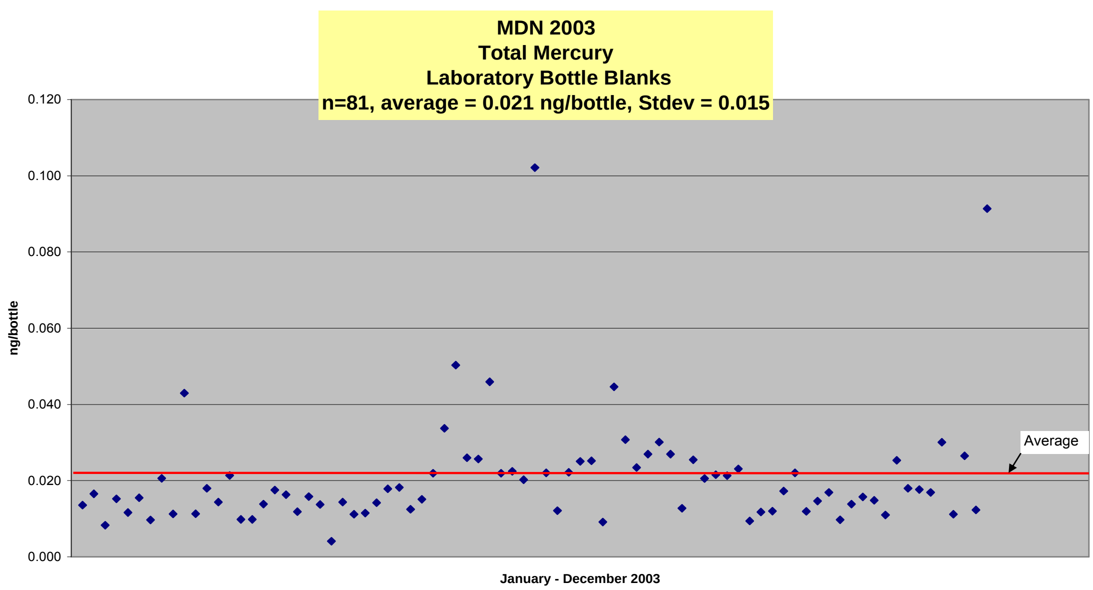
Following cleaning, HAL bottles are charged with 20mL of 1% hydrochloric acid. A random selection of these bottles is then analyzed for total mercury.

3.1.2. Purpose

Even in an ultra-clean laboratory, mercury exposure is inherent to the handling of MDN sample bottles. Because such contamination is inevitable, it must be analyzed and quantified so that it can be objectively subtracted from final sample results.

3.1.3. Discussion

In 2003, the mean of 81 laboratory bottle blanks was 0.021ng/bottle with a standard deviation of 0.056ng/bottle. In 2003, two laboratory bottle blanks were higher than the MDL. The current MDL for total mercury is 0.06 ng/L. Laboratory bottle blanks are expected to be at or near MDL. In cases where the blanks are significantly higher, the situation is investigated. Possible contamination sources are researched and identified. Once the contamination has been isolated and corrected, the run is continued.



3.2. Preparation Blanks

3.2.1. Description

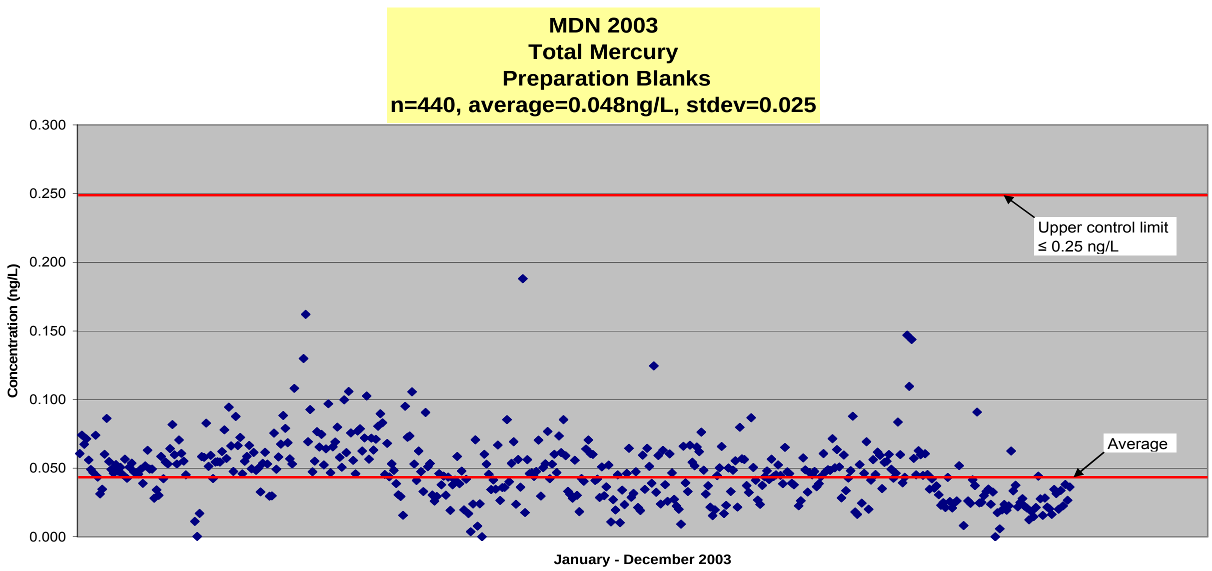
Preparation blanks for total mercury consist of 1% (v/v) 0.2N bromine monochloride, 0.2mL 20% hydroxylamine hydrochloride, and 0.3mL 20% stannous chloride in 100mL of reagent water. Preparation blanks for methylmercury consist of hydrochloric acid, APDC solution, ethylating agent, acetate buffer, and reagent water.

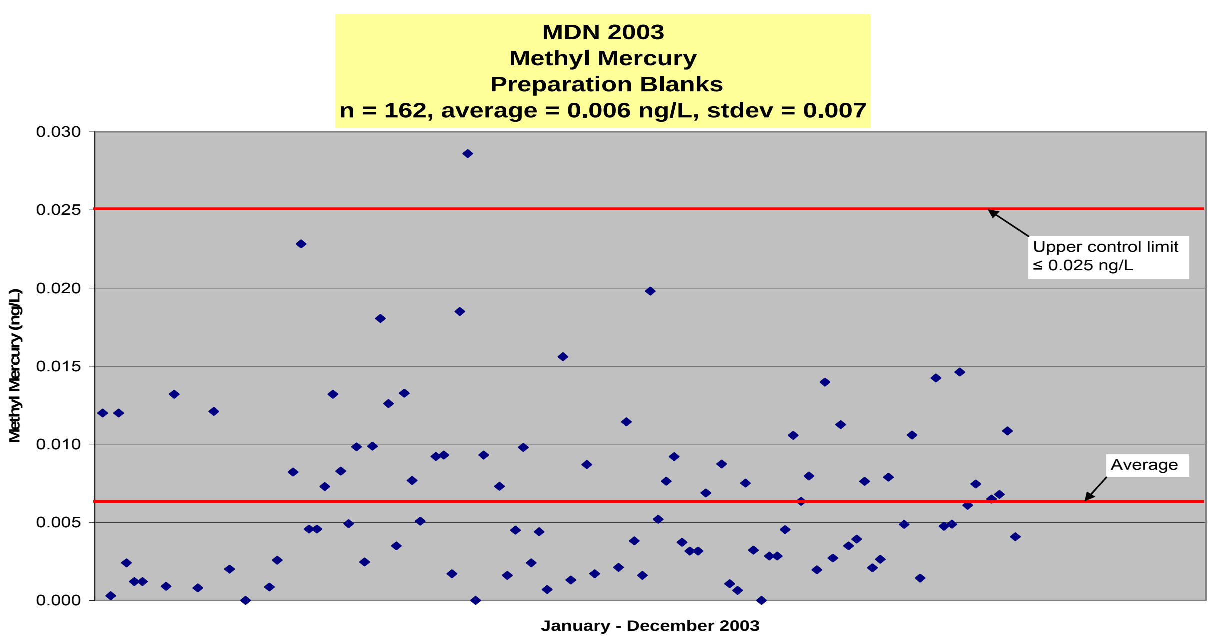
3.2.2. Purpose:

Mercury content is inherent even in FGS' preparatory and analytical reagents. Preparation blanks are a measure of how much of each sample result can be attributed to these necessary reagents. Preparation Blanks also help when investigating possible sources of contamination.

3.2.3. Discussion

In 2003, the mean for total mercury of 440 preparation blanks was 0.048ng/L with a standard deviation of 0.025ng/L. In 2003, no preparation blanks for total mercury were above the control limit of 0.25ng/L. In 2003, the mean for methylmercury of 162 preparation blanks was 0.006ng/L with a standard deviation of 0.007ng/L. In 2003, one preparation blank for methylmercury was above the control limit of 0.025ng/L.





3.3. Ongoing Calibration Standards

3.3.1. Description

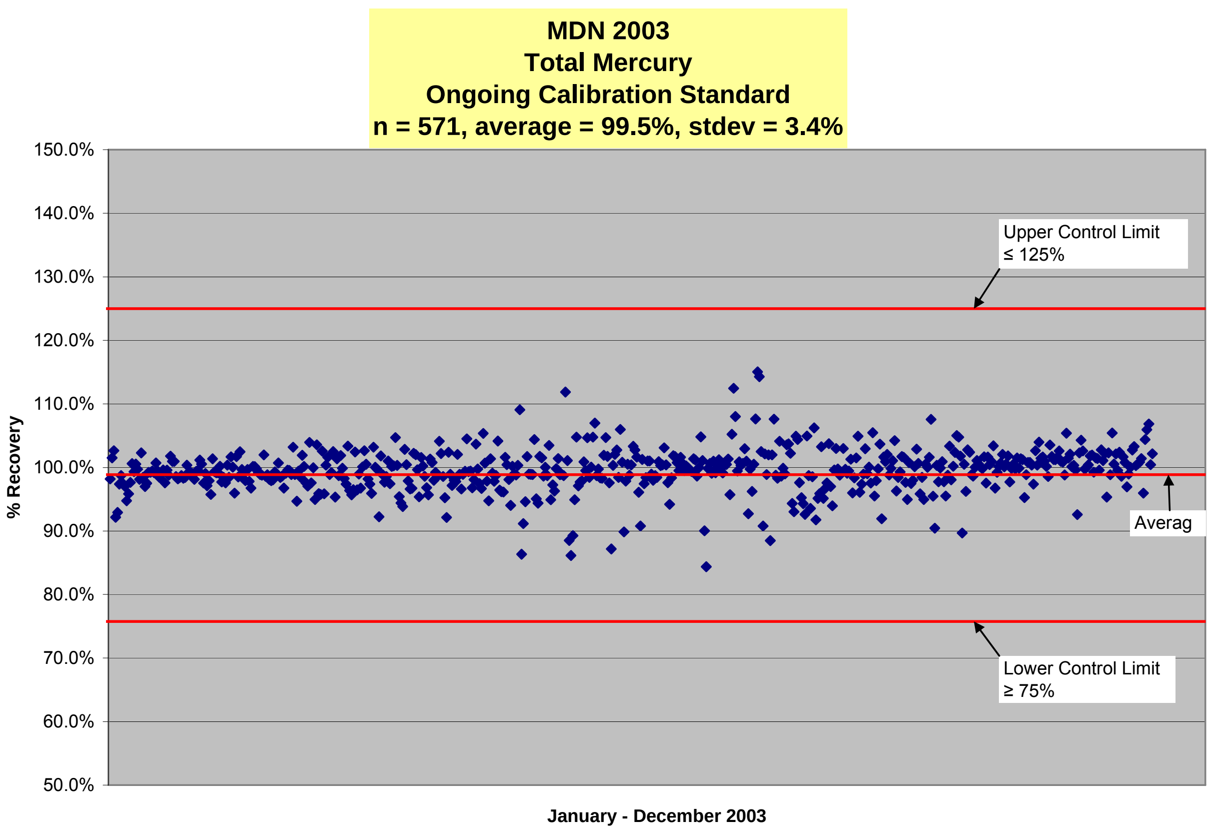
Ongoing calibration standards are continuously analyzed during the course of sample analysis, typically after a suite of ten samples and at the end of each analytical day. A 1.0ng standard for total mercury and a 0.1ng standard for methylmercury are typically analyzed as an ongoing calibration standard.

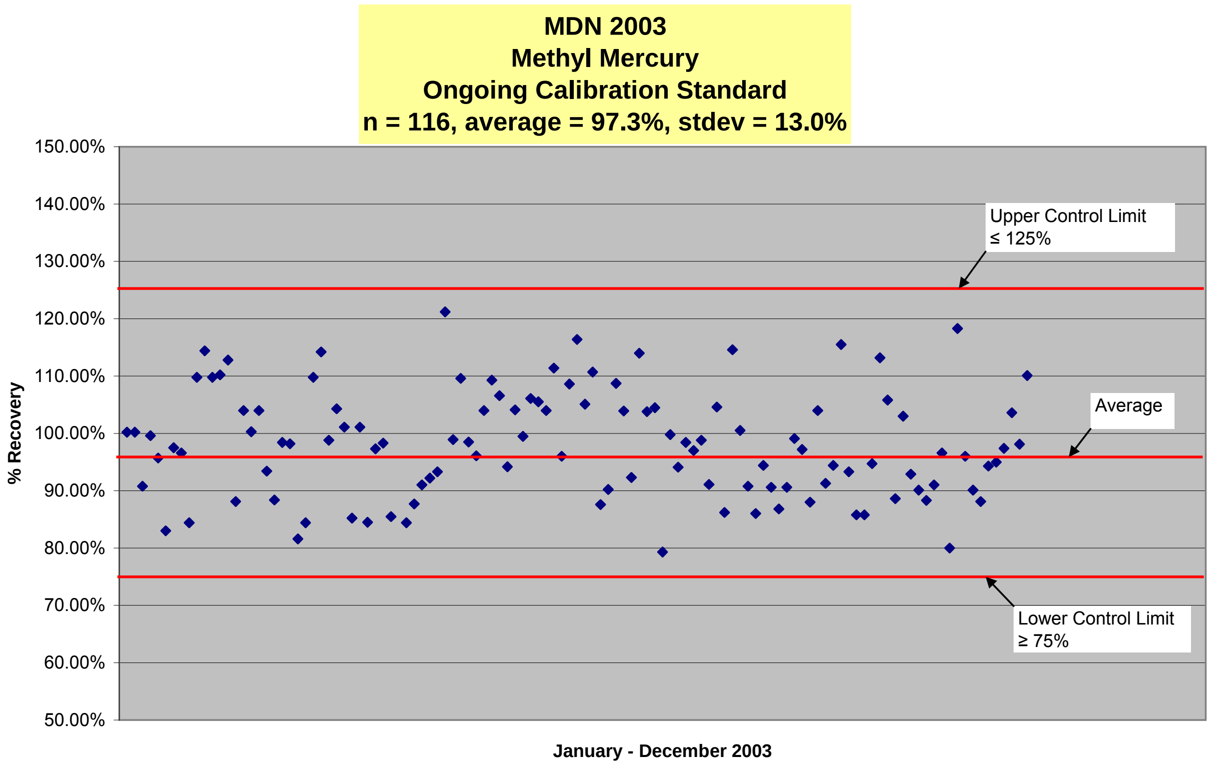
3.3.2. Purpose

Ongoing calibration standards verify that the analytical system is in control. All total mercury standard solutions are traceable to certified standards or manufacturer lot number. Currently there is no commercial available methylmercury standard. All raw data references a unique laboratory ID number for associated standards. This ID may then be traced through the standards logbooks to the original shipment, container, and certification.

3.3.3. Discussion

In 2003, the mean of 571 ongoing calibration standard recoveries for total mercury was 99.5% with a standard deviation of 3.4%. In 2003, no ongoing calibration standards were out statistical control. In 2003, the mean of 116 ongoing calibration standard recoveries for methylmercury was 97.3% with a standard deviation of 13.0 %. There were no ongoing calibration standard recoveries for the MDN project in 2003 that were out of statistical control.





3.4. Ongoing Calibration Blanks

3.4.1. Description

Ongoing calibration blanks are continuously analyzed during the course of sample analysis, typically after a suite of ten samples and at the end of each analytical day.

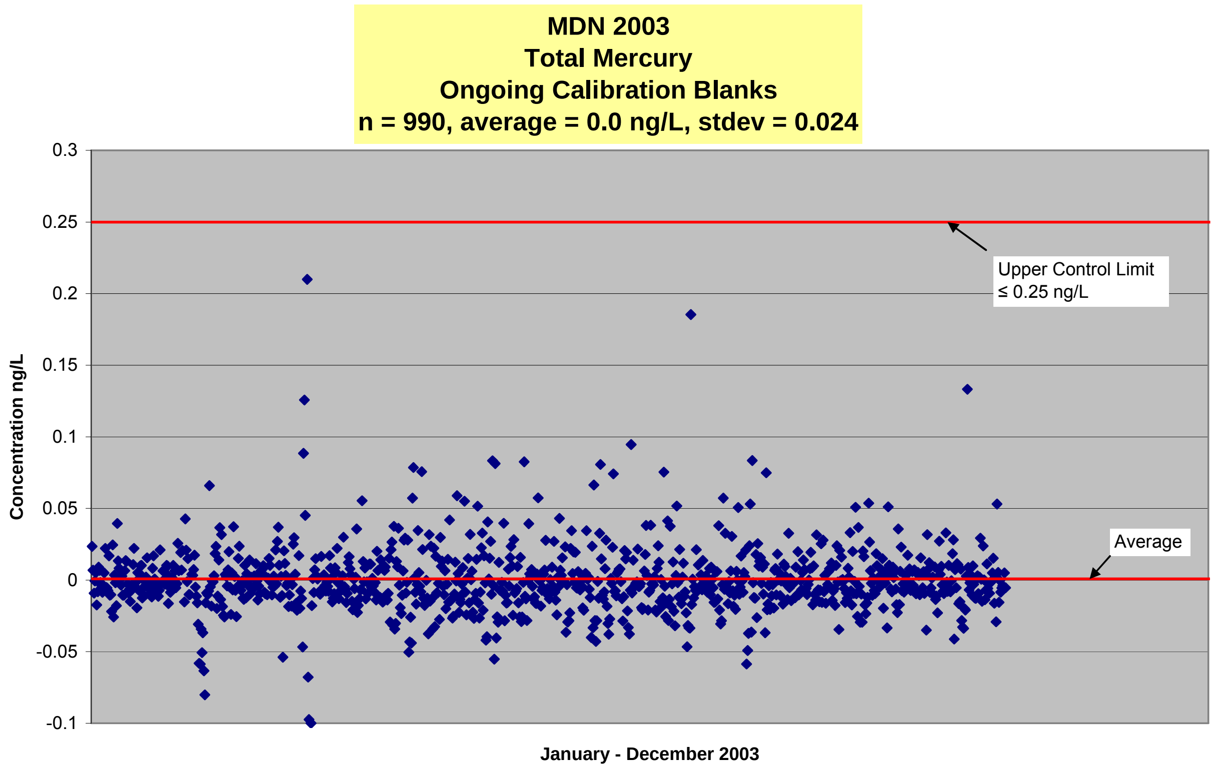
3.4.2. Purpose

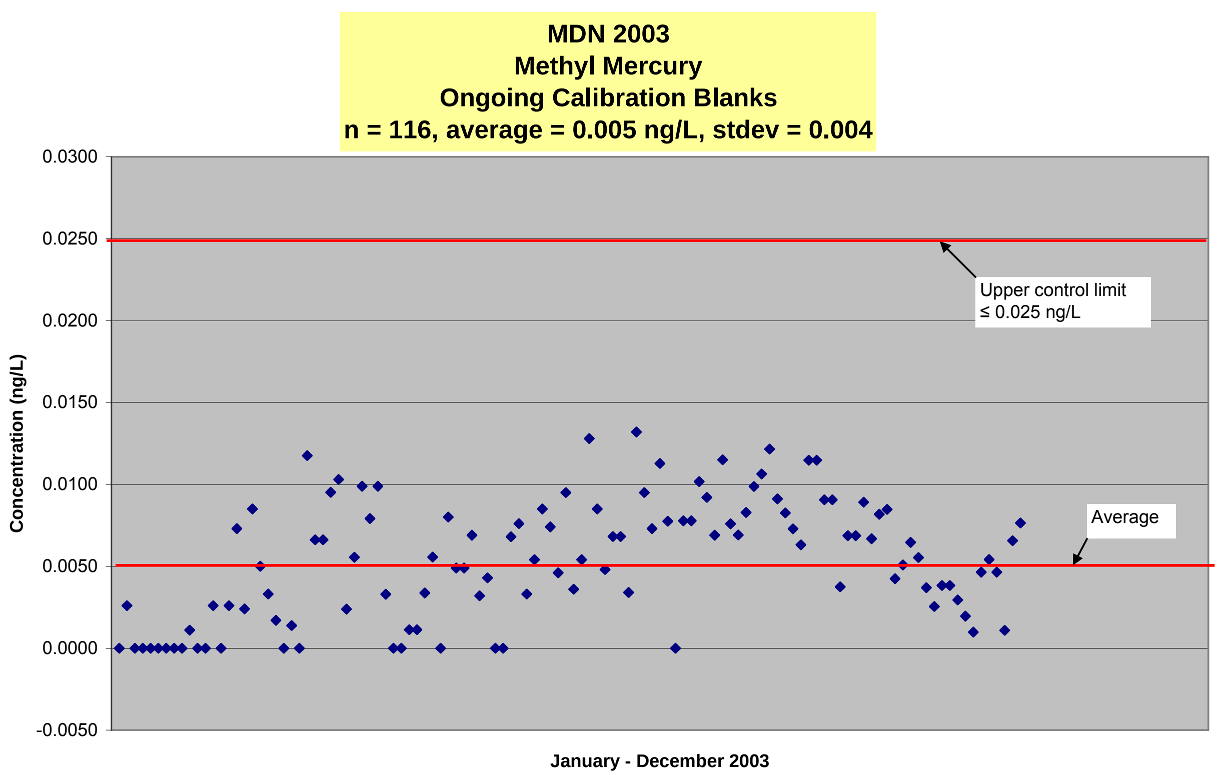
Instrument blanks are used to demonstrate freedom from system contamination, carryover, and to monitor baseline drift.

3.4.3. Discussion

In 2003, the mean concentration of 990 ongoing calibration blanks for total mercury was 0.00ng/L with a standard deviation of 0.024. There were no ongoing calibration blanks for the MDN project in 2003 that were above the upper control limit (0.25ng/L). In 2003, the mean concentration of 116 ongoing calibration blanks for methylmercury was 0.005ng/L with a standard deviation of 0.004. There were no ongoing calibration blanks for methylmercury that were above the upper control limit (0.025ng/L).

Ongoing calibration blanks are expected to be at or near MDL. In cases where the blanks are significantly higher, the situation is investigated. Possible contamination sources are researched and identified. Once the contamination has been isolated and corrected, the run is continued.


MDN 2003
Total Mercury
Ongoing Calibration Blanks
n = 990, average = 0.0 ng/L, stdev = 0.024
Concentration ng/L
0.3
0.25
0.2
0.15
0.1
0.05
0
-0.05
-0.1
Upper Control Limit
≤ 0.25 ng/L
Average
January - December 2003


MDN 2003
Methyl Mercury
Ongoing Calibration Blanks
n = 116, average = 0.005 ng/L, stdev = 0.004
Concentration (ng/L)
0.0300
0.0250
0.0200
0.0150
0.0100
0.0050
0.0000
-0.0050
Upper control limit
≤ 0.025 ng/L
Average
January - December 2003

3.5. Matrix Duplicates

3.5.1. Description

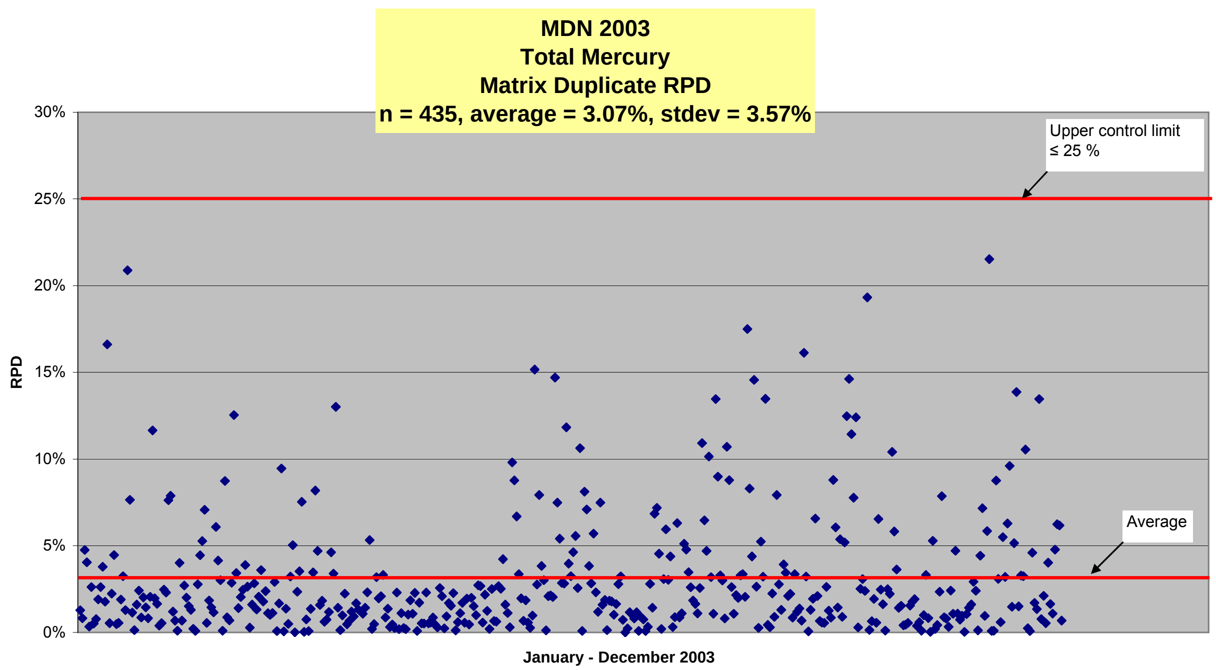
Matrix duplicates are created when an existing sample is split into two portions that can then be compared analytically.

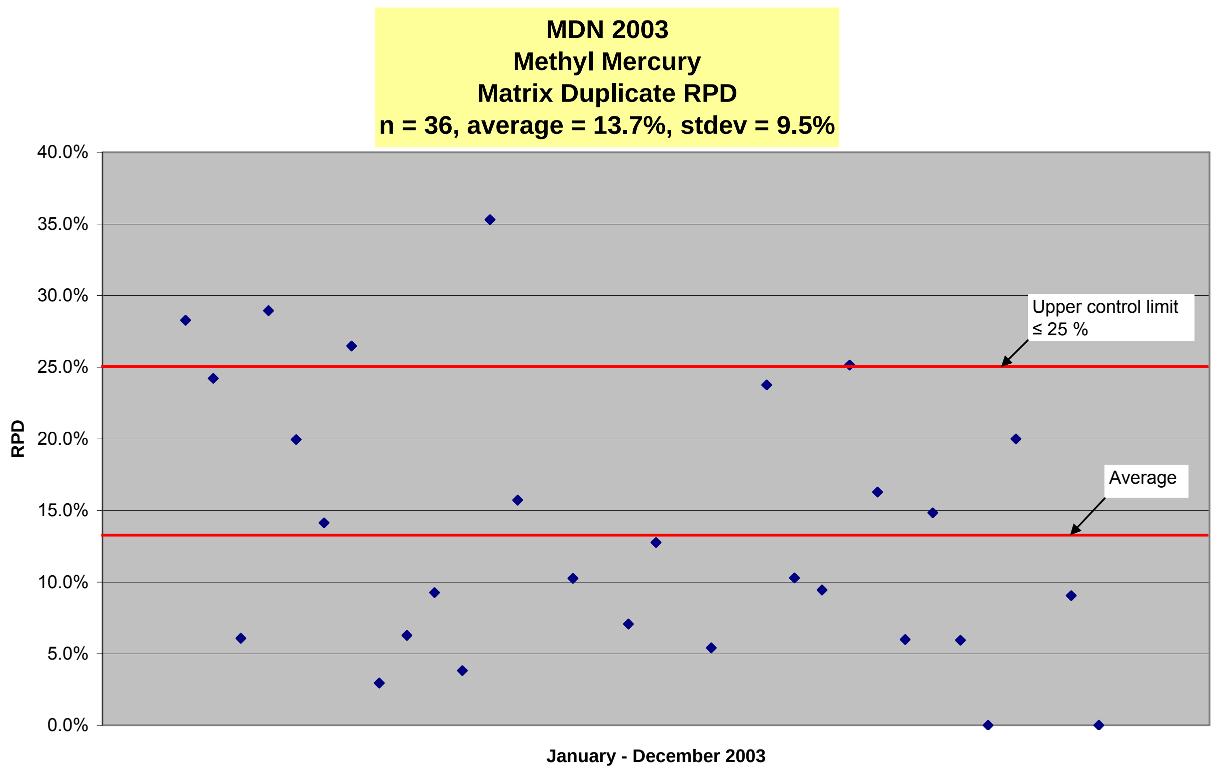
3.5.2. Purpose

As there is no theoretical difference between a pair of matrix duplicates, their relative percent difference (RPD) is expected to be less than 25%. Out of control results are indicative of a heterogeneous sample matrix and/or poor analytical precision.

3.5.3. Discussion

In 2003, the mean RPD of 435 matrix duplicate pairs for total mercury was 3.07% with a standard deviation of 3.57%. This low mean reflects the homogeneous nature of the MDN sample matrix, as well as the analytical precision of HAL. In 2003, the mean RPD of 36 matrix duplicate pairs for methylmercury was 13.7 % with a standard deviation of 9.5%. Several RPDs were above the 25% RPD acceptance level. However, all of these matrix duplicates concentrations were less than or equal to five times MDL. At such low concentrations, variability is expected to increase. Therefore, the larger RPD values at low concentrations are not of concern. No corrective action was taken.





3.6. Matrix Spikes

3.6.1. Description

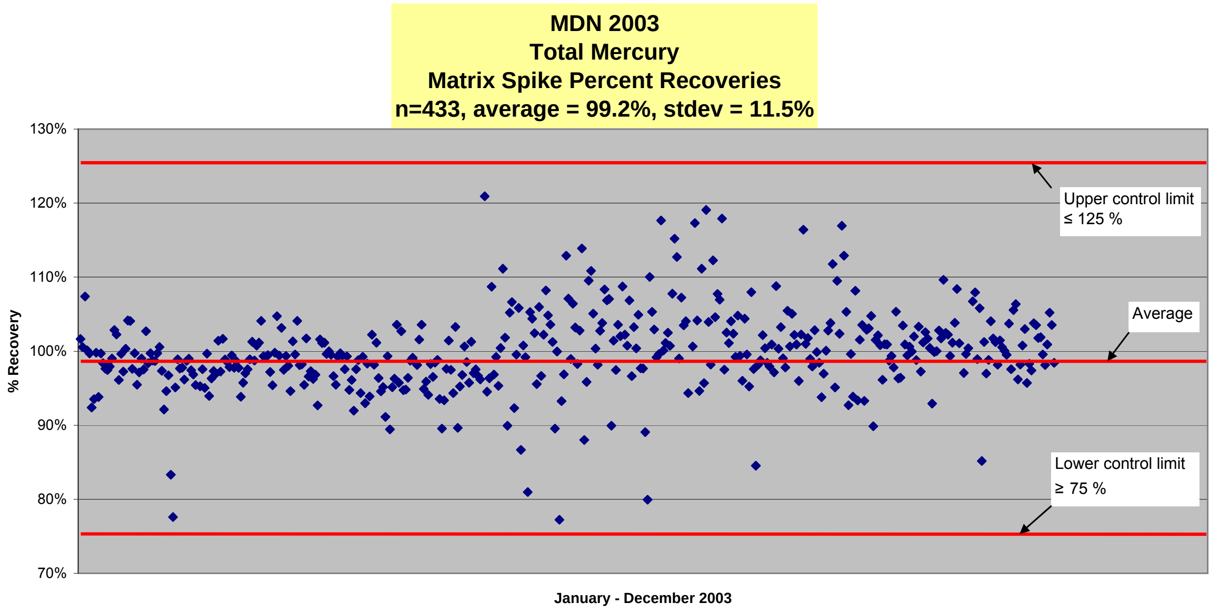
A matrix spike is created when an MDN sample with known mercury content is supplemented with an additional 1.00ng of mercury standard.

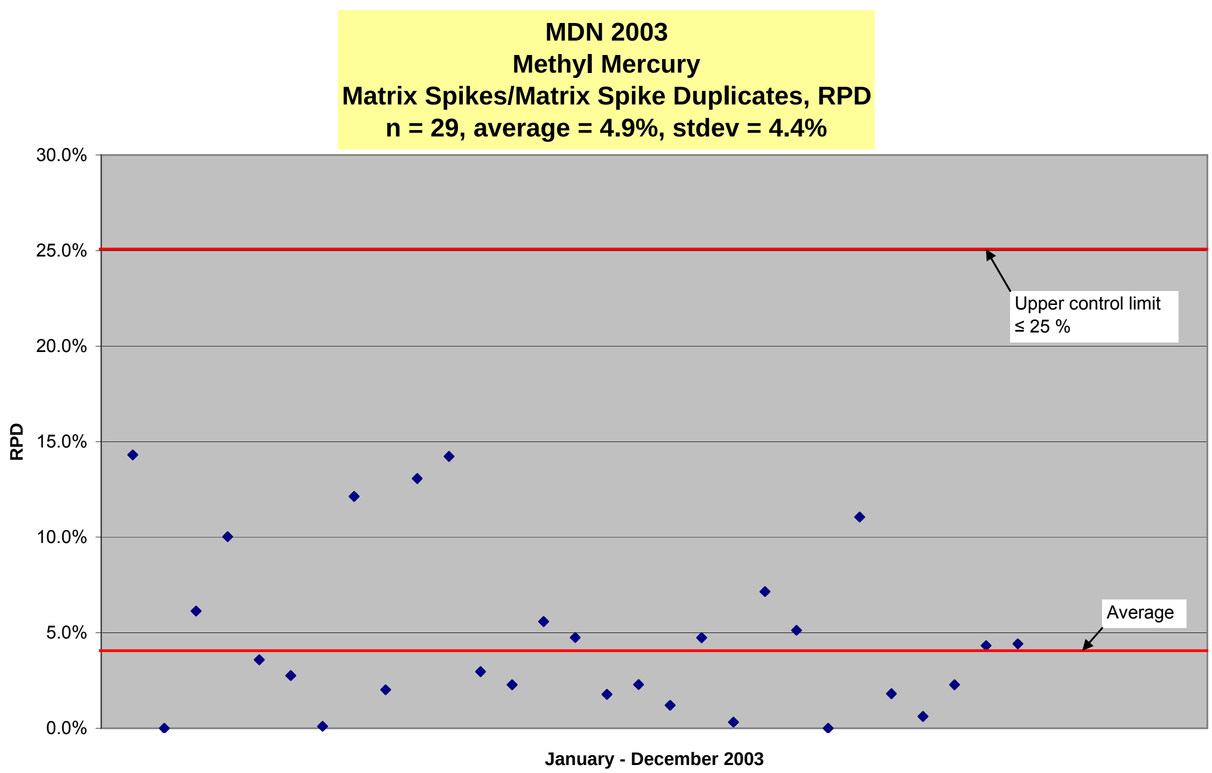
3.6.2. Purpose

As the combined mercury content of the matrix spike sample is known in theory, matrix spike recoveries are expected to be within 75% and 125% of this theoretical value. Matrix spike recoveries determine if, and how, the sample matrix interferes with target analyte recovery. They also ensure that HAL's preparation and analytical procedures do not result in significant analyte losses.

3.6.3. Discussion

In 2003, the mean of 433 matrix spike recoveries for total mercury was 99.2% with a standard deviation of 11.5%. There were no unacceptable matrix spike recoveries for the MDN project in 2003. This is indicative of a chemically passive sample matrix, as well as good analytical accuracy. Had any Matrix Spikes fallen outside the 75%-125% control limits, involved samples would have been rerun to investigate possible matrix interference. In 2003, the mean RPD of 29 matrix spike/matrix spike duplicates for methyl mercury was 4.9% with a standard deviation of 4.4%. No matrix spike/matrix spike duplicate RPD was above the acceptance criteria.


MDN 2003
Total Mercury
Matrix Spike Percent Recoveries
n=433, average = 99.2%, stdev = 11.5%
130%
120%
110%
100%
90%
80%
70%
% Recovery
Upper control limit
≤ 125 %
Average
Lower control limit
≥ 75 %
January - December 2003


MDN 2003
Methyl Mercury
Matrix Spikes/Matrix Spike Duplicates, RPD
n = 29, average = 4.9%, stdev = 4.4%
30.0%
25.0%
20.0%
15.0%
10.0%
5.0%
0.0%
RPD
Upper control limit
≤ 25 %
Average
January - December 2003

3.7. Certified Reference Materials

3.7.1. Description

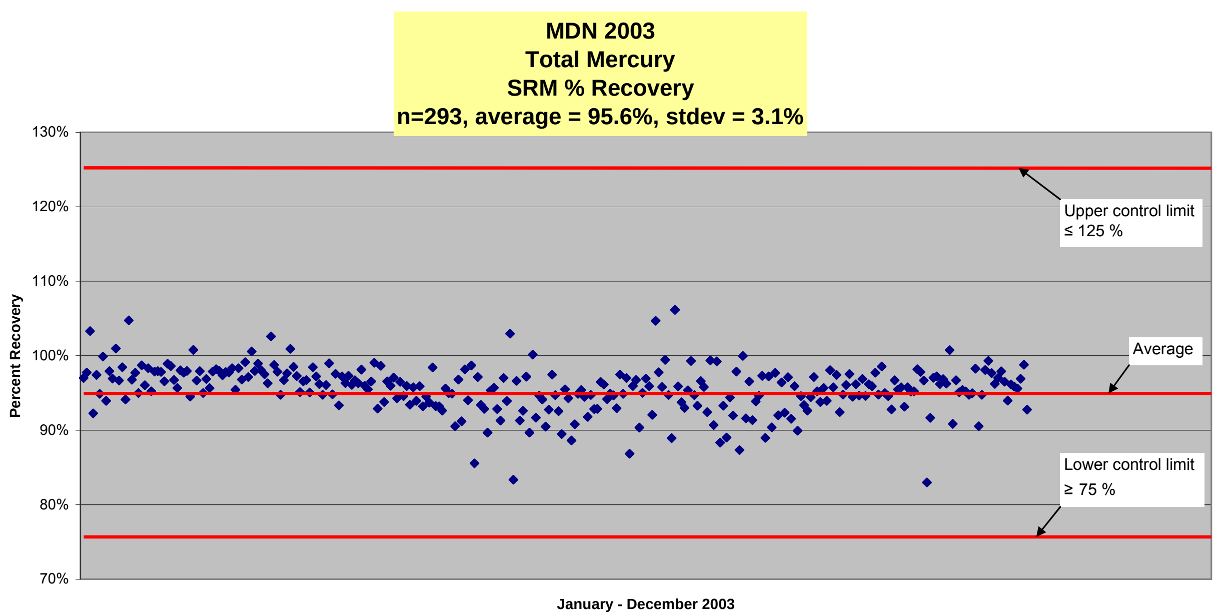
Certified reference materials are commercially available samples containing known quantities of analyte in a specific matrix. Currently, there is no available Reference Material matching the MDN rainwater matrix. Instead, HAL uses National Institute of Standards and Technology Reference Material 1641d – Total Mercury in Water. For methylmercury, HAL uses National Research Council Canada Reference Material DORM-2.

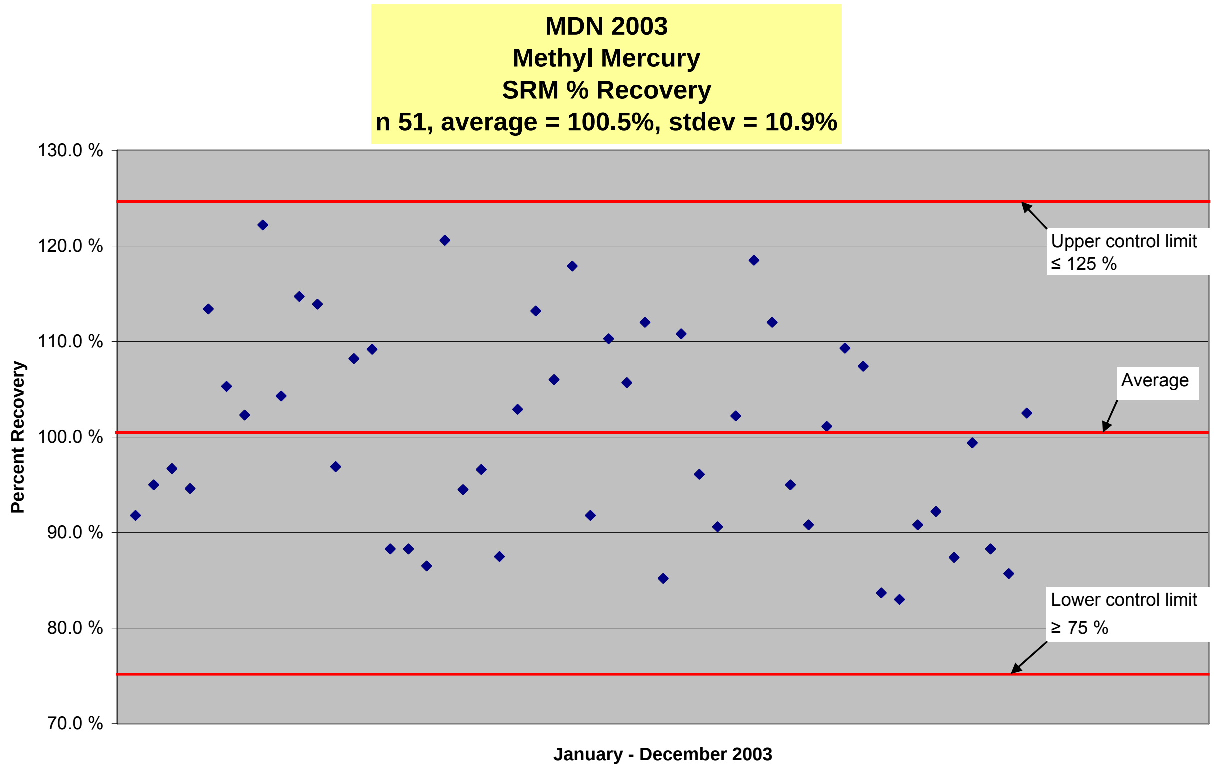
3.7.2. Purpose

Certified reference materials are used to demonstrate HAL's ability to recover a target analyte from a specific matrix. They are also a secondary source for verifying the validity of the analytical curve.

3.7.3. Discussion

In 2003, the mean of 293 certified reference material recoveries for total mercury was 95.6% with a standard deviation of 3.1%. For methylmercury, the mean of 51 certified reference material recoveries was 100.5% with a standard deviation of 10.9%. In 2003, there were no recoveries outside the control limits for total and methylmercury. Failing recoveries are immediately rerun to ensure that the analytical failure is isolated rather than systemic.




MDN 2003
Methyl Mercury
SRM % Recovery
n 51, average = 100.5%, stdev = 10.9%
130.0 %
120.0 %
110.0 %
100.0 %
90.0 %
80.0 %
70.0 %
Percent Recovery
Upper control limit
≤ 125 %
Average
Lower control limit
≥ 75 %
January - December 2003

4. Calculations

Calculations have been color-coded in instances where results become variables in subsequent calculations.

4.1. Calculation: Gross MDN Sample Concentration

{(Sample PA - Ave BB) / Slope} - {(Aliquot * BrCl RB) / 100} = ng Hg/aliquot (mL)

Sample PA = sample peak area (PA units)
Ave BB = average bubbler blank (PA units)
Slope = slope (PA units/ng)
Aliquot = volume of sample analyzed (mL)
BrCl RB = BrCl reagent blank value (ng/mL of preservative)
1/100 = correction for 1% preservation concentration

4.2. Calculation: Net MDN Sample Concentration

ng Hg/aliquot (mL) * mL / Sample Bottle = ng Hg/Sample Bottle

ng Hg/Sample Bottle – ng Hg/Quarterly Bottle Blank = net ng Hg/Sample Bottle

net ng Hg/Sample Bottle * (Sample Bottle / mL) * 1000 = net ng Hg/L

4.3. Calculation: MDN Deposition

(net ng Hg/L) * (precip vol (mL) / 120.0cm^2) * (1/1000mL) * (10000cm^2/m^2) = (ng/m^2)

Alternatively, because there are 10000 cm^2 in 1m^2:

(net ng Hg/L) * (precip vol (mL) / 120.0cm^2)*10 = (ng/m^2)

120.0cm^2 = Area of MDN Funnel
Precip volume (mL) = Precipitation Volume — see below

The standard rain gauge (Belfort) is used for the precipitation volume when the rain gauge data has passed Quality Assurance.

Precip volume (Rain Gauge (mL)) = Inches of Rain (rain gauge) * (825mL / Inch Belfort)

When the standard rain gauge (Belfort) has not passed Quality Assurance, we use the Bottle Catch to calculate deposition (as long as the Event Recorder shows that the collector worked properly).

Precip volume (Bottle Catch (mL)) = Total mL of sample captured in MDN Sample Bottle minus 20mL preservative

5. Analytical Run Sequence

HAL routinely includes the aforementioned QC samples in all of its analyses for the MDN project. The following bench sheet shows how these samples are arranged within a typical analysis day. For every set of ten samples analyzed, the sample set is preceded and superceded with a matrix duplicate, a matrix spike, ongoing calibration standard, and an ongoing calibration blank. In addition, after the twentieth sample an additional reference material sample is analyzed.

MDN Precipitation Sample Analysis Lab Sheet

FGS DATA SET ID:
MDN LAB DATA SET CODE:

Analysis Date:
Analyzer:
Analyst:

REVIEWER: DATE:

Analytical Run Trap Set:
D=Duplicate Analysis S=Sample Spike @ 1.00ng

Run	Tp	Bub	HAL Code	Sample ID	PA	% BrCl	Aliquot Volume	THg per Aliquot	THg Conc (Net)	Remarks
1	1	1		4.00 ng						
2	2	2		2.00 ng						
3	3	3		1.00 ng						
4	4	4		0.50 ng						
5	5	1		0.05 ng						
6	6	2		BB-1						
7	7	3		BB-2						
8	8	4		BB-3						
9	9	1		NIST1641d		2				
10	10	2		BrCl-1						
11	1	3		BrCl-2						
12	2	4		BrCl-3						
13	3	1		BB-4						
14	4	2		Sample #1						
15	5	3		Sample #1 D						
16	6	4		Sample #1 S						
17	7	1		Sample #2						
18	8	2		Sample #3						
19	9	3		Sample #4						
20	10	4		Sample #5						
21	1	1		Sample #6						
22	2	2		Sample #7						
23	3	3		Sample #8						
24	4	4		Sample #9						
25	5	1		Sample #10						
26	6	2		1.00						
27	7	3		BB-5						
28	8	4		Sample #11						
29	9	3		Sample #12						
30	10	4		Sample #13						
31	1	1		Sample #14						
32	2	2		Sample #15						
33	3	3		Sample #16						
34	4	4		Sample #17						
35	5	1		Sample #18						
36	6	2		Sample #19						
37	7	3		Sample #20						
38	8	4		Sample #11 D						
39	9	3		Sample #11 S						
40	10	4		1.00						
41	1	1		BB-6						
42	2	2		NIST1641d						
43	3	3		Sample #21						
44	4	4		Sample #22						
45	5	1		Sample #23						
46	6	2		etc...						
47	7	3								
48	8	4								
49	9	1								
50	10	2								
51	1	3								
52	2	4								
53	3	1		Sample #21 D						
54	4	2		Sample #21 S						
55	5	3		1.00						
56	6	4		BB-7						

Key
Reference materials
Preparation blanks
Matrix duplicates
Matrix spikes
Ongoing calibration
Ongoing calibration

6. Proficiency Tests and Laboratory Intercomparisons

Proficiency tests (PT) and laboratory intercomparisons are an important part of the Quality Assurance Program. Each year, FGS completes at least four PTs representing a suite of trace metals in wastewater and solid waste matrices. While these studies are a requirement of accreditation, they are also a valuable tool for internal quality control.

6.1. Proficiency Tests

The following proficiency tests were completed by HAL during 2003. Results for these tests are available upon request.

Table 1

Water Pollution	Analytical Products Group	01/2003
Non-Potable Water / Solid and Hazardous Waste Proficiency Study	New York Department of Health	01/2003
Water Pollution	Analytical Products Group	03/2003
Water Pollution	Analytical Products Group	06/2003
Non-Potable Water / Solid and Hazardous Waste Proficiency Study	New York Department of Health	07/2003
RCRA solids	Resource Technology Corporation	03/2003

6.2. Laboratory Intercomparisons

HAL participates in a U.S. Geological Survey PE sample laboratory intercomparison program. This program is coordinated by the USGS.

FGS is also an invited participant in several domestic and international laboratory intercomparisons each year. Many intercomparison participants are fellow world leaders in mercury and trace metals analysis. While functionally similar to PTs, these studies often involve more complex matrices or additional analytes and while project-specific intercomparison studies are helpful for assessing interlaboratory comparability, they do not necessarily address individual laboratory accuracy, and are not designed to function as third party validation. For these reasons although FGS does provide proficiency test study results, clients are not provided with intercomparison study results.

The following laboratory intercomparison studies were completed by HAL during 2003.

Table 2

Surface Waters	National Water Research Institute Environment Canada	Spring 2003
Standard Reference Sample	U.S. Geological Survey	03/2003
Sediments and Tissues	National Research Council Canada	06/2003
Sediment	International Atomic Energy Agency	06/2003
Tissue	International Measurement Evaluation Programme/ Institute for Reference Materials and Measurements	09/2003
Ambient Water	Florida Department of Environmental Protection	09/2003
Standard Reference Sample	U.S. Geological Survey	11/2003

7. Field Quality Control

7.1. Field Bottle Blanks

7.1.1. Description

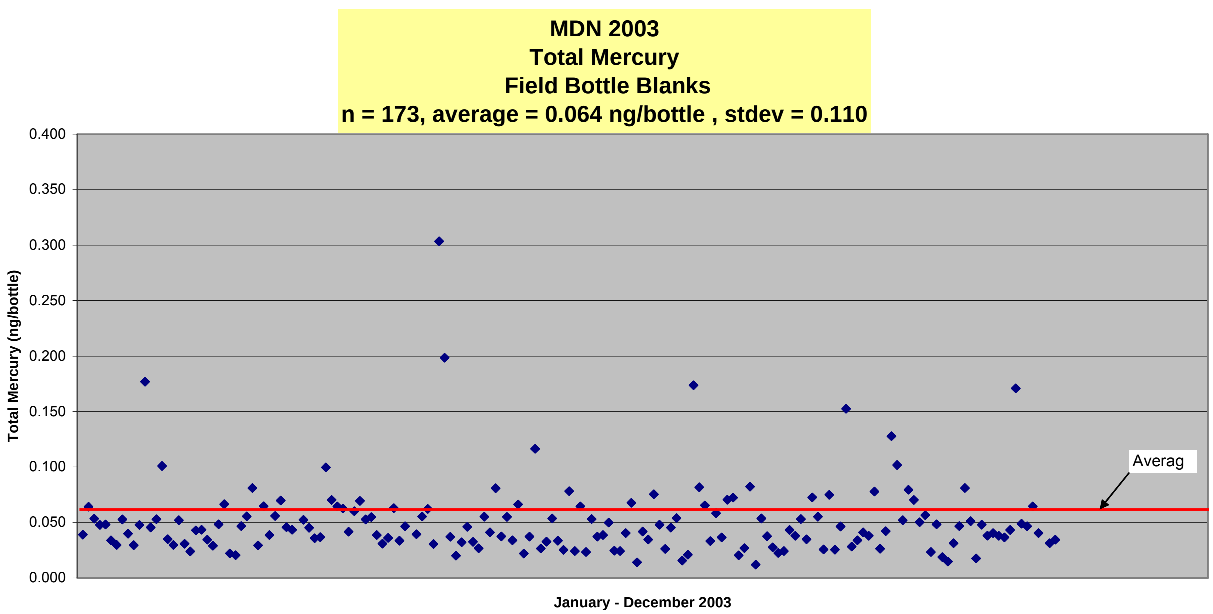
A field bottle blank has the same contents as a laboratory bottle blank. However, this blank is left exposed at the sampling site for the entire collection period without any collector openings. All field bottle blanks that maintain at least 15mL of the initial 20mL1% hydrochloric acid charge are then analyzed for total mercury.

7.1.2. Purpose

Outside of the controlled laboratory environment, ambient mercury levels increase and additional sample handling occurs. Because such contamination sources are inevitable, their contributions must be quantified so that they can be objectively subtracted from final sample results.

7.1.3. Discussion

In 2003, the mean of 173 Field Bottle Blanks was 0.064ng/bottle with a standard deviation of 0.110ng/bottle. This suggests that the MDN aerochem collector protects the sample train and bottle well and the field exposure is minimal.



8. Quality Rating Codes

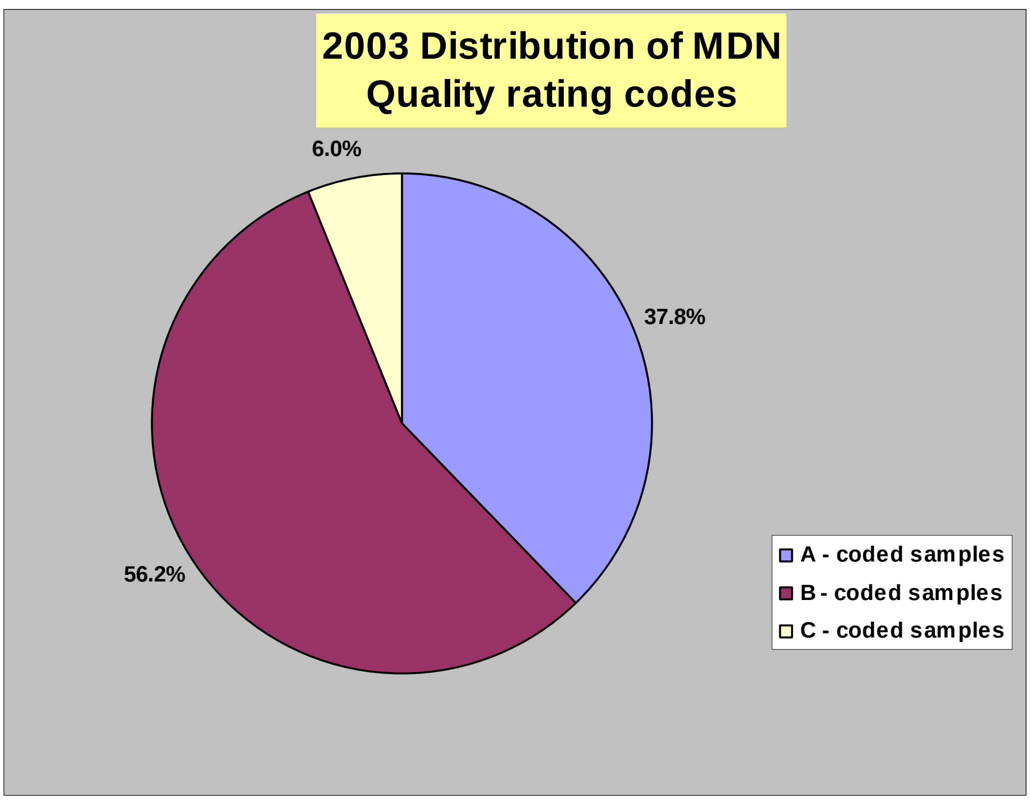
The quality rating code (QR) is designed as a user-friendly method to indicate the overall quality of each individual MDN data value. The MDN QR is modeled directly from the NADP AirMon QR. The QR code is what the general user of the final database will use in the evaluation of MDN data. This QR code is assigned by the computer program based on the results of the notes codes given to each MDN sample. A general description of each code follows.

A. Valid samples with no problems; contained only water; all sampling and laboratory protocols were followed; all required equipment was installed and operating properly.

B. Valid samples with minor problems; may have contaminants such as insects or other debris; there may be an exception to approved sampling or laboratory methods; required equipment may be lacking or not operating properly. The laboratory does not consider these problems sufficient to invalidate the data, but there is more uncertainty than for A data. These data are used along with A data to calculate average concentrations and deposition.

C. Invalid samples; major problems occurred; the laboratory does not have confidence in the data.

The HAL processed 4238 samples in 2003. 1602 samples received a QR code of A, 2383 received a B QR code, and 255 received a C QR code. FGS continued to maintain and demonstrate acceptable quality control in 2003.



Appendix A

Matrix Specific MDL Studies

Matrix Specific MDL Study:

April 29, 2003

Frontier Geosciences Inc.
414 Pontius North, Suite B
Seattle, WA 98109

Objective. Determine the method detection limit (MDL) for total mercury in water using preservation method FGS-012 and analysis FGS-069, and following the protocols outlined in 40 CFR 136. As detailed below, the MDL for Total Mercury in Water was determined to be **0.04** ng/L THg.

Analytical Method. A calibration was performed according to FGS-069. Briefly, this method incorporates oxidation with the addition of BrCl, reduction of Mercury in the sample aliquot with $SnCl_2$, analysis by purge and trap and dual amalgamation CV-AFS.

The MDL study consisted of the analysis of nine replicates of a waters sample spiked with 0.5 ng/L THg oxidized with 1% BrCl. The results of these measurements are found in the table on the next page, as well in the raw data sheets (ID # THG9-030429-1). All results are reported ***uncorrected*** for the method blanks.

MDL Calculation. Using 40 CFR 136, the MDL was calculated using the standard deviation of the spiked samples, with n = 9 replicates (8 degrees of freedom). In this case, the t value of 2.897 was used in the following equation, where is the standard deviation of the results obtained on samples spiked at a level near the MDL.

MDL = t*

The MDL calculated from these data is (2.8965)(0.012), or 0.036 ng/L.*

Total Mercury in Water (THg) MDL Study Data for CV-AFS #9

April 29, 2003

Sample	[THg], ng/L
method blank #1	0.058
method blank #2	0.071
method blank #3	0.052
Mean	**0.060**
SD	**0.010**

Sample	[THg], ng/L	% Rec.
IPR-1 (5.0 ng/L)	4.911	98.2
IPR-2 (5.0 ng/L)	4.964	99.3
IPR-3 (5.0 ng/L)	4.966	99.3
IPR-4 (5.0 ng/L)	5.064	101.3
Mean	4.976	99.5
SD	0.064	1.28
MDL-1 (0.5 ng/L)	0.520	104.0
MDL-2 (0.5 ng/L)	0.502	100.4
MDL-3 (0.5 ng/L)	0.533	106.6
MDL-4 (0.5 ng/L)	0.522	104.4
MDL-5 (0.5 ng/L)	0.525	105.0
MDL-6 (0.5 ng/L)	0.528	105.6
MDL-7 (0.5 ng/L)	0.539	107.8
MDL-8 (0.5 ng/L)	0.510	102.0
MDL-9 (0.5 ng/L)	0.533	106.6
Mean	**0.524**	**104.7**
SD	**0.012**	**2.3**
NIST1641d	**16.062**	**100.3**
certified value NIST 1641d	**16.010**	

Matrix Specific MDL Study:

April 29, 2003

Frontier Geosciences Inc.
414 Pontius North, Suite B
Seattle, WA 98109

Objective. Determine the method detection limit (MDL) for total mercury in water using preservation method FGS-012 and analysis FGS-069, and following the protocols outlined in 40 CFR 136. As detailed below, the MDL for Total Mercury in Water was determined to be **0.06** ng/L THg.

Analytical Method. A calibration was performed according to FGS-069. Briefly, this method incorporates oxidation with the addition of BrCl, reduction of Mercury in the sample aliquot with $SnCl_2$, analysis by purge and trap and dual amalgamation CV-AFS.

The MDL study consisted of the analysis of nine replicates of a waters sample spiked with 0.5 ng/L THg oxidized with 1% BrCl. The results of these measurements are found in the table on the next page, as well in the raw data sheets (ID # THG10-030429-1). All results are reported ***uncorrected*** for the method blanks.

MDL Calculation. Using 40 CFR 136, the MDL was calculated using the standard deviation of the spiked samples, with n = 9 replicates (8 degrees of freedom). In this case, the t value of 2.897 was used in the following equation, where is the standard deviation of the results obtained on samples spiked at a level near the MDL.

MDL = t*

The MDL calculated from these data is (2.897)(0.020), or 0.058 ng/L.*

Total Mercury in Water (THg) MDL Study Data for CV-AFS #10

April 29, 2003

Sample	[THg], ng/L	% Rec.
method blank #1	0.055	
method blank #2	0.103	
method blank #3	0.060	
Mean	**0.073**	
SD	**0.026**	
Sample	**[THg], ng/L**	**% Rec.**
IPR-1 (5.0 ng/L)	4.829	96.6
IPR-2 (5.0 ng/L)	4.854	97.1
IPR-3 (5.0 ng/L)	4.904	98.1
IPR-4 (5.0 ng/L)	4.951	99.0
Mean	4.885	97.7
SD	0.054	1.08
MDL-1 (0.5 ng/L)	0.502	100.4
MDL-2 (0.5 ng/L)	0.468	93.6
MDL-3 (0.5 ng/L)	0.454	90.8
MDL-4 (0.5 ng/L)	0.473	94.6
MDL-5 (0.5 ng/L)	0.506	101.2
MDL-6 (0.5 ng/L)	0.487	97.4
MDL-7 (0.5 ng/L)	0.504	100.8
MDL-8 (0.5 ng/L)	0.507	101.4
MDL-9 (0.5 ng/L)	0.507	101.4
Mean	**0.490**	**98.0**
SD	**0.020**	**4.0**
NIST1641d	**15.507**	**96.9**
certified value NIST 1641d	**16.010**	

Matrix Specific MDL Study:

June 3, 2003

Frontier Geosciences Inc.
414 Pontius North, Suite B
Seattle, WA 98109

Objective. Determine the method detection limit (MDL) for methyl mercury in water, using distillation method FGS-013, and following the protocols outlined in 40 CFR 136. As detailed below, the MDL for Methyl Mercury in Water was determined to be **0.023 ng/L** MeHg.

Analytical Method. A calibration was performed according to FGS-070. Briefly, this method incorporates distillation followed by analysis utilizing aqueous phase ethylation, CV purge and trap, thermal desorption, GC separation, pyrolytic decomposition, and detection using CV-AFS.

The MDL study consisted of the analysis of nine waters spiked with 0.111 ng/L MHg. An ongoing precision and recovery study (OPR) was conducted in conjunction with the MDL study. Recoveries on the OPR samples (spiked with 2.22 ug/L) were 92-97%. The standard deviation of the four OPR sample recoveries was 2.0%. The results of these measurements are found in the table on the next page, as well in the raw data sheets (ID # MHg1-030603-1). All results are reported **corrected** *for the method blanks.*

MDL Calculation. Using 40 CFR 136, the MDL was calculated using the standard deviation of the spiked samples, with n = 9 replicates (8 degrees of freedom). In this case, the t value of 2.896 was used in the following equation, where σ is the standard deviation of the results obtained on samples spiked at a level near the MDL.

$$\mathbf{MDL = t^{*}\sigma}$$

The MDL calculated from these data is (2.896)(0.008), or 0.0232 ng/L.*

Methyl Mercury in Water (MHg) MDL Study (CVAFS #1)

June 3, 2003

Sample	[MeHg], ng/L	
method blank #1	0.008	
method blank #2	0.023	
method blank #3	0.005	
Mean	**0.012**	
SD	**0.010**	
OPR + 2.22 ug/L #1	2.135	96.2
OPR + 2.22 ug/L #2	2.117	95.4
OPR + 2.22 ug/L #3	2.135	96.2
OPR + 2.22 ug/L #4	2.044	92.1
Mean	**2.108**	**94.9**
SD	**0.043**	**2.0**
MDL #1+ 0.111 ng/L	0.102	91.9%
MDL #2+ 0.111 ng/L	0.110	99.1%
MDL #3+ 0.111 ng/L	0.112	100.9%
MDL #4+ 0.111 ng/L	0.098	88.3%
MDL #5+ 0.111 ng/L	0.103	92.8%
MDL #6+ 0.111 ng/L	0.106	95.5%
MDL #7+ 0.111 ng/L	0.114	102.7%
MDL #8+ 0.111 ng/L	0.089	80.2%
MDL #9+ 0.111 ng/L	0.105	94.6%
Mean	**0.104**	**94.0**
SD	**0.008**	**0.1**
DORM-2 (4470ug/L)	**4333**	**96.9**

Appendix B

QC Summary Tables

MDN ANALYSIS QC SUMMARY

ANALYSIS		CALIBRATION R	BRCL BLK CONC	SRM (NIST 1641-d) TV=8.005 ng/mL	%REC	DUPLICATES BOTTLE ID	RPD	SPIKES BOTTLE ID	REC.	BOTTLE BLANKS BOTTLE ID	CONC
2003-001	1/22/2003	0.99990	0.067 ng/L	7.77 ng/mL	97.0%	MDN0988	1.3%	MDN0988	101.6%		
	CVAFS-9			7.82 ng/mL	97.7%	MDN2290	0.8%	MDN2290	100.5%		
						MDN2324	4.8%	MDN2324	107.4%		
2003-002	1/22/2003	0.99918	0.059 ng/L	8.27 ng/mL	103.3%	MDN0136	4.0%	MDN0136	100.1%	MDN1746	0.010 ng/Bottle
	CVAFS-10			7.39 ng/mL	92.3%	MDN1911	0.3%	MDN1911	99.7%		
						MDN2196	2.6%	MDN2196	92.4%		
2003-003	1/26/2003	0.99977	0.055 ng/L	7.80 ng/mL	97.4%	MDN2182	0.5%	MDN2182	93.5%	MDN0122	0.018 ng/Bottle
	CVAFS-9			7.60 ng/mL	94.9%	MDN2189	0.8%	MDN2189	99.8%		
						MDN3016	1.9%	MDN3016	93.8%		
2003-004	1/26/2003	0.99956	0.042 ng/L	8.00 ng/mL	99.9%	MDN0692	2.6%	MDN0692	99.7%		
	CVAFS-10			7.52 ng/mL	94.0%	MDN0976	3.8%	MDN0976	98.4%		
						MDN2313	1.8%	MDN2313	97.6%		
2003-005	1/27/2003	0.99988	0.063 ng/L	7.84 ng/mL	97.9%	MDN0445	16.6%	MDN0445	97.5%		
	CVAFS-9			7.76 ng/mL	96.9%	MDN2016	0.5%	MDN2016	97.9%		
						MDN2181	2.2%	MDN2181	99.0%		
2003-006	1/27/2003	0.99988	0.049 ng/L	8.08 ng/mL	101.0%	MDN0672	4.5%	MDN0672	102.9%	MDN2356	0.014 ng/Bottle
	CVAFS-10			7.74 ng/mL	96.7%	MDN0761	0.5%	MDN0761	102.3%		
						MDN1743	0.5%	MDN1743	96.1%		
2003-007	2/12/2003	0.99980	0.051 ng/L	7.88 ng/mL	98.5%	MDN0090	1.9%	MDN0090	99.6%	MDN0662	0.018 ng/Bottle
	CVAFS-9			7.53 ng/mL	94.1%	MDN0955	3.2%	MDN0955	97.2%		
						MDN1953	1.3%	MDN1953	100.3%		
2003-008	2/12/2003	0.99996	0.049 ng/L	8.38 ng/mL	104.7%	MDN0185	20.9%	MDN0185	104.1%	MDN0861	0.011 ng/Bottle
	CVAFS-10			7.75 ng/mL	96.8%	MDN0746	7.7%	MDN0746	104.1%	MDN2077	0.024 ng/Bottle
						MDN2220	1.2%	MDN2220	97.6%		
2003-009	2/14/2003	0.99996	0.046 ng/L	7.82 ng/mL	97.7%	MDN0392	0.1%	MDN0392	99.7%	MDN1928	0.013 ng/Bottle
	CVAFS-9			7.60 ng/mL	95.0%	MDN1937	1.6%	MDN1937	95.5%		
						MDN2209	2.4%	MDN2209	97.1%		
2003-010	2/13/2003	0.99997	0.047 ng/L	7.90 ng/mL	98.7%	MDN0285	0.9%	MDN0285	99.0%		

	CVAFS-10			7.69 ng/mL	96.0%	MDN0909	2.0%	MDN0909	97.5%			
						MDN2377	1.5%	MDN2377	102.7%			
2003-011	2/13/2003	0.99989	0.054 ng/L	7.87 ng/mL	98.3%	MDN1934	0.8%	MDN1934	98.4%			
	CVAFS-9			7.62 ng/mL	95.2%	MDN2117	2.1%	MDN2117	99.7%			
						MDN2262	11.7%	MDN2262	98.7%			
2003-012	2/14/2003	0.99994	0.031 ng/L	7.84 ng/mL	97.9%	MDN2098	2.0%	MDN2098	98.7%			
	CVAFS-10			7.84 ng/mL	97.9%	MDN2183	1.7%	MDN2183	99.7%			
						MDN2365	0.4%	MDN2365	100.6%			
2003-013	2/21/2003	0.99991	0.052 ng/L	7.83 ng/mL	97.8%	MDN0823	0.5%	MDN0823	97.4%			
	CVAFS-9			7.73 ng/mL	96.6%	MDN0848	2.5%	MDN0848	92.1%			
						MDN2283	2.3%	MDN2283	94.6%			
2003-014	2/21/2003	0.99996	0.066 ng/L	7.92 ng/mL	98.9%	MDN0866	7.6%	MDN0866	96.7%			
	CVAFS-10			7.89 ng/mL	98.6%	MDN2021	7.9%	MDN2021	83.3%			
						MDN2318	67.7%	MDN2318	77.6%			
2003-015	2/25/2003	0.99987	0.061 ng/L	7.75 ng/mL	96.8%	MDN0494	0.7%	MDN0494	95.1%	MDN2304	0.052 ng/Bottle	
	CVAFS-9			7.66 ng/mL	95.7%	MDN0779	0.1%	MDN0779	98.9%	MDN0662	0.014 ng/Bottle	
						MDN0833	4.0%	MDN0833	97.7%			
2003-016	2/25/2003	0.99998	0.054 ng/L	7.85 ng/mL	98.0%	MDN0484	0.7%	MDN0484	97.8%	MDN2098	0.022 ng/Bottle	
	CVAFS-10			7.82 ng/mL	97.7%	MDN2026	2.7%	MDN2026	96.2%			
						MDN2397	2.0%	MDN2397	98.7%			
2003-017	3/4/2003	0.99995	-0.010 ng/L	7.84 ng/mL	98.0%	MDN0731	1.5%	MDN0731	99.0%	MDN2299	0.017 ng/Bottle	
	CVAFS-9			7.57 ng/mL	94.5%	MDN1710	1.3%	MDN1710	97.4%			
						MDN2204	0.2%	MDN2204	96.8%			
2003-018	3/4/2003	0.99975	0.010 ng/L	8.07 ng/mL	100.8%	MDN2052	0.1%	MDN2052	95.4%			
	CVAFS-10			7.74 ng/mL	96.7%	MDN2196	2.8%	MDN2196	193.2%			
						MDN2200	4.5%	MDN2200	95.3%			
2003-019	3/11/2003	0.95934	0.066 ng/L	7.84 ng/mL	97.9%	MDN0125	5.3%	MDN0125	97.6%	MDN0187	0.025 ng/Bottle	
	CVAFS-9			7.60 ng/mL	95.0%	MDN2055	7.1%	MDN2055	95.0%			
						MDN2237	0.5%	MDN2237	99.7%			
2003-020	3/6/2003	0.99993	0.051 ng/L	7.76 ng/mL	96.9%	MDN0144	1.8%	MDN0144	94.0%	MDN2334	0.012 ng/Bottle	
	CVAFS-9			7.66 ng/mL	95.6%	MDN2160	1.5%	MDN2160	96.3%			
						MDN3000	1.2%	MDN3000	97.3%			
2003-021	3/6/2003	0.99987	0.055 ng/L	7.84 ng/mL	97.9%	MDN0689	6.1%	MDN0689	97.0%	MDN0945	0.011 ng/Bottle	
	CVAFS-10			7.86 ng/mL	98.2%	MDN0928	4.2%	MDN0928	101.4%			
						MDN2122	3.0%	MDN2122	97.2%			

2003-022	3/12/2003	0.99987	0.066 ng/L	7.84 ng/mL	98.0%	MDN0490	0.1%	MDN0490	101.7%	MDN0731	0.016 ng/Bottle
	CVAFS-9			7.80 ng/mL	97.4%	MDN0955	8.7%	MDN0955	98.9%		
						MDN1910	0.9%	MDN1910	98.5%		
2003-023	3/12/2003	0.99992	0.069 ng/L	7.83 ng/mL	97.8%	MDN1901	0.7%	MDN1901	97.9%		
	CVAFS-10			7.82 ng/mL	97.7%	MDN2156	2.9%	MDN2156	99.4%		
						MDN2279	12.5%	MDN2279	97.8%		
2003-024	3/18/2003	0.99995	0.076 ng/L	7.87 ng/mL	98.3%	MDN0141	3.4%	MDN0141	98.6%	MDN3007	0.036 ng/Bottle
	CVAFS-9			7.64 ng/mL	95.5%	MDN1926	1.4%	MDN1926	97.7%		
						MDN2051	2.0%	MDN2051	93.8%		
2003-025	3/18/2003	0.99988	0.053 ng/L	7.87 ng/mL	98.3%	MDN0632	2.5%	MDN0632	95.8%	MDN0936	0.019 ng/Bottle
	CVAFS-10			7.75 ng/mL	96.8%	MDN0678	3.9%	MDN0678	97.0%		
						MDN0970	2.6%	MDN0970	97.6%		
2003-026	3/21/2003	0.99999	0.059 ng/L	7.93 ng/mL	99.1%	MDN0663	0.3%	MDN0663	98.9%	MDN1741	0.014 ng/Bottle
	CVAFS-9			7.78 ng/mL	97.1%	MDN1972	1.6%	MDN1972	101.3%		
						MDN2069	2.8%	MDN2069	98.8%		
2003-027	3/21/2003	0.99995	0.044 ng/L	8.05 ng/mL	100.6%	MDN0172	1.3%	MDN0172	100.8%		
	CVAFS-10			7.84 ng/mL	98.0%	MDN1951	2.1%	MDN1951	101.1%		
						MDN2372	3.6%	MDN2372	104.1%		
2003-028	3/25/2003	0.99994	0.056 ng/L	7.92 ng/mL	98.9%	MDN1966	1.8%	MDN1966	99.3%	MDN0732	0.019 ng/Bottle
	CVAFS-10			7.85 ng/mL	98.0%	MDN2071	2.4%	MDN2071	99.2%		
						MDN2189	1.1%	MDN2189	99.5%		
2003-029	4/1/2003	0.99983	0.045 ng/L	7.81 ng/mL	97.5%	MDN1983	1.0%	MDN1983	97.2%		
	CVAFS-9			7.71 ng/mL	96.3%	MDN2256	1.1%	MDN2256	95.4%		
						MDN2380	2.9%	MDN2380	99.8%		
2003-030	4/1/2003	0.99843	0.058 ng/L	8.21 ng/mL	102.6%	MDN0751	0.1%	MDN0751	104.7%		
	CVAFS-10			7.91 ng/mL	98.8%	MDN2314	1.7%	MDN2314	99.4%		
						MDN2369	9.5%	MDN2369	103.2%		
2003-031	4/4/2003	0.99987	0.079 ng/L	7.83 ng/mL	97.8%	MDN0197	0.1%	MDN0197	97.5%		
	CVAFS-9			7.58 ng/mL	94.8%	MDN2134	1.4%	MDN2134	99.4%		
						MDN2143	0.5%	MDN2143	98.0%		
2003-032	4/7/2003	0.99996	0.073 ng/L	7.74 ng/mL	96.7%	MDN0756	3.2%	MDN0756	94.6%	MDN2375	0.017 ng/Bottle
	CVAFS-9			7.82 ng/mL	97.6%	MDN2107	5.0%	MDN2107	101.3%		
						MDN2212		MDN2212	99.6%		

2003-033	4/7/2003	0.99975	-0.027 ng/L	8.08 ng/mL	100.9%	MDN0694	2.3%	MDN0694	104.1%	MDN1758	0.004 ng/Bottle
	CVAFS-10			7.88 ng/mL	98.5%	MDN2184	3.5%	MDN2184	98.1%		
						MDN2305	7.5%	MDN2305	98.2%		
2003-034	4/14/2003	0.99989	0.120 ng/L	7.79 ng/mL	97.3%	MDN0796		MDN0796	95.5%	MDN0197	0.017 ng/Bottle
	CVAFS-9			7.62 ng/mL	95.1%	MDN0846	0.8%	MDN0846	101.7%		
						MDN0894	0.1%	MDN0894	96.6%		
2003-035	4/14/2003	0.99947	0.065 ng/L	7.73 ng/mL	96.6%	MDN1735	1.4%	MDN1735	97.3%		
	CVAFS-10			7.74 ng/mL	96.7%	MDN2055	3.5%	MDN2055	96.2%		
						MDN2122	8.2%	MDN2122	96.8%		
2003-036	4/17/2003	0.99948	0.072 ng/L	7.61 ng/mL	95.1%	MDN0792	4.7%	MDN0792	92.7%	MDN0182	0.013 ng/Bottle
	CVAFS-10			7.88 ng/mL	98.4%	MDN2302	1.6%	MDN2302	101.6%		
						MDN2367	1.8%	MDN2367	101.1%		
2003-037	4/21/2003	0.99997	0.071 ng/L	7.78 ng/mL	97.2%	MDN0709	0.6%	MDN0709	101.2%		
	CVAFS-9			7.70 ng/mL	96.2%	MDN0731	0.7%	MDN0731	99.6%		
						MDN1954	1.2%	MDN1954	100.0%		
2003-038	4/21/2003	0.99967	0.060 ng/L	7.59 ng/mL	94.8%	MDN1757	4.6%	MDN1757	99.5%	MDN2315	0.013 ng/Bottle
	CVAFS-10			7.69 ng/mL	96.1%	MDN1902	3.4%	MDN1902	96.6%		
						MDN3014	13.0%	MDN3014	95.5%		
2003-039	4/24/2003	0.99990	0.063 ng/L	7.92 ng/mL	99.0%	MDN0430	1.4%	MDN0430	99.3%		
	CVAFS-9			7.59 ng/mL	94.8%	MDN0488	0.1%	MDN0488	99.7%		
						MDN1924	1.0%	MDN1924	99.4%		
2003-040	5/1/2003	0.99965	0.089 ng/L	7.81 ng/mL	97.6%	MDN0763	2.2%	MDN0763	97.6%		
	CVAFS-9			7.47 ng/mL	93.3%	MDN0871	0.5%	MDN0871	99.3%		
						MDN1999	0.7%	MDN1999	94.8%		
2003-041	5/1/2003	0.99970	0.059 ng/L	7.78 ng/mL	97.2%	MDN0734	1.2%	MDN0734	96.1%	MDN0811	0.017 ng/Bottle
	CVAFS-10			7.71 ng/mL	96.3%	MDN1740	0.9%	MDN1740	92.0%	MDN0122	0.022 ng/Bottle
						MDN2081	1.7%	MDN2081	97.6%		
2003-042	5/2/2003	0.99964	0.073 ng/L	7.79 ng/mL	97.3%	MDN0085	1.3%	MDN0085	98.8%		
	CVAFS-9			7.69 ng/mL	96.1%	MDN2237	1.2%	MDN2237	94.3%		
						MDN2348	1.1%	MDN2348	99.3%		
2003-043	5/2/2003	0.99936	0.077 ng/L	7.74 ng/mL	96.7%	MDN0632	1.4%	MDN0632	93.0%		
	CVAFS-10			7.71 ng/mL	96.3%	MDN1908	2.3%	MDN1908	98.3%		
						MDN2371	5.3%	MDN2371	93.9%		
2003-044	5/6/2003	0.99991	0.069 ng/L	7.86 ng/mL	98.1%	MDN0633	66.8%	MDN0633	102.2%	MDN2101	0.021 ng/Bottle

	CVAFS-9			7.68 ng/mL	96.0%	MDN0812	0.5%	MDN0812	98.2%		
						MDN2178	3.2%	MDN2178	101.1%		
2003-045	5/9/2003	0.99985	0.084 ng/L	7.65 ng/mL	95.5%	MDN0198	2.0%	MDN0198	96.4%	MDN2290	0.014 ng/Bottle
	CVAFS-10			7.73 ng/mL	96.6%	MDN0759	2.1%	MDN0759	94.6%		
						MDN0895	3.3%	MDN0895	95.2%		
2003-046	5/12/2003	0.99915	0.052 ng/L	7.93 ng/mL	99.1%	MDN0448	0.9%	MDN0448	91.1%		
	CVAFS-9			7.44 ng/mL	92.9%	MDN0836	1.4%	MDN0836	99.3%		
						MDN2372	0.3%	MDN2372	89.4%		
2003-047	5/15/2003	0.99998	0.047 ng/L	7.90 ng/mL	98.6%	MDN0665	0.5%	MDN0665	95.1%	MDN0292	0.018 ng/Bottle
	CVAFS-9			7.51 ng/mL	93.8%	MDN1976	0.3%	MDN1976	96.3%		
						MDN2374	2.3%	MDN2374	103.6%		
2003-048	5/15/2003	0.99980	0.025 ng/L	7.73 ng/mL	96.6%	MDN0392	0.2%	MDN0392	95.7%		
	CVAFS-10			7.68 ng/mL	96.0%	MDN1738	1.1%	MDN1738	102.7%		
						MDN2146	0.3%	MDN2146	94.7%		
2003-049	5/21/2003	0.99998	0.080 ng/L	7.77 ng/mL	97.1%	MDN0447	0.2%	MDN0447	94.8%	MDN0833	0.027 ng/Bottle
	CVAFS-9			7.55 ng/mL	94.3%	MDN0834	1.0%	MDN0834	96.4%		
						MDN2305	1.9%	MDN2305	98.7%		
2003-050	5/23/2003	0.99999	0.067 ng/L	7.72 ng/mL	96.5%	MDN0272	1.1%	MDN0272	99.1%	MDN2063	0.039 ng/Bottle
	CVAFS-9			7.57 ng/mL	94.6%	MDN0875	2.3%	MDN0875	98.6%		
						MDN0918	0.1%	MDN0918	98.2%		
2003-051	5/23/2003	0.99985	0.048 ng/L	7.68 ng/mL	95.9%	MDN0260	1.7%	MDN0260	101.6%		
	CVAFS-10			7.48 ng/mL	93.4%	MDN2162	0.5%	MDN2162	103.6%		
						MDN2183	0.5%	MDN2183	94.9%		
2003-052	6/2/2003	0.99999	0.065 ng/L	7.67 ng/mL	95.8%	MDN0411	2.3%	MDN0411	95.9%	MDN2006	0.063 ng/Bottle
	CVAFS-9			7.52 ng/mL	94.0%	MDN0779	0.5%	MDN0779	94.1%		
						MDN2229	0.6%	MDN2229	98.3%		
2003-053	6/3/2003	0.99999	0.029 ng/L	7.68 ng/mL	95.9%	MDN0813	0.9%	MDN0813	96.5%		
	CVAFS-9			7.46 ng/mL	93.2%	MDN1745	0.4%	MDN1745	98.4%		
						MDN2136	0.3%	MDN2136	98.8%		
2003-054	6/3/2003	0.99984	0.043 ng/L	7.57 ng/mL	94.5%	MDN2078	2.6%	MDN2078	93.6%	MDN2291	0.030 ng/Bottle
	CVAFS-10			7.50 ng/mL	93.7%	MDN2359	2.1%	MDN2359	89.5%		
						MDN2413	0.2%	MDN2413	93.4%		
2003-055	6/12/2003	0.99918	0.031 ng/L	7.88 ng/mL	98.4%	MDN1929	0.9%	MDN1929	97.6%	MDN2143	0.031 ng/Bottle
	CVAFS-9			7.46 ng/mL	93.3%	MDN1994	1.7%	MDN1994	101.4%		
						MDN2020	1.5%	MDN2020	97.5%		

2003-056	6/12/2003	0.99974	0.046 ng/L	7.46 ng/mL	93.2%	MDN0698	2.3%	MDN0698	94.3%	
	CVAFS-10			7.41 ng/mL	92.6%	MDN1999	0.1%	MDN1999	103.3%	
						MDN2045	0.6%	MDN2045	89.7%	
2003-057	6/16/2003	1.00000	0.035 ng/L	7.65 ng/mL	95.6%	MDN0873	1.1%	MDN0873	95.2%	
	CVAFS-9			7.60 ng/mL	95.0%	MDN1972	1.7%	MDN1972	96.8%	
						MDN2206	0.6%	MDN2206	100.7%	
2003-058	6/20/2003	0.99998	0.021 ng/L	7.60 ng/mL	94.9%	MDN0871	2.0%	MDN0871	98.5%	
	CVAFS-9			7.25 ng/mL	90.5%	MDN2118	0.5%	MDN2118	95.7%	
2003-059	6/17/2003	0.99997	0.034 ng/L	7.75 ng/mL	96.8%	MDN1756	2.0%	MDN1756	101.3%	MDN0437 0.052 ng/Bottle
	CVAFS-9			7.30 ng/mL	91.2%	MDN2267	1.5%	MDN2267	97.0%	
2003-060	6/26/2003	0.99992	0.028 ng/L	7.86 ng/mL	98.2%	MDN0911	1.0%	MDN0911	97.5%	
	CVAFS-9			7.53 ng/mL	94.0%	MDN0940	2.7%	MDN0940	96.7%	
						MDN1936	2.7%	MDN1936	96.2%	
						MDN2302	0.6%	MDN2302	0.3%	
2003-061	6/26/2003	0.99973	0.044 ng/L	7.90 ng/mL	98.7%	MDN0181	2.2%	MDN0181	120.9%	
	CVAFS-10			6.85 ng/mL	85.6%	MDN2128	1.3%	MDN2128	94.5%	
						MDN2241	0.2%	MDN2241	96.4%	
2003-062	6/27/2003	0.99995	0.048 ng/L	7.78 ng/mL	97.1%	MDN0128	2.5%	MDN0128	108.7%	
	CVAFS-9			7.48 ng/mL	93.4%	MDN2340	0.7%	MDN2340	96.9%	
						MDN3010	0.6%	MDN3010	99.2%	
2003-063	6/27/2003	0.99962	0.033 ng/L	7.44 ng/mL	92.9%	MDN0400	2.7%	MDN0400	95.3%	MDN2177 0.026 ng/Bottle
	CVAFS-10			7.18 ng/mL	89.7%	MDN2287	2.5%	MDN2287	100.4%	MDN2143 0.028 ng/Bottle
						MDN2386	4.2%	MDN2386	111.1%	
2003-064	7/1/2003	0.99977	0.060 ng/L	7.63 ng/mL	95.3%	MDN0753	1.6%	MDN0753	101.8%	MDN0783 0.025 ng/Bottle
	CVAFS-9			7.66 ng/mL	95.7%	MDN1920	1.1%	MDN1920	89.9%	
						MDN2264	0.3%	MDN2264	105.2%	
2003-065	7/1/2003	0.99968	0.050 ng/L	7.43 ng/mL	92.8%	MDN0279	9.8%	MDN1982	106.6%	MDN1924 0.128 ng/Bottle
	CVAFS-10			7.31 ng/mL	91.3%	MDN0654	8.8%	MDN2036	92.3%	
						MDN0899	6.7%	MDN2037	99.5%	
						MDN1982	3.4%	MDN2294	105.8%	
2003-066	7/8/2003	0.99957	0.081 ng/L	7.76 ng/mL	97.0%	MDN0180	0.6%	MDN0180	86.7%	MDN2277 0.027 ng/Bottle
	CVAFS-9			7.52 ng/mL	93.9%	MDN1919	0.3%	MDN1919	100.8%	
						MDN2295	1.0%	MDN2295	99.2%	

2003-067	**7/10/2003**	**0.99959**	**0.050 ng/L**	**8.24 ng/mL**	**103.0%**	**MDN2255**	**15.2%**	**MDN2255**	**81.0%**	
	CVAFS-10			**6.67 ng/mL**	**83.4%**	**MDN2256**	**2.8%**	**MDN2256**	**105.3%**	
						MDN2315	**7.9%**	**MDN2315**	**104.4%**	
2003-068	**7/11/2003**	**0.99906**	**0.054 ng/L**	**7.73 ng/mL**	**96.6%**	**MDN0809**	**3.8%**	**MDN0809**	**102.4%**	**MDN2358 0.015 ng/Bottle**
	CVAFS-9			**7.31 ng/mL**	**91.3%**	**MDN2355**	**3.0%**	**MDN2355**	**95.6%**	
2003-069	**7/11/2003**	**0.99978**	**0.044 ng/L**	**7.41 ng/mL**	**92.6%**	**MDN2134**	**0.1%**	**MDN2134**	**106.0%**	**MDN2307 0.028 ng/Bottle**
	CVAFS-10			**7.78 ng/mL**	**97.2%**	**MDN2258**	**2.1%**	**MDN2258**	**96.7%**	
						MDN2411	**2.1%**	**MDN2411**	**102.2%**	
2003-070	**7/18/2003**	**0.99964**	**0.057 ng/L**	**7.18 ng/mL**	**89.7%**	**MDN0284**	**2.1%**	**MDN0284**	**108.2%**	**MDN0933 0.031 ng/Bottle**
	CVAFS-10			**8.02 ng/mL**	**100.2%**	**MDN2131**	**14.7%**	**MDN2131**	**104.8%**	
						MDN2359	**7.5%**	**MDN2359**	**103.6%**	
2003-071	**7/17/2003**	**0.99981**	**0.060 ng/L**	**7.34 ng/mL**	**91.7%**	**MDN0723**	**5.4%**	**MDN0723**	**101.3%**	
	CVAFS-9			**7.58 ng/mL**	**94.7%**	**MDN2069**	**2.9%**	**MDN2069**	**89.5%**	
						MDN3011	**2.8%**	**MDN3011**	**100.0%**	
2003-072	**7/17/2003**	**0.99987**	**0.069 ng/L**	**7.54 ng/mL**	**94.1%**	**MDN1904**	**11.8%**	**MDN1904**	**77.2%**	
	CVAFS-10			**7.24 ng/mL**	**90.5%**	**MDN2003**	**4.0%**	**MDN2003**	**93.3%**	
						MDN2116	**3.2%**	**MDN2116**	**96.9%**	
2003-073	**7/21/2003**	**0.99958**	**0.031 ng/L**	**7.43 ng/mL**	**92.8%**	**MDN0282**	**4.6%**	**MDN0282**	**112.9%**	**MDN3007 0.031 ng/Bottle**
	CVAFS-10			**7.80 ng/mL**	**97.4%**	**MDN2046**	**5.6%**	**MDN2046**	**107.1%**	
						MDN2132	**2.6%**	**MDN2132**	**99.0%**	
2003-074	**7/28/2003**	**0.99822**	**0.035 ng/L**	**7.58 ng/mL**	**94.7%**	**MDN2119**	**10.6%**	**MDN2119**	**106.4%**	**MDN2391 0.011 ng/Bottle**
	CVAFS-9			**7.41 ng/mL**	**92.6%**	**MDN2266**	**0.1%**	**MDN2266**	**103.2%**	
						MDN3004	**8.1%**	**MDN3004**	**98.3%**	
2003-075	**7/22/2003**	**0.99976**	**0.049 ng/L**	**7.16 ng/mL**	**89.5%**	**MDN0123**	**7.1%**	**MDN0893**	**102.8%**	
	CVAFS-10			**7.64 ng/mL**	**95.5%**	**MDN0893**	**3.8%**	**MDN3006**	**113.9%**	
						MDN3006	**2.8%**			
2003-076	**7/28/2003**	**0.99987**	**0.064 ng/L**	**7.55 ng/mL**	**94.3%**	**MDN0120**	**5.7%**	**MDN0120**	**88.0%**	
	CVAFS-10			**7.09 ng/mL**	**88.6%**	**MDN0408**	**2.3%**	**MDN0408**	**95.9%**	
						MDN0429	**1.2%**	**MDN0429**	**109.5%**	
2003-077	**7/31/2003**	**0.99966**	**0.037 ng/L**	**7.27 ng/mL**	**90.8%**	**MDN0190**	**7.5%**	**MDN0190**	**110.9%**	**MDN0155 0.055 ng/Bottle**
	CVAFS-9			**7.60 ng/mL**	**94.9%**	**MDN2273**	**1.6%**	**MDN2273**	**105.1%**	
						MDN2281	**1.9%**	**MDN2281**	**100.4%**	
2003-078	**8/1/2003**	**0.99996**	**0.039 ng/L**	**7.64 ng/mL**	**95.4%**	**MDN0425**	**0.1%**	**MDN0425**	**98.2%**	**MDN0165 0.028 ng/Bottle**

	CVAFS-9			7.56 ng/mL	94.5%	MDN2193	1.8%	MDN2193	102.8%	MDN2209 0.037 ng/Bottle
						MDN2314	1.8%	MDN2314	103.8%	
2003-079	8/6/2003	0.99996	0.030 ng/L	7.35 ng/mL	91.8%	MDN0122	1.0%	MDN0122	108.4%	
	CVAFS-9			7.58 ng/mL	94.7%	MDN1922	1.6%	MDN1922	106.9%	
						MDN2263	2.8%	MDN2263	107.1%	
2003-080	8/6/2003	0.99974	0.025 ng/L	7.43 ng/mL	92.9%	MDN0922	3.2%	MDN0922	89.9%	
	CVAFS-10			7.44 ng/mL	92.9%	MDN1750	0.7%	MDN1750	101.4%	
						MDN1954		MDN1954	97.5%	
2003-081	8/7/2003	0.99992	0.035 ng/L	7.72 ng/mL	96.5%	MDN0639	0.2%	MDN0639	103.6%	MDN2085 0.033 ng/Bottle
	CVAFS-9			7.70 ng/mL	96.2%	MDN2031	1.2%	MDN2031	102.0%	
						MDN3002	1.0%	MDN3002	108.7%	
2003-082	8/11/2003	0.99995	0.042 ng/L	7.54 ng/mL	94.2%	MDN0735	0.8%	MDN0735	102.2%	MDN2389 0.038 ng/Bottle
	CVAFS-9			7.60 ng/mL	94.9%	MDN2059	1.2%	MDN2059	100.7%	
						MDN2333	0.1%	MDN2333	106.9%	
2003-083	8/12/2003	0.99999	0.029 ng/L	7.58 ng/mL	94.7%	MDN1994	0.9%	MDN1994	96.6%	
	CVAFS-9			7.44 ng/mL	93.0%	MDN2045	0.8%	MDN2045	103.3%	
						MDN2300	0.1%	MDN2300	100.4%	
2003-084	8/18/2003	0.99992	0.053 ng/L	7.80 ng/mL	97.5%	MDN0182	0.3%	MDN0182	104.9%	
	CVAFS-9			7.60 ng/mL	94.9%	MDN2049	2.8%	MDN2049	97.7%	
						MDN2204	1.4%	MDN2204	97.7%	
2003-085	8/18/2003	0.99976	0.072 ng/L	7.77 ng/mL	97.0%	MDN0262	6.8%	MDN0262	89.1%	MDN1984 0.033 ng/Bottle
	CVAFS-10			6.95 ng/mL	86.8%	MDN0676	7.2%	MDN0676	79.9%	
						MDN2413	4.5%	MDN2413	110.0%	
2003-086	8/22/2003	0.99996	0.039 ng/L	7.68 ng/mL	95.9%	MDN0413	0.2%	MDN0413	105.3%	MDN1922 0.016 ng/Bottle
	CVAFS-9			7.75 ng/mL	96.8%	MDN2290	3.1%	MDN2290	102.9%	
						MDN2407	5.9%	MDN2407	99.2%	
2003-087	8/22/2003	0.99978	0.042 ng/L	7.23 ng/mL	90.4%	MDN0872	3.0%	MDN0872	99.6%	MDN1922 0.017 ng/Bottle
	CVAFS-10			7.61 ng/mL	95.0%	MDN0928	4.4%	MDN0928	117.7%	MDN1953 0.024 ng/Bottle
						MDN2061	0.3%	MDN2061	100.1%	
2003-088	8/25/2003	0.99998	0.045 ng/L	7.76 ng/mL	96.9%	MDN0896	0.9%	MDN0896	101.1%	
	CVAFS-9			7.68 ng/mL	95.9%	MDN0968	6.3%	MDN0968	102.5%	
						MDN2351	0.9%	MDN2351	100.7%	
2003-089	8/25/2003	0.99955	0.017 ng/L	7.37 ng/mL	92.1%	MDN1931	1.1%	MDN1931	107.8%	MDN2457 0.030 ng/Bottle
	CVAFS-10			8.38 ng/mL	104.7%	MDN2285	5.1%	MDN2285	115.2%	
						MDN2390	4.8%	MDN2390	112.7%	

2003-090	**8/28/2003**	**0.99999**	**0.046 ng/L**	**7.83 ng/mL**	**97.8%**	**MDN1734**	**3.5%**	**MDN1734**	**99.0%**	**MDN2182 0.025 ng/Bottle**
	CVAFS-9			**7.67 ng/mL**	**95.8%**	**MDN1756**	**2.6%**	**MDN1756**	**107.2%**	
						MDN2329	**1.8%**	**MDN2329**	**103.5%**	
2003-091	**9/3/2003**	**1.00000**	**0.058 ng/L**	**7.96 ng/mL**	**99.4%**	**MDN2176**	**1.6%**	**MDN2176**	**104.1%**	**MDN0154 0.024 ng/Bottle**
	CVAFS-9			**7.58 ng/mL**	**94.7%**	**MDN2227**	**1.1%**	**MDN2227**	**94.3%**	
2003-092	**9/8/2003**	**0.99799**	**0.068 ng/L**	**7.12 ng/mL**	**88.9%**	**MDN0274**	**2.6%**	**MDN0274**	**21.3%**	**MDN0836 0.025 ng/Bottle**
	CVAFS-10			**8.50 ng/mL**	**106.2%**	**MDN0820**	**10.9%**	**MDN0820**	**100.6%**	
2003-093	**9/12/2003**	**0.99953**	**0.039 ng/L**	**7.68 ng/mL**	**95.9%**	**MDN0121**	**6.5%**	**MDN0121**	**117.3%**	
	CVAFS-9			**7.51 ng/mL**	**93.8%**	**MDN0122**	**4.7%**	**MDN0122**	**104.1%**	
						MDN2323	**10.1%**	**MDN2323**	**94.6%**	
2003-094	**9/12/2003**	**0.99941**	**0.019 ng/L**	**7.44 ng/mL**	**93.0%**	**MDN0150**	**3.2%**	**MDN0150**	**111.1%**	
	CVAFS-10			**7.63 ng/mL**	**95.4%**	**MDN2029**	**1.1%**	**MDN2029**	**95.7%**	
						MDN2165	**13.5%**	**MDN2165**	**119.1%**	
2003-095	**9/16/2003**	**0.99914**	**0.054 ng/L**	**7.95 ng/mL**	**99.3%**	**MDN0790**	**9.0%**	**MDN0790**	**103.9%**	**MDN2295 0.028 ng/Bottle**
	CVAFS-9			**7.58 ng/mL**	**94.7%**	**MDN0831**	**3.3%**	**MDN0831**	**98.2%**	
						MDN0966	**3.0%**	**MDN0966**	**112.3%**	
2003-096	**9/16/2003**	**0.99892**	**0.030 ng/L**	**7.47 ng/mL**	**93.3%**	**MDN2289**	**0.8%**	**MDN2289**	**104.6%**	
	CVAFS-10			**7.73 ng/mL**	**96.6%**	**MDN2363**	**10.7%**	**MDN2363**	**107.8%**	
						MDN2410	**8.8%**	**MDN2410**	**106.9%**	
2003-097	**9/26/2003**	**0.99938**	**0.046 ng/L**	**7.67 ng/mL**	**95.8%**	**MDN0257**	**2.6%**	**MDN0257**	**117.9%**	**MDN2392 0.011 ng/Bottle**
	CVAFS-9			**7.40 ng/mL**	**92.4%**	**MDN0871**	**1.1%**	**MDN0871**	**97.5%**	
						MDN2059	**2.2%**	**MDN2059**	**102.5%**	
2003-098	**9/23/2003**	**0.99973**	**0.053 ng/L**	**7.95 ng/mL**	**99.4%**	**MDN0661**	**2.0%**	**MDN0661**	**101.1%**	**MDN2371 0.014 ng/Bottle**
	CVAFS-9			**7.26 ng/mL**	**90.7%**	**MDN1924**	**3.3%**	**MDN1924**	**104.1%**	
						MDN2153	**3.4%**	**MDN2153**	**102.4%**	
						MDN2313	**2.1%**	**MDN2313**	**99.2%**	
2003-099	**9/29/2003**	**0.99961**	**0.042 ng/L**	**7.94 ng/mL**	**99.2%**	**MDN0893**	**17.5%**	**MDN0893**	**104.8%**	
	CVAFS-9			**7.07 ng/mL**	**88.3%**	**MDN0922**	**8.3%**	**MDN0922**	**99.4%**	
						MDN0938	**4.4%**	**MDN0938**	**96.0%**	
2003-100	**9/29/2003**	**0.99921**	**0.059 ng/L**	**7.47 ng/mL**	**93.3%**	**MDN2435**	**14.6%**	**MDN2435**	**104.4%**	**MDN0116 0.015 ng/Bottle**
	CVAFS-10			**7.13 ng/mL**	**89.0%**					**MDN2554 0.021 ng/Bottle**
2003-101	**9/30/2003**	**0.99994**	**0.029 ng/L**	**7.56 ng/mL**	**94.4%**	**MDN2009**	**2.6%**	**MDN2009**	**99.6%**	**MDN0122 0.025 ng/Bottle**

	CVAFS-9			7.36 ng/mL	92.0%	MDN2409	0.3%	MDN2409	95.2%	
						MDN2470	5.2%	MDN2470	108.0%	
2003-102	10/2/2003	0.99996	0.044 ng/L	7.84 ng/mL	97.9%	MDN2137	3.2%	MDN2137	97.6%	
	CVAFS-9			6.99 ng/mL	87.3%	MDN2214	13.5%	MDN2214	84.5%	
						MDN2275	0.4%	MDN2275	98.2%	
2003-103	10/3/2003	0.99996	0.049 ng/L	8.00 ng/mL	100.0%	MDN0647	0.3%	MDN0647	98.8%	MDN0747 0.014 ng/Bottle
	CVAFS-9			7.33 ng/mL	91.6%	MDN2426	2.2%	MDN2426	102.2%	
						MDN2427	0.9%	MDN2427	100.4%	
2003-104	10/6/2003	0.99993	0.045 ng/L	7.73 ng/mL	96.5%	MDN0746	7.9%	MDN0746	98.4%	
	CVAFS-9			7.31 ng/mL	91.4%	MDN0796	2.8%	MDN0796	97.9%	
						MDN2049	1.3%	MDN2049	100.9%	
2003-105	10/6/2003	0.99969	0.053 ng/L	7.51 ng/mL	93.9%	MDN0797	3.9%	MDN0797	97.1%	
	CVAFS-10			7.57 ng/mL	94.6%	MDN2234	3.4%	MDN2234	108.8%	
						MDN2262	2.1%	MDN2262	100.3%	
2003-106	10/7/2003	0.99993	0.018 ng/L	7.79 ng/mL	97.3%	MDN0954	2.2%	MDN0954	103.3%	MDN0445 0.017 ng/Bottle
	CVAFS-9			7.12 ng/mL	89.0%	MDN2272	0.9%	MDN2272	99.0%	
						MDN2436	3.4%	MDN2436	97.8%	
2003-107	10/8/2003	0.99997	0.035 ng/L	7.78 ng/mL	97.2%	MDN1935	1.2%	MDN2066	105.5%	MDN0255 0.020 ng/Bottle
	CVAFS-9			7.24 ng/mL	90.4%	MDN2066	1.4%	MDN3013	100.6%	
						MDN3013	0.7%			
2003-108	10/9/2003	0.99986	0.043 ng/L	7.82 ng/mL	97.7%	MDN0959	16.1%	MDN0959	105.1%	
	CVAFS-9			7.36 ng/mL	92.0%	MDN2428	3.2%	MDN2428	102.2%	
						MDN2458	0.1%	MDN2458	100.9%	
2003-109	10/13/2003	0.99982	0.043 ng/L	7.72 ng/mL	96.4%	MDN0169	1.3%	MDN0169	96.0%	
	CVAFS-9			7.39 ng/mL	92.4%	MDN0267	2.0%	MDN0267	102.3%	
						MDN2282	6.6%	MDN2282	116.4%	
2003-110	10/15/2003	0.99993	0.048 ng/L	7.77 ng/mL	97.1%	MDN0801	2.1%	MDN0801	101.0%	MDN2415 0.012 ng/Bottle
	CVAFS-9			7.33 ng/mL	91.5%	MDN0867	0.7%	MDN0867	101.8%	
						MDN1992	0.6%	MDN1992	99.0%	
2003-111	10/18/2003	0.99993	0.048 ng/L	7.68 ng/mL	95.9%	MDN1922	0.6%	MDN1922	97.9%	
	CVAFS-9			7.20 ng/mL	89.9%	MDN2364	2.6%	MDN2364	102.8%	
						MDN2492	1.3%	MDN2492	99.9%	
2003-112	10/23/2003	0.99970	0.062 ng/L	7.57 ng/mL	94.6%	MDN0699	0.9%	MDN0699	98.4%	
	CVAFS-9			7.47 ng/mL	93.4%	MDN2148	8.8%	MDN2148	93.8%	
						MDN2437	6.1%	MDN2437	97.0%	

2003-113	10/17/2003 CVAFS-9											
2003-114	10/24/2003 CVAFS-9	0.99974	0.046 ng/L	7.42 ng/mL 7.56 ng/mL	92.6% 94.5%	MDN1760 MDN2011 MDN2522	1.4% 5.4% 0.9%	MDN1760 MDN2011 MDN2522	100.1% 102.8% 103.8%	MDN0135	0.017 ng/Bottle
2003-115	10/30/2003 CVAFS-9	0.99940	0.042 ng/L	7.78 ng/mL 7.62 ng/mL	97.1% 95.2%	MDN0264 MDN1732 MDN2393	31.2% 12.5% 14.6%	MDN0264 MDN1732 MDN2393	111.8% 95.1% 109.5%	MDN2170	0.019 ng/Bottle
2003-116	10/30/2003 CVAFS-10	0.99970	0.041 ng/L	7.51 ng/mL 7.66 ng/mL	93.8% 95.7%	MDN0414 MDN2400 MDN2473	11.4% 7.8% 12.4%	MDN0414 MDN2400 MDN2473	102.4% 116.9% 112.9%		
2003-117	11/5/2003 CVAFS-9	0.99894	0.041 ng/L	7.52 ng/mL 7.85 ng/mL	94.0% 98.1%	MDN0142 MDN0163 MDN0654	0.3% 2.5% 3.1%	MDN0142 MDN0163 MDN0654	105.3% 92.7% 99.6%	MDN0898	0.018 ng/Bottle
2003-118	11/10/2003 CVAFS-9	0.99948	0.044 ng/L	7.67 ng/mL 7.80 ng/mL	95.8% 97.4%	MDN2191 MDN2243 MDN3016	2.4% 19.3% 0.1%	MDN2191 MDN2243 MDN3016	93.9% 108.2% 93.3%		
2003-119	11/11/2003 CVAFS-9	0.99948	0.054 ng/L	7.40 ng/mL 7.59 ng/mL	92.4% 94.8%	MDN2100 MDN2331 MDN2465	0.7% 1.9% 0.6%	MDN2100 MDN2331 MDN2465	101.6% 103.6% 93.3%		
2003-120	11/11/2003 CVAFS-10	0.99945	0.050 ng/L	7.69 ng/mL 7.81 ng/mL	96.1% 97.5%	MDN0144 MDN0165 MDN2327	6.5% 2.5% 1.6%	MDN0144 MDN0165 MDN2327	102.9% 103.1% 104.8%		
2003-121	11/13/2003 CVAFS-9	0.99941	0.055 ng/L	7.57 ng/mL 7.70 ng/mL	94.5% 96.2%	MDN0735 MDN2141 MDN2214	0.1% 2.5% 2.2%	MDN0735 MDN2141 MDN2214	89.9% 101.5% 102.1%	MDN2489	0.013 ng/Bottle
2003-122	11/18/2003 CVAFS-9	0.99979	0.058 ng/L	7.58 ng/mL 7.76 ng/mL	94.7% 96.9%	MDN0866 MDN1972 MDN2378	10.4% 5.8% 3.6%	MDN0866 MDN1972 MDN2378	100.8% 96.1% 100.9%		
2003-123	11/18/2003 CVAFS-10	0.99989	0.048 ng/L	7.57 ng/mL 7.70 ng/mL	94.6% 96.2%	MDN2192 MDN2244 MDN2293	1.4% 1.5% 0.4%	MDN2192 MDN2244 MDN2293	100.9% 98.7% 99.4%	MDN2456	0.030 ng/Bottle
2003-124	11/20/2003	0.99973	0.133 ng/L	7.68 ng/mL	95.9%	MDN0196	0.5%	MDN0196	97.8%	MDN2459	0.022 ng/Bottle

	CVAFS-9			7.82 ng/mL	97.7%	MDN0980	0.5%	MDN0980	105.3%		
						MDN2107	1.5%	MDN2107	96.3%		
2003-125	11/25/2003	0.99966	0.055 ng/L	7.59 ng/mL	94.8%	MDN0285	1.8%	MDN0285	96.4%		
	CVAFS-9			7.89 ng/mL	98.6%	MDN2117	1.9%	MDN2117	103.5%		
						MDN2552	0.4%	MDN2552	100.9%		
2003-126	11/25/2003	0.99999	0.055 ng/L	7.60 ng/mL	95.0%	MDN2158	0.6%	MDN2158	99.4%	MDN2375	0.021 ng/Bottle
	CVAFS-10			7.57 ng/mL	94.6%	MDN2383	0.1%	MDN2383	100.6%		
						MDN2452	1.0%	MDN2452	100.0%		
2003-127	12/2/2003	0.99978	0.041 ng/L	7.43 ng/mL	92.8%	MDN0129	3.3%	MDN0129	102.0%		
	CVAFS-9			7.74 ng/mL	96.7%	MDN1969	0.8%	MDN1969	98.8%		
						MDN2328		MDN2328	103.3%		
2003-128	12/2/2003	0.99992	0.034 ng/L	7.64 ng/mL	95.5%	MDN2108	5.3%	MDN2108	97.3%		
	CVAFS-10			7.67 ng/mL	95.8%	MDN2257	0.2%	MDN2257	101.2%		
						MDN2429	0.4%	MDN2429	102.6%		
2003-129	12/4/2003	0.99978	0.023 ng/L	7.46 ng/mL	93.2%	MDN0646	2.4%	MDN0646	101.7%		
	CVAFS-9			7.67 ng/mL	95.8%	MDN0951	7.9%	MDN0951	100.4%		
						MDN2387	0.9%	MDN2387	92.9%		
2003-130	12/4/2003	0.99999	0.030 ng/L	7.62 ng/mL	95.2%	MDN0758	0.8%	MDN0758	99.9%	MDN1996	0.020 ng/Bottle
	CVAFS-10			7.62 ng/mL	95.2%	MDN0970	0.3%	MDN0970	100.0%		
						MDN2497	2.4%	MDN2497	102.8%		
2003-131	12/11/2003	0.99986	0.034 ng/L	7.86 ng/mL	98.2%	MDN0123	1.1%	MDN0123	101.7%	MDN2397	0.037 ng/Bottle
	CVAFS-9			7.83 ng/mL	97.8%	MDN1710	4.7%	MDN1710	109.6%		
						MDN2512	1.1%	MDN2512	102.5%		
2003-132	12/11/2003	0.99953	0.001 ng/L	7.74 ng/mL	96.7%	MDN0392	0.7%	MDN0392	102.2%		
	CVAFS-10			6.64 ng/mL	83.0%	MDN0419	1.0%	MDN0419	99.4%		
				7.34 ng/mL	91.7%	MDN1995		MDN1995	101.1%		
				7.77 ng/mL	97.0%						
2003-133	12/16/2003	0.99999	0.031 ng/L	7.78 ng/mL	97.2%	MDN1922	1.1%	MDN1922	103.8%		
	CVAFS-9			7.70 ng/mL	96.2%	MDN2269	1.4%	MDN2269	108.4%		
						MDN2532	1.6%	MDN2532	101.1%		
2003-134	12/16/2003	0.99988	0.051 ng/L	7.75 ng/mL	96.8%	MDN0483	2.9%	MDN0483	97.1%	MDN2121	0.013 ng/Bottle
	CVAFS-10			7.71 ng/mL	96.3%	MDN0797	2.4%	MDN0797	99.6%		
						MDN2122	0.1%	MDN2122	100.4%		
						MDN2361	25.7%	MDN2361	0.6%		

2003-135	12/18/2003	0.99877	0.029 ng/L	8.07 ng/mL	100.8%	MDN2321	4.4%	MDN2321	106.7%	
	CVAFS-9			7.27 ng/mL	90.9%	MDN2442	7.2%	MDN2442	107.9%	
						MDN2531	1.0%	MDN2531	98.9%	
2003-136	12/18/2003	0.99995	0.030 ng/L	7.74 ng/mL	96.7%	MDN2124	5.9%	MDN2124	105.8%	
	CVAFS-10			7.61 ng/mL	95.1%	MDN2260	21.5%	MDN2260	85.2%	
						MDN2545	0.1%	MDN2545	101.2%	
2003-137	12/29/2003	0.99963	0.008 ng/L	7.64 ng/mL	95.4%	MDN2336	0.1%	MDN2336	97.0%	
	CVAFS-9			7.62 ng/mL	95.2%	MDN2459	8.8%	MDN2459	98.8%	
						MDN2535	3.1%	MDN2535	104.0%	
2003-138	12/29/2003	0.99998	0.021 ng/L	7.59 ng/mL	94.8%	MDN1999	0.6%	MDN1999	101.7%	MDN2509 0.030 ng/Bottle
	CVAFS-10			7.60 ng/mL	95.0%	MDN2049	5.5%	MDN2049	101.2%	
						MDN2130	3.2%	MDN2130	98.2%	
2003-139	1/5/2004	0.99989	0.040 ng/L	7.87 ng/mL	98.3%	MDN0288	6.3%	MDN0288	101.5%	MDN0174 0.016 ng/Bottle
	CVAFS-9			7.25 ng/mL	90.5%	MDN2153	9.6%	MDN2153	100.5%	
						MDN2341	1.5%	MDN2341	100.1%	
2003-140	1/5/2004	0.99980	0.028 ng/L	7.59 ng/mL	94.8%	MDN0827	5.1%	MDN0827	99.5%	
	CVAFS-10			7.85 ng/mL	98.1%	MDN0916	13.9%	MDN0916	103.7%	
						MDN1760	1.5%	MDN1760	97.5%	
2003-141	1/6/2004	0.99958	0.024 ng/L	7.95 ng/mL	99.3%	MDN0734	3.3%	MDN0734	105.6%	
	CVAFS-9			7.82 ng/mL	97.7%	MDN0846	3.3%	MDN0846	106.4%	
						MDN0861	10.6%	MDN0861	96.2%	
2003-143	1/7/2004	0.99984	0.031 ng/L	7.84 ng/mL	97.9%	MDN0836	1.7%	MDN0836	95.7%	
	CVAFS-9			7.73 ng/mL	96.5%	MDN0918	1.3%	MDN0918	98.3%	
						MDN2422	13.5%	MDN2422	97.4%	
2003-142	1/6/2004	0.99991	0.015 ng/L	7.70 ng/mL	96.2%	MDN1913	0.2%	MDN1913	98.2%	MDN2240 0.110 ng/Bottle
	CVAFS-10			7.77 ng/mL	97.0%	MDN2106	0.1%	MDN2106	100.8%	
						MDN2351	4.6%	MDN2351	103.0%	
2003-144	1/9/2004	0.99996	0.022 ng/L	7.52 ng/mL	94.0%	MDN0699	0.8%	MDN0699	103.8%	
	CVAFS-9			7.70 ng/mL	96.1%	MDN1743	2.1%	MDN1743	103.5%	
						MDN2086	0.5%	MDN2086	101.8%	
2003-145	1/9/2004	0.99995	0.024 ng/L	7.67 ng/mL	95.9%	MDN0754	4.0%	MDN0754	101.9%	
	CVAFS-10			7.65 ng/mL	95.6%	MDN0816	1.6%	MDN0816	99.6%	
						MDN2178	1.1%	MDN2178	98.2%	

2003-146	1/13/2004 CVAFS-9	0.99997	0.028 ng/L	7.76 ng/mL 7.91 ng/mL	96.9% 98.8%	MDN0936 MDN2173 MDN2197	4.8% 6.2% 6.2%	MDN0936 MDN2173 MDN2197	100.9% 105.2% 103.6%	MDN0875	0.063 ng/Bottle
2003-147	1/13/2004 CVAFS-10	0.99965	0.029 ng/L	7.43 ng/mL	92.8%	MDN0447	0.7%	MDN0447	98.4%		