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OPERATION/CONSTRUCTION MANAGERS

Municipal Services

PO Box 97, Garner, North Carolina 27529 (919) 772-5393

CIVIL/SANITARY ENGINEERS

Engineering Company, P.A.

PO Box 349, Boone, North Carolina 28607 (828) 262-1767

December 27, 2000

Mr. Larry Rose
Solid Waste Section
Division of Waste Management
North Carolina Department of Environment and Natural Resources
401 Oberlin Road, Suite 150
Raleigh, NC 27605

DEC 2000
Received
Solid Waste
Section

Re: Groundwater Sampling and Statistical Analysis
Cherokee County Lined Landfill, Marble, North Carolina
MESCO Project No. G99011.0

Dear Mr. Rose:

Municipal Engineering Services Company, P.A. (MESCO) completed statistical analyses for the Cherokee County Subtitle D Lined Landfill located in Marble, North Carolina. The purpose of these analyses is to determine, in comparison to background levels, statistical significance of constituents detected during the April-2000 sampling event.

Statistical Analysis Methodology

Metals

Interwell statistical analysis was conducted on detected metals. Based on the data from the background well(s), an upper tolerance limit (UTL) was calculated for each of the detected metals, and the confidence level was set 95% for all the metals on which the interwell analysis was conducted. For each tested constituent, an appropriate statistical analysis method was selected based on the percentage of non-detects (%ND) in the historical background data. The following table (Table 1) summarizes the methods used for four different %ND ranges.

Table 1. Statistical Analysis Methods for Various %ND Ranges

%ND	Analysis Method	ND Substitution
%ND < 15%	Parametric tolerance limit	1/2 ND
15% < %ND < 50%	Parametric tolerance limit	Cohen or 1/2 ND
50% < %ND < 90%	Non-parametric tolerance limit	1/2 ND
90% < %ND	Poisson tolerance limit	-

NOTE: For parametric tolerance interval, normality of the background data was checked as the method requires that the data be normally distributed.

VOCs

All historical VOC detections in the background well(s) were pooled in order to determine the total number of detections, from which the expected number of detections in a single downgradient

monitoring point (y^*) was derived by using the Poisson prediction interval.* The parameter y^* is defined by the following equation:

$$y^* = cy + \frac{t^2 c}{2} + tc\sqrt{y\left(1 + \frac{1}{c}\right) + \frac{t^2}{4}}$$

where

c = $1/n$ (n = number of background samples)
t = one-sided value of Student's t-Statistic at 95% confidence
y = number of events observed in n previous samples
y^* = expected number of events in a single future sample

For each monitoring location showing any VOC detections, the number of detected VOCs was counted with each detection being considered a "hit". The number was then compared with the expected number of detections derived from the background VOC data. The value of Student's t-Statistic was derived from tabulated values included in Gibbons (1994).†

Results

Interwell analysis was performed on 13 metals detected during the sampling event. Monitoring well MW-1 was used as the background well. The parametric tolerance interval was used for chromium, lead, nickel, vanadium and zinc as their background data were either normally or "log-normally" distributed with %ND less than 50%. The non-parametric tolerance interval was used for antimony, barium, beryllium, cadmium, cobalt, thallium, and tin as their background data were not normally distributed or had %ND greater than 50%. The Poisson tolerance interval was used for silver as its background data had %ND greater than 90%.

Carbon disulfide was detected at three sampling locations MW-1, MW-2, and MW-6S. Historical detections of this compound is summarized in the following table.

Table 2. Summary of Carbon Disulfide Detections

Location	Number of Detections
MW-1	2
MW-2	1
MW-5	1
MW-6S	1
MW-7	2
SW-2	1

Since the detections of carbon disulfide are location-independent, and the background well (MW-1) also shows two historical detections of this compound, they are likely not associated with groundwater contamination. Available literature on this compound (see enclosed material) states that carbon disulfide

*The primary difference between the prediction interval method and the tolerance interval method is the prediction interval attempts to include *all* future comparisons (*i.e.* 100% coverage), whereas the tolerance interval only attempts to include less than 100% of all future comparisons (typically 95%). It's been suggested that the prediction interval method may result in an increased false positive rate if the number of background samples is not sufficiently large.

†Gibbons, R. D., 1994, Statistical methods for groundwater monitoring: John Wiley & Sons, Inc., p. 12.

> " . . . occurs naturally mostly due to the action of microorganisms living in sediments found on the sea floor and in marshes."

This, as well as the fact that carbon disulfide is frequently detected in groundwater samples in the absence of groundwater contamination, suggests that the detections of carbon disulfide at this site is most likely a reflection of naturally occurring carbon disulfide, and should not be taken as an early indication of groundwater contamination. The Poisson prediction interval analysis did not find any VOC detections statistically significant.

Levels of antimony at MW-2 and MW-3 and silver at MW-2 were found statistically significant with respect to their background levels. These detections are, however, the first occurrences in the entire sampling history, and are therefore not necessarily an early indication of groundwater contamination. Intrawell analysis was not performed on these metals due to an insignificant number of sampling events.

Should you have any questions or concerns regarding the content of this report, please contact me at (919) 772-5393.

Sincerely,
MUNICIPAL ENGINEERING SERVICES COMPANY, P.A.

Kohei Yoshida
Hydrogeologist

Enclosures

cc: Robert Allen
Cherokee County

Exceedance Scan
Cherokee County Lined Landfill

Well ID	Parameter Name [1]	Sample Date	Result	Unit	PQL [2]	MCL [3]	Exceedance
MW-1	Antimony, total	4/18/2000	0.01	mg/l	0.01	-	
MW-2	Antimony, total	4/18/2000	0.018	mg/l	0.01	-	
MW-3	Antimony, total	4/18/2000	0.011	mg/l	0.01	-	
MW-1	Barium, total	4/18/2000	0.11	mg/l	0.005	2	
MW-2	Barium, total	4/18/2000	0.053	mg/l	0.005	2	
MW-3	Barium, total	4/18/2000	0.28	mg/l	0.005	2	
MW-4	Barium, total	4/18/2000	0.33	mg/l	0.005	2	
MW-5	Barium, total	4/18/2000	0.02	mg/l	0.005	2	
MW-6D	Barium, total	4/18/2000	0.0065	mg/l	0.005	2	
MW-6S	Barium, total	4/18/2000	0.052	mg/l	0.005	2	
MW-7	Barium, total	4/18/2000	0.028	mg/l	0.005	2	
Leachate	Barium, total	4/18/2000	0.24	mg/l	0.005	2	
MW-1	Beryllium, total	4/18/2000	0.002	mg/l	0.002	-	
MW-3	Beryllium, total	4/18/2000	0.0026	mg/l	0.002	-	
MW-4	Beryllium, total	4/18/2000	0.0039	mg/l	0.002	-	
MW-7	Beryllium, total	4/18/2000	0.002	mg/l	0.002	-	
MW-1	**Cadmium, total**	**4/18/2000**	**0.0065**	**mg/l**	**0.001**	**0.005**	**0.0015**
MW-2	Cadmium, total	4/18/2000	0.0021	mg/l	0.001	0.005	
MW-3	Cadmium, total	4/18/2000	0.0036	mg/l	0.001	0.005	
MW-4	Cadmium, total	4/18/2000	0.0041	mg/l	0.001	0.005	
MW-6S	Cadmium, total	4/18/2000	0.0013	mg/l	0.001	0.005	
MW-7	Cadmium, total	4/18/2000	0.0014	mg/l	0.001	0.005	
Leachate	Cadmium, total	4/18/2000	0.0022	mg/l	0.001	0.005	
MW-1	Chromium, total	4/18/2000	0.043	mg/l	0.005	0.05	
MW-2	Chromium, total	4/18/2000	0.013	mg/l	0.005	0.05	
MW-3	Chromium, total	4/18/2000	0.027	mg/l	0.005	0.05	
MW-4	Chromium, total	4/18/2000	0.047	mg/l	0.005	0.05	
MW-7	Chromium, total	4/18/2000	0.0051	mg/l	0.005	0.05	
MW-1	Cobalt, total	4/18/2000	0.027	mg/l	0.005	-	
MW-2	Cobalt, total	4/18/2000	0.0073	mg/l	0.005	-	
MW-3	Cobalt, total	4/18/2000	0.026	mg/l	0.005	-	
MW-4	Cobalt, total	4/18/2000	0.022	mg/l	0.005	-	
MW-6S	Cobalt, total	4/18/2000	0.0053	mg/l	0.005	-	
MW-1	Copper, total	4/18/2000	0.067	mg/l	0.005	1	
MW-1	**Lead, total**	**4/18/2000**	**0.016**	**mg/l**	**0.01**	**0.015**	**0.001**
MW-3	Lead, total	4/18/2000	0.014	mg/l	0.01	0.015	
MW-4	Lead, total	4/18/2000	0.01	mg/l	0.01	0.015	
MW-1	Nickel, total	4/18/2000	0.03	mg/l	0.005	0.1	
MW-2	Nickel, total	4/18/2000	0.011	mg/l	0.005	0.1	
MW-3	Nickel, total	4/18/2000	0.023	mg/l	0.005	0.1	
MW-4	Nickel, total	4/18/2000	0.052	mg/l	0.005	0.1	
MW-5	Nickel, total	4/18/2000	0.01	mg/l	0.005	0.1	
MW-6S	Nickel, total	4/18/2000	0.006	mg/l	0.005	0.1	
Leachate	Nickel, total	4/18/2000	0.011	mg/l	0.005	0.1	
MW-2	**Silver, total**	**4/18/2000**	**0.064**	**mg/l**	**0.002**	**0.018**	**0.046**
MW-3	Silver, total	4/18/2000	0.0025	mg/l	0.002	0.018	
MW-3	Thallium, total	4/18/2000	0.002	mg/l	0.002	-	
MW-1	Tin, total	4/18/2000	0.019	mg/l	0.01	-	
SW-1	Tin, total	4/18/2000	0.016	mg/l	0.01	-	

Well ID	Parameter Name [1]	Sample Date	Result	Unit	PQL [2]	MCL [3]	Exceedance
MW-1	Vanadium	4/18/2000	0.039	mg/l	0.005	-	
MW-2	Vanadium	4/18/2000	0.0094	mg/l	0.005	-	
MW-3	Vanadium	4/18/2000	0.019	mg/l	0.005	-	
MW-4	Vanadium	4/18/2000	0.031	mg/l	0.005	-	
MW-1	Zinc, total	4/18/2000	0.1	mg/l	0.01	2.1	
MW-2	Zinc, total	4/18/2000	0.03	mg/l	0.01	2.1	
MW-3	Zinc, total	4/18/2000	0.087	mg/l	0.01	2.1	
MW-4	Zinc, total	4/18/2000	0.13	mg/l	0.01	2.1	
MW-5	Zinc, total	4/18/2000	0.068	mg/l	0.01	2.1	
MW-6D	Zinc, total	4/18/2000	0.015	mg/l	0.01	2.1	
MW-6S	Zinc, total	4/18/2000	0.021	mg/l	0.01	2.1	
MW-7	Zinc, total	4/18/2000	0.027	mg/l	0.01	2.1	
MW-1	Carbon disulfide	4/18/2000	37	ug/l	5	-	
MW-2	Carbon disulfide	4/18/2000	6.1	ug/l	5	-	
MW-6S	Carbon disulfide	4/18/2000	5.9	ug/l	5	-	
Rathbone	**Trichloroethylene**	**4/18/2000**	**21**	**ug/l**	**5**	**2.8**	**18.2**

[1] Table only contains detected constituents.

[2] PQL = Practical Quantitation Limit

[3] MCL = Maximum Contaminant Level (North Carolina Groundwater Standard)

Interwell Analysis Summary
Cherokee County Lined Landfill

Background Well(s): MW-1

Antimony, total

%ND	Normality	Method	ND Adj.	Upper Limit (α = 95%)	Unit
87.50	–	Non-parametric tolerance interval	½ ND	10	ug/l

Well	Result	Significance
MW-2	11	yes
MW-3	18	yes

Barium, total

%ND	Normality	Method	ND Adj.	Upper Limit (α = 95%)	Unit
25.00	no	Non-parametric tolerance interval	½ ND	3000	ug/l

Well	Result	Significance
MW-2	53	no
MW-3	280	no
MW-4	330	no
MW-5	20	no
MW-6D	6.5	no
MW-6S	52	no
MW-7	28	no

Beryllium, total

%ND	Normality	Method	ND Adj.	Upper Limit (α = 95%)	Unit
62.50	–	Non-parametric tolerance interval	½ ND	12	ug/l

Well	Result	Significance
MW-3	2.6	no
MW-4	3.9	no
MW-7	2.0	no

Cadmium, total

%ND	Normality	Method	ND Adj.	Upper Limit (α = 95%)	Unit
75.00	–	Non–parametric tolerance interval	½ ND	6.5	ug/l

Well	Result	Significance
MW–2	2.1	no
MW–3	3.6	no
MW–4	4.1	no
MW–6S	1.3	no
MW–7	1.4	no

Chromium, total

%ND	Normality	Method	ND Adj.	Upper Limit (α = 95%)	Unit
12.50	normal	Parametric tolerance interval	½ ND	52.9	ug/l

Well	Result	Significance
MW–2	13	no
MW–3	27	no
MW–4	47	no
MW–7	5.1	no

Cobalt, total

%ND	Normality	Method	ND Adj.	Upper Limit (α = 95%)	Unit
0.00	no	Non–parametric tolerance interval	½ ND	531	ug/l

Well	Result	Significance
MW–2	7.3	no
MW–3	26	no
MW–4	22	no
MW–6S	5.3	no

Lead, total

%ND	Normality	Method	ND Adj.	Upper Limit (α = 95%)	Unit
37.50	log–normal	Parametric tolerance interval	½ ND	5.77701	log[ug/l]

Well	Result	Significance
MW–3	2.63906	no
MW–4	2.30259	no

Nickel, total

%ND	Normality	Method	ND Adj.	Upper Limit (α = 95%)	Unit
50.00	normal	Parametric tolerance interval	Cohen	68.421	ug/l

Well	Result	Significance
MW-2	11	no
MW-3	23	no
MW-4	52	no
MW-5	10	no
MW-6S	6	no

Silver, total

%ND	Normality	Method	ND Adj.	Upper Limit (α = 95%)	Unit
100.00	–	Poisson tolerance interval	ND	4.5	ug/l

Well	Result	Significance
MW-2	64	yes
MW-3	2.5	no

Thallium, total

%ND	Normality	Method	ND Adj.	Upper Limit (α = 95%)	Unit
75.00	–	Non-parametric tolerance interval	½ ND	3.0	ug/l

Well	Result	Significance
MW-3	2.0	no

Tin, total

%ND	Normality	Method	ND Adj.	Upper Limit (α = 95%)	Unit
50.00	–	Non-parametric tolerance interval	½ ND	19.0	ug/l

Well	Result	Significance
SW-1	16.0	no

Vanadium

%ND	Normality	Method	ND Adj.	Upper Limit (α = 95%)	Unit
37.50	normal	Parametric tolerance interval	Cohen	37.1255	ug/l

Well	Result	Significance
MW-2	9.4	no
MW-3	19	no
MW-4	31	no

Zinc, total

%ND	Normality	Method	ND Adj.	Upper Limit (α = 95%)	Unit
0.00	normal	Parametric tolerance interval	½ ND	324.956	ug/l

Well	Result	Significance
MW-2	30	no
MW-3	87	no
MW-4	130	no
MW-5	68	no
MW-6D	15	no
MW-6S	21	no
MW-7	27	no

NOTE: Bold-faced monitoring points indicate detected levels exceed North Carolina Groundwater Standard.

Summary of Background VOC Detections (MW-1)
Cherokee County Lined Landfill

Constituent	Samples	NDs	% NDs
1,1,1,2-Tetrachloroethane	7	7	100.00
1,1,1-Trichloroethane	7	7	100.00
1,1,2,2-Tetrachloroethane	7	7	100.00
1,1,2-Trichloroethane	7	7	100.00
1,1-Dichloroethane	7	7	100.00
1,1-Dichloroethene	7	7	100.00
1,2,3-Trichloropropane	7	7	100.00
1,2-Dibromo-3-chloropropane	7	7	100.00
1,2-Dibromoethane	7	7	100.00
1,2-Dichlorobenzene	7	7	100.00
1,2-Dichloroethane	7	7	100.00
1,2-Dichloropropane	7	7	100.00
1,4-Dichlorobenzene	7	7	100.00
2-Butanone	6	6	100.00
2-Hexanone	6	6	100.00
4-Methyl-2-Pentanone	6	6	100.00
Acetone	6	6	100.00
Acrylonitrile	6	6	100.00
Benzene	7	7	100.00
Bromochloromethane	7	7	100.00
Bromodichloromethane	7	7	100.00
Bromoform	7	7	100.00
Bromomethane	7	6	85.71
Carbon disulfide	8	6	75.00
Carbon tetrachloride	7	7	100.00
Chlorobenzene	7	7	100.00
Chloroethane	7	7	100.00
Chloroform	7	7	100.00
Chloromethane	7	7	100.00
cis-1,2-Dichloroethene	7	7	100.00
cis-1,3-Dichloropropene	6	6	100.00
Chlorodibromomethane	7	7	100.00
Dibromomethane	7	7	100.00
Ethylbenzene	7	7	100.00
Iodomethane	6	6	100.00
Dichloromethane	7	7	100.00
Styrene	7	7	100.00
Tetrachloroethylene	7	7	100.00
Toluene	7	7	100.00
trans-1,2-Dichloroethene	7	7	100.00
trans-1,3-Dichloropropene	6	6	100.00
trans-1,4-Dichloro-2-butene	6	6	100.00
Trichloroethylene	7	7	100.00
Trichlorofluoromethane	7	7	100.00
Vinyl acetate	6	6	100.00
Vinyl chloride	7	7	100.00
Xylene	7	7	100.00
Total	**320**	**317**	**99.06**

Poisson Prediction Interval Based on Pooled Background VOCs
Cherokee County Lined Landfill

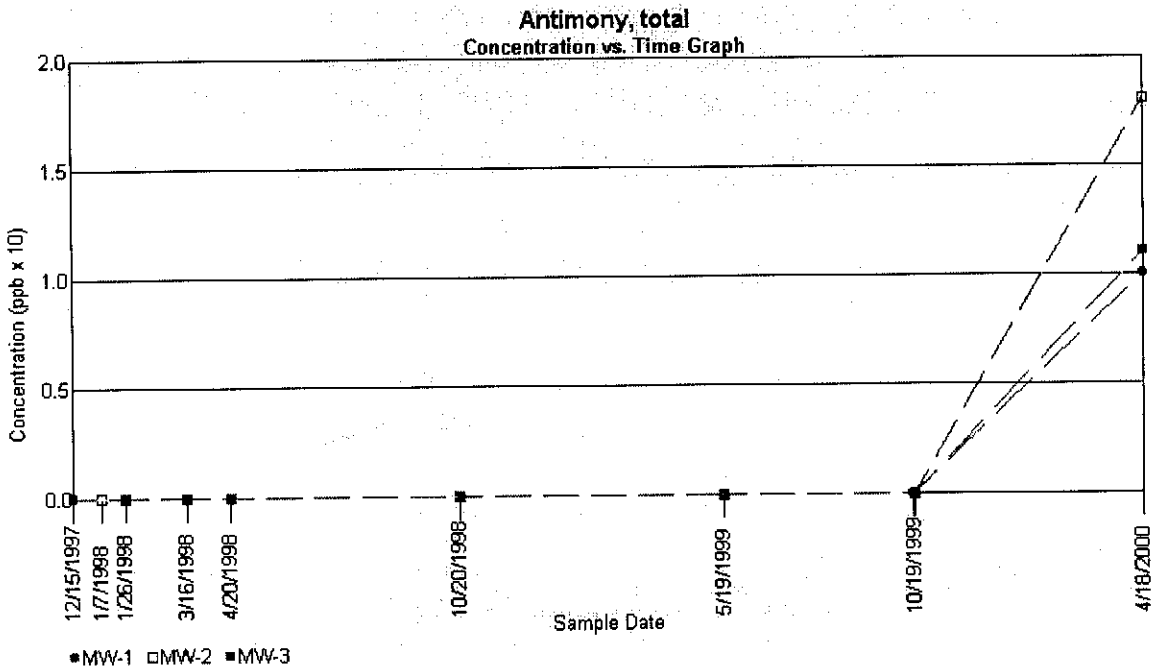
All detected VOCs (Background Well: MW-1)

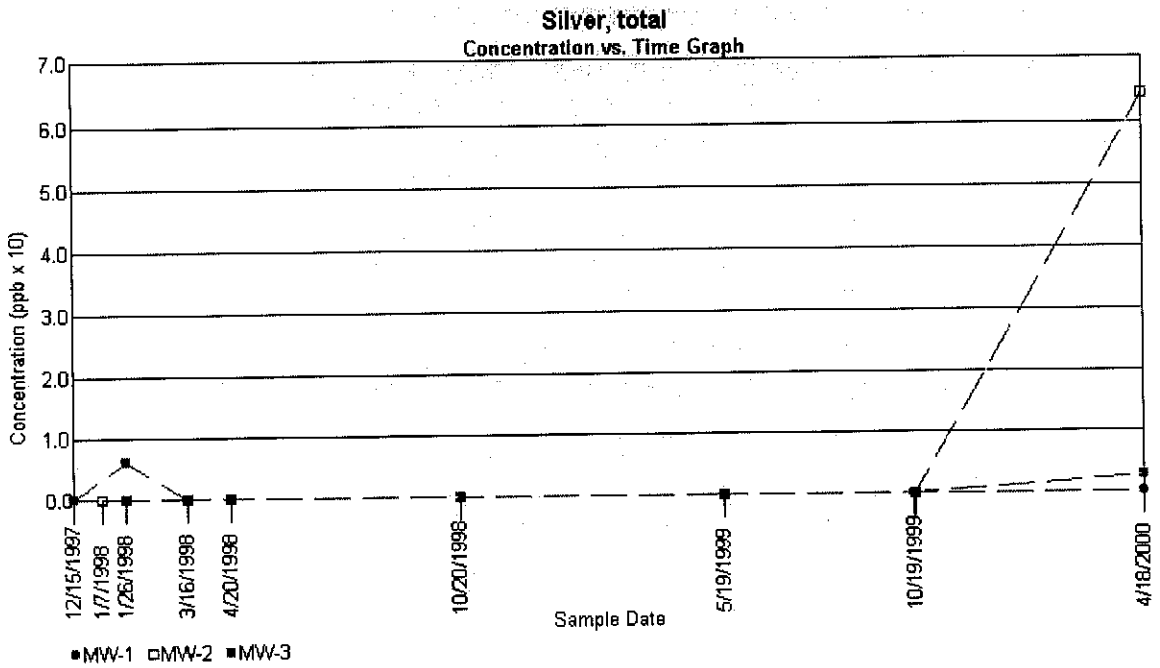
Constituent	MW-1	MW-2	MW-6S	Rathbone
Carbon disulfide	x	x	x	
Trichloroethylene				x
Detection(s) per Scan	–	1.00	1.00	1.00

Total number of sampling events [n] =	6.81
Total number of detections in background wells [y] =	3
Number of comparisons (downgradient wells) [k] =	13
One-sided value of Student's t-statistic (95% confidence) [t] =	4.49
Expected number of detections in a single future sample [y*] =	**5.44**

No statistically significant VOC detections at 95% confidence level

Time Series Plots for Select Constituents
Cherokee County Lined Landfill





OPPT Chemical Fact Sheet EPA 749-F-94-008

CHEMICALS IN THE ENVIRONMENT: CARBON DISULFIDE (CAS NO. 75-15-0)

prepared by
OFFICE OF POLLUTION PREVENTION AND TOXICS
U.S. ENVIRONMENTAL PROTECTION AGENCY
August 1994

Chemicals can be released to the environment as a result of their manufacture, processing, and use. EPA has developed information summaries on selected chemicals to describe how you might be exposed to these chemicals, how exposure to them might affect you and the environment, what happens to them in the environment, who regulates them, and whom to contact for additional information. EPA is committed to reducing environmental releases of chemicals through source reduction and other practices that reduce creation of pollutants.

WHAT IS CARBON DISULFIDE, HOW IS IT USED, AND HOW MIGHT I BE EXPOSED?

Carbon disulfide is a colorless, flammable liquid with a pleasant odor. Impure samples have a yellow color and a disagreeable odor. It occurs naturally mostly due to the action of microorganisms living in sediments found on the sea floor and in marshes. Carbon disulfide is produced in large amounts (207 million pounds in 1992) by three companies in the United States. US demand for carbon disulfide has declined in recent years and is likely to continue to fall. The largest users of carbon disulfide are chemical companies that make rayon. Companies use smaller amounts of the chemical to make agricultural fumigants, rubber chemicals, and cellulose. Companies also use carbon disulfide to clean metal surfaces. Olive oil processors use the chemical to extract olive oil.

Exposure to carbon disulfide can occur in the workplace or in the environment following releases to air, water, land, or groundwater. Carbon disulfide enters the body when breathed in with contaminated air or when consumed with contaminated food or water. It is also absorbed through skin contact. It does not remain in the body due to its breakdown and removal.

WHAT HAPPENS TO CARBON DISULFIDE IN THE ENVIRONMENT?

Carbon disulfide evaporates when exposed to air. It dissolves when mixed with water. Most direct releases of carbon disulfide to the environment are to air. Carbon disulfide also evaporates from water and soil exposed to air. Once in air, it breaks down to other chemicals. Because it is a liquid that does not bind well to soils, carbon disulfide that makes its way into the ground can move through the ground and into groundwater. Plants and animals are not likely to store carbon disulfide.

HOW DOES CARBON DISULFIDE AFFECT HUMAN HEALTH AND THE ENVIRONMENT?

Effects of carbon disulfide on human health and the environment depend on how much carbon disulfide is present and the length and frequency of exposure. Effects also depend on the health of a person or the condition of the environment when exposure occurs.

Breathing or otherwise consuming carbon disulfide for short periods of time adversely affects the human nervous system. Effects range from dizziness and headaches, to blurred vision and agitation, to convulsions, coma, and death. Carbon disulfide vapor also irritates the nose and the throat. Direct skin contact with liquid carbon disulfide causes chemical burns. Carbon disulfide can severely damage the eyes. These effects are not likely to occur at levels of carbon disulfide that are normally found in the environment.

Breathing or otherwise consuming small amounts of carbon disulfide over long periods of time can cause potentially permanent damage to the human nervous system. Effects range from tremors and weakness to mental impairment. Carbon disulfide can also damage the human cardiovascular system, resulting in increased blood pressure and coronary heart disease. Workers repeatedly exposed to carbon disulfide have developed gastro-intestinal and immune insufficiency problems. Laboratory studies show that exposure to large amounts of carbon disulfide during pregnancy adversely affects the developing fetus of animals. Studies also show that repeated exposure to carbon disulfide causes adverse kidney effects in animals.

Carbon disulfide by itself is not likely to cause environmental harm at levels normally found in the environment. Carbon disulfide can contribute to the formation of photochemical smog when it reacts with other volatile organic substance in air.

WHAT EPA PROGRAM OFFICES REGULATE CARBON DISULFIDE, AND UNDER WHAT LAWS IS IT REGULATED?

EPA OFFICE	LAW	PHONE NUMBER
Pollution Prevention & Toxics	Toxic Substances Control Act	(202) 554-1404
	Emergency Planning and Community Right-to-Know Act (EPCRA) Regulations (Sec. 313)	(800) 535-0202
	Toxics Release Inventory data	(202) 260-1531
Air	Clean Air Act	(919) 541-0888
Solid Waste & Emergency Response	Comprehensive Environmental Response, Compensation, and Liability Act (Superfund)/ Resource Conservation and Recovery Act / EPCRA (Sec. 304/311/312)	(800) 535-0202
Water	Clean Water Act	(202) 260-7588

A technical support document can be requested from the TSCA Assistance Information Service, (202) 554-1404.

WHAT OTHER FEDERAL AGENCIES OR GROUPS CAN I CONTACT FOR INFORMATION ON CARBON DISULFIDE?

AGENCY/GROUP	PHONE NUMBER
Agency for Toxic Substances and Disease Registry	(404) 639-6000
American Conference of Governmental Industrial Hygienists	(513) 742-2020
National Institute for Environmental Health Sciences (EnviroHealth Clearinghouse)	(800) 643-4794
National Institute for Occupational Safety and Health (NIOSH)	(800) 356-4674
Occupational Safety and Health Administration (Check your local phone book under U.S. Department of Labor)	

Basic Statistics

Basic Statistics

Parameter: Antimony, total

Total Observations	82
Total Non-Detects	79
Pooled Mean	5.95122
Pooled Std Dev	3.68146
Background Mean	5.625
Background Std Dev	3.62284

Background Wells

There is 1 background well

Well	Samples	Non-Detects	% ND	Total
MW-1	8	7	87.5	45

Well	Mean	Std Dev	Std Err	Rank Sum	Rank Mean
MW-1	5.625	3.62284	0	360	45

Compliance Wells

There are 12 compliance wells

Well	Samples	Non-Detects	% ND	Total
MW-3	8	7	87.5	46
MW-4	8	8	100	45
MW-5	8	8	100	45
MW-6D	8	8	100	45
MW-6S	8	8	100	45
SW-1	8	8	100	45
SW-2	8	8	100	45
MW-2	8	7	87.5	55
MW-7	7	7	100	42
Pendergrass	1	1	100	10
Rathbone	1	1	100	10
Solesbee	1	1	100	10

Well	Mean	Std Dev	Dif From Bkg	Std Err	Rank Sum	Rank Mean
MW-3	5.75	3.80789	0.125	1.93696	361	45.125
MW-4	5.625	3.62284	0	1.93696	320	40
MW-5	5.625	3.62284	0	1.93696	320	40
MW-6D	5.625	3.62284	0	1.93696	320	40
MW-6S	5.625	3.62284	0	1.93696	320	40
SW-1	5.625	3.62284	0	1.93696	320	40
SW-2	5.625	3.62284	0	1.93696	320	40
MW-2	6.875	5.43632	1.25	1.93696	362	45.25
MW-7	6	3.74166	0.375	2.00494	280	40
Pendergrass	10	0	4.375	4.10891	40	40
Rathbone	10	0	4.375	4.10891	40	40
Solesbee	10	0	4.375	4.10891	40	40

Analysis of Variance Statistics

SS Wells	62.3049
SS Total	1097.8

Kruskal-Wallis Statistics

Non-Detect Rank	40
Background Rank Sum	360
Background Rank Mean	45

H Statistic	0.786585
H Adjusted for Ties	7.43465

Basic Statistics

Parameter: Barium, total

Total Observations	82
Total Non-Detects	33
Pooled Mean	440.698
Pooled Std Dev	868.035
Background Mean	670
Background Std Dev	1114.99

Background Wells

There is 1 background well

Well	Samples	Non-Detects	% ND	Total
MW-1	8	2	25	5360

Well	Mean	Std Dev	Std Err	Rank Sum	Rank Mean
MW-1	670	1114.99	0	395	49.375

Compliance Wells

There are 12 compliance wells

Well	Samples	Non-Detects	% ND	Total
MW-3	8	0	0	13930
MW-4	8	0	0	11140
MW-5	8	4	50	778
MW-6D	8	6	75	520.2
MW-6S	8	3	37.5	643
SW-1	8	6	75	524.3
SW-2	8	6	75	520.4
MW-2	8	2	25	1645
MW-7	7	1	14.2857	1061.3
Pendergrass	1	1	100	5
Rathbone	1	1	100	5
Solesbee	1	1	100	5

Well	Mean	Std Dev	Dif From Bkg	Std Err	Rank Sum	Rank Mean
MW-3	1741.25	1460.75	1071.25	345.1	571	71.375
MW-4	1392.5	1117.43	722.5	345.1	575	71.875
MW-5	97.25	52.2952	-572.75	345.1	269	33.625
MW-6D	65.025	48.2803	-604.975	345.1	176	22
MW-6S	80.375	27.1921	-589.625	345.1	295	36.875
SW-1	65.5375	47.6181	-604.462	345.1	176	22
SW-2	65.05	48.2428	-604.95	345.1	177	22.125
MW-2	205.625	184.057	-464.375	345.1	388	48.5
MW-7	151.614	173.496	-518.386	357.213	330	47.1429
Pendergrass	5	0	-665	732.068	17	17
Rathbone	5	0	-665	732.068	17	17
Solesbee	5	0	-665	732.068	17	17

Analysis of Variance Statistics

SS Wells	2.81623e+007
SS Total	6.10323e+007

Kruskal-Wallis Statistics

Non-Detect Rank	17
Background Rank Sum	395
Background Rank Mean	49.375

H Statistic	47.9355
H Adjusted for Ties	51.2749

Basic Statistics

Parameter: Beryllium, total

Total Observations	82
Total Non-Detects	56
Pooled Mean	2.54756
Pooled Std Dev	3.37237
Background Mean	4.125
Background Std Dev	4.88255

Background Wells

There is 1 background well

Well	Samples	Non-Detects	% ND	Total
MW-1	8	5	62.5	33

Well	Mean	Std Dev	Std Err	Rank Sum	Rank Mean
MW-1	4.125	4.88255	0	360.5	45.0625

Compliance Wells

There are 12 compliance wells

Well	Samples	Non-Detects	% ND	Total
MW-3	8	0	0	30.7
MW-4	8	1	12.5	46.8
MW-5	8	7	87.5	13
MW-6D	8	8	100	11
MW-6S	8	6	75	12
SW-1	8	8	100	11
SW-2	8	8	100	11
MW-2	8	5	62.5	24.4
MW-7	7	5	71.4286	10
Pendergrass	1	1	100	2
Rathbone	1	1	100	2
Solesbee	1	1	100	2

Well	Mean	Std Dev	Dif From Bkg	Std Err	Rank Sum	Rank Mean
MW-3	3.8375	1.6561	-0.2875	1.63794	561	70.125
MW-4	5.85	7.79963	1.725	1.63794	538.5	67.3125
MW-5	1.625	0.744024	-2.5	1.63794	270.5	33.8125
MW-6D	1.375	0.517549	-2.75	1.63794	228	28.5
MW-6S	1.5	0.534522	-2.625	1.63794	289	36.125
SW-1	1.375	0.517549	-2.75	1.63794	228	28.5
SW-2	1.375	0.517549	-2.75	1.63794	228	28.5
MW-2	3.05	4.0592	-1.075	1.63794	350.5	43.8125
MW-7	1.42857	0.534522	-2.69643	1.69543	263.5	37.6429
Pendergrass	2	0	-2.125	3.4746	28.5	28.5
Rathbone	2	0	-2.125	3.4746	28.5	28.5
Solesbee	2	0	-2.125	3.4746	28.5	28.5

Analysis of Variance Statistics

SS Wells	180.736
SS Total	921.205

Kruskal-Wallis Statistics

Non-Detect Rank	28.5
Background Rank Sum	360.5
Background Rank Mean	45.0625

H Statistic	30.6802
H Adjusted for Ties	45.0156

Basic Statistics

Parameter: Cadmium, total

Total Observations	82
Total Non-Detects	66
Pooled Mean	1.57805
Pooled Std Dev	1.53229
Background Mean	2.1875
Background Std Dev	2.23507

Background Wells

There is 1 background well

Well	Samples	Non-Detects	% ND	Total
MW-1	8	6	75	17.5

Well	Mean	Std Dev	Std Err	Rank Sum	Rank Mean
MW-1	2.1875	2.23507	0	358	44.75

Compliance Wells

There are 12 compliance wells

Well	Samples	Non-Detects	% ND	Total
MW-3	8	6	75	15.1
MW-4	8	6	75	14.9
MW-5	8	5	62.5	16.6
MW-6D	8	8	100	8
MW-6S	8	7	87.5	8.3
SW-1	8	8	100	8
SW-2	8	7	87.5	9
MW-2	8	5	62.5	20.6
MW-7	7	5	71.4286	8.4
Pendergrass	1	1	100	1
Rathbone	1	1	100	1
Solesbee	1	1	100	1

Well	Mean	Std Dev	Dif From Bkg	Std Err	Rank Sum	Rank Mean
MW-3	1.8875	1.72	-0.3	0.772114	353	44.125
MW-4	1.8625	1.60796	-0.325	0.772114	352	44
MW-5	2.075	2.33957	-0.1125	0.772114	388.5	48.5625
MW-6D	1	0	-1.1875	0.772114	268	33.5
MW-6S	1.0375	0.106066	-1.15	0.772114	302.5	37.8125
SW-1	1	0	-1.1875	0.772114	268	33.5
SW-2	1.125	0.353553	-1.0625	0.772114	304.5	38.0625
MW-2	2.575	2.689	0.3875	0.772114	400.5	50.0625
MW-7	1.2	0.382971	-0.9875	0.799214	307.5	43.9286
Pendergrass	1	0	-1.1875	1.6379	33.5	33.5
Rathbone	1	0	-1.1875	1.6379	33.5	33.5
Solesbee	1	0	-1.1875	1.6379	33.5	33.5

Analysis of Variance Statistics

SS Wells	25.6405
SS Total	190.18

Kruskal-Wallis Statistics

Non-Detect Rank	33.5
Background Rank Sum	358
Background Rank Mean	44.75

H Statistic	4.64729
H Adjusted for Ties	9.70978

Basic Statistics

Parameter: Chromium, total

Total Observations	82
Total Non-Detects	36
Pooled Mean	11.2988
Pooled Std Dev	22.6225
Background Mean	20.875
Background Std Dev	15.8784

Background Wells

There is 1 background well

Well	Samples	Non-Detects	% ND	Total
MW-1	8	1	12.5	167

Well	Mean	Std Dev	Std Err	Rank Sum	Rank Mean
MW-1	20.875	15.8784	0	487.5	60.9375

Compliance Wells

There are 12 compliance wells

Well	Samples	Non-Detects	% ND	Total
MW-3	8	0	0	114
MW-4	8	0	0	156
MW-5	8	4	50	52.4
MW-6D	8	5	62.5	41
MW-6S	8	4	50	27
SW-1	8	8	100	20
SW-2	8	8	100	20
MW-2	8	1	12.5	269
MW-7	7	3	42.8571	24.1
Pendergrass	1	1	100	5
Rathbone	1	0	0	26
Solesbee	1	1	100	5

Well	Mean	Std Dev	Dif From Bkg	Std Err	Rank Sum	Rank Mean
MW-3	14.25	14.3003	-6.625	10.9629	474	59.25
MW-4	19.5	21.5208	-1.375	10.9629	486	60.75
MW-5	6.55	10.3105	-14.325	10.9629	294	36.75
MW-6D	5.125	4.05101	-15.75	10.9629	267.5	33.4375
MW-6S	3.375	1.84681	-17.5	10.9629	256	32
SW-1	2.5	2.0702	-18.375	10.9629	148	18.5
SW-2	2.5	2.0702	-18.375	10.9629	148	18.5
MW-2	33.625	60.677	12.75	10.9629	484.5	60.5625
MW-7	3.44286	1.73384	-17.4321	11.3477	249.5	35.6429
Pendergrass	5	0	-15.875	23.2558	18.5	18.5
Rathbone	26	0	5.125	23.2558	71	71
Solesbee	5	0	-15.875	23.2558	18.5	18.5

Analysis of Variance Statistics

SS Wells	8282.87
SS Total	41454

Kruskal-Wallis Statistics

Non-Detect Rank	18.5
Background Rank Sum	487.5
Background Rank Mean	60.9375

H Statistic	41.3802
H Adjusted for Ties	45.2028

Basic Statistics
Parameter: Cobalt, total

Total Observations	82
Total Non-Detects	27
Pooled Mean	35.611
Pooled Std Dev	77.2869
Background Mean	137.625
Background Std Dev	204.846

Background Wells
There is 1 background well

Well	Samples	Non-Detects	% ND	Total
MW-1	8	0	0	1101

Well	Mean	Std Dev	Std Err	Rank Sum	Rank Mean
MW-1	137.625	204.846	0	508	63.5

Compliance Wells
There are 12 compliance wells

Well	Samples	Non-Detects	% ND	Total
MW-3	8	0	0	644
MW-4	8	0	0	487
MW-5	8	1	12.5	83
MW-6D	8	6	75	30
MW-6S	8	0	0	119.5
SW-1	8	7	87.5	20
SW-2	8	8	100	20
MW-2	8	0	0	320.3
MW-7	7	2	28.5714	80.3
Pendergrass	1	1	100	5
Rathbone	1	1	100	5
Solesbee	1	1	100	5

Well	Mean	Std Dev	Dif From Bkg	Std Err	Rank Sum	Rank Mean
MW-3	80.5	48.0298	-57.125	35.0015	559	69.875
MW-4	60.875	40.1299	-76.75	35.0015	538	67.25
MW-5	10.375	8.24513	-127.25	35.0015	306	38.25
MW-6D	3.75	2.81577	-133.875	35.0015	156	19.5
MW-6S	14.9375	13.8084	-122.688	35.0015	360	45
SW-1	2.5	2.0702	-135.125	35.0015	127	15.875
SW-2	2.5	2.0702	-135.125	35.0015	112	14
MW-2	40.0375	45.7576	-97.5875	35.0015	440	55
MW-7	11.4714	8.10899	-126.154	36.23	255	36.4286
Pendergrass	5	0	-132.625	74.2495	14	14
Rathbone	5	0	-132.625	74.2495	14	14
Solesbee	5	0	-132.625	74.2495	14	14

Analysis of Variance Statistics

SS Wells	145704
SS Total	483834

Kruskal-Wallis Statistics

Non-Detect Rank	14
Background Rank Sum	508
Background Rank Mean	63.5

H Statistic	61.5023
H Adjusted for Ties	63.7762

Basic Statistics
Parameter: Copper, total

Total Observations	82
Total Non-Detects	60
Pooled Mean	27.639
Pooled Std Dev	95.6778
Background Mean	181.625
Background Std Dev	273.552

Background Wells
There is 1 background well

Well	Samples	Non-Detects	% ND	Total
MW-1	8	0	0	1453

Well	Mean	Std Dev	Std Err	Rank Sum	Rank Mean
MW-1	181.625	273.552	0	600	75

Compliance Wells
There are 12 compliance wells

Well	Samples	Non-Detects	% ND	Total
MW-3	8	6	75	65
MW-4	8	7	87.5	65.4
MW-5	8	3	37.5	191
MW-6D	8	7	87.5	75
MW-6S	8	8	100	65
SW-1	8	8	100	65
SW-2	8	7	87.5	75
MW-2	8	5	62.5	119
MW-7	7	7	100	55
Pendergrass	1	0	0	28
Rathbone	1	1	100	5
Solesbee	1	1	100	5

Well	Mean	Std Dev	Dif From Bkg	Std Err	Rank Sum	Rank Mean
MW-3	8.125	2.58775	-173.5	43.7844	312	39
MW-4	8.175	2.52176	-173.45	43.7844	274.5	34.3125
MW-5	23.875	18.3726	-157.75	43.7844	457.5	57.1875
MW-6D	9.375	4.95516	-172.25	43.7844	282.5	35.3125
MW-6S	8.125	2.58775	-173.5	43.7844	244	30.5
SW-1	8.125	2.58775	-173.5	43.7844	244	30.5
SW-2	9.375	4.95516	-172.25	43.7844	283.5	35.4375
MW-2	14.875	18.3649	-166.75	43.7844	357.5	44.6875
MW-7	7.85714	2.67261	-173.768	45.3211	213.5	30.5
Pendergrass	28	0	-153.625	92.8807	73	73
Rathbone	5	0	-176.625	92.8807	30.5	30.5
Solesbee	5	0	-176.625	92.8807	30.5	30.5

Analysis of Variance Statistics

SS Wells	212382
SS Total	741493

Kruskal-Wallis Statistics

Non-Detect Rank	30.5
Background Rank Sum	600
Background Rank Mean	75

H Statistic	28.4024
H Adjusted for Ties	46.6916

Basic Statistics
Parameter: Lead, total

Total Observations	82
Total Non-Detects	46
Pooled Mean	16.3049
Pooled Std Dev	20.1204
Background Mean	39.75
Background Std Dev	53.4676

Background Wells
There is 1 background well

Well	Samples	Non-Detects	% ND	Total
MW-1	8	3	37.5	318

Well	Mean	Std Dev	Std Err	Rank Sum	Rank Mean
MW-1	39.75	53.4676	0	414.5	51.8125

Compliance Wells
There are 12 compliance wells

Well	Samples	Non-Detects	% ND	Total
MW-3	8	1	12.5	219
MW-4	8	2	25	138
MW-5	8	4	50	104
MW-6D	8	5	62.5	93
MW-6S	8	5	62.5	86
SW-1	8	8	100	55
SW-2	8	8	100	55
MW-2	8	3	37.5	149
MW-7	7	4	57.1429	90
Pendergrass	1	1	100	10
Rathbone	1	1	100	10
Solesbee	1	1	100	10

Well	Mean	Std Dev	Dif From Bkg	Std Err	Rank Sum	Rank Mean
MW-3	27.375	14.2221	-12.375	9.56078	509.5	63.6875
MW-4	17.25	8.34523	-22.5	9.56078	426	53.25
MW-5	13	9.89949	-26.75	9.56078	330	41.25
MW-6D	11.625	8.99107	-28.125	9.56078	296.5	37.0625
MW-6S	10.75	5.94619	-29	9.56078	296.5	37.0625
SW-1	6.875	2.58775	-32.875	9.56078	188	23.5
SW-2	6.875	2.58775	-32.875	9.56078	188	23.5
MW-2	18.625	14.7158	-21.125	9.56078	398.5	49.8125
MW-7	12.8571	5.84319	-26.8929	9.89634	285	40.7143
Pendergrass	10	0	-29.75	20.2815	23.5	23.5
Rathbone	10	0	-29.75	20.2815	23.5	23.5
Solesbee	10	0	-29.75	20.2815	23.5	23.5

Analysis of Variance Statistics

SS Wells	7562.65
SS Total	32791.4

Kruskal-Wallis Statistics

Non-Detect Rank	23.5
Background Rank Sum	414.5
Background Rank Mean	51.8125

H Statistic	22.7838
H Adjusted for Ties	27.6663

Basic Statistics
Parameter: Nickel, total

Total Observations	82
Total Non-Detects	60
Pooled Mean	37.989
Pooled Std Dev	21.1831
Background Mean	43.25
Background Std Dev	12.6576

Background Wells
There is 1 background well

Well	Samples	Non-Detects	% ND	Total
MW-1	8	4	50	346

Well	Mean	Std Dev	Std Err	Rank Sum	Rank Mean
MW-1	43.25	12.6576	0	420	52.5

Compliance Wells
There are 12 compliance wells

Well	Samples	Non-Detects	% ND	Total
MW-3	8	5	62.5	343
MW-4	8	5	62.5	405
MW-5	8	5	62.5	324
MW-6D	8	7	87.5	265
MW-6S	8	5	62.5	273.1
SW-1	8	8	100	265
SW-2	8	8	100	265
MW-2	8	4	50	395
MW-7	7	6	85.7143	219
Pendergrass	1	1	100	5
Rathbone	1	1	100	5
Solesbee	1	1	100	5

Well	Mean	Std Dev	Dif From Bkg	Std Err	Rank Sum	Rank Mean
MW-3	42.875	10.9862	-0.375	10.304	369.5	46.1875
MW-4	50.625	5.15302	7.375	10.304	388.5	48.5625
MW-5	40.5	15.8925	-2.75	10.304	364.5	45.5625
MW-6D	33.125	23.2897	-10.125	10.304	274.5	34.3125
MW-6S	34.1375	21.9065	-9.1125	10.304	341.5	42.6875
SW-1	33.125	23.2897	-10.125	10.304	244	30.5
SW-2	33.125	23.2897	-10.125	10.304	244	30.5
MW-2	49.375	32.4122	6.125	10.304	417	52.125
MW-7	31.2857	23.3789	-11.9643	10.6656	248	35.4286
Pendergrass	5	0	-38.25	21.858	30.5	30.5
Rathbone	5	0	-38.25	21.858	30.5	30.5
Solesbee	5	0	-38.25	21.858	30.5	30.5

Analysis of Variance Statistics

SS Wells	7043.16
SS Total	36346.6

Kruskal-Wallis Statistics

Non-Detect Rank	30.5
Background Rank Sum	420
Background Rank Mean	52.5

H Statistic	9.80235
H Adjusted for Ties	16.1144

Basic Statistics
Parameter: Silver, total

Total Observations	82
Total Non-Detects	76
Pooled Mean	5.21341
Pooled Std Dev	24.4713
Background Mean	1.375
Background Std Dev	0.517549

Background Wells
There is 1 background well

Well	Samples	Non-Detects	% ND	Total
MW-1	8	8	100	11

Well	Mean	Std Dev	Std Err	Rank Sum	Rank Mean
MW-1	1.375	0.517549	0	308	38.5

Compliance Wells
There are 12 compliance wells

Well	Samples	Non-Detects	% ND	Total
MW-3	8	6	75	16.5
MW-4	8	8	100	11
MW-5	8	8	100	11
MW-6D	8	8	100	11
MW-6S	8	6	75	42
SW-1	8	8	100	11
SW-2	8	8	100	11
MW-2	8	7	87.5	74
MW-7	7	6	85.7143	223
Pendergrass	1	1	100	2
Rathbone	1	1	100	2
Solesbee	1	1	100	2

Well	Mean	Std Dev	Dif From Bkg	Std Err	Rank Sum	Rank Mean
MW-3	2.0625	1.69953	0.6875	12.4221	386	48.25
MW-4	1.375	0.517549	0	12.4221	308	38.5
MW-5	1.375	0.517549	0	12.4221	308	38.5
MW-6D	1.375	0.517549	0	12.4221	308	38.5
MW-6S	5.25	7.77817	3.875	12.4221	390	48.75
SW-1	1.375	0.517549	0	12.4221	308	38.5
SW-2	1.375	0.517549	0	12.4221	308	38.5
MW-2	9.25	22.1279	7.875	12.4221	350.5	43.8125
MW-7	31.8571	80.319	30.4821	12.8581	313	44.7143
Pendergrass	2	0	0.625	26.3513	38.5	38.5
Rathbone	2	0	0.625	26.3513	38.5	38.5
Solesbee	2	0	0.625	26.3513	38.5	38.5

Analysis of Variance Statistics

SS Wells	5917.19
SS Total	48506.5

Kruskal-Wallis Statistics

Non-Detect Rank	38.5
Background Rank Sum	308
Background Rank Mean	38.5

H Statistic	2.3963
H Adjusted for Ties	11.7546

Basic Statistics
Parameter: Thallium, total

Total Observations	82
Total Non-Detects	64
Pooled Mean	1.68293
Pooled Std Dev	1.00466
Background Mean	1.625
Background Std Dev	0.744024

Background Wells
There is 1 background well

Well	Samples	Non-Detects	% ND	Total
MW-1	8	6	75	13

Well	Mean	Std Dev	Std Err	Rank Sum	Rank Mean
MW-1	1.625	0.744024	0	337	42.125

Compliance Wells
There are 12 compliance wells

Well	Samples	Non-Detects	% ND	Total
MW-3	8	3	37.5	20
MW-4	8	5	62.5	17
MW-5	8	8	100	11
MW-6D	8	5	62.5	13
MW-6S	8	6	75	14
SW-1	8	8	100	11
SW-2	8	8	100	11
MW-2	8	6	75	12
MW-7	7	6	85.7143	10
Pendergrass	1	1	100	2
Rathbone	1	1	100	2
Solesbee	1	1	100	2

Well	Mean	Std Dev	Dif From Bkg	Std Err	Rank Sum	Rank Mean
MW-3	2.5	1.92725	0.875	0.50885	468.5	58.5625
MW-4	2.125	1.80772	0.5	0.50885	389.5	48.6875
MW-5	1.375	0.517549	-0.25	0.50885	260	32.5
MW-6D	1.625	0.517549	0	0.50885	381.5	47.6875
MW-6S	1.75	1.0351	0.125	0.50885	340	42.5
SW-1	1.375	0.517549	-0.25	0.50885	260	32.5
SW-2	1.375	0.517549	-0.25	0.50885	260	32.5
MW-2	1.5	0.534522	-0.125	0.50885	346	43.25
MW-7	1.42857	0.534522	-0.196429	0.52671	263	37.5714
Pendergrass	2	0	0.375	1.07943	32.5	32.5
Rathbone	2	0	0.375	1.07943	32.5	32.5
Solesbee	2	0	0.375	1.07943	32.5	32.5

Analysis of Variance Statistics

SS Wells	10.2918
SS Total	81.7561

Kruskal-Wallis Statistics

Non-Detect Rank	32.5
Background Rank Sum	337
Background Rank Mean	42.125

H Statistic	9.48443
H Adjusted for Ties	18.0793

Basic Statistics

Parameter: Tin, total

Total Observations	23
Total Non-Detects	21
Pooled Mean	10.6522
Pooled Std Dev	2.2076
Background Mean	14.5
Background Std Dev	6.36396

Background Wells

There is 1 background well

Well	Samples	Non-Detects	% ND	Total
MW-1	2	1	50	29

Well	Mean	Std Dev	Std Err	Rank Sum	Rank Mean
MW-1	14.5	6.36396	0	34	17

Compliance Wells

There are 12 compliance wells

Well	Samples	Non-Detects	% ND	Total
MW-6D	2	2	100	20
MW-6S	2	2	100	20
SW-1	2	1	50	26
SW-2	2	2	100	20
MW-2	2	2	100	20
MW-3	2	2	100	20
MW-4	2	2	100	20
MW-5	2	2	100	20
MW-7	2	2	100	20
Pendergrass	1	1	100	10
Rathbone	1	1	100	10
Solesbee	1	1	100	10

Well	Mean	Std Dev	Dif From Bkg	Std Err	Rank Sum	Rank Mean
MW-6D	10	0	-4.5	2.41868	22	11
MW-6S	10	0	-4.5	2.41868	22	11
SW-1	13	4.24264	-1.5	2.41868	33	16.5
SW-2	10	0	-4.5	2.41868	22	11
MW-2	10	0	-4.5	2.41868	22	11
MW-3	10	0	-4.5	2.41868	22	11
MW-4	10	0	-4.5	2.41868	22	11
MW-5	10	0	-4.5	2.41868	22	11
MW-7	10	0	-4.5	2.41868	22	11
Pendergrass	10	0	-4.5	2.96226	11	11
Rathbone	10	0	-4.5	2.96226	11	11
Solesbee	10	0	-4.5	2.96226	11	11

Analysis of Variance Statistics

SS Wells	48.7174
SS Total	107.217

Kruskal-Wallis Statistics

Non-Detect Rank	11
Background Rank Sum	34
Background Rank Mean	17

H Statistic	2.38043
H Adjusted for Ties	9.95455

Basic Statistics
Parameter: Vanadium

Total Observations	82
Total Non-Detects	58
Pooled Mean	12.25
Pooled Std Dev	16.3683
Background Mean	19.5
Background Std Dev	13.2234

Background Wells
There is 1 background well

Well	Samples	Non-Detects	% ND	Total
MW-1	8	3	37.5	156

Well	Mean	Std Dev	Std Err	Rank Sum	Rank Mean
MW-1	19.5	13.2234	0	460.5	57.5625

Compliance Wells
There are 12 compliance wells

Well	Samples	Non-Detects	% ND	Total
MW-3	8	4	50	110
MW-4	8	4	50	130
MW-5	8	5	62.5	107
MW-6D	8	6	75	78
MW-6S	8	8	100	55
SW-1	8	8	100	55
SW-2	8	8	100	55
MW-2	8	3	37.5	206.4
MW-7	7	6	85.7143	37.1
Pendergrass	1	1	100	5
Rathbone	1	1	100	5
Solesbee	1	1	100	5

Well	Mean	Std Dev	Dif From Bkg	Std Err	Rank Sum	Rank Mean
MW-3	13.75	9.51315	-5.75	8.16874	391	48.875
MW-4	16.25	12.9477	-3.25	8.16874	404	50.5
MW-5	13.375	13.6794	-6.125	8.16874	357.5	44.6875
MW-6D	9.75	7.49762	-9.75	8.16874	315	39.375
MW-6S	6.875	5.3033	-12.625	8.16874	236	29.5
SW-1	6.875	5.3033	-12.625	8.16874	236	29.5
SW-2	6.875	5.3033	-12.625	8.16874	236	29.5
MW-2	25.8	43.2406	6.3	8.16874	438.5	54.8125
MW-7	5.3	0.793725	-14.2	8.45545	240	34.2857
Pendergrass	5	0	-14.5	17.3285	29.5	29.5
Rathbone	5	0	-14.5	17.3285	29.5	29.5
Solesbee	5	0	-14.5	17.3285	29.5	29.5

Analysis of Variance Statistics

SS Wells	3284.62
SS Total	21701.6

Kruskal-Wallis Statistics

Non-Detect Rank	29.5
Background Rank Sum	460.5
Background Rank Mean	57.5625

H Statistic	15.7532
H Adjusted for Ties	24.3788

Basic Statistics
Parameter: Zinc, total

Total Observations	82
Total Non-Detects	21
Pooled Mean	55.8415
Pooled Std Dev	61.553
Background Mean	135
Background Std Dev	94.5289

Background Wells
There is 1 background well

Well	Samples	Non-Detects	% ND	Total
MW-1	8	0	0	1080

Well	Mean	Std Dev	Std Err	Rank Sum	Rank Mean
MW-1	135	94.5289	0	530	66.25

Compliance Wells
There are 12 compliance wells

Well	Samples	Non-Detects	% ND	Total
MW-3	8	0	0	652
MW-4	8	0	0	687
MW-5	8	1	12.5	580
MW-6D	8	4	50	113
MW-6S	8	1	12.5	207
SW-1	8	7	87.5	100
SW-2	8	4	50	119
MW-2	8	1	12.5	634
MW-7	7	1	14.2857	371
Pendergrass	1	0	0	16
Rathbone	1	1	100	10
Solesbee	1	1	100	10

Well	Mean	Std Dev	Dif From Bkg	Std Err	Rank Sum	Rank Mean
MW-3	81.5	16.2832	-53.5	25.6982	499	62.375
MW-4	85.875	28.3672	-49.125	25.6982	505	63.125
MW-5	72.5	49.8541	-62.5	25.6982	425	53.125
MW-6D	14.125	4.67325	-120.875	25.6982	150	18.75
MW-6S	25.875	10.4258	-109.125	25.6982	272	34
SW-1	12.5	4.6291	-122.5	25.6982	109	13.625
SW-2	14.875	5.22186	-120.125	25.6982	164	20.5
MW-2	79.25	108.638	-55.75	25.6982	383	47.875
MW-7	53	42.7434	-82	26.6001	317	45.2857
Pendergrass	16	0	-119	54.514	27	27
Rathbone	10	0	-125	54.514	11	11
Solesbee	10	0	-125	54.514	11	11

Analysis of Variance Statistics

SS Wells	124622
SS Total	306891

Kruskal-Wallis Statistics

Non-Detect Rank	11
Background Rank Sum	530
Background Rank Mean	66.25

H Statistic	52.9645
H Adjusted for Ties	53.8674

Basic Statistics

Parameter: Carbon Disulfide

Total Observations	66
Total Non-Detects	58
Pooled Mean	7.60303
Pooled Std Dev	9.56344
Background Mean	11.1333
Background Std Dev	12.8167

Background Wells

There is 1 background well

Well	Samples	Non-Detects	% ND	Total
MW-1	6	4	66.6667	66.8

Well	Mean	Std Dev	Std Err	Rank Sum	Rank Mean
MW-1	11.1333	12.8167	0	243	40.5

Compliance Wells

There are 12 compliance wells

Well	Samples	Non-Detects	% ND	Total
MW-3	6	6	100	30
MW-4	6	6	100	30
MW-5	6	5	83.3333	48
MW-6D	6	6	100	30
MW-6S	6	5	83.3333	30.9
MW-7	6	4	66.6667	126
SW-1	6	6	100	30
SW-2	6	5	83.3333	49
MW-2	6	5	83.3333	31.1
Pendergrass	2	2	100	10
Rathbone	2	2	100	10
Solesbee	2	2	100	10

Well	Mean	Std Dev	Dif From Bkg	Std Err	Rank Sum	Rank Mean
MW-3	5	0	-6.13333	5.32931	177	29.5
MW-4	5	0	-6.13333	5.32931	177	29.5
MW-5	8	7.34847	-3.13333	5.32931	209.5	34.9167
MW-6D	5	0	-6.13333	5.32931	177	29.5
MW-6S	5.15	0.367423	-5.98333	5.32931	206.5	34.4167
MW-7	21	24.988	9.86667	5.32931	249	41.5
SW-1	5	0	-6.13333	5.32931	177	29.5
SW-2	8.16667	7.75672	-2.96667	5.32931	210.5	35.0833
MW-2	5.18333	0.449073	-5.95	5.32931	207.5	34.5833
Pendergrass	5	0	-6.13333	7.53679	59	29.5
Rathbone	5	0	-6.13333	7.53679	59	29.5
Solesbee	5	0	-6.13333	7.53679	59	29.5

Analysis of Variance Statistics

SS Wells	1429.01
SS Total	5944.86

Kruskal-Wallis Statistics

Non-Detect Rank	29.5
Background Rank Sum	243
Background Rank Mean	40.5

H Statistic	3.24876
H Adjusted for Ties	10.1086

Basic Statistics

Parameter: Trichloroethene (-ethylene)

Total Observations	76
Total Non-Detects	75
Pooled Mean	5.21053
Pooled Std Dev	1.83533
Background Mean	5
Background Std Dev	0

Background Wells

There is 1 background well

Well	Samples	Non-Detects	% ND	Total
MW-1	7	7	100	35

Well	Mean	Std Dev	Std Err	Rank Sum	Rank Mean
MW-1	5	0	0	266	38

Compliance Wells

There are 12 compliance wells

Well	Samples	Non-Detects	% ND	Total
MW-3	7	7	100	35
MW-4	7	7	100	35
MW-5	7	7	100	35
MW-6D	7	7	100	35
MW-6S	7	7	100	35
MW-7	7	7	100	35
SW-1	7	7	100	35
SW-2	7	7	100	35
MW-2	7	7	100	35
Pendergrass	2	2	100	10
Rathbone	2	1	50	26
Solesbee	2	2	100	10

Well	Mean	Std Dev	Dif From Bkg	Std Err	Rank Sum	Rank Mean
MW-3	5	0	0	0.761905	266	38
MW-4	5	0	0	0.761905	266	38
MW-5	5	0	0	0.761905	266	38
MW-6D	5	0	0	0.761905	266	38
MW-6S	5	0	0	0.761905	266	38
MW-7	5	0	0	0.761905	266	38
SW-1	5	0	0	0.761905	266	38
SW-2	5	0	0	0.761905	266	38
MW-2	5	0	0	0.761905	266	38
Pendergrass	5	0	0	1.14286	76	38
Rathbone	13	11.3137	8	1.14286	114	57
Solesbee	5	0	0	1.14286	76	38

Analysis of Variance Statistics

SS Wells	124.632
SS Total	252.632

Kruskal-Wallis Statistics

Non-Detect Rank	38
Background Rank Sum	266
Background Rank Mean	38

H Statistic	1.44156
H Adjusted for Ties	37

Interwell Analyses for Metals

Non-Parametric Tolerance Interval

Parameter: Antimony, total

Total Percent Non-Detects = 87.5%
Background Samples (n) = 8
Maximum Background Concentration = 10
Minimum Coverage = 68.8%
Average Coverage = 88.8889%

Well	Sample	Result	Impacted
MW-3	12/15/1997	ND<1.5	FALSE
MW-3	1/26/1998	ND<1.5	FALSE
MW-3	3/16/1998	ND<1.5	FALSE
MW-3	4/20/1998	ND<1.5	FALSE
MW-3	10/20/1998	ND<1.5	FALSE
MW-3	5/19/1999	ND<5	FALSE
MW-3	10/19/1999	ND<5	FALSE
MW-3	4/18/2000	11	TRUE
MW-2	1/7/1998	ND<2.5	FALSE
MW-2	1/26/1998	ND<1.5	FALSE
MW-2	3/16/1998	ND<1.5	FALSE
MW-2	4/20/1998	ND<1.5	FALSE
MW-2	10/20/1998	ND<1.5	FALSE
MW-2	5/19/1999	ND<5	FALSE
MW-2	10/19/1999	ND<5	FALSE
MW-2	4/18/2000	18	TRUE

Non-Parametric Tolerance Interval

Parameter: Barium, total

Total Percent Non-Detects = 28.5714%
Background Samples (n) = 8
Maximum Background Concentration = 3000
Minimum Coverage = 68.8%
Average Coverage = 88.8889%

Well	Sample	Result	Impacted
MW-3	12/15/1997	2200	FALSE
MW-3	1/26/1998	4000	TRUE
MW-3	3/16/1998	2800	FALSE
MW-3	4/20/1998	1400	FALSE
MW-3	10/20/1998	2900	FALSE
MW-3	5/19/1999	140	FALSE
MW-3	10/19/1999	210	FALSE
MW-3	4/18/2000	280	FALSE
MW-2	1/7/1998	570	FALSE
MW-2	1/26/1998	200	FALSE
MW-2	3/16/1998	ND<50	FALSE
MW-2	4/20/1998	400	FALSE
MW-2	10/20/1998	ND<50	FALSE
MW-2	5/19/1999	72	FALSE
MW-2	10/19/1999	150	FALSE
MW-2	4/18/2000	53	FALSE
MW-4	12/15/1997	3200	TRUE
MW-4	1/26/1998	2400	FALSE
MW-4	3/16/1998	2200	FALSE
MW-4	4/20/1998	1100	FALSE
MW-4	10/20/1998	1400	FALSE
MW-4	5/19/1999	210	FALSE
MW-4	10/19/1999	300	FALSE
MW-4	4/18/2000	330	FALSE
MW-5	12/15/1997	ND<50	FALSE
MW-5	1/26/1998	ND<50	FALSE
MW-5	3/16/1998	ND<50	FALSE
MW-5	4/20/1998	200	FALSE
MW-5	10/19/1998	ND<50	FALSE
MW-5	5/19/1999	48	FALSE
MW-5	10/19/1999	110	FALSE
MW-5	4/18/2000	20	FALSE
MW-6D	12/15/1997	ND<50	FALSE
MW-6D	1/26/1998	ND<50	FALSE
MW-6D	3/16/1998	ND<50	FALSE
MW-6D	4/20/1998	ND<50	FALSE
MW-6D	10/19/1998	ND<50	FALSE
MW-6D	5/19/1999	8.7	FALSE
MW-6D	10/18/1999	ND<2.5	FALSE
MW-6D	4/18/2000	6.5	FALSE

MW-6S	12/15/1997	100	FALSE
MW-6S	1/26/1998	ND<50	FALSE
MW-6S	3/16/1998	100	FALSE
MW-6S	4/20/1998	ND<50	FALSE
MW-6S	10/19/1998	ND<50	FALSE
MW-6S	5/19/1999	48	FALSE
MW-6S	10/18/1999	43	FALSE
MW-6S	4/18/2000	52	FALSE
MW-7	1/26/1998	500	FALSE
MW-7	3/16/1998	200	FALSE
MW-7	4/20/1998	200	FALSE
MW-7	10/20/1998	ND<50	FALSE
MW-7	5/19/1999	26	FALSE
MW-7	10/19/1999	7.3	FALSE
MW-7	4/18/2000	28	FALSE

Non-Parametric Tolerance Interval

Parameter: Beryllium, total

Total Percent Non-Detects = 35.4839%
Background Samples (n) = 8
Maximum Background Concentration = 12
Minimum Coverage = 68.8%
Average Coverage = 88.8889%

Well	Sample	Result	Impacted
MW-3	12/15/1997	2	FALSE
MW-3	1/26/1998	6	FALSE
MW-3	3/16/1998	5	FALSE
MW-3	4/20/1998	4	FALSE
MW-3	10/20/1998	6	FALSE
MW-3	5/19/1999	2.2	FALSE
MW-3	10/19/1999	2.9	FALSE
MW-3	4/18/2000	2.6	FALSE
MW-4	12/15/1997	4	FALSE
MW-4	1/26/1998	3	FALSE
MW-4	3/16/1998	4	FALSE
MW-4	4/20/1998	3	FALSE
MW-4	10/20/1998	ND<0.5	FALSE
MW-4	5/19/1999	25	TRUE
MW-4	10/19/1999	2.9	FALSE
MW-4	4/18/2000	3.9	FALSE
MW-7	1/26/1998	1	FALSE
MW-7	3/16/1998	ND<0.5	FALSE
MW-7	4/20/1998	ND<0.5	FALSE
MW-7	10/20/1998	ND<0.5	FALSE
MW-7	5/19/1999	ND<1	FALSE
MW-7	10/19/1999	ND<1	FALSE
MW-7	4/18/2000	2	FALSE

Non-Parametric Tolerance Interval

Parameter: Cadmium, total

Total Percent Non-Detects = 74.4681%
Background Samples (n) = 8
Maximum Background Concentration = 6.5
Minimum Coverage = 68.8%
Average Coverage = 88.8889%

Well	Sample	Result	Impacted
MW-3	12/15/1997	ND<0.5	FALSE
MW-3	1/26/1998	ND<0.5	FALSE
MW-3	3/16/1998	ND<0.5	FALSE
MW-3	4/20/1998	ND<0.5	FALSE
MW-3	10/20/1998	ND<0.5	FALSE
MW-3	5/19/1999	ND<0.5	FALSE
MW-3	10/19/1999	5.5	FALSE
MW-3	4/18/2000	3.6	FALSE
MW-4	12/15/1997	ND<0.5	FALSE
MW-4	1/26/1998	ND<0.5	FALSE
MW-4	3/16/1998	ND<0.5	FALSE
MW-4	4/20/1998	ND<0.5	FALSE
MW-4	10/20/1998	ND<0.5	FALSE
MW-4	5/19/1999	ND<0.5	FALSE
MW-4	10/19/1999	4.8	FALSE
MW-4	4/18/2000	4.1	FALSE
MW-7	1/26/1998	ND<0.5	FALSE
MW-7	3/16/1998	2	FALSE
MW-7	4/20/1998	ND<0.5	FALSE
MW-7	10/20/1998	ND<0.5	FALSE
MW-7	5/19/1999	ND<0.5	FALSE
MW-7	10/19/1999	ND<0.5	FALSE
MW-7	4/18/2000	1.4	FALSE
MW-2	1/7/1998	ND<0.5	FALSE
MW-2	1/26/1998	ND<0.5	FALSE
MW-2	3/16/1998	8	TRUE
MW-2	4/20/1998	ND<0.5	FALSE
MW-2	10/20/1998	ND<0.5	FALSE
MW-2	5/19/1999	ND<0.5	FALSE
MW-2	10/19/1999	5.5	FALSE
MW-2	4/18/2000	2.1	FALSE
MW-6S	12/15/1997	ND<0.5	FALSE
MW-6S	1/26/1998	ND<0.5	FALSE
MW-6S	3/16/1998	ND<0.5	FALSE
MW-6S	4/20/1998	ND<0.5	FALSE
MW-6S	10/19/1998	ND<0.5	FALSE
MW-6S	5/19/1999	ND<0.5	FALSE
MW-6S	10/18/1999	ND<0.5	FALSE
MW-6S	4/18/2000	1.3	FALSE

Shapiro-Wilks Test of Normality

Parameter: Chromium, total
Background Wells
Normality Test of Parameter Concentrations
K = 4; Samples = 8

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	0.5	43	42.5	0.6052	25.721
2	2	36	34	0.3164	10.7576
3	10	34	24	0.1743	4.1832
4	19	22	3	0.0561	0.1683
5	22	19	-3		
6	34	10	-24		
7	36	2	-34		
8	43	0.5	-42.5		

Sum of b values = 40.8301
Sample Standard Deviation = 15.9686
W Statistic = 0.933964
5% Critical value of 0.818 is less than 0.933964
Data is normally distributed at 95% level of significance
1% Critical value of 0.749 is less than 0.933964
Data is normally distributed at 99% level of significance

Parametric Tolerance Interval Analysis

Parameter: Chromium, total

Background mean = 20.8125
Background standard deviation = 15.9686
One-sided normal tolerance factor at 95% confidence = 2.0095
Tolerance factor calculation follows USEPA 1992 Guidance
Upper tolerance limit = 52.9014

Well	Date	Result	Impacted
MW-3	12/15/1997	7	FALSE
	1/26/1998	5	FALSE
	3/16/1998	5	FALSE
	4/20/1998	3	FALSE
	10/20/1998	3	FALSE
	5/19/1999	23	FALSE
	10/19/1999	41	FALSE
	4/18/2000	27	FALSE
MW-4	12/15/1997	5	FALSE
	1/26/1998	4	FALSE
	3/16/1998	9	FALSE
	4/20/1998	3	FALSE
	10/20/1998	2	FALSE
	5/19/1999	32	FALSE
	10/19/1999	54	TRUE
	4/18/2000	47	FALSE
MW-7	1/26/1998	2	FALSE
	3/16/1998	4	FALSE
	4/20/1998	2	FALSE
	10/20/1998	ND<0.5	FALSE
	5/19/1999	ND<2.5	FALSE
	10/19/1999	ND<2.5	FALSE
	4/18/2000	5.1	FALSE
MW-2	1/7/1998	180	TRUE
	1/26/1998	6	FALSE
	3/16/1998	5	FALSE
	4/20/1998	5	FALSE
	10/20/1998	ND<0.5	FALSE
	5/19/1999	15	FALSE
	10/19/1999	44	FALSE
	4/18/2000	13	FALSE

Non-Parametric Tolerance Interval

Parameter: Cobalt, total

Total Percent Non-Detects = 0%
Background Samples (n) = 8
Maximum Background Concentration = 531
Minimum Coverage = 68.8%
Average Coverage = 88.8889%

Well	Sample	Result	Impacted
MW-3	12/15/1997	146	FALSE
MW-3	1/26/1998	93	FALSE
MW-3	3/16/1998	141	FALSE
MW-3	4/20/1998	90	FALSE
MW-3	10/20/1998	86	FALSE
MW-3	5/19/1999	26	FALSE
MW-3	10/19/1999	36	FALSE
MW-3	4/18/2000	26	FALSE
MW-4	12/15/1997	92	FALSE
MW-4	1/26/1998	55	FALSE
MW-4	3/16/1998	143	FALSE
MW-4	4/20/1998	64	FALSE
MW-4	10/20/1998	50	FALSE
MW-4	5/19/1999	26	FALSE
MW-4	10/19/1999	35	FALSE
MW-4	4/18/2000	22	FALSE
MW-2	1/7/1998	78	FALSE
MW-2	1/26/1998	13	FALSE
MW-2	3/16/1998	136	FALSE
MW-2	4/20/1998	34	FALSE
MW-2	10/20/1998	1	FALSE
MW-2	5/19/1999	15	FALSE
MW-2	10/19/1999	36	FALSE
MW-2	4/18/2000	7.3	FALSE
MW-6S	12/15/1997	42	FALSE
MW-6S	1/26/1998	6	FALSE
MW-6S	3/16/1998	29	FALSE
MW-6S	4/20/1998	13	FALSE
MW-6S	10/19/1998	1	FALSE
MW-6S	5/19/1999	9.2	FALSE
MW-6S	10/18/1999	14	FALSE
MW-6S	4/18/2000	5.3	FALSE

Shapiro-Wilks Test of Normality

Parameter: Lead, total
Background Wells
Normality Test of Parameter Concentrations
K = 4; Samples = 8

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	0.916291	4.99043	4.07414	0.6052	2.46567
2	0.916291	4.60517	3.68888	0.3164	1.16716
3	1.60944	3.04452	1.43508	0.1743	0.250135
4	2.63906	2.77259	0.133531	0.0561	0.00749111
5	2.77259	2.63906	-0.133531		
6	3.04452	1.60944	-1.43508		
7	4.60517	0.916291	-3.68888		
8	4.99043	0.916291	-4.07414		

Sum of b values = 3.89046
Sample Standard Deviation = 1.53784
W Statistic = 0.914288
5% Critical value of 0.818 is less than 0.914288
Data is normally distributed at 95% level of significance
1% Critical value of 0.749 is less than 0.914288
Data is normally distributed at 99% level of significance

Parametric Tolerance Interval Analysis

Parameter: Lead, total

Background mean = 2.68672
Background standard deviation = 1.53784
One-sided normal tolerance factor at 95% confidence = 2.0095
Tolerance factor calculation follows USEPA 1992 Guidance
Upper tolerance limit = 5.77701

Well	Date	Result	Impacted
MW-3	12/15/1997	3.71357	FALSE
	1/26/1998	3.7612	FALSE
	3/16/1998	3.78419	FALSE
	4/20/1998	3.46574	FALSE
	10/20/1998	2.99573	FALSE
	5/19/1999	ND<1.60944	FALSE
	10/19/1999	2.70805	FALSE
	4/18/2000	2.63906	FALSE
MW-4	12/15/1997	3.13549	FALSE
	1/26/1998	3.29584	FALSE
	3/16/1998	3.4012	FALSE
	4/20/1998	2.83321	FALSE
	10/20/1998	2.3979	FALSE
	5/19/1999	ND<1.60944	FALSE
	10/19/1999	ND<1.60944	FALSE
	4/18/2000	2.30259	FALSE

Shapiro-Wilks Test of Normality

Parameter: Nickel, total
Background Wells
Normality Test of Parameter Concentrations
K = 4; Samples = 8

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	25	60	35	0.6052	21.182
2	30	50	20	0.3164	6.328
3	31	50	19	0.1743	3.3117
4	50	50	0	0.0561	0
5	50	50	0		
6	50	31	-19		
7	50	30	-20		
8	60	25	-35		

Sum of b values = 30.8217
Sample Standard Deviation = 12.6576
W Statistic = 0.847059
5% Critical value of 0.818 is less than 0.847059
Data is normally distributed at 95% level of significance
1% Critical value of 0.749 is less than 0.847059
Data is normally distributed at 99% level of significance

Parametric Tolerance Interval Analysis

Parameter: Nickel, total

Background mean = 36.5
Background standard deviation = 15.885
One-sided normal tolerance factor at 95% confidence = 2.0095
Tolerance factor calculation follows USEPA 1992 Guidance
Upper tolerance limit = 68.421

Well	Date	Result	Impacted
MW-3	12/15/1997	ND<50	FALSE
	1/26/1998	ND<50	FALSE
	3/16/1998	ND<50	FALSE
	4/20/1998	ND<50	FALSE
	10/20/1998	ND<50	FALSE
	5/19/1999	29	FALSE
	10/19/1999	41	FALSE
	4/18/2000	23	FALSE
MW-4	12/15/1997	ND<50	FALSE
	1/26/1998	ND<50	FALSE
	3/16/1998	ND<50	FALSE
	4/20/1998	ND<50	FALSE
	10/20/1998	ND<50	FALSE
	5/19/1999	42	FALSE
	10/19/1999	61	FALSE
	4/18/2000	52	FALSE
MW-5	12/15/1997	ND<50	FALSE
	1/26/1998	ND<50	FALSE
	3/16/1998	ND<50	FALSE
	4/20/1998	ND<50	FALSE
	10/19/1998	ND<50	FALSE
	5/19/1999	21	FALSE
	10/19/1999	43	FALSE
	4/18/2000	10	FALSE
MW-6S	12/15/1997	ND<50	FALSE
	1/26/1998	ND<50	FALSE
	3/16/1998	ND<50	FALSE
	4/20/1998	ND<50	FALSE
	10/19/1998	ND<50	FALSE
	5/19/1999	8.5	FALSE
	10/18/1999	8.6	FALSE
	4/18/2000	6	FALSE
MW-2	1/7/1998	120	TRUE
	1/26/1998	ND<50	FALSE
	3/16/1998	ND<50	FALSE
	4/20/1998	ND<50	FALSE
	10/20/1998	ND<50	FALSE
	5/19/1999	20	FALSE
	10/19/1999	44	FALSE
	4/18/2000	11	FALSE

Poisson Tolerance Limit

Parameter: Silver, total

Poisson Count of 8 background Samples = 11
Degrees of Freedom = 24

95% Confidence Values
Chi-Squared Value (95% Confidence) = 36.415
Lambda (from Zack's formula) = 2.27594
Smallest Degrees of Freedom = 11
Upper Tolerance Limit (95%) = 4.5

99% Confidence Values
Chi-Squared Value (99% Confidence) = 42.9798
Lambda (from Zack's formula) = 2.68624
Smallest Degrees of Freedom = 16
Upper Tolerance Limit (99%) = 7

	Date	Result	Impacted 95%	Impacted 99%
MW-3	12/15/1997	ND<1	FALSE	FALSE
	1/26/1998	6	TRUE	FALSE
	3/16/1998	ND<1	FALSE	FALSE
	4/20/1998	ND<1	FALSE	FALSE
	10/20/1998	ND<1	FALSE	FALSE
	5/19/1999	ND<2	FALSE	FALSE
	10/19/1999	ND<2	FALSE	FALSE
	4/18/2000	2.5	FALSE	FALSE
MW-2	1/7/1998	ND<2	FALSE	FALSE
	1/26/1998	ND<1	FALSE	FALSE
	3/16/1998	ND<1	FALSE	FALSE
	4/20/1998	ND<1	FALSE	FALSE
	10/20/1998	ND<1	FALSE	FALSE
	5/19/1999	ND<2	FALSE	FALSE
	10/19/1999	ND<2	FALSE	FALSE
	4/18/2000	64	TRUE	TRUE

Non-Parametric Tolerance Interval

Parameter: Thallium, total

Total Percent Non-Detects = 56.25%
Background Samples (n) = 8
Maximum Background Concentration = 3
Minimum Coverage = 68.8%
Average Coverage = 88.8889%

Well	Sample	Result	Impacted
MW-3	12/15/1997	2	FALSE
MW-3	1/26/1998	2	FALSE
MW-3	3/16/1998	ND<0.5	FALSE
MW-3	4/20/1998	ND<0.5	FALSE
MW-3	10/20/1998	ND<0.5	FALSE
MW-3	5/19/1999	6	TRUE
MW-3	10/19/1999	5	TRUE
MW-3	4/18/2000	2	FALSE

Non-Parametric Tolerance Interval

Parameter: Tin, total

Total Percent Non-Detects = 50%
Background Samples (n) = 2
Maximum Background Concentration = 19
Minimum Coverage = 22.4%
Average Coverage = 66.6667%

Well	Sample	Result	Impacted
SW-1	10/18/1999	ND<10	FALSE
SW-1	4/18/2000	16	FALSE

Shapiro-Wilks Test of Normality

Parameter: Vanadium
Background Wells
Normality Test of Parameter Concentrations
K = 4; Samples = 8

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	5	39	34	0.6052	20.5768
2	5	32	27	0.3164	8.5428
3	5	26	21	0.1743	3.6603
4	21	23	2	0.0561	0.1122
5	23	21	-2		
6	26	5	-21		
7	32	5	-27		
8	39	5	-34		

Sum of b values = 32.8921
Sample Standard Deviation = 13.2234
W Statistic = 0.883897
5% Critical value of 0.818 is less than 0.883897
Data is normally distributed at 95% level of significance
1% Critical value of 0.749 is less than 0.883897
Data is normally distributed at 99% level of significance

Parametric Tolerance Interval Analysis

Parameter: Vanadium

Background mean = -49.4007
Background standard deviation = 43.0585
One-sided normal tolerance factor at 95% confidence = 2.0095
Tolerance factor calculation follows USEPA 1992 Guidance
Upper tolerance limit = 37.1255

Well	Date	Result	Impacted
MW-4	12/15/1997	ND<20	FALSE
	1/26/1998	ND<5	FALSE
	3/16/1998	ND<5	FALSE
	4/20/1998	ND<5	FALSE
	10/20/1998	5	FALSE
	5/19/1999	23	FALSE
	10/19/1999	36	FALSE
	4/18/2000	31	FALSE
MW-2	1/7/1998	130	TRUE
	1/26/1998	5	FALSE
	3/16/1998	ND<5	FALSE
	4/20/1998	ND<5	FALSE
	10/20/1998	ND<5	FALSE
	5/19/1999	13	FALSE
	10/19/1999	34	FALSE
	4/18/2000	9.4	FALSE
MW-3	12/15/1997	ND<20	FALSE
	1/26/1998	7	FALSE
	3/16/1998	ND<5	FALSE
	4/20/1998	ND<5	FALSE
	10/20/1998	ND<5	FALSE
	5/19/1999	19	FALSE
	10/19/1999	30	FALSE
	4/18/2000	19	FALSE

Parametric Tolerance Interval Analysis

Parameter: Zinc, total

Background mean = 135
Background standard deviation = 94.5289
One-sided normal tolerance factor at 95% confidence = 2.0095
Tolerance factor calculation follows USEPA 1992 Guidance
Upper tolerance limit = 324.956

Well	Date	Result	Impacted
MW-4	12/15/1997	60	FALSE
	1/26/1998	50	FALSE
	3/16/1998	100	FALSE
	4/20/1998	80	FALSE
	10/20/1998	70	FALSE
	5/19/1999	77	FALSE
	10/19/1999	120	FALSE
	4/18/2000	130	FALSE
MW-2	1/7/1998	340	TRUE
	1/26/1998	40	FALSE
	3/16/1998	20	FALSE
	4/20/1998	60	FALSE
	10/20/1998	ND<5	FALSE
	5/19/1999	38	FALSE
	10/19/1999	96	FALSE
	4/18/2000	30	FALSE
MW-3	12/15/1997	70	FALSE
	1/26/1998	100	FALSE
	3/16/1998	70	FALSE
	4/20/1998	70	FALSE
	10/20/1998	80	FALSE
	5/19/1999	65	FALSE
	10/19/1999	110	FALSE
	4/18/2000	87	FALSE
MW-6D	12/15/1997	20	FALSE
	1/26/1998	ND<5	FALSE
	3/16/1998	ND<5	FALSE
	4/20/1998	10	FALSE
	10/19/1998	ND<5	FALSE
	5/19/1999	ND<10	FALSE
	10/18/1999	18	FALSE
	4/18/2000	15	FALSE
MW-7	1/26/1998	80	FALSE
	3/16/1998	120	FALSE
	4/20/1998	90	FALSE
	10/20/1998	20	FALSE
	5/19/1999	ND<10	FALSE
	10/19/1999	14	FALSE
	4/18/2000	27	FALSE
MW-5	12/15/1997	ND<5	FALSE
	1/26/1998	30	FALSE
	3/16/1998	50	FALSE
	4/20/1998	110	FALSE
	10/19/1998	60	FALSE
	5/19/1999	82	FALSE
	10/19/1999	170	FALSE

	4/18/2000	68	FALSE
MW-6S	12/15/1997	40	FALSE
	1/26/1998	10	FALSE
	3/16/1998	40	FALSE
	4/20/1998	30	FALSE
	10/19/1998	20	FALSE
	5/19/1999	ND<10	FALSE
	10/18/1999	26	FALSE
	4/18/2000	21	FALSE

Shapiro-Wilks Test of Normality

Parameter: Zinc, total
Background Wells
Normality Test of Parameter Concentrations
K = 4; Samples = 8

i	x(i)	x(n-i+1)	x(n-1+1)-x(i)	a(n-i+1)	b(i)
1	35	320	285	0.6052	172.482
2	55	190	135	0.3164	42.714
3	60	180	120	0.1743	20.916
4	100	140	40	0.0561	2.244
5	140	100	-40		
6	180	60	-120		
7	190	55	-135		
8	320	35	-285		

Sum of b values = 238.356
Sample Standard Deviation = 94.5289
W Statistic = 0.908291
5% Critical value of 0.818 is less than 0.908291
Data is normally distributed at 95% level of significance
1% Critical value of 0.749 is less than 0.908291
Data is normally distributed at 99% level of significance