FINAL REPORT

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MISSOURI DEPARTMENT OF
NATURAL RESOURCES

TRW Inc.

Ground Water Monitoring
2000 Biennial Report
Sullivan Landfill - Sullivan, Missouri

July 13, 2000

Project No. A3149.00 / 97189GL

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Superfund

Environmental Resources Management
1630 Heritage Landing Drive, Suite 100
St. Charles, Missouri 63303

ERM®

A MEMBER OF THE ENVIRONMENTAL RESOURCES MANAGEMENT GROUP

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Environmental Resources Management
1630 Heritage Landing Drive, Suite 100
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1.0 *INTRODUCTION*

This report summarizes the ground water monitoring effort which took place on May 22 and 23, 2000 at the Sullivan Landfill site located in Sullivan, Missouri.

Sampling activities were conducted by Environmental Resources Management (ERM) of St. Charles, Missouri.

2.0 *GROUND WATER SAMPLING*

This section describes the sampling procedures used to collect the ground water samples. It describes the well purging activities, decontamination procedures, and sample collection procedures.

In a letter dated Febraury 29, 2000, the Missouri Department of Natural Resources (MDNR) requested some alterations in the sampling program. The sampling frequency for the wells was reduced from annual to biennial. The analyte lead was added to the parameter list, and inorganic samples were to be analyzed for dissolved parameters. The monitoring wells MW102A, MW102B, and B201 were no longer required to be sampled, and MW104 was included as a sample point.

2.1 *WELL PURGING ACTIVITIES*

There are seven ground water monitoring wells currently surrounding the landfill. There is also a ground water production well located near the landfill designated as the "Voss Well". The locations of these wells are shown on Figure 1. Table 1 displays a summary of the well numbers and measurements.

Ground water sampling activities were conducted following the methodologies presented in the March 1994 Ground water Monitoring Plan (the Work Plan) prepared by ABB Environmental Services, Inc. (ABB) of Portland, Maine, and approved by the MDNR.

Prior to well purging, depth to water measurements were collected from the monitoring wells (Table 1) and the casing volume of each well to be sampled was calculated. The Voss Well has a permanent pump and is sealed, so no water level reading was collected from this well.

As described in the Work Plan, some of the wells will not accept a submersible Grundfos pump. Therefore, in order to use a consistent method of purging and sampling for all of the wells, purging of the ground water monitoring wells was completed with dedicated PVC bailers. The bailers were lowered and raised with an electric motor. A stainless steel line was connected to the bailers and they were lowered approximately 10 feet below the water surface before retrieval.

The Voss well is fitted with an automatic chlorination device, therefore, prior to purging, the chlorinator was disconnected. The well was then purged at a rate of approximately 1 gallon per minute using the existing pump until approximately 50 gallons had been removed.

Ground water from monitoring wells was tested, after each full casing volume was removed, for the following field-measured parameters: pH, temperature, specific conductance, and turbidity. These readings were recorded on Field Data Sheets, which are included as Appendix A. As described in the Work Plan, if two well volumes have been removed and field-measured parameters (except turbidity) have stabilized within 10%, the well is considered purged and may be sampled. As shown in the Field Data Sheets, the field-measured parameters for all of the monitoring wells were stable after two casing volumes had been removed.

According to the Work Plan, the Voss Well was to be considered purged after it was allowed to run for a minimum of 10 minutes. During this sampling event it was allowed to run for approximately 1 hour prior to sample collection since it was purged at a slow rate. The purge rate was set low to avoid excessive ponding of water where the purge water was discharged. Field-measured parameters were collected from the well just before sample collection and were recorded on a Field Data Sheet (see Appendix A).

Purge water from all the wells, except the Voss Well, was disposed of in the city of Sullivan sanitary sewer, as approved by the MDNR project manager for this site. Purge water from the Voss Well was allowed to run on the ground, in accordance with the Work Plan.

2.2 *DECONTAMINATION PROCEDURES*

Dedicated bailers were used in all of the monitoring wells. Each bailer is stored by hanging it within the individual wells. Decontamination consisted of a rinse with distilled water prior to use. The stainless steel line used to retrieve bailers was decontaminated between wells with an Alconox detergent and distilled water solution followed by a distilled water rinse.

2.3 *SAMPLE COLLECTION PROCEDURES*

Samples were collected from each well for volatile organic compounds (VOCs) and dissolved barium, chromium, and lead.

Laboratory-supplied containers that had been pre-preserved were used for sample collection. Following sample collection, the containers were held on ice in an insulated cooler.

Samples from the monitoring wells were collected directly from the bailers used to purge the wells. Samples collected for inorganic analysis were placed in a

laboratory-supplied neat container and then field filtered into laboratory-supplied pre-preserved containers. Field filtering was conducted using a peristaltic pump, using dedicated tubing and 0.45 micron filters for each well sampled.

At the Voss Well, the ground water samples were collected from a short length of hose attached to the well spigot. This was the same length of hose that had been used for well purging.

2.4 *QUALITY CONTROL SAMPLE COLLECTION*

A field duplicate sample, equipment blank, and trip blank were included for field sampling and laboratory quality control purposes.

The trip blank consisted of a laboratory-supplied sample for VOCs only, which accompanied the sample containers to the field, during storage, and during delivery to the analytical laboratory.

The equipment blank consisted of the collection of distilled water that was poured over the connector that was used to attach the stainless steel line to the individual bailers. The equipment blank was collected after decontamination procedures had been completed. The equipment blank samples were collected following to the purging and sampling of MW-104 and were labeled MW-104B.

The field duplicate consisted of the filling of an additional set of laboratory-supplied containers. The field duplicate for this sampling event was collected from MW-104 and was labeled MW-104(DUP).

3.0 *GROUND WATER FLOW DIRECTION*

On May 22, 2000 a round of water level measurements was collected from the monitoring wells. The depth-to-water measurements and ground water elevations are shown in Table 1.

The water level elevations for MW-101, MW-102B, MW-103, and MW-105 were used in the construction of the potentiometric surface map (see Figure 2). These four wells were chosen because the screened elevations of these wells are the most similar. Previous potentiometric maps constructed by ABB Environmental Services, Inc. also utilized only these four wells.

As shown in Figure 2, the ground water flow direction is generally to the north, based on the measurements collected on May 22, 2000. The flow direction is similar to that determined during the last annual monitoring event.

4.0 *ANALYTICAL RESULTS*

The ground water samples were delivered by overnight carrier to Quanterra Environmental Services of North Canton, Ohio for laboratory analyses. The samples were held, transported, and delivered following strict chain-of-custody procedures. Custody seals were placed on the shipping cooler.

The collected samples were analyzed for VOCs by Method 8260B, and dissolved barium, chromium, and lead by Method 6010B. The laboratory analytical report and completed chain-of-custody forms are included as Appendix B.

A summary of detected VOCs and inorganic analytes is attached as Table 2.

Three of the VOCs were found above laboratory detection limits: 1,1-dichloroethane, 1,1,1-trichloroethane, and trichloroethene. The compound 1,1-dichloroethane was found at 8 ug/l in MW105 and at 3.6 ug/l in the Voss Well. These two are upgradient and sidegradient of the landfill, respectively (see Figure 2). The compound 1,1,1-trichloroethane was found at 1.1 ug/l in MW105 and at the estimated value of 1.2 ug/l in the Voss Well. As previously described, these wells are upgradient and sidegradient of the landfill, respectively. Trichloroethene was found at 3.8 ug/l in MW101, 4.3 ug/l in MW104, 3.0 ug/l in MW105, and at the estimated value of 1.6 ug/l in the Voss Well. As shown in Figure 2, these four wells are all upgradient or sidegradient from the landfill.

Except for the previously described three compounds, all other VOCs were found at estimated levels below the laboratory detection limits.

The analytical results for dissolved barium, chromium, and lead show that for all of the samples submitted, the levels were below the instrument detection limit.

5.0 *SUMMARY*

On May 22 and 23, 2000, ground water samples were collected for VOCs and dissolved barium, chromium, and lead from five wells around the Sullivan Landfill located in Sullivan, Missouri. As described in Section 4.0 of this report, the only analytes found at levels above the detection limit were 1,1-Dichloroethane, 1,1,1-Trichloroethane, and Trichloroethene. The analytes were found in several monitoring wells at varied concentrations shown in Table 2. The concentrations of these VOCs found in the ground water samples are only slightly above the detection limits of 1 ug/L and are below the maximum contaminant levels promulgated by the U.S. Environmental Protection Agency.

In order to provide a comparison to previous sampling results, a historical summary of detected VOCs as well as, total and dissolved barium, chromium, and lead from all previous sampling events has been included as Table 3. As shown in this table, the measurements in all of the wells have remained relatively consistent over time since sampling activities began.

A potentiometric surface map was completed based on depth-to-water measurements collected on May 22, 2000 and indicates a northerly ground water flow direction, which is similar to what has been previously measured.

TABLES

TABLE 1

WELL SUMMARY SULLIVAN LANDFILL SAMPLING [1]
May 22-23, 2000
SULLIVAN, MISSOURI

Well	TOC Elevation [2]	Depth-to-Water from TOC	Ground Water Elevation [2]	Total Well Depth from TOC	Total Boring Depth from Ground Surface	Base of Well Elevation [2]	Formation Screened
MW-101	887.08	168.33	718.75	185	243	702.08	Gasconade
MW-102A	895.5	194.28	701.22	275	283	620.5	Gasconade
MW-102B	896.01	186.80	709.21	210	214	686.01	Gasconade
MW-103	878.46	187.62	690.84	208	243	670.46	Gasconade
MW-104	898.95	184.38	714.57	202	205	696.95	NC
MW-105	881.69	155.40	726.29	177	203	704.69	Gasconade
B-201	NC	14.30	NC	20.2	17.5	NC	Roubidoux
Voss	NC	NC	NC	NC	NC	NC	NC

Notes: [1] All measurements are expressed in feet.
[2] Elevations are based on the North American Vertical Datum of 1988.

Key: TOC = Top of casing.
NC = Not collected.

TABLE 2

SUMMARY OF DETECTED ANALYTES [1]
May 22 and 23, 2000
SULLIVAN LANDFILL
SULLIVAN, MISSOURI

	MCL[2]	Detection Limit	Sample Number							
			MW-101	MW-103	MW-104	MW-104 (duplicate)	MW-104B (eqpt. blank)	MW-105	Voss	Trip Blank
Volatile Organic Analytes										
Acetone	(3)	10	--	--	0.92 J	1.0 J	2.7 J	--	--	1.0 J
2-Butanone	(3)	10	--	--	--	0.13 J	0.83 J	--	--	
Chlorobenzene	100	1	--	--	--	--	--	--	--	--
Dibromochloromethane	(3)	1	--	--	--	--	--	--	--	--
Chloroform	(3)	1	0.11 J	--	0.14 J	--	--	0.27 J	0.64 J	--
1,1-Dichloroethane	(3)	1	0.35 J	--	0.35 J	0.36 J	--	8.0	3.6	--
1,2-Dichloroethane	5	1	--	--	--	--	--	0.14 J	--	--
1,1-Dichloroethene	7	1	--	--	--	--	--	0.24 J	--	--
1,2-Dichloroethene	5	1	0.97 J	--	--	--	--	--	--	--
Methylene Chloride	5	1	--	--	--	--	--	0.40 J	--	--
Toluene	1,000	1	0.12 J	--	--	--	0.96 J	--	--	0.14 J
1,1,1-Trichloroethane	200	1	0.39 J	0.82 J	0.37 J	0.37 J	--	1.1	1.2 J	--
Trichloroethene	5	1	3.8	--	4.3	4.2	--	3.0	1.6 J	--
Tetrachloroethene	5	1	0.36 J	0.70 J	0.49 J	0.45 J	--	0.70 J	0.93 J	--
Inorganic Analytes (dissolved)										
Barium	2000	200	--	--	--	--	--	--	--	N/A
Chromium	100	10	--	--	--	--	--	--	--	N/A
Lead	15	3	--	--	--	--	--	--	--	N/A

Notes: [1] Results expressed in ug/l.
[2] U.S. Environmental Protection Agency maximum contaminant level.
[3] No MCL is associated with this compound.

Key: J = Estimated value.
-- = Not detected.
N/A = Not analyzed.

TABLE 3

MW-101
HISTORIC SUMMARY OF DETECTED GROUND WATER ANALYTES
SULLIVAN LANDFILL

	Sample Event														
	5/23/92	7/22/92	2/13/93	8/30/93	5/24/94	9/6/94	3/24/95	6/28/95	9/15/95	12/18/95	5/3/96	6/23/97	7/22/98	6/29/99	5/22/00
Volatile Organic Compounds (ug/l)															
Acetone	--	--	--	--	--	--	--	--	--	--	--	--	4 BJ	--	--
2-Butanone (MEK)	--	--	--	--	--	--	--	--	--	--	--	3 J	--	--	--
4-Methyl-2-Pentanone (MIBK)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	--	--	--	--	--	--	--	--	--	--	--	--	--	0.28 J	0.35 J
1,1-Dichloroethene	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Methylene Chloride	--	--	--	--	--	--	--	--	--	--	--	--	1 BJ	0.19 J	--
1,1,1-Trichloroethane	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.39 J
Trichloroethene	4 J	--	--	4.2	1.9	3.7	2.1	2.2	3.7	4.1	3.2	--	3 J	2.3	3.8
Tetrachloroethene	--	--	--	--	--	--	--	--	--	--	--	--	--	0.33 J	0.36 J
Toluene	--	--	--	--	--	--	--	1.8	--	--	--	--	--	--	0.12 J
Dibromochloromethane	--	--	--	3.3 J	2.2	--	--	--	--	--	--	NA	NA	NA	--
Dichlorodifluoromethane	NA	NA	--	--	--	--	2.1	1.9	3	4.9	4.8	NA	NA	NA	NA
Trichlorofluoromethane	NA	NA	51	31	26.2	43.8	26.8	24.8	32.4	42.3	32.9	NA	NA	NA	NA
Dichlorofluoromethane	NA	NA	30	26	18.6	23.7	16.3	19.4	22.5	39.8	25.5	NA	NA	NA	NA
Inorganic Analytes (total) (ug/l)															
Barium	90	--	NA	NA	52	53	56	51	53	58	63	61.1	67 B	--	NA
Chromium	--	--	NA	NA	--	--	--	--	--	--	--	--	4.5 B	39	NA
Lead	10	8	NA	NA	--	--	--	--	--	--	--	--	NA	NA	NA
Inorganic Analytes (dissolved) (ug/l)															
Barium	NA	NA	--	53	60	58	64	57	56	55	54	NA	NA	NA	--
Chromium	NA	NA	--	--	--	--	--	--	--	--	--	NA	NA	NA	--
Lead	NA	NA	--	--	--	--	--	--	--	--	--	NA	NA	NA	--

Key: -- = Not Detected
B = Organic qualifier indicating that this compound was also detected in the associated laboratory method blank.
B = Inorganic qualifier indicating that this analyte was found below the instrument detection limit, but above the client-required detection limit.
J=Estimated value.
NA = Not Analyzed

TABLE 3

MW-103
HISTORIC SUMMARY OF DETECTED GROUND WATER ANALYTES
SULLIVAN LANDFILL

	Sample Event														
	5/20/92	7/22/92	2/11/93	8/30/93	5/24/94	9/6/94	3/29/95	6/28/95	9/28/95	12/18/95	5/3/96	6/24/97	7/23/98	6/30/99	5/23/00
Volatile Organic Compounds (ug/l)															
Acetone	--	--	--	--	--	--	--	--	--	--	--	--	4 BJ	--	--
2-Butanone (MEK)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Methyl-2-Pentanone (MIBK)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	--	--	--	--	--	--	--	--	--	--	--	--	--	0.38 J	--
1,1-Dichloroethene	--	--	--	--	--	--	--	--	--	--	--	--	--	0.32 J	--
Methylene Chloride	--	--	--	--	--	--	--	--	--	--	--	--	35 B	0.55 J	--
1,1,1-Trichloroethane	--	--	--	--	1.1	1.4	1.3	1.1	1.4	1.9	1	--	2 J	2	0.82 J
Trichloroethene	--	--	--	--	--	--	--	--	--	--	--	--	1 J	0.5 J	--
Tetrachloroethene	--	--	--	--	--	--	--	--	--	--	--	--	--	1.2	0.7 J
Toluene	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dibromochloromethane	--	--	--	--	--	--	--	--	--	--	--	NA	NA	--	--
Dichlorodifluoromethane	NA	NA	--	--	4.7	3.6	7.7	6	6.1	7.5	10.1	NA	NA	NA	--
Trichlorofluoromethane	NA	NA	63	76	14.4	18.5	176	174	179	175	185	NA	NA	NA	--
Dichlorofluoromethane	NA	NA	--	5.6	24.4	37.5	43.3	42	54.2	88.8	74.1	NA	NA	NA	--
Inorganic Analytes (total) (ug/l)															
Barium	NA	--	--	NA	52	48	52	48	54	56	54	57.1 B	117 B	--	NA
Chromium	NA	70	70	NA	--	--	--	--	--	--	--	--	17.4 B	12.0	NA
Lead	NA	10	160	NA	--	--	198	119	119	119	--				NA
Inorganic Analytes (dissolved) (ug/l)															
Barium	NA	NA	NA	50	52	55	58	51	90	53	58	NA	NA	NA	--
Chromium	NA	NA	NA	--	--	--	--	--	--	--	--	NA	NA	NA	--
Lead	NA	NA	NA	--	--	--	--	--	--	--	--	NA	NA	NA	--

Key: -- = Not Detected
B = Organic qualifier indicating that this compound was also detected in the associated laboratory method blank.
B = Inorganic qualifier indicating that this analyte was found below the instrument detection limit, but above the client-required detection limit.
J=Estimated value.
NA = Not Analyzed

TABLE 3

MW-104
HISTORIC SUMMARY OF DETECTED GROUND WATER ANALYTES
SULLIVAN LANDFILL

	Sample Event				
	5/23/92	7/22/92	2/13/93	8/30/93	5/23/00
Volatile Organic Compounds (ug/l)					
Acetone	4 J	--	--	--	0.92 J
2-Butanone (MEK)	--	--	--	--	--
4-Methyl-2-Pentanone (MIBK)	30 J	--	--	--	--
1,1-Dichloroethane	--	--	--	--	0.35 J
1,1-Dichloroethene	--	--	--	--	--
Methylene Chloride	--	--	--	--	--
1,1,1-Trichloroethane	--	--	--	--	0.37 J
Trichloroethene	4 J	--	--	--	4.3
Tetrachloroethene	--	--	--	--	0.49
Toluene	--	--	--	--	--
Dibromochloromethane	NA	NA	--	--	--
Dichlorodifluoromethane	NA	NA	--	--	NA
Trichlorofluoromethane	NA	NA	89	58	NA
Dichlorofluoromethane	NA	NA	52	60	NA
Inorganic Analytes (total) (ug/l)					
Barium	NA	--	NA	NA	NA
Chromium	NA	60	NA	NA	NA
Lead	NA	60	NA	NA	NA
Inorganic Analytes (dissolved) (ug/l)					
Barium	70	NA	--	56	--
Chromium	--	NA	--	--	--
Lead	--	NA	--	3.1	--

Key: -- = Not Detected
J=Estimated value.
NA = Not Analyzed

TABLE 3

MW-105
HISTORIC SUMMARY OF DETECTED GROUND WATER ANALYTES
SULLIVAN LANDFILL

	Sample Event														
	5/24/92	7/22/92	2/2/93	8/30/93	5/24/94	9/6/94	3/29/95	6/28/95	9/22/95	12/18/95	5/3/96	6/23/97	7/22/98	6/29/99	5/23/00
Volatile Organic Compounds (ug/l)															
Acetone	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone (MEK)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Methyl-2-Pentanone (MIBK)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	21	--	27	--	8.0	11.7	11.5	10.1	12.5	8.1	17.1	--	12	13	8.0
1,1-Dichloroethene	--	--	--	--	--	--	--	--	--	--	--	--	1 J	0.93 J	0.24 J
Methylene Chloride	3 J	--	--	--	--	--	--	--	--	--	--	--	2 BJ	0.73 J	0.4 J
1,1,1-Trichloroethane	5	--	--	--	9.4	9.6	8.9	7.1	6.2	3.6	1.7	--	3 J	2.5	1.1
Trichloroethene	6	--	--	--	2.5	4.3	3.6	2.6	5.4	2.9	4.8	--	4 J	3.9	3.0
Tetrachloroethene	--	--	--	--	--	--	--	--	--	--	--	--	--	0.61 J	0.7 J
Toluene	--	--	--	--	--	--	--	1.2	--	--	--	--	--	--	--
Dibromochloromethane	--	--	--	23 J	--	--	--	--	--	--	--	NA	NA	--	--
Dichlorodifluoromethane	NA	NA	--	--	2.7	--	4.4	2.3	2.8	3.6	7.7	NA	NA	NA	
Trichlorofluoromethane	NA	NA	89	--	31	50.6	44.2	29.5	26.7	25.6	197	NA	NA	NA	
Dichlorofluoromethane	NA	NA	320	120	84.1	114	121	88.8	104	114	28.9	NA	NA	NA	
Inorganic Analytes (total) (ug/l)															
Barium	300	120	NA	NA	152	123	136	121	129	139	160	158 B	144 B	--	NA
Chromium	30	--	NA	NA	--	--	--	--	--	--	--	--	1.5 B	--	NA
Lead	120	50	NA	NA	--	--	--	--	--	--	5.8				NA
Inorganic Analytes (dissolved) (ug/l)															
Barium	NA	NA	120	120	--	139	153	136	131	145	173	NA	NA	NA	--
Chromium	NA	NA	--	--	--	--	--	--	--	--	--	NA	NA	NA	--
Lead	NA	NA	--	--	--	--	--	--	--	--	--	NA	NA	NA	--

Key: -- = Not Detected
B = Organic qualifier indicating that this compound was also detected in the associated laboratory method blank.
B = Inorganic qualifier indicating that this analyte was found below the instrument detection limit, but above the client-required detection limit.
J=Estimated value.
NA = Not Analyzed

TABLE 3

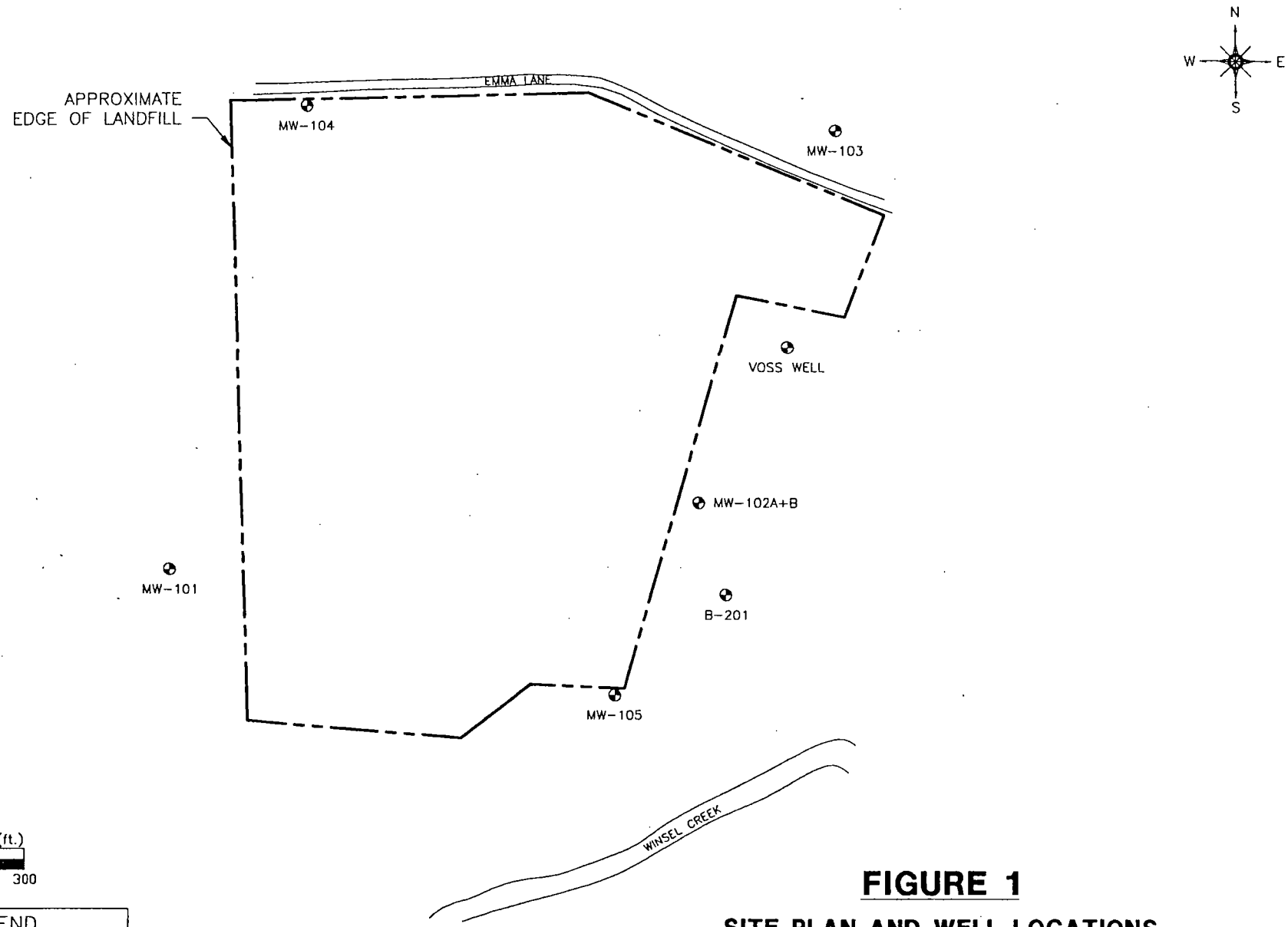
VOSS WELL
HISTORIC SUMMARY OF DETECTED GROUND WATER ANALYTES
SULLIVAN LANDFILL

	Sample Event												
	2/12/93	8/31/93	5/24/94	9/6/94	3/29/95	6/28/95	9/22/95	12/18/95	5/3/96	6/23/97	7/22/98	6/30/99	5/23/00
Volatile Organic Compounds (ug/l)													
Acetone	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone (MEK)	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Methyl-2-Pentanone (MIBK)	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	--	--	1.9	2.0	2.3	3.1	2.6	3.1	3.5	--	4 J	5.2	3.6
1,1-Dichloroethene	--	--	--	--	--	--	--	--	--	--	--	--	--
Methylene Chloride	--	--	--	--	--	--	--	--	--	--	2 BJ	0.85 J	--
1,1,1-Trichloroethane	--	--	1.7	1.7	1.5	1.6	1.5	1.8	1.6	--	2 J	1.9	1.2 J
Trichloroethene	--	--	2.5	2.4	2.8	2.7	2.8	3.1	3.4	--	3 J	2.6	1.6 J
Tetrachloroethene	--	--	--	--	--	--	--	--	--	8	1 J	1	0.93 J
Toluene	--	--	--	--	--	--	--	--	--	--	--	--	--
Dibromochloromethane	--	--	--	--	--	--	--	--	--	NA	NA	0.11 J	--
Dichlorodifluoromethane	NA	--	3.9	3.8	4.7	5.2	5.7	7	8.7	NA	NA	NA	
Trichlorofluoromethane	120	15 J	73.9	--	70.1	90.3	81.4	88.7	92.7	NA	NA	NA	
Dichlorofluoromethane	150	19 J	70	66.7	76.7	97.4	80.8	161	192	NA	NA	NA	
Inorganic Analytes [1] (ug/l)													
Barium	NA	NA	76	82	82	69	83	83	85	88.2 B	83 B	--	NA
Chromium	NA	NA	--	--	--	--	--	--	--	--	--	--	NA
Lead	NA	NA	--	--	--	--	--	--	--				NA
Inorganic Analytes (dissolved) (ug/l)													
Barium	90	76	78	91	93	78	85	86	96	NA	NA	NA	--
Chromium	--	--	--	--	--	--	--	--	--	NA	NA	NA	--
Lead	--	--	--	--	--	--	--	--	--	NA	NA	NA	--

Key: -- = Not Detected
B = Organic qualifier indicating that this compound was also detected in the associated laboratory method blank.
B = Inorganic qualifier indicating that this analyte was found below the instrument detection limit, but above the client-required detection limit.
J=Estimated value.
NA = Not Analyzed

FIGURES

DRAWN: WRA | FILE: H:\TRW\97189\ACAD\FG1.DWG – September 01, 1998 – 14:12:24



APPROX. SCALE (ft.)
0 300

SYMBOL LEGEND
WELL LOCATION

FIGURE 1

SITE PLAN AND WELL LOCATIONS
SULLIVAN LANDFILL
SULLIVAN, MISSOURI

ERM

DRAWN: FK | FILE: S:\CPF\A31\A3149\00\ACAD\FIG2.DWG JUNE 15, 2000 - 10:54:15

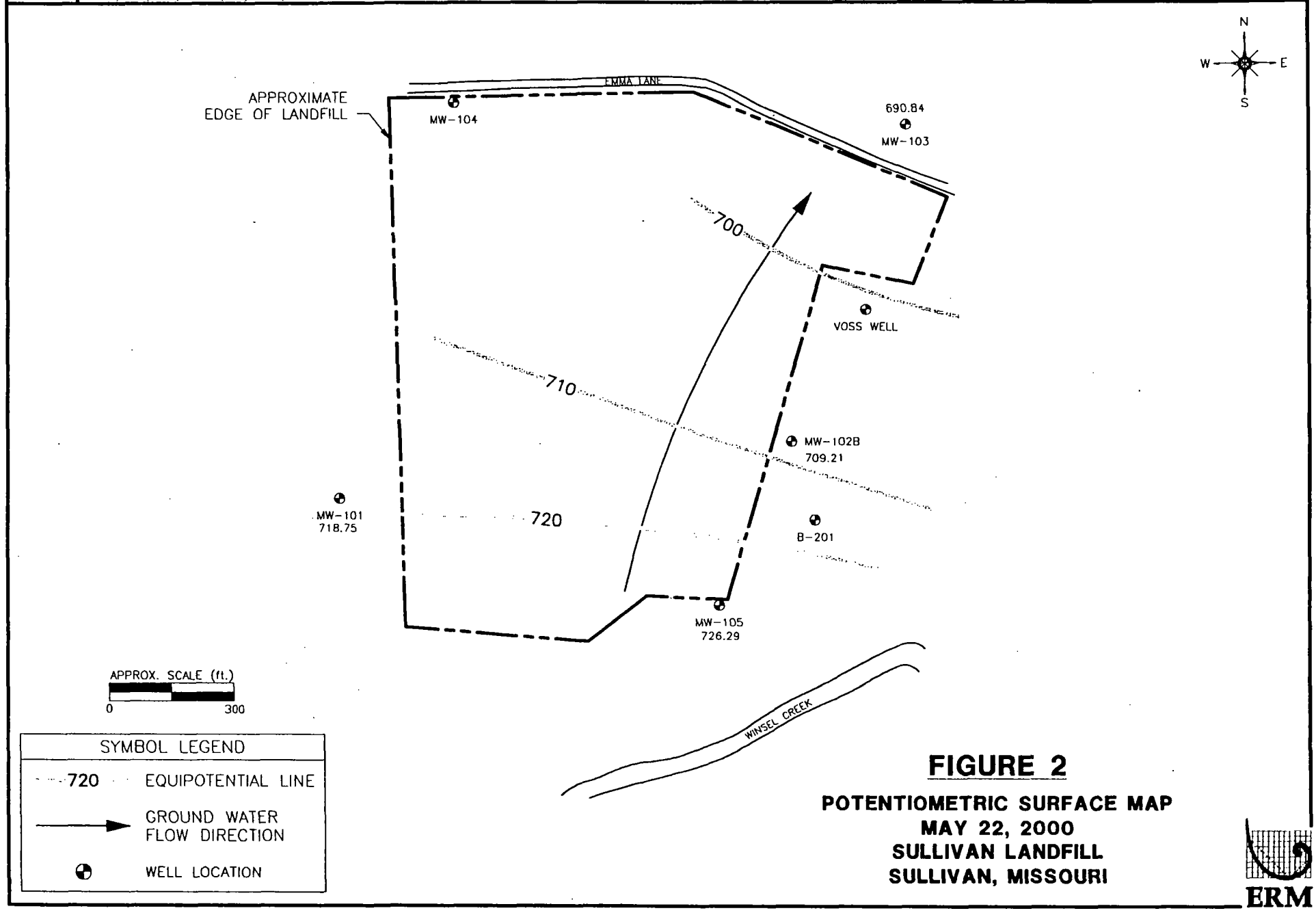


FIGURE 2

POTENTIOMETRIC SURFACE MAP
MAY 22, 2000
SULLIVAN LANDFILL
SULLIVAN, MISSOURI

APPENDIX A

FIELD DATA SHEETS

Environmental Resources Management
Ground Water Sampling
Field Data Form

Project # **A3149.00** Sample I.D. **MW-101** Date **5/22/00** Time 17:00

Project Description: Year 2000 Sampling

Samplers:	Affiliation:	Observers:	Affiliation:
DMB	ERM	None	
AC	ERM		

Well Number MW-101 Total Depth 185 (ft) I.D. 2 (in)

Material PVC Screened Interval _____ (ft)

WATER LEVEL TO TOP OF CASING (ft)

Pre-Purge 168.33 Post-Purge _____ Sampling _____

Depth of Water Column 16.67 Casing Volume 2.7 (gal)

Pumping Method Dedicated Bailer Sampling Method Dedicated Bailer

STABILIZATION TEST

Turbidity (NTU)	pH	Conductance (umhos/cm)	Temperature (F)	Cumulative Volume (gal)
206	7.28	630	75.6	Initial
262	7.39	597	70.5	3
1250	7.46	554	69.6	6

OBSERVATIONS

Environmental Resources Management
Ground Water Sampling
Field Data Form

Project # A3149.00 Sample I.D. MW-103 Date 5/23/00 Time 10:20

Project Description: Year 2000 Sampling

Samplers:	Affiliation:	Observers:	Affiliation:
DMB	ERM	None	
EJR	ERM		

Well Number MW-103 Total Depth 208 (ft) I.D. 2 (in)

Material PVC Screened Interval _____ (ft)

WATER LEVEL TO TOP OF CASING (ft)

Pre-Purge 187.62 Post-Purge _____ Sampling _____

Depth of Water Column 20.38 Casing Volume 3.3 (gal)

Pumping Method Dedicated Bailer Sampling Method Dedicated Bailer

STABILIZATION TEST

Turbidity (NTU)	pH	Conductance (umhos/cm)	Temperature (F)	Cumulative Volume (gal)
34.7	7.10	434	66.7	Initial
225	7.57	410	65.6	3.5
189.2	7.66	409	64.7	7

OBSERVATIONS _____

Environmental Resources Management
Ground Water Sampling
Field Data Form

Project # A3149.00 Sample I.D. MW-104 Date 5/23/00 Time 11:45

Project Description: Year 2000 Sampling

Samplers:	Affiliation:	Observers:	Affiliation:
DMB	ERM	None	
EJR	ERM		

Well Number MW-103 Total Depth 202 (ft) I.D. 2 (in)

Material PVC Screened Interval _____ (ft)

WATER LEVEL TO TOP OF CASING (ft)

Pre-Purge 184.38 Post-Purge _____ Sampling _____

Depth of Water Column 17.62 Casing Volume 2.9 (gal)

Pumping Method Dedicated Bailer Sampling Method Dedicated Bailer

STABILIZATION TEST

Turbidity (NTU)	pH	Conductance (umhos/cm)	Temperature (F)	Cumulative Volume (gal)
7.95	69.1	770	69.1	Initial
1116	7.68	686	65.6	3
1235	7.66	694	65.7	6

OBSERVATIONS Collected Field Duplicate MW-104DUP
Collecedted Field Blank MW-104B at 13:00

Environmental Resources Management
Ground Water Sampling
Field Data Form

Project # A3149.00 Sample I.D. MW-105 Date 5/23/00 Time 14:30

Project Description: Year 2000 Sampling

Samplers:	Affiliation:	Observers:	Affiliation:
DMB	ERM	None	
EJR	ERM		

Well Number MW-105 Total Depth 177 (ft) I.D. 2 (in)

Material PVC Screened Interval _____ (ft)

WATER LEVEL TO TOP OF CASING (ft)

Pre-Purge 155.40 Post-Purge _____ Sampling _____

Depth of Water Column 21.6 Casing Volume 3.5 (gal)

Pumping Method Dedicated Bailer Sampling Method Dedicated Bailer

STABILIZATION TEST

Turbidity (NTU)	pH	Conductance (umhos/cm)	Temperature (F)	Cumulative Volume (gal)
4.85	6.94	84	67.9	Initial
171	7.06	83	64.9	3.5
188	7.07	82	64.9	7

OBSERVATIONS

Environmental Resources Management
Ground Water Sampling
Field Data Form

Project # A3149.00 Sample I.D. Voss Well Date 5/23/00 Time 12:45

Project Description: Year 2000 Sampling

Samplers:	Affiliation:	Observers:	Affiliation:
DMB	ERM	None	
EJR	ERM		

Well Number Voss Total Depth _____ (ft) I.D. 2 (in)

Material PVC Screened Interval _____ (ft)

WATER LEVEL TO TOP OF CASING (ft)

Pre-Purge _____ Post-Purge _____ Sampling _____

Depth of Water Column _____ Casing Volume _____ (gal)

Pumping Method Dedicated Pump Sampling Method Dedicated Pump

STABILIZATION TEST

Turbidity (NTU)	pH	Conductance (umhos/cm)	Temperature (F)	Cumulative Volume (gal)
1.10	7.09	53	69.0	49

OBSERVATIONS Cumulative volume based on flow meter readings before and after purging.

APPENDIX B

LABORATORY REPORT AND CHAIN-OF-CUSTODY FORMS

Quanterra
4101 Shuffel Drive, NW
North Canton, Ohio 44720-6961

330 497-9396 Telephone
330 497-0772 Fax
www.quanterra.com

ANALYTICAL REPORT

PROJECT NO. A3149.00

SULLIVAN LANDFILL

Lot #: A0E240174

Richard Bell

TRW - Cleveland

SEVERN TRENT LABORATORIES, INC.

Denise Pohl
Project Manager

June 2, 2000

CASE NARRATIVE
AOE240174

The following report contains the analytical results for seven water samples and one quality control sample submitted to STL North Canton by TRW – Cleveland from the Sullivan Landfill Site, project number A3149.00. The samples were received May 24, 2000 according to documented sample acceptance procedures.

STL utilizes only USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameters listed on the analytical methods summary page in accordance with the method indicated. A summary of QC data for this analysis is included at the rear of the report.

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant with laboratory protocol.

Supplemental QC Information

SAMPLIE RECEIVING

The temperature of the cooler upon sample receipt was 4.1° C.

GC/MS VOLATILES

Samples MW103 and VOSS WELL were diluted during analysis due to high concentrations of unlisted compounds (TICs) in this sample.

Sample(s) which contain results between the MDL and the RL are flagged with a "J". There is the possibility of false positive or misidentification at these quantitation levels. In analytical methods requiring confirmation of the analyte reported, confirmation will be performed only down to the standard reporting limit (SRL). The acceptance criteria for QC criteria may not be met at these quantitation levels.

ANALYTICAL METHODS SUMMARY

A0E240174

PARAMETER	ANALYTICAL METHOD
Inductively Coupled Plasma (ICP) Metals	SW846 6010B
Trace Inductively Coupled Plasma (ICP) Metals	SW846 6010B
Volatile Organics by GC/MS	SW846 8260B

References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

SAMPLE SUMMARY

A0E240174

WO #	SAMPLE#	CLIENT SAMPLE ID	DATE	TIME
DDLT5	001	MW101	05/22/00	17:00
DDLTH	002	MW103	05/23/00	10:20
DDLTN	003	MW104	05/23/00	11:45
DDLTR	004	MW104-B	05/23/00	13:00
DDLV0	005	MW104-DUP	05/23/00	11:45
DDLV2	006	MW105	05/23/00	14:30
DDLV5	007	VOSS WELL	05/23/00	12:45
DDLV9	008	TRIP BLANK	05/23/00	

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

TRW - CLEVELAND

Client Sample ID: MW101

GC/MS Volatiles

Lot-Sample #...: A0E240174-001 Work Order #...: DDLT5101 Matrix.....: WG
Date Sampled...: 05/22/00 17:00 Date Received..: 05/24/00
Prep Date.....: 05/30/00 Analysis Date..: 05/30/00
Prep Batch #...: 0152177
Dilution Factor: 1 Method.....: SW846 8260B

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Acetone	ND	10	ug/L
Benzene	ND	1.0	ug/L
Bromodichloromethane	ND	1.0	ug/L
Bromoform	ND	1.0	ug/L
Bromomethane	ND	2.0	ug/L
2-Butanone	ND	10	ug/L
Carbon disulfide	ND	1.0	ug/L
Carbon tetrachloride	ND	1.0	ug/L
Chlorobenzene	ND	1.0	ug/L
Dibromochloromethane	ND	1.0	ug/L
Chloroethane	ND	2.0	ug/L
Chloroform	**0.11 J**	**1.0**	**ug/L**
Chloromethane	ND	2.0	ug/L
1,1-Dichloroethane	**0.35 J**	**1.0**	**ug/L**
1,2-Dichloroethane	ND	1.0	ug/L
1,1-Dichloroethene	ND	1.0	ug/L
1,2-Dichloroethene (total)	**0.97 J**	**1.0**	**ug/L**
1,2-Dichloropropane	ND	1.0	ug/L
cis-1,3-Dichloropropene	ND	1.0	ug/L
trans-1,3-Dichloropropene	ND	1.0	ug/L
Ethylbenzene	ND	1.0	ug/L
2-Hexanone	ND	10	ug/L
Methylene chloride	ND	1.0	ug/L
4-Methyl-2-pentanone	ND	10	ug/L
Styrene	ND	1.0	ug/L
1,1,2,2-Tetrachloroethane	ND	1.0	ug/L
Tetrachloroethene	**0.36 J**	**1.0**	**ug/L**
Toluene	**0.12 J**	**1.0**	**ug/L**
1,1,1-Trichloroethane	**0.39 J**	**1.0**	**ug/L**
1,1,2-Trichloroethane	ND	1.0	ug/L
Trichloroethene	**3.8**	**1.0**	**ug/L**
Vinyl chloride	ND	2.0	ug/L
Xylenes (total)	ND	1.0	ug/L

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Toluene-d8	97	(76 - 110)
1,2-Dichloroethane-d4	95	(61 - 128)
Dibromofluoromethane	96	(73 - 122)
4-Bromofluorobenzene	102	(74 - 116)

(Continued on next page)

TRW - CLEVELAND

Client Sample ID: MW101

DISSOLVED Metals

Lot-Sample #...: A0E240174-001 Matrix.....: WG
Date Sampled...: 05/22/00 17:00 Date Received..: 05/24/00

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 0146108						
Barium	ND	0.20	mg/L	SW846 6010B	05/25/00	DDLT5104
		Dilution Factor: 1				
Chromium	ND	0.010	mg/L	SW846 6010B	05/25/00	DDLT5105
		Dilution Factor: 1				
Lead	ND	0.0030	mg/L	SW846 6010B	05/25/00	DDLT5103
		Dilution Factor: 1				

TRW - CLEVELAND

Client Sample ID: MW103

GC/MS Volatiles

Lot-Sample #...: A0E240174-002 Work Order #...: DDLTH101 Matrix.....: WG
Date Sampled...: 05/23/00 10:20 Date Received..: 05/24/00
Prep Date.....: 05/30/00 Analysis Date..: 05/30/00
Prep Batch #...: 0152177
Dilution Factor: 5 Method.....: SW846 8260B

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Acetone	ND	50	ug/L
Benzene	ND	5.0	ug/L
Bromodichloromethane	ND	5.0	ug/L
Bromoform	ND	5.0	ug/L
Bromomethane	ND	10	ug/L
2-Butanone	ND	50	ug/L
Carbon disulfide	ND	5.0	ug/L
Carbon tetrachloride	ND	5.0	ug/L
Chlorobenzene	ND	5.0	ug/L
Dibromochloromethane	ND	5.0	ug/L
Chloroethane	ND	10	ug/L
Chloroform	ND	5.0	ug/L
Chloromethane	ND	10	ug/L
1,1-Dichloroethane	ND	5.0	ug/L
1,2-Dichloroethane	ND	5.0	ug/L
1,1-Dichloroethene	ND	5.0	ug/L
1,2-Dichloroethene (total)	ND	5.0	ug/L
1,2-Dichloropropane	ND	5.0	ug/L
cis-1,3-Dichloropropene	ND	5.0	ug/L
trans-1,3-Dichloropropene	ND	5.0	ug/L
Ethylbenzene	ND	5.0	ug/L
2-Hexanone	ND	50	ug/L
Methylene chloride	ND	5.0	ug/L
4-Methyl-2-pentanone	ND	50	ug/L
Styrene	ND	5.0	ug/L
1,1,2,2-Tetrachloroethane	ND	5.0	ug/L
Tetrachloroethene	**0.70 J**	**5.0**	**ug/L**
Toluene	ND	5.0	ug/L
1,1,1-Trichloroethane	**0.82 J**	**5.0**	**ug/L**
1,1,2-Trichloroethane	ND	5.0	ug/L
Trichloroethene	ND	5.0	ug/L
Vinyl chloride	ND	10	ug/L
Xylenes (total)	ND	5.0	ug/L

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Toluene-d8	96	(76 - 110)
1,2-Dichloroethane-d4	93	(61 - 128)
Dibromofluoromethane	94	(73 - 122)
4-Bromofluorobenzene	100	(74 - 116)

(Continued on next page)

TRW - CLEVELAND

Client Sample ID: MW103

GC/MS Volatiles

Lot-Sample #...: A0E240174-002 Work Order #...: DDLTH101 Matrix.....: WG

NOTE(S):

J Estimated result. Result is less than RL.

Elevated reporting limits due to TICs.

TRW - CLEVELAND

Client Sample ID: MW103

DISSOLVED Metals

Lot-Sample #...: A0E240174-002 Matrix.....: WG
Date Sampled...: 05/23/00 10:20 Date Received..: 05/24/00

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 0146108						
Barium	ND	0.20	mg/L	SW846 6010B	05/25/00	DDLTH104
		Dilution Factor: 1				
Chromium	ND	0.010	mg/L	SW846 6010B	05/25/00	DDLTH105
		Dilution Factor: 1				
Lead	ND	0.0030	mg/L	SW846 6010B	05/25/00	DDLTH103
		Dilution Factor: 1				

TRW - CLEVELAND

Client Sample ID: MW104

GC/MS Volatiles

Lot-Sample #...: A0E240174-003 Work Order #...: DDLTN101 Matrix.....: WG
Date Sampled...: 05/23/00 11:45 Date Received..: 05/24/00
Prep Date.....: 05/30/00 Analysis Date..: 05/30/00
Prep Batch #...: 0152177
Dilution Factor: 1 Method.....: SW846 8260B

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Acetone	**0.92 J**	**10**	**ug/L**
Benzene	ND	1.0	ug/L
Bromodichloromethane	ND	1.0	ug/L
Bromoform	ND	1.0	ug/L
Bromomethane	ND	2.0	ug/L
2-Butanone	ND	10	ug/L
Carbon disulfide	ND	1.0	ug/L
Carbon tetrachloride	ND	1.0	ug/L
Chlorobenzene	ND	1.0	ug/L
Dibromochloromethane	ND	1.0	ug/L
Chloroethane	ND	2.0	ug/L
Chloroform	**0.14 J**	**1.0**	**ug/L**
Chloromethane	ND	2.0	ug/L
1,1-Dichloroethane	**0.35 J**	**1.0**	**ug/L**
1,2-Dichloroethane	ND	1.0	ug/L
1,1-Dichloroethene	ND	1.0	ug/L
1,2-Dichloroethene (total)	ND	1.0	ug/L
1,2-Dichloropropane	ND	1.0	ug/L
cis-1,3-Dichloropropene	ND	1.0	ug/L
trans-1,3-Dichloropropene	ND	1.0	ug/L
Ethylbenzene	ND	1.0	ug/L
2-Hexanone	ND	10	ug/L
Methylene chloride	ND	1.0	ug/L
4-Methyl-2-pentanone	ND	10	ug/L
Styrene	ND	1.0	ug/L
1,1,2,2-Tetrachloroethane	ND	1.0	ug/L
Tetrachloroethene	**0.49 J**	**1.0**	**ug/L**
Toluene	ND	1.0	ug/L
1,1,1-Trichloroethane	**0.37 J**	**1.0**	**ug/L**
1,1,2-Trichloroethane	ND	1.0	ug/L
Trichloroethene	**4.3**	**1.0**	**ug/L**
Vinyl chloride	ND	2.0	ug/L
Xylenes (total)	ND	1.0	ug/L

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Toluene-d8	96	(76 - 110)
1,2-Dichloroethane-d4	95	(61 - 128)
Dibromofluoromethane	93	(73 - 122)
4-Bromofluorobenzene	101	(74 - 116)

(Continued on next page)

TRW - CLEVELAND

Client Sample ID: MW104

GC/MS Volatiles

Lot-Sample #...: A0E240174-003 Work Order #...: DDLTN101 Matrix.....: WG

NOTE(S):

J Estimated result. Result is less than RL.

TRW - CLEVELAND

Client Sample ID: MW104

DISSOLVED Metals

Lot-Sample #...: A0E240174-003 **Matrix.....:** WG
Date Sampled...: 05/23/00 11:45 **Date Received..:** 05/24/00

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 0146108						
Barium	ND	0.20	mg/L	SW846 6010B	05/25/00	DDLTN104
		Dilution Factor: 1				
Chromium	ND	0.010	mg/L	SW846 6010B	05/25/00	DDLTN105
		Dilution Factor: 1				
Lead	ND	0.0030	mg/L	SW846 6010B	05/25/00	DDLTN103
		Dilution Factor: 1				

TRW - CLEVELAND

Client Sample ID: MW104-B

GC/MS Volatiles

Lot-Sample #...: A0E240174-004 Work Order #...: DDLTR101 Matrix.....: WG
Date Sampled...: 05/23/00 13:00 Date Received..: 05/24/00
Prep Date.....: 05/30/00 Analysis Date..: 05/30/00
Prep Batch #...: 0152177
Dilution Factor: 1 Method.....: SW846 8260B

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Acetone	**2.7 J**	**10**	**ug/L**
Benzene	ND	1.0	ug/L
Bromodichloromethane	ND	1.0	ug/L
Bromoform	ND	1.0	ug/L
Bromomethane	ND	2.0	ug/L
2-Butanone	**0.83 J**	**10**	**ug/L**
Carbon disulfide	ND	1.0	ug/L
Carbon tetrachloride	ND	1.0	ug/L
Chlorobenzene	ND	1.0	ug/L
Dibromochloromethane	ND	1.0	ug/L
Chloroethane	ND	2.0	ug/L
Chloroform	ND	1.0	ug/L
Chloromethane	ND	2.0	ug/L
1,1-Dichloroethane	ND	1.0	ug/L
1,2-Dichloroethane	ND	1.0	ug/L
1,1-Dichloroethene	ND	1.0	ug/L
1,2-Dichloroethene (total)	ND	1.0	ug/L
1,2-Dichloropropane	ND	1.0	ug/L
cis-1,3-Dichloropropene	ND	1.0	ug/L
trans-1,3-Dichloropropene	ND	1.0	ug/L
Ethylbenzene	ND	1.0	ug/L
2-Hexanone	ND	10	ug/L
Methylene chloride	ND	1.0	ug/L
4-Methyl-2-pentanone	ND	10	ug/L
Styrene	ND	1.0	ug/L
1,1,2,2-Tetrachloroethane	ND	1.0	ug/L
Tetrachloroethene	ND	1.0	ug/L
Toluene	**0.96 J**	**1.0**	**ug/L**
1,1,1-Trichloroethane	ND	1.0	ug/L
1,1,2-Trichloroethane	ND	1.0	ug/L
Trichloroethene	ND	1.0	ug/L
Vinyl chloride	ND	2.0	ug/L
Xylenes (total)	ND	1.0	ug/L

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Toluene-d8	95	(76 - 110)
1,2-Dichloroethane-d4	95	(61 - 128)
Dibromofluoromethane	94	(73 - 122)
4-Bromofluorobenzene	97	(74 - 116)

(Continued on next page)

TRW - CLEVELAND

Client Sample ID: MW104-B

GC/MS Volatiles

Lot-Sample #...: A0E240174-004 Work Order #...: DDLTR101 Matrix.....: WG

NOTE(S):

J Estimated result. Result is less than RL.

TRW - CLEVELAND

Client Sample ID: MW104-B

DISSOLVED Metals

Lot-Sample #...: A0E240174-004 Matrix.....: WG
Date Sampled...: 05/23/00 13:00 Date Received..: 05/24/00

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 0146108						
Barium	ND	0.20	mg/L	SW846 6010B	05/25/00	DDLTR104
		Dilution Factor: 1				
Chromium	ND	0.010	mg/L	SW846 6010B	05/25/00	DDLTR105
		Dilution Factor: 1				
Lead	ND	0.0030	mg/L	SW846 6010B	05/25/00	DDLTR103
		Dilution Factor: 1				

TRW - CLEVELAND

Client Sample ID: MW104-DUP

GC/MS Volatiles

Lot-Sample #...: A0E240174-005 Work Order #...: DDLV0101 Matrix.....: WG
Date Sampled...: 05/23/00 11:45 Date Received..: 05/24/00
Prep Date.....: 05/30/00 Analysis Date..: 05/30/00
Prep Batch #...: 0152177
Dilution Factor: 1 Method.....: SW846 8260B

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Acetone	**1.0 J**	**10**	**ug/L**
Benzene	ND	1.0	ug/L
Bromodichloromethane	ND	1.0	ug/L
Bromoform	ND	1.0	ug/L
Bromomethane	ND	2.0	ug/L
2-Butanone	ND	10	ug/L
Carbon disulfide	ND	1.0	ug/L
Carbon tetrachloride	ND	1.0	ug/L
Chlorobenzene	ND	1.0	ug/L
Dibromochloromethane	ND	1.0	ug/L
Chloroethane	ND	2.0	ug/L
Chloroform	**0.13 J**	**1.0**	**ug/L**
Chloromethane	ND	2.0	ug/L
1,1-Dichloroethane	**0.36 J**	**1.0**	**ug/L**
1,2-Dichloroethane	ND	1.0	ug/L
1,1-Dichloroethene	ND	1.0	ug/L
1,2-Dichloroethene (total)	ND	1.0	ug/L
1,2-Dichloropropane	ND	1.0	ug/L
cis-1,3-Dichloropropene	ND	1.0	ug/L
trans-1,3-Dichloropropene	ND	1.0	ug/L
Ethylbenzene	ND	1.0	ug/L
2-Hexanone	ND	10	ug/L
Methylene chloride	ND	1.0	ug/L
4-Methyl-2-pentanone	ND	10	ug/L
Styrene	ND	1.0	ug/L
1,1,2,2-Tetrachloroethane	ND	1.0	ug/L
Tetrachloroethene	**0.45 J**	**1.0**	**ug/L**
Toluene	ND	1.0	ug/L
1,1,1-Trichloroethane	**0.37 J**	**1.0**	**ug/L**
1,1,2-Trichloroethane	ND	1.0	ug/L
Trichloroethene	**4.2**	**1.0**	**ug/L**
Vinyl chloride	ND	2.0	ug/L
Xylenes (total)	ND	1.0	ug/L

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Toluene-d8	96	(76 - 110)
1,2-Dichloroethane-d4	93	(61 - 128)
Dibromofluoromethane	96	(73 - 122)
4-Bromofluorobenzene	99	(74 - 116)

(Continued on next page)

TRW - CLEVELAND

Client Sample ID: MW104-DUP

GC/MS Volatiles

Lot-Sample #...: A0E240174-005 Work Order #...: DDLV0101 Matrix.....: WG

NOTE(S):

J Estimated result. Result is less than RL.

TRW - CLEVELAND

Client Sample ID: MW104-DUP

DISSOLVED Metals

Lot-Sample #...: A0E240174-005 Matrix.....: WG
Date Sampled...: 05/23/00 11:45 Date Received..: 05/24/00

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 0146108						
Barium	ND	0.20	mg/L	SW846 6010B	05/25/00	DDLV0104
		Dilution Factor: 1				
Chromium	ND	0.010	mg/L	SW846 6010B	05/25/00	DDLV0105
		Dilution Factor: 1				
Lead	ND	0.0030	mg/L	SW846 6010B	05/25/00	DDLV0103
		Dilution Factor: 1				

TRW - CLEVELAND

Client Sample ID: MW105

GC/MS Volatiles

Lot-Sample #...: A0E240174-006 Work Order #...: DDLV2101 Matrix.....: WG
Date Sampled...: 05/23/00 14:30 Date Received..: 05/24/00
Prep Date.....: 05/30/00 Analysis Date..: 05/30/00
Prep Batch #...: 0152177
Dilution Factor: 1 Method.....: SW846 8260B

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Acetone	ND	10	ug/L
Benzene	ND	1.0	ug/L
Bromodichloromethane	ND	1.0	ug/L
Bromoform	ND	1.0	ug/L
Bromomethane	ND	2.0	ug/L
2-Butanone	ND	10	ug/L
Carbon disulfide	ND	1.0	ug/L
Carbon tetrachloride	ND	1.0	ug/L
Chloroform	**0.27 J**	**1.0**	**ug/L**
Chloromethane	ND	2.0	ug/L
1,1-Dichloroethane	**8.0**	**1.0**	**ug/L**
Chlorobenzene	ND	1.0	ug/L
Dibromochloromethane	ND	1.0	ug/L
Chloroethane	ND	2.0	ug/L
1,2-Dichloroethane	**0.14 J**	**1.0**	**ug/L**
1,1-Dichloroethene	**0.24 J**	**1.0**	**ug/L**
1,2-Dichloroethene (total)	ND	1.0	ug/L
1,2-Dichloropropane	ND	1.0	ug/L
cis-1,3-Dichloropropene	ND	1.0	ug/L
trans-1,3-Dichloropropene	ND	1.0	ug/L
Ethylbenzene	ND	1.0	ug/L
2-Hexanone	ND	10	ug/L
Methylene chloride	**0.40 J**	**1.0**	**ug/L**
4-Methyl-2-pentanone	ND	10	ug/L
Styrene	ND	1.0	ug/L
1,1,2,2-Tetrachloroethane	ND	1.0	ug/L
Tetrachloroethene	**0.70 J**	**1.0**	**ug/L**
Toluene	ND	1.0	ug/L
1,1,1-Trichloroethane	**1.1**	**1.0**	**ug/L**
1,1,2-Trichloroethane	ND	1.0	ug/L
Trichloroethene	**3.0**	**1.0**	**ug/L**
Vinyl chloride	ND	2.0	ug/L
Xylenes (total)	ND	1.0	ug/L

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Toluene-d8	98	(76 - 110)
1,2-Dichloroethane-d4	94	(61 - 128)
Dibromofluoromethane	95	(73 - 122)
4-Bromofluorobenzene	100	(74 - 116)

(Continued on next page)

TRW - CLEVELAND

Client Sample ID: MW105

GC/MS Volatiles

Lot-Sample #...: A0E240174-006 Work Order #...: DDLV2101 Matrix.....: WG

NOTE(S):

J Estimated result. Result is less than RL.

TRW - CLEVELAND

Client Sample ID: MW105

DISSOLVED Metals

Lot-Sample #...: A0E240174-006 Matrix.....: WG
Date Sampled...: 05/23/00 14:30 Date Received..: 05/24/00

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 0146108						
Barium	ND	0.20	mg/L	SW846 6010B	05/25/00	DDLV2104
		Dilution Factor: 1				
Chromium	ND	0.010	mg/L	SW846 6010B	05/25/00	DDLV2105
		Dilution Factor: 1				
Lead	ND	0.0030	mg/L	SW846 6010B	05/25/00	DDLV2103
		Dilution Factor: 1				

TRW - CLEVELAND

Client Sample ID: VOSS WELL

GC/MS Volatiles

Lot-Sample #...: A0E240174-007 Work Order #...: DDLV5101 Matrix.....: WG
Date Sampled...: 05/23/00 12:45 Date Received..: 05/24/00
Prep Date.....: 05/30/00 Analysis Date...: 05/30/00
Prep Batch #...: 0152177
Dilution Factor: 3.33 Method.....: SW846 8260B

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Acetone	ND	33	ug/L
Benzene	ND	3.3	ug/L
Bromodichloromethane	ND	3.3	ug/L
Bromoform	ND	3.3	ug/L
Bromomethane	ND	6.7	ug/L
2-Butanone	ND	33	ug/L
Carbon disulfide	ND	3.3	ug/L
Carbon tetrachloride	ND	3.3	ug/L
Chlorobenzene	ND	3.3	ug/L
Dibromochloromethane	ND	3.3	ug/L
Chloroethane	ND	6.7	ug/L
Chloroform	**0.64 J**	**3.3**	**ug/L**
Chloromethane	ND	6.7	ug/L
1,1-Dichloroethane	**3.6**	**3.3**	**ug/L**
1,2-Dichloroethane	ND	3.3	ug/L
1,1-Dichloroethene	ND	3.3	ug/L
1,2-Dichloroethene (total)	ND	3.3	ug/L
1,2-Dichloropropane	ND	3.3	ug/L
cis-1,3-Dichloropropene	ND	3.3	ug/L
trans-1,3-Dichloropropene	ND	3.3	ug/L
Ethylbenzene	ND	3.3	ug/L
2-Hexanone	ND	33	ug/L
Methylene chloride	ND	3.3	ug/L
4-Methyl-2-pentanone	ND	33	ug/L
Styrene	ND	3.3	ug/L
1,1,2,2-Tetrachloroethane	ND	3.3	ug/L
Tetrachloroethene	**0.93 J**	**3.3**	**ug/L**
Toluene	ND	3.3	ug/L
1,1,1-Trichloroethane	**1.2 J**	**3.3**	**ug/L**
1,1,2-Trichloroethane	ND	3.3	ug/L
Trichloroethene	**1.6 J**	**3.3**	**ug/L**
Vinyl chloride	ND	6.7	ug/L
Xylenes (total)	ND	3.3	ug/L

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Toluene-d8	94	(76 - 110)
1,2-Dichloroethane-d4	97	(61 - 128)
Dibromofluoromethane	96	(73 - 122)
4-Bromofluorobenzene	101	(74 - 116)

(Continued on next page)

TRW - CLEVELAND

Client Sample ID: VOSS WELL

GC/MS Volatiles

Lot-Sample #...: A0E240174-007 Work Order #...: DDLV5101 Matrix.....: WG

NOTE(S):

J Estimated result. Result is less than RL.

Elevated reporting limits due to TICs.

TRW - CLEVELAND

Client Sample ID: VOSS WELL

DISSOLVED Metals

Lot-Sample #...: A0E240174-007 Matrix.....: WG
Date Sampled...: 05/23/00 12:45 Date Received..: 05/24/00

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 0146108						
Barium	ND	0.20	mg/L	SW846 6010B	05/25/00	DDLV5104
		Dilution Factor: 1				
Chromium	ND	0.010	mg/L	SW846 6010B	05/25/00	DDLV5105
		Dilution Factor: 1				
Lead	ND	0.0030	mg/L	SW846 6010B	05/25/00	DDLV5103
		Dilution Factor: 1				

TRW - CLEVELAND

Client Sample ID: TRIP BLANK

GC/MS Volatiles

Lot-Sample #...: A0E240174-008 Work Order #...: DDLV9101 Matrix.....: WQ
Date Sampled...: 05/23/00 Date Received..: 05/24/00
Prep Date.....: 05/30/00 Analysis Date..: 05/30/00
Prep Batch #...: 0152177
Dilution Factor: 1 Method.....: SW846 8260B

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Ethylbenzene	ND	1.0	ug/L
2-Hexanone	ND	10	ug/L
Methylene chloride	ND	1.0	ug/L
4-Methyl-2-pentanone	ND	10	ug/L
Styrene	ND	1.0	ug/L
1,1,2,2-Tetrachloroethane	ND	1.0	ug/L
Tetrachloroethene	ND	1.0	ug/L
Toluene	**0.14 J**	**1.0**	**ug/L**
1,1,1-Trichloroethane	ND	1.0	ug/L
1,1,2-Trichloroethane	ND	1.0	ug/L
Trichloroethene	ND	1.0	ug/L
Vinyl chloride	ND	2.0	ug/L
Xylenes (total)	ND	1.0	ug/L
Acetone	**1.0 J**	**10**	**ug/L**
Benzene	ND	1.0	ug/L
Bromodichloromethane	ND	1.0	ug/L
Bromoform	ND	1.0	ug/L
Bromomethane	ND	2.0	ug/L
2-Butanone	ND	10	ug/L
Carbon disulfide	ND	1.0	ug/L
Carbon tetrachloride	ND	1.0	ug/L
Chlorobenzene	ND	1.0	ug/L
Dibromochloromethane	ND	1.0	ug/L
Chloroethane	ND	2.0	ug/L
Chloroform	ND	1.0	ug/L
Chloromethane	ND	2.0	ug/L
1,1-Dichloroethane	ND	1.0	ug/L
1,2-Dichloroethane	ND	1.0	ug/L
1,1-Dichloroethene	ND	1.0	ug/L
1,2-Dichloroethene (total)	ND	1.0	ug/L
1,2-Dichloropropane	ND	1.0	ug/L
cis-1,3-Dichloropropene	ND	1.0	ug/L
trans-1,3-Dichloropropene	ND	1.0	ug/L

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Toluene-d8	98	(76 - 110)
1,2-Dichloroethane-d4	96	(61 - 128)
Dibromofluoromethane	95	(73 - 122)
4-Bromofluorobenzene	103	(74 - 116)

(Continued on next page)

TRW - CLEVELAND

Client Sample ID: TRIP BLANK

GC/MS Volatiles

Lot-Sample #...: A0E240174-008 Work Order #...: DDLV9101 Matrix.....: WQ

NOTE(S):

J - Estimated result. Result is less than RL.

QUALITY CONTROL SECTION

QUALITY CONTROL ELEMENTS OF SW-846 METHODS

STL North Canton conducts a quality assurance/quality control (QA/QC) program designed to provide scientifically valid and legally defensible data. Toward this end, several types of quality control indicators are incorporated into the QA/QC program, which is described in detail in QA Policy, QA-003. These indicators are introduced into the sample testing process to provide a mechanism for the assessment of the analytical data.

QC BATCH

Environmental samples are taken through the testing process in groups called QUALITY CONTROL BATCHES (QC batches). A QC batch contains up to twenty environmental samples of a similar matrix (water, soil) that are processed using the same reagents and standards. STL North Canton requires that each environmental sample be associated with a QC batch.

Several quality control samples are included in each QC batch and are processed identically to the twenty environmental samples. These QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) pair or a MATRIX SPIKE/SAMPLE DUPLICATE (MS/DU) pair. If there is insufficient sample to perform an MS/MSD or an MS/DU, then a LABORATORY CONTROL SAMPLE DUPLICATE (LCSD) is included in the QC batch.

LABORATORY CONTROL SAMPLE

The Laboratory Control Sample is a QC sample that is created by adding known concentrations of a full or partial set of target analytes to a matrix similar to that of the environmental samples in the QC batch. The LCS analyte recovery results are used to monitor the analytical process and provide evidence that the laboratory is performing the method within acceptable guidelines. All control analytes indicated by a bold type in the LCS must meet acceptance criteria. Failure to meet the established recovery guidelines requires the repreparation and reanalysis of all samples in the QC batch. The only exception is that if the LCS recoveries are biased high and the associated sample is ND for the parameter(s) of interest, the batch is acceptable.

At times, a Laboratory Control Sample Duplicate (LCSD) is also included in the QC batch. An LCSD is a QC sample that is created and handled identically to the LCS. Analyte recovery data from the LCSD is assessed in the same way as that of the LCS. The LCSD recoveries, together with the LCS recoveries, are used to determine the reproducibility (precision) of the analytical system. Precision data are expressed as relative percent differences (RPDs). If the RPD fails for an LCS/LCSD and yet the recoveries are within acceptance criteria, the batch is still acceptable.

METHOD BLANK

The Method Blank is a QC sample consisting of all the reagents used in analyzing the environmental samples contained in the QC batch. Method Blank results are used to determine if interference or contamination in the analytical system could lead to the reporting of false positive data or elevated analyte concentrations. All target analytes must be below the reporting limits (RL), the analytes were greater than 10 times the blank level for organics or 20 times for inorganics, or the associated sample(s) must be ND except for the common laboratory contaminants indicated below.

Volatile (GC or GC/MS)	Semivolatile (GC/MS)	Metals
Methylene chloride	Phthalate Esters	Copper
Acetone		Iron
2-Butanone		Zinc
		Lead*

- *for analyses run on TJA Trace ICP only*

QUALITY CONTROL ELEMENTS OF SW-846 METHODS
(Continued)

The listed volatile and semivolatile compounds may be present in concentrations up to 5 times the reporting limits. Failure to meet these Method Blank criteria requires the repreparation and reanalysis of all samples in the QC batch.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A Matrix Spike and a Matrix Spike Duplicate are a pair of environmental samples to which known concentrations of a full or partial set of target analytes are added. The MS/MSD results are determined in the same manner as the results of the environmental sample used to prepare the MS/MSD. The analyte recoveries and the relative percent differences (RPDs) of the recoveries are calculated and used to evaluate the effect of the sample matrix on the analytical results. Due to the potential variability of the matrix of each sample, the MS/MSD results may not have an immediate bearing on any samples except the one spiked; therefore, the associated batch MS/MSD may not reflect the same compounds as the samples contained in the analytical report. When these MS/MSD results fail to meet acceptance criteria, the data is evaluated. If the LCS is within acceptance criteria, the batch is considered acceptable. The acceptance criteria does not apply to samples that are diluted for organics or at a 4 times dilution for inorganics.

For certain methods, a Matrix Spike/Sample Duplicate (MS/DU) may be included in the QC batch in place of the MS/MSD. For the parameters (i.e. pH, ignitability) where it is not possible to prepare a spiked sample, a Sample Duplicate may be included in the QC batch. However, a Sample Duplicate is less likely to provide usable precision statistics depending on the likelihood of finding concentrations below the standard reporting limit. When the Sample Duplicate result fails to meet acceptance criteria, the data is evaluated.

SURROGATE COMPOUNDS

In addition to these batch-related QC indicators, each organic environmental and QC sample are spiked with surrogate compounds. Surrogates are organic chemicals that behave similarly to the analytes of interest and that are rarely present in the environment. Surrogate recoveries are used to monitor the individual performance of a sample in the analytical system.

If the surrogate recoveries are outside criteria for environmental or MS/MSD samples, the batch is acceptable if the Method Blank, LCS, and LCSD surrogate recoveries are within acceptance criteria. The only exception is if the surrogate recoveries are biased high in the LCS, LCSD, or the Method Blank and the associated sample(s) are ND, the batch is acceptable. If the LCS, LCSD, or Method Blank surrogate(s) fail to meet recovery criteria, the entire sample batch is reprepared and reanalyzed.

For the GC/MS BNA methods, the surrogate criterion is that two of the three surrogates for each fraction must meet acceptance criteria. The third surrogate must have a recovery of ten percent or greater.

For the Pesticide/PCB, PAH, and Herbicide methods, the surrogate criteria is that one of two surrogate compounds meet acceptance criteria.

LABORATORY CONTROL SAMPLE EVALUATION REPORT

GC/MS Volatiles

Client Lot #...: A0E240174 Work Order #...: DDXWL102-LCS Matrix.....: WATER
LCS Lot-Sample#: A0E310000-177 DDXWL103-LCSD
Prep Date.....: 05/30/00 Analysis Date..: 05/30/00
Prep Batch #...: 0152177
Dilution Factor: 1

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD
1,1-Dichloroethene	95	(63 - 130)			SW846 8260B
	91	(63 - 130)	3.8	(0-20)	SW846 8260B
Benzene	93	(80 - 116)			SW846 8260B
	90	(80 - 116)	2.3	(0-20)	SW846 8260B
Trichloroethene	101	(75 - 122)			SW846 8260B
	98	(75 - 122)	2.4	(0-20)	SW846 8260B
Toluene	98	(74 - 119)			SW846 8260B
	96	(74 - 119)	1.8	(0-20)	SW846 8260B
Chlorobenzene	104	(76 - 117)			SW846 8260B
	101	(76 - 117)	3.3	(0-20)	SW846 8260B

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Toluene-d8	99	(76 - 110)
	98	(76 - 110)
1,2-Dichloroethane-d4	95	(61 - 128)
	91	(61 - 128)
Dibromofluoromethane	98	(73 - 122)
	94	(73 - 122)
4-Bromofluorobenzene	105	(74 - 116)
	100	(74 - 116)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

LABORATORY CONTROL SAMPLE EVALUATION REPORT

DISSOLVED Metals

Client Lot #...: A0E240174 Matrix.....: WATER

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
LCS Lot-Sample#: A0E250000-108 Prep Batch #...: 0146108					
Lead	96	(80 - 120)	SW846 6010B	05/25/00	DDNC712A
		Dilution Factor: 1			
Barium	96	(80 - 120)	SW846 6010B	05/25/00	DDNC712C
		Dilution Factor: 1			
Chromium	95	(80 - 120)	SW846 6010B	05/25/00	DDNC712D
		Dilution Factor: 1			

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK REPORT

GC/MS Volatiles

Client Lot #...: A0E240174 Work Order #...: DDXWL101 Matrix.....: WATER
MB Lot-Sample #: A0E310000-177

Prep Date.....: 05/30/00
Analysis Date..: 05/30/00 Prep Batch #...: 0152177
Dilution Factor: 1

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD
Acetone	ND	10	ug/L	SW846 8260B
Benzene	ND	1.0	ug/L	SW846 8260B
Bromodichloromethane	ND	1.0	ug/L	SW846 8260B
Bromoform	ND	1.0	ug/L	SW846 8260B
Bromomethane	ND	2.0	ug/L	SW846 8260B
2-Butanone	ND	10	ug/L	SW846 8260B
Carbon disulfide	ND	1.0	ug/L	SW846 8260B
Carbon tetrachloride	ND	1.0	ug/L	SW846 8260B
Chlorobenzene	ND	1.0	ug/L	SW846 8260B
Dibromochloromethane	ND	1.0	ug/L	SW846 8260B
Chloroethane	ND	2.0	ug/L	SW846 8260B
Chloroform	ND	1.0	ug/L	SW846 8260B
Chloromethane	ND	2.0	ug/L	SW846 8260B
1,1-Dichloroethane	ND	1.0	ug/L	SW846 8260B
1,2-Dichloroethane	ND	1.0	ug/L	SW846 8260B
1,1-Dichloroethene	ND	1.0	ug/L	SW846 8260B
1,2-Dichloroethene (total)	ND	1.0	ug/L	SW846 8260B
1,2-Dichloropropane	ND	1.0	ug/L	SW846 8260B
cis-1,3-Dichloropropene	ND	1.0	ug/L	SW846 8260B
trans-1,3-Dichloropropene	ND	1.0	ug/L	SW846 8260B
Ethylbenzene	ND	1.0	ug/L	SW846 8260B
2-Hexanone	ND	10	ug/L	SW846 8260B
Methylene chloride	ND	1.0	ug/L	SW846 8260B
4-Methyl-2-pentanone	ND	10	ug/L	SW846 8260B
Styrene	ND	1.0	ug/L	SW846 8260B
1,1,2,2-Tetrachloroethane	ND	1.0	ug/L	SW846 8260B
Tetrachloroethene	ND	1.0	ug/L	SW846 8260B
Toluene	ND	1.0	ug/L	SW846 8260B
1,1,1-Trichloroethane	ND	1.0	ug/L	SW846 8260B
1,1,2-Trichloroethane	ND	1.0	ug/L	SW846 8260B
Trichloroethene	ND	1.0	ug/L	SW846 8260B
Vinyl chloride	ND	2.0	ug/L	SW846 8260B
Xylenes (total)	ND	1.0	ug/L	SW846 8260B

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Toluene-d8	98	(76 - 110)
1,2-Dichloroethane-d4	92	(61 - 128)
Dibromofluoromethane	94	(73 - 122)
4-Bromofluorobenzene	99	(74 - 116)

(Continued on next page)

METHOD BLANK REPORT

GC/MS Volatiles

Client Lot #...: A0E240174 Work Order #...: DDXWL101 Matrix.....: WATER

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK REPORT

DISSOLVED Metals

Client Lot #...: A0E240174 Matrix.....: WATER

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
MB Lot-Sample #: A0E250000-108 **Prep Batch #...:** 0146108						
Barium	ND	0.20	mg/L	SW846 6010B	05/25/00	DDNC711N
		Dilution Factor: 1				
Chromium	ND	0.010	mg/L	SW846 6010B	05/25/00	DDNC711P
		Dilution Factor: 1				
Lead	ND	0.0030	mg/L	SW846 6010B	05/25/00	DDNC711M
		Dilution Factor: 1				

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

MATRIX SPIKE SAMPLE EVALUATION REPORT

DISSOLVED Metals

Client Lot #...: A0E240174 Matrix.....: WATER
Date Sampled...: 05/24/00 15:00 Date Received..: 05/24/00

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
MS Lot-Sample #: A0E240286-001 Prep Batch #...: 0146108							
Barium	97	(75 - 125)			SW846 6010B	05/25-05/26/00	DDMTT13G
	95	(75 - 125)	2.0	(0-20)	SW846 6010B	05/25-05/26/00	DDMTT13H
		Dilution Factor: 1					
Chromium	97	(75 - 125)			SW846 6010B	05/25-05/26/00	DDMTT13K
	96	(75 - 125)	1.8	(0-20)	SW846 6010B	05/25-05/26/00	DDMTT13L
		Dilution Factor: 1					
Lead	96	(75 - 125)			SW846 6010B	05/25-05/26/00	DDMTT13D
	93	(75 - 125)	2.1	(0-20)	SW846 6010B	05/25-05/26/00	DDMTT13E
		Dilution Factor: 1					

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

ERM.
ENVIRONMENTAL RESOURCES MANAGEMENT, INC.
1630 Heritage Landing Drive, Suite 100
St. Charles, MO 63303
636/928-0300
636/928-2050 (fax)

SAMPLE CHAIN OF CUSTODY

Preservation:

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W.O. No: A3149.00

Project Name: SULLIVAN LANDFILL

Sampler: DOUG M BURLE, ERIK ROSENFELDT

Number of Containers

REMARKS:

ERM Sample Number	Date 2000	Time	COMP	GRAB	Station Location		VOC 8260	Pb, Cr, Ba						
MW101	5/22	17:00		X		4	3	1						
MW103	5/23	10:20		X		4	3	1						
MW104	5/23	11:45		X		4	3	1						
MW104-B	5/23	13:00		X		4	3	1						
MW104-DUP	5/23	11:45		X		4	3	1						
MW105	5/23	14:30		X		4	3	1						
VOSS WELL	5/23	12:45		X		4	3	1						
					TRIP BLANK	2	2	0						

Sample Relinquished by:	Date	Time	Sample Received by:	Date	Time	Reason for Transfer
DMB	5/23/00	18:00				OVERNIGHT CARRIER TO LABORATORY
			Jenny Stiller	5-24-00	9:45A	

COMMENTS:

Pb, Cr, Ba SAMPLES HAVE BEEN FIELD FILTERED

S: Wh... low co... ompan... shipm... borator... copy to ... rned to ... files ... copy re... labor... nk cop... d by s...