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February 9, 1999

VIA FEDERAL EXPRESS

Ms. Denise Radtke
New York State Department of Environmental Conservation
Bureau of Hazardous Compliance and Land Management
50 Wolf Road
Albany, NY 12233-7252

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Subject: **Semi-Annual Groundwater Monitoring and IRM Report
Former Borden Resin Facility
Bainbridge, NY
LAW Project No. 50700-8-0985**

Dear Denise:

On behalf of Cherokee Environmental Risk Management, L.P. (Cherokee), Law Engineering and Environmental Services, P.C. (LAW) is herein providing a report of groundwater monitoring and interim remedial measures (IRM) conducted in the second half of 1998.

Groundwater Monitoring

Groundwater monitoring was conducted as scheduled in August and November 1998. Prior to groundwater sample collection, the depth to groundwater and the depth to the well bottom were measured for each monitoring well. November 1998 measurements are provided in Table 1. Depth to well bottom is determined in order to monitor sediment build-up in the monitoring wells. As illustrated in Table 1, there has been significant sedimentation (i.e., greater than one foot) in monitoring wells MW-15, MW-20, MW-27, MW-35, and MW-21. Therefore, these wells will be re-developed prior to the next monitoring event scheduled for February 1999.

Groundwater elevations are tabulated in Table 1, and water table contours and flow lines are illustrated on Figure 1. Water table contours reflect IRM pumping conditions (see below). These data indicate that the groundwater in the Phenol Recovery Area generally discharges to Beatty

Creek. However, groundwater is being captured by the IRM in the immediate vicinity of the groundwater collection well (Sump 1). The limited extent of the cone-of-depression and decreased yield of Sump 1 relative to previous periods (see below) are attributed to below normal rainfall (i.e., depressed water table), and perhaps to sediment and/or minerals fouling of the slots of the collection sump.

Groundwater quality analytical results for August and November 1998 are summarized in Tables 2 and 3. (Complete laboratory reports are provided in Attachments A and B.) For comparison purposes, Tables 2 and 3 also include site groundwater clean-up criteria. In reviewing the analytical data, the most pertinent conclusions include the following:

- Constituents occurring at the highest concentrations and above clean-up criteria include phenolics (primarily phenol) and VOCs (primarily toluene).
- The highest contaminant concentrations occur at MW-29, located between the former surface impoundments and phenol recovery unit. Phenolics occurred at 618 mg/L, toluene at 254 mg/L. Sump 1 collects groundwater from this vicinity.
- PCBs were non-detectable.
- In November, but not August, formaldehyde was encountered at elevated concentrations throughout the monitoring area. Formaldehyde results are highly suspect for two reasons. First, the significant disparity between August and November sampling results is not easily explained by natural phenomena. Second, the results were generated by two different laboratories. Results from previous analyses (Erceg and Benson domestic wells) have had elevated levels of formaldehyde in laboratory blanks. For these reasons, it is believed that elevated formaldehyde results may be partially attributable to laboratory error/contamination or limitations of the analytical procedures. QA/QC issues are currently being investigated by NYSDEC.
- Deep monitoring wells (i.e., MW-15D and MW-29D) are significantly less contaminated than adjacent shallow wells, indicating that contamination is primarily limited to shallow groundwater.

Figure 2 illustrates the extent of the contaminant plume (August 1998) in excess of groundwater clean-up criteria. The most significant contamination is downgradient of the former surface impoundments and phenol recovery unit. Lesser concentrations (e.g., 64 ug/L) are found across Beatty Creek and at MW-19.

Figure 3 illustrates historic concentration trends at the most contaminated sample location, MW-29. Recent data suggest a declining trend for toluene, and an increasing trend for phenol.

Interim Remedial Measures

Since June 1995, contaminated groundwater has been collected, treated, and discharged on a batch basis. Contaminated groundwater is collected from Sump 1 and discharged for treatment into an aboveground, open-top tank. Aeration is provided to the treatment tank to facilitate aerobic biological degradation of contaminants. An operator performs weekly on-site inspection and maintenance to ensure proper operation. When the treatment tank is full, groundwater collection is interrupted and a treated water sample is collected. Upon laboratory confirmation that discharge criteria have been achieved, water is discharged as a batch to the adjacent creek, and if weather permits, simultaneously to the spray application area (i.e., the area of the former surface impoundments). After the tank is emptied, groundwater collection and treatment resume.

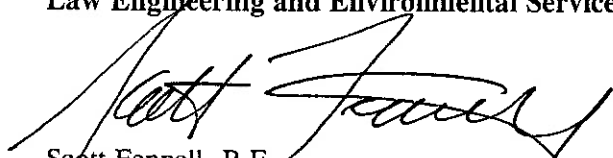
A summary of IRM batch treatment since 1995 is provided in Table 4. The total volume treated in the period July through December 1998 was approximately 300,000 gallons. The average groundwater collection rate was approximately one gpm. As illustrated in Table 4, there has been a significant decline in the groundwater collection rate from the initial (average) rate of 10 gpm to the most recent rate of one gpm. The decline in the most recent period is attributable to some extent to lower than normal rainfall reported for Bainbridge, and the resultant depression of the water table. (Rainfall has been approximately seven inches below normal for the second half of 1998.) The decreased yield from Sump 1 may also be attributable to sediment, mineral and/or biological fouling of the slots of the collection sump. Since Sump 1 will be destroyed during remedial soil excavation in 1999, Sump 1 will be replaced at that time.

Due to the limited yield of Sump 1, no batches have been tested or discharged since July 1998. The IRM system will continue to be operated on a batch basis until final corrective measures (air sparging, in-situ bioremediation) are implemented and demonstrated to be successful.

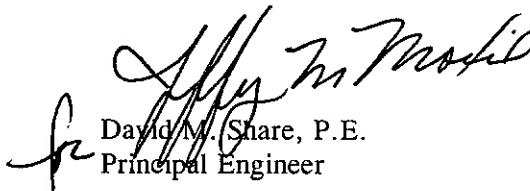
If you have any questions or comments regarding groundwater monitoring or IRM, please contact Scott Fennell. Meanwhile, we please recall our request to abandon inactive monitoring wells in the Land Application Area (letter dated October 30, 1998).

Sincerely,

Law Engineering and Environmental Services, P.C.



Scott Fennell, P.E.
Senior Engineer/ Project Manager



David M. Share, P.E.
Principal Engineer

C: See distribution list

Attachments

DISTRIBUTION LIST- GROUNDWATER TREATMENT

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Alan Springett – Site Copy 7 Newton Road Bainbridge, NY 13733	1 copy (without laboratory reports)

Former Borden Resin Facility - Bainbridge, New York
Table 1
Groundwater Elevations and Well Status - November 1998

Monitoring Location	Initial Well Depth (Ft TOC)	11/98 Well Depth (Ft TOC)	Sedimentation (Ft)	TOC Elevation (Ft)	11/98 DTW (Ft TOC)	GW Elevation (Ft)
MW-15	21.37	17.52	3.85	995.54	12.77	982.77
MW-15D	32.59	32.15	0.44	995.33	10.12	985.21
MW-16	16.27	15.98	0.29	990.75	6.57	984.18
MW-19	22.23	22.18	0.05	998.58	10.81	987.77
MW-20	19.60	16.43	3.17	989.59	4.92	984.67
MW-27	14.51	12.80	1.71	988.48	6.59	981.89
MW-29	18.52	18.51	0.01	996.33	9.41	986.92
MW-29D	32.97	32.43	0.54	997.19	9.41	987.78
MW-30	17.50	17.50	0.00	996.76	10.76	986.00
MW-34	16.90	16.06	0.84	992.09	10.50	981.59
MW-35	14.70	12.46	2.24	987.07	4.54	982.53
Sump 1	ND	ND	NA	992.14	8.25	983.89
Sump 3	ND	ND	NA	995.44	9.79	985.65
MW-2A	8.83	8.75	0.08	999.82	7.35	992.47
MW-17	21.14	21.10	0.04	1000.83	8.45	992.38
MW-21	21.34	20.31	1.03	999.69	8.29	991.40
Beatty Creek	NA	NA	NA	982.79	0.00	982.79

Prepared by: SF
Checked by: DS

Former Borden Resin Facility - Bainbridge, New York
Table 2
Summary of Groundwater Analysis - August 1998

Monitoring Location	Formaldehyde (mg/L)	PCBs (mg/L)	Total Phenolics (mg/L)	Total VOCs (mg/L)
MW-15	NS	NS	NS	NS
MW-15D	< 0.050	< 0.000952	< 0.010	< 0.002
MW-16	< 0.050	< 0.000952	0.064	< 0.002
MW-19	< 0.050	< 0.000952	0.038	< 0.002
MW-20	< 0.050	< 0.001	0.043	< 0.002
MW-27	0.196	< 0.000952	< 0.010	< 0.002
MW-29	< 5	< 0.000952	618.200	254.593
MW-29D	< 0.050	< 0.000952	0.025	0.005
MW-30	< 0.050	< 0.000952	< 0.010	0.005
MW-34	< 0.050	< 0.000105	< 0.010	< 0.002
MW-35	< 0.050	< 0.000952	< 0.010	< 0.002
Sump 1	< 0.050	< 0.000952	0.147	1.917
Sump 3	< 0.050	< 0.000952	0.031	< 0.002
MW-2A	< 0.050	NS	NS	NS
MW-17	< 0.050	NS	NS	NS
MW-21	< 0.050	NS	NS	NS
Beatty Creek**	0.097	< 0.00099	0.012	< 0.002
Site Clean-up Criteria	0.050	0.0001	0.001	0.005*

Notes:

- * - 0.005 is the criterion for most individual VOCs, including toluene, the most significant site VOC.
- ** - Sampled from pooled water, creek not flowing.
- NS - Not Sampled.
- ND - Not Detected.
- Bold - Exceeds criteria.

Prepared by: SF
Checked by: DS

Former Borden Resin Facility - Bainbridge, New York
Table 3
Summary of Groundwater Analysis - November 1998

Monitoring Location	Formaldehyde (mg/L)	PCBs (mg/L)	Total Phenolics (mg/L)	Total VOCs (mg/L)
MW-15	0.148	< 0.0003	< 0.002	0.052
MW-15D	0.101	< 0.0003	< 0.002	< 0.002
MW-16	0.048	< 0.0003	< 0.002	< 0.002
MW-19	0.148	< 0.0003	< 0.002	0.002
MW-20	0.073	< 0.0003	< 0.002	< 0.002
MW-27	0.145	< 0.000353	< 0.002	< 0.002
MW-29	1.936	< 0.0003	330.770	186.942
MW-29D	0.062	< 0.0003	0.081	0.006
MW-30	0.056	< 0.0003	< 0.002	< 0.002
MW-34	0.039	< 0.000353	< 0.002	< 0.002
MW-35	0.075	< 0.000353	< 0.002	< 0.002
Sump 1	0.213	< 0.0003	0.280	0.856
Sump 3	0.188	< 0.0003	< 0.002	0.004
MW-2A	0.050	NA	NA	NA
MW-17	0.087	NA	NA	NA
MW-21	0.091	NA	NA	NA
Beatty Creek **	0.169	< 0.0003	< 0.002	< 0.002
Site Clean-up Criteria	0.050	0.0001	0.001	0.005*

Notes:

* - 0.005 is the criterion for most individual VOCs, including toluene, the most significant site VOC.

** - Sampled from pooled water, creek not flowing.

NS - Not Sampled.

ND - Not Detected.

Bold - Exceeds criteria.

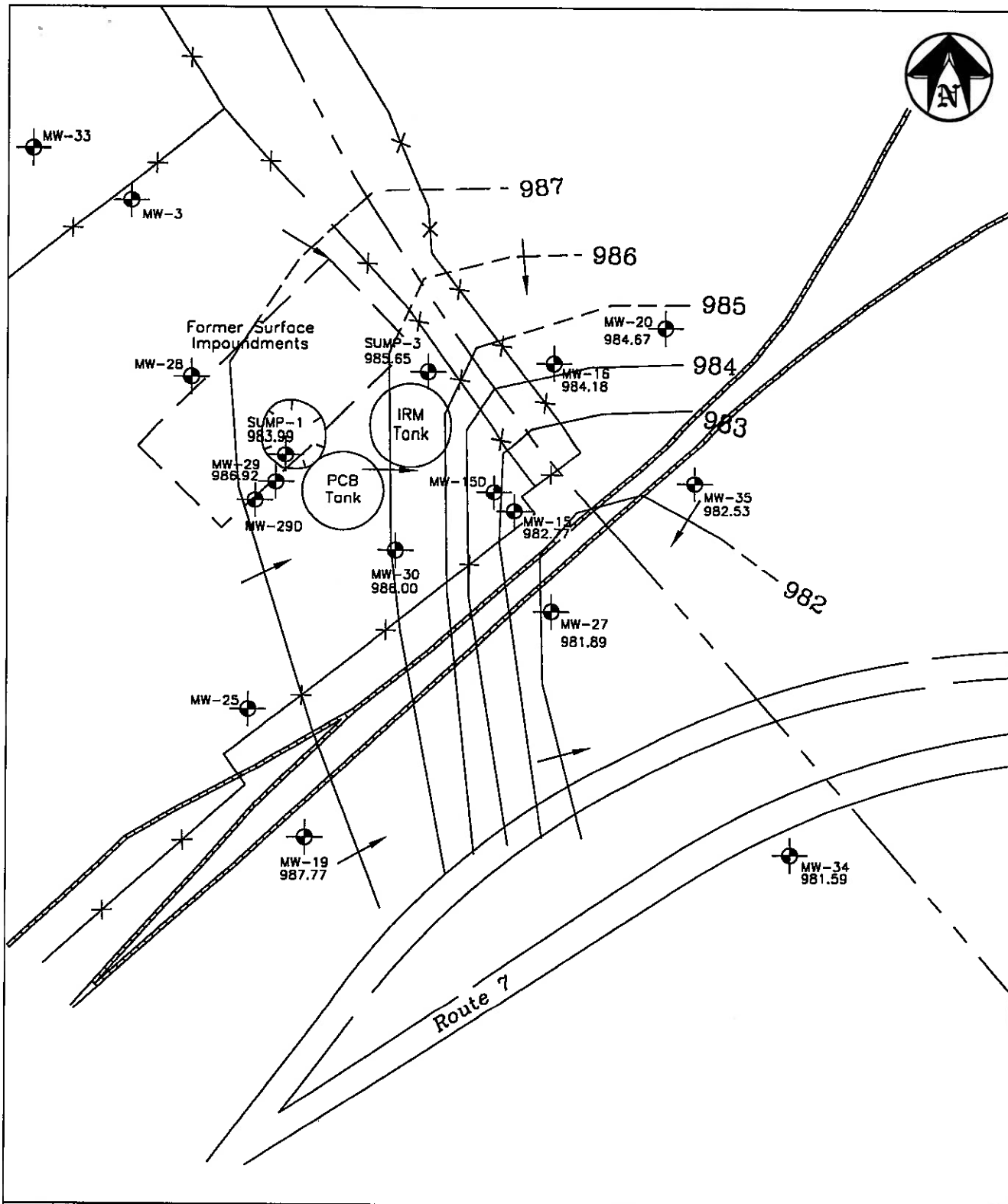
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Former Borden Resin Facility - Bainbridge, New York
Table 4
Batch Treatment Record

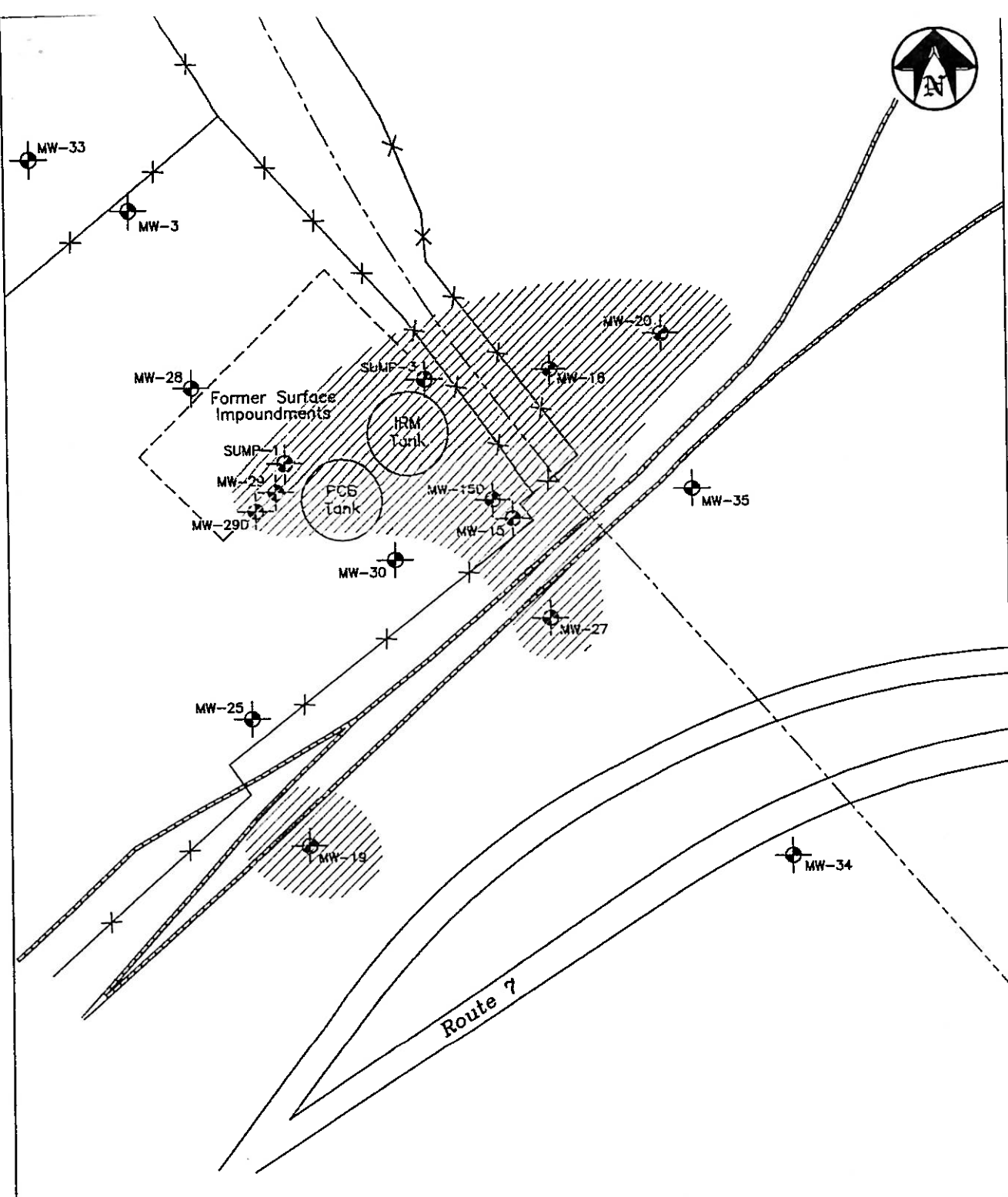
Date Start/End	Batch No.	Start/End DTW (ft)	Time to Fill (days)	Volume Treated (gal)	Collection Rate (gpm)	Effluent to:
27-Jun-95 30-Dec-97	01 - 12	N/A	38 (Average) 7 - 153 (Range)	3,490,560	10 (Average) 2 - 35 (Range)	SW and/or SF
07-Feb-98 29-Jun-98	13 - 15	N/A	34 (Average) 22 - 58 (Range)	923,160	7 (Average) 4 - 10 (Range)	SW
10-Jul-98 30-Dec-98	16	13.4 3	173	300,027	1	N/A

Notes: DTW - Depth to water surface from top of tank.
SW - Discharge to surface water.
SF - Discharge to spray field.

Prepared by: SF
Checked by: DS



DRAWN BY JGB	DATE 8/4/98	 LAW ENGINEERING AND ENVIRONMENTAL SERVICES	
CHECKED BY SKF	8/5/98		
SOURCE SITE PLAN ADAPTED FROM: BLOCK & CLARK'S NATIONAL SURVEYORS NETWORK	1/18/96	Phenol Recovery Area Water Table Contours and Flow Lines - Nov 1998	
		PROJECT NAME Former Borden Facility Bainbridge, New York	
FIGURE NO. 1		SIZE A	PROJECT NO. 50700.8.0985
		APPROX. SCALE: 1" = 120'	FILE NAME: G:\Projects\Cincinnati\Cherokee\ Bainbridge\0985cod.dwg
		SHEET: 1 OF 1	



DRAWN BY JGB/JLR		DATE 8/13/98		 LAW ENGINEERING AND ENVIRONMENTAL SERVICES	
CHECKED BY SKF		8/13/98			
SOURCE				Groundwater Contamination Plume in Excess of Standards - August 1998	
SITE PLAN ADAPTED FROM: BLOCK & CLARK'S NATIONAL SURVEYORS NETWORK		1/18/96		PROJECT NAME Former Borden Facility Bainbridge, New York	
FIGURE NO. 2		SIZE A	PROJECT NO. 50700.8.0985		REV
		APPROX. SCALE: 1" = 120'	FILE NAME: G:\Projects\Cincinnati\Cherokee\ Bainbridge\rem_dsgn_figs\0985 fig 15.dwg		SHEET: 1 OF 1

Former Borden Resin Facility - Bainbridge, New York

Figure 3

Concentration Trends at MW-29

