Correspondence Memorandum, State of Wisconsin

Date: November 19, 1987

To: Ted Bosch - SED
Brian Barbieur - WW/2

File Code: 4430

From: Mark Tusler MT

Subject: Saukville POTW Report dated 11/13/87

Roger Hatcher has sent us another report on Freeman's impact on the Saukville POTW. Though his analysis of the data is a bit convoluted to make up for deficiencies in the field work, the data does show that the POTW is providing for a significant reduction of the VOCs.

I cannot answer the question as to whether this treatment is sufficient to meet water quality or pretreatment needs. Brian, could you check with Jim Schmidt (WR/2) to see if the influent or effluent concentrations approach levels of concern? The field sampling is limited to VOCs so its difficult to know if there's additional compounds that may cause a water quality problem. Even if we were to require a more comprehensive analysis (priority pollutants or Appendix IX analysis for about 250 hazardous constituents), I'm not sure if Jim Schmidt (WR/2) could tell us if it's a problem. I'd rather pursue bioassays for Freeman's discharge to the river and the Saukville POTW.

On a technical side, there's some serious problems with Hatcher's reasoning in the timing of sample collection. In the letter responding to this report we should notify Hatcher that collection systems and wastewater treatment plants do not act as ideal plug flow reactors. In reality they behave more like a mix between a plug flow and complete mix system. In a complete mix system, it takes about 3 residence volumes before the system approaches equilibrium. Sampling of the system should be delayed by about 3 residence volumes before sampling if some sort of transient sampling protocol is attempted.

In thinking about monitoring requirements for the systems, I'd like to see regular monitoring (quarterly?) of the collector discharges, discharge to the POTW, POTW effluent and Freeman's effluent (to the river). The samples would be analyzed for the method 624 VOCs, total recoverable phenolics and trichlorofluoromethane (Freon). Phenolics are included because Freeman's appendix IX analysis of the acid reaction water showed phenol to be the only nonVOC compound showing up in detectable levels. I don't know of any other analyses that looked for phenols so I don't know how much is in the groundwater. Freon is included because its a major component used in urethane production (a blowing agent).

Due to the length of time for the groundwater extraction program (on the order of 10 years), we should also consider regular (annual, biannual?) bioassay monitoring.

Ted, since this is a wastewater issue, I'm assuming that you will coordinate the response. If I can help with clarifying comments or reviewing a draft response, let me know.

→ Brian B

SAUKVILLE POTW STUDY
GROUNDWATER REMEDIATION
FREEMAN CHEMICAL CORPORATION
SAUKVILLE, WISCONSIN

Prepared by:

Hatcher Incorporated
Midlothian, Virginia
Job No. 0001-003

November 13, 1987

SAUKVILLE POTW STUDY
GROUNDWATER REMEDIATION
FREEMAN CHEMICAL CORPORATION
SAUKVILLE, WISCONSIN

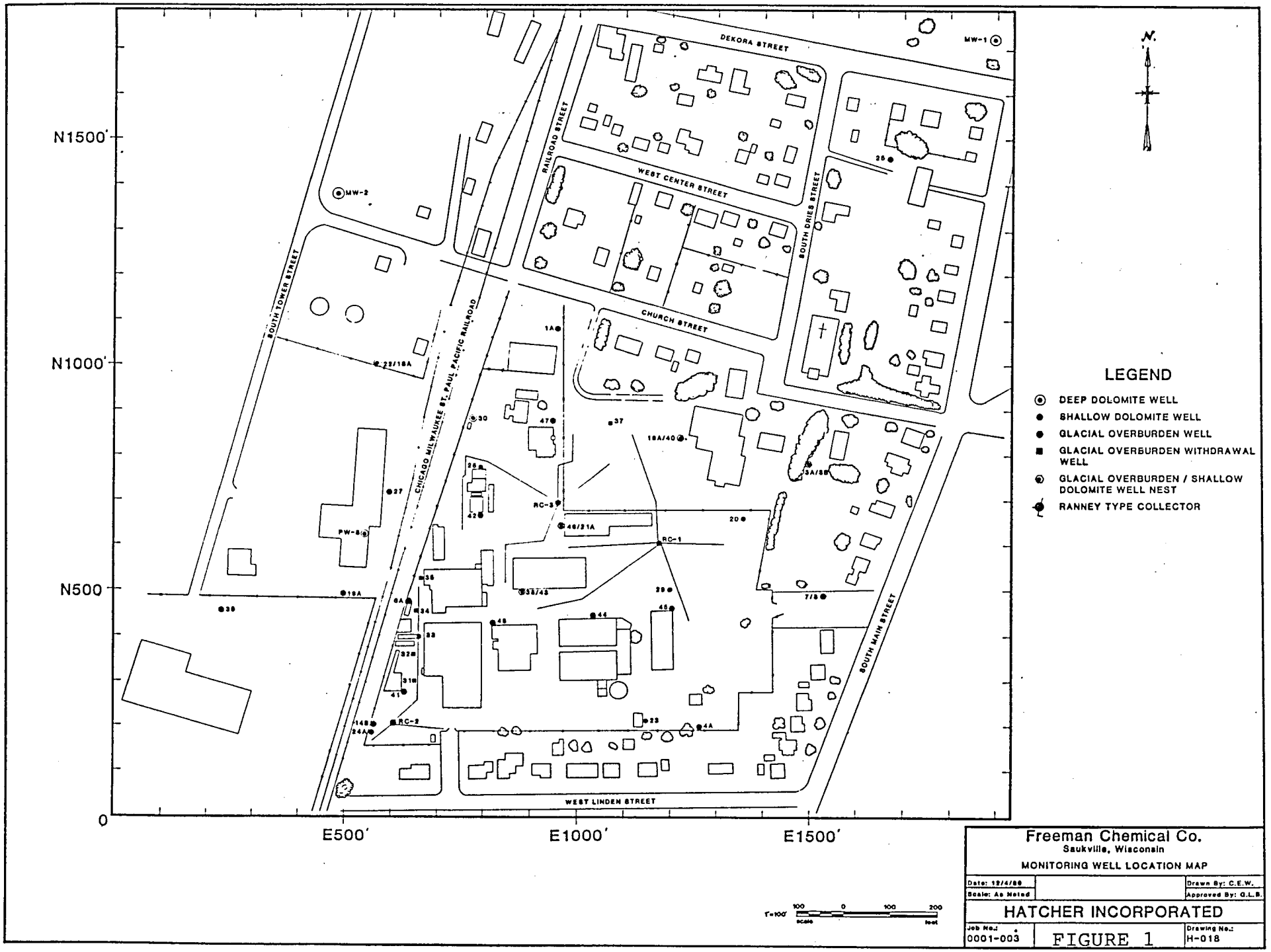
Background

Since 1948, Freeman Chemical Corporation has operated a polyester, alkyd and urethane synthetic resin manufacturing plant on Railroad Street in Saukville, Wisconsin. As a result of plant operations, groundwater at the facility has become contaminated. During the past several years, Freeman Chemical has been conducting investigations, designing and implementing remedial actions to clean up the contaminated groundwater. One of these remedial actions consisted of constructing three Ranney Collectors within the contaminated areas on-site to collect the groundwater for subsequent treatment (see Figure 1).

Following about 3 years of groundwater quality investigations, several alternative treatment scenarios were reviewed to determine viable clean-up options (Hatcher Incorporated, 1986). One such option consisted of pumping the waters collected from the Ranney System to the Saukville POTW sewerage system to be ultimately treated by the Village's activated sludge treatment facility. The Village agreed to accept the contaminated groundwater from Freeman on the condition that periodic laboratory analyses be conducted to ensure effective treatment of the VOC's and that no accumulation was occurring in the sludge.

During mid-March of this year, prior to completion of the Ranney Collector Pumping System, the contaminated VOC waters from Ranney Collector No. 1 (RC-1) were utilized to test the effectiveness of the POTW in treating these waters at varying rates (Hatcher Incorporated, 1987). The results indicated that the POTW could effectively treat the groundwater at gradually increased rates up to 30 gpm.

The Ranney Collector System became operational on July 23, 1987. Based upon meter readings from each collector, between



Freeman Chemical Co.
Saukville, Wisconsin
MONITORING WELL LOCATION MAP

Date: 12/4/89		Drawn By: C.E.W.
Scale: As Noted		Approved By: G.L.B.

HATCHER INCORPORATED

Job No.:		Drawing No.:
0001-003	FIGURE 1	H-018

July 23, 1987 and September 4, 1987 (43 days), the Ranney Collector System (RC-1, RC-2 and RC-3) at Freeman Chemical Corporation's Saukville Plant site had pumped a total of 389,940 gallons to the Saukville POTW. It is estimated that, of this total amount, approximately 80,000 gallons was from water stored in the system prior to becoming operational. Based upon this estimate, after drainage of this initially stored water, the estimated amount of water being discharged to the POTW through the dewatering process probably averages about 5 gpm. The breakdown by collector is shown below:

Collector	Total Gallons	GPM	Est. w/o Storage	GPM
RC-1	43,650	0.7	7,650	0.12
RC-2	311,000	5.0	299,000	4.8
RC-3	35,290	0.6	6,290	0.10
TOTALS	389,940	6.3	312,940	5.02

These figures indicate that RC-2 contributes about 94% of the total flow to the POTW. Since all pumps are automatically set to pump at a constant rate of 10 gpm, this means that RC-2 is pumping about one-half of the time and RC-1 and RC-3 only about 1% of the time (approximately 3 minutes every 5 to 6 hours).

Methodology

For this particular investigation, rather than attempt to study the effectiveness of treatment under normal Ranney Collector operations (which would be essentially RC-2 with a high probability of missing flows from RC-1 and RC-3), it was decided to study RC-2 alone but also to shock the POTW system by having all three collectors pumping at 10 gpm for several consecutive hours. To ensure that there would be sufficient waters for this type of test, RC-1 and RC-3 were manually turned off 4 days prior to the test and RC-2 shut off 2 days before the test.

Since we were not sure how long RC-1 and RC-3 would continue to pump after being manually turned back on, a minimum time frame had to be established for the groundwater to first reach the POTW

Wet Well and then establish the retention time during the treatment process. Based upon the distance from the Freeman site to the POTW (≈ 1 mile) and an estimated flow rate of 2 ft./sec (minimum rate to prevent sedimentation), a flow time of 44 minutes was calculated. Based upon this calculation, a time of 1 hour after the pumps were turned on was used to collect the wet well samples.

Mr. Fred Ruekert of Ruekert Mielke, who designed the Village POTW, was contacted regarding the retention time of the plant. He computed that, under current operating conditions, the retention time should be about 12 hours and, therefore, we allowed 12.5 hours before collecting the effluent samples.

The test was essentially to be conducted over a 24-hour period. The first 8 hours were to include only RC-2; the second 8 hours all three collectors; and the third 8 hours only RC-2 again.

Prior to initiating the study and after the collectors had been shut down for at least two days, samples were collected from the POTW Wet Well (WW-O) and Effluent (EF-O) for determining baseline conditions. The various samples were collected in the following manner:

The Ranney Collector samples were taken from the discharge pipe before entering the Village sewer system. The VOA vials were filled by holding the vials near the edge of the discharge pipe and allowing them to slowly fill with water. When a convex miniscus formed, the bottles were capped and checked for air bubbles. Since all Ranney Collectors share the same discharge pipe, the pipe was flushed prior to each sampling with its respective water. RC-1 was flushed for 15 minutes; RC-2 was flushed for 23 minutes; and RC-3 was flushed for 11 minutes.

The Wet Well samples were taken inside of the Wet Well before the sewage enters the plant. The VOA vials were submerged, at an angle, into the wastewater and allowed to

fill slowly. When the vials were full and a convex miniscus had formed, the vials were capped and checked for the presence of air bubbles.

The Effluent samples were taken from the discharge of the final settling and aeration basin. The samples were collected by the same procedure as the Wet Well samples described above.

The laboratory analyses for the Hazardous Substance List (HSL) Volatile Organics (VOC's) were performed by Erco Laboratory (ENSECO) in Cambridge, Massachusetts and included standard CLP QA/QC procedures.

Results

A summary of the VOC analyses is presented in Table 1; the laboratory results are contained in the Appendix. Based upon the calculated travel time and retention times, the Wet Well (WW) influent sample numbers should have corresponded to the Effluent (EF) sample numbers. It is readily apparent from these data that they do not, e.g., influent Wet Well-3 had VOC's totalling 0.38 mg/l while the anticipated corresponding Effluent-3 had a total of 1.38 mg/l, over 3.5 times more VOC's than what would have been going into the plant.

It is, therefore, obvious that the initially calculated flow times were not correct and would need to be adjusted to compare wet well samples with effluent samples. By plotting out the timing of sampling events and analyzing and comparing the data collected, it was determined that the actual timing sequences appears to be approximately 1½ to 2 hours to the wet well and 13 to 14 hours through the treatment plant.

By utilizing these adjusted times, the sequencing of arrival and departure of contaminated groundwater through the POTW would essentially be as follows:

TABLE 1

VOC LABORATORY ANALYSES (Mg/1)
Contaminated Groundwater
Saukville POTW Treatment Study
Freeman Chemical Corporation

Parameter	RC-1	RC-2	RC-3	WW-0	WW-1	WW-2	WW-3	EF-0	EF-1	EF-2	EF-3
Methylene Chloride	0.81	0.68	0.69	-	0.004	0.024	0.007	-	0.004	0.004	0.007
Acetone	16.00	1.30	2.40	0.170	0.092	0.79	0.064	-	-	0.54	0.13
Carbon Disulfide	-	-	-	0.014	-	-	-	-	-	-	-
Trans. 1,2 - Dichloroethylene	-	0.27	-	-	0.003	-	-	-	-	0.002	0.003
2-Butanone	-	-	-	-	-	0.18	-	-	-	0.045	-
Benzene	5.30	-	0.54	-	-	0.043	-	-	-	0.008	0.009
4-Methyl-2-Pentanone	3.10	-	-	-	-	0.052	-	-	-	0.008	-
Tetrachloroethylene	-	-	-	0.003	-	-	-	-	-	-	-
Toluene	27.00	0.30	27.00	-	0.017	0.67	0.052	-	-	0.11	0.30
Ethyl Benzene	30.00	-	12.00	0.003	0.005	0.35	0.039	-	-	0.099	0.18
Styrene	-	-	-	0.013	0.003	-	-	-	-	0.004	-
Xylenes (Total)	71.00	4.60	57.00	0.010	0.110	1.20	0.220	0.004	-	0.12	0.75
TOTALS	153.21	7.15	99.63	0.21	0.23	3.31	0.38	0.004	0.004	0.94	1.38

	RC-2	RC-1	RC-3
Waters arrive @ wet well	1000	1830	2000
Waters leave wet well	continuous	0230(Day 2)	0400(Day 2)
Waters become effluent	2300	0730	0900
Waters no longer effluent	continuous	1530	1700

Based upon these adjusted times, the collected samples would be representative of the following conditions:

Sample	Time Collected	RC-2	RC-1	RC-3
WW-0	1812	0	0	0
WW-1	0910	0	0	0
WW-2	1925	+	+	0
WW-3	0815	+	0	0
EF-0	1819	0	0	0
EF-1	2137	0	0	0
EF-2	0830	+	+	0
EF-3	1500	+	+	+

0 = Not included in sample
+ = Included in sample

These adjusted times allow a direct comparison of the influent (WW) samples with the effluent (EF) samples. Therefore, WW-0, WW-1, EF-0 and EF-1 are all without contaminated groundwater. WW-2 and EF-2 are the results of having both RC-1 and RC-2 pumping, each at a rate of 10 gpm. WW-3 is the result of only having RC-2 pumping at 10 gpm, however, EF-3 represents the treated effluent from all three collectors pumping a total of 30 gpm, 10 gpm each.

To verify these conditions, simple mass balance calculations can be derived based upon the flow from the Ranney Collectors (RC) and the flow to the POTW. These calculations assume the following flow conditions:

- One (1) RC pumping @ 10 gpm = 2% of POTW flow
- Two (2) RC's pumping @ 20 gpm = 3.9% of POTW flow
- Three (3) RC's pumping @ 30 gpm = 5.8% at POTW flow

Therefore, the calculated total VOC concentrations at the POTW wet well under the different pumping requirements would be as follows:

RC-2 only = (POTW Average VOC concentration x percent POTW flow) + (RC VOC concentration x percent RC flow)
RC-2 only = (0.22x0.98) + (7.15x0.02) = 0.36 mg/l
RC-1 + RC-2 = (0.22x0.961) + (80.18x0.039) = 3.34 mg/l
RC-1 + RC-2 + RC-3 = (0.22x0.942) + (86.66x0.058) = 5.23 mg/l

Comparing these calculations with what would be expected based upon the adjusted flow time samples, a very good correlation is developed. For example, the adjusted time samples indicate that only RC-2 waters were sampled at the time WW-3 was collected. From the above calculated values, a total VOC concentration of 0.36 mg/l would be expected while the actual laboratory results indicate a total concentration of 0.38 mg/l.

For WW-2, the adjusted times indicated that the collected samples should have collected waters from RC-1 and RC-2. Again, the calculated concentrations for this situation was 3.34 mg/l while the actual lab data indicate a total VOC concentration of 3.31 mg/l. Both of these comparisons, therefore, would indicate that the adjusted times are indeed correct.

As a result of these analyses, the following chart has been constructed to show the correlation of total VOC's at various points throughout the treatment process:

Total VOC Concentrations in mg/l

	Freeman RC Water	POTW Wet Well	POTW Effluent	Treatment Efficiency
Baseline Condition	0	0.22 (WW-0+1)	0.004(EF-0+1)	98%
RC-2 only	7.15	0.38 (WW-3)	unknown	unknown
RC-1,RC-3	80.18	3.31 (WW-2)	0.94(EF-2)	72%
RC-1,RC-2 RC-3	86.66	5.23 (calculated)	1.38(EF-3)	74%

It should be noted that these values represent results of test conditions which were established to shock the POTW treatment system. Based upon the metered flows, normal conditions would be about 5 gpm with 12.51 mg/l total VOC's.

With RC-1 and RC-2 pumping at 20 gpm and VOC's averaging 80.18 mg/l, loading to the POTW was 25 times normal conditions. With all three pumps turned on, loading would be more than 40 times normal. During the testing, no time was allowed for system recovery; samples were essentially collected only 6 hours after introducing the contaminated flows to the treatment plant. If sufficient time were allowed for activated sludge conditioning, however, treatment efficiency should increase and approach the 98% value obtained without the contaminated groundwater.

Sludge Testing - Prior to initiating the testing program, a baseline sludge sample without contaminated groundwater was scheduled for collection. Unfortunately, the sludge age at the plant was about 2.5 days and, therefore, since RC-2 was shut down for only 2 days, none of the sludge would have been entirely free of the contaminated groundwater. The POTW had water in which sludge was being conditioned in an aerated holding/settling tank which would have only about 0.5 day of RC-2 groundwater. A sample of this water, therefore, was collected from the surface of the tank for VOC testing. The results were as follows:

Methylene Chloride	0.0031 mg/l
Acetone	0.064 mg/l
Total Xylenes	0.0026 mg/l

It should be noted that both the trip and field blanks contained more methylene chloride than reported for this sample and, therefore, it probably was not present. The field blank, which was taken in the Ranney Collector caisson, also contained the following compounds:

Ethyl Benzene	0.0072 mg/l
Toluene	0.011 mg/l
Total Xylenes	0.023 mg/l

Following the testing program, the POTW personnel collected a conditioned sludge sample as it was being pumped from the holding/settling tank to a truck. Analytical results indicated that the solids content was 2.3% and only one compound, methylene chloride, was found at a concentration of 0.690 mg/l. Methylene

chloride, however, is readily biodegradable (Kincannon, et al., 1983 and Namkung and Rittmann, 1987) and, if truly present, will not cause any problems for land application, especially during normal operations.

Summary

Results of the Saukville POTW treatment study indicate that the POTW can effectively treat the contaminated groundwater under normal operating conditions. Even by shocking the system with loadings of 25 to 40 times above normal, treatment efficiency was greater than 70%. Although sludge analyses indicated a possible increase in methylene chloride concentrations, the compound is readily biodegradable and under normal operating conditions would not interfere with land application.

References

Hatcher Incorporated, 1986. Position Paper, Remedial Action Alternatives, Freeman Chemical Corporation, Saukville, Wisconsin. 18 pp.

Hatcher Incorporated, 1987. Assimilative Study of Freeman Chemical Corporation's VOC Contaminated Groundwater at the Saukville Village POTW. 9 pp. and Appendix.

Kincannon, D.F., E.L. Stover, V. Nichols, and D. Medley. 1983. Removal Mechanisms for Toxic Priority Pollutants. Journal WPCF, 55(2) 157-163.

Namkung, E. and B.E. Rittman, 1987. Estimating Volatile Organic Compound Emissions from Publicly Owned Treatment Works. Journal WPCF, 59(7) 670-678.

Enseco

HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: Hatcher Incorporated

Client ID: RC11021639 (RC-1)

Laboratory ID: 5521-14

Matrix: Water Sampled: 10/02/87 Received: 10/06/87

Authorized: 10/06/87 Prepared: 10/17/87 Analyzed: 10/17/87

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	1,300
Bromomethane	ND	µg/L	1,300
Vinyl chloride	ND	µg/L	1,300
Chloroethane	ND	µg/L	1,300
Methylene chloride	810	µg/L	500
Acetone	16,000	µg/L	13,000
Carbon disulfide	ND	µg/L	500
1,1-Dichloroethene	ND	µg/L	500
1,1-Dichloroethane	ND	µg/L	500
trans-1,2-Dichloroethene	ND	µg/L	500
Chloroform	ND	µg/L	500
1,2-Dichloroethane	ND	µg/L	500
2-Butanone	ND	µg/L	2,500
1,1,1-Trichloroethane	ND	µg/L	500
Carbon tetrachloride	ND	µg/L	500
Vinyl acetate	ND	µg/L	2,500
Bromodichloromethane	ND	µg/L	500
1,2-Dichloropropane	ND	µg/L	500
trans-1,3-Dichloropropene	ND	µg/L	500
Trichloroethene	ND	µg/L	500
Dibromochloromethane	ND	µg/L	500
1,1,2-Trichloroethane	ND	µg/L	500
Benzene	5,300	µg/L	500
cis-1,3-Dichloropropene	ND	µg/L	500
2-Chloroethyl vinyl ether	ND	µg/L	2,500
Bromoform	ND	µg/L	500
4-Methyl-2-pentanone	3,100	µg/L	2,500
2-Hexanone	ND	µg/L	2,500
1,1,2,2-Tetrachloroethane	ND	µg/L	500
Tetrachloroethene	ND	µg/L	500
Toluene	27,000	µg/L	500
Chlorobenzene	ND	µg/L	500
Ethyl benzene	30,000	µg/L	500
Styrene	ND	µg/L	500
Total xylenes	71,000	µg/L	500

ND = Not detected.

Reported by _____ Approved by _____

Enseco

HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: Hatcher Incorporated

Client ID: RC-2

Laboratory ID: 5521-03

Matrix: Water Sampled: 10/02/87 Received: 10/06/87

Authorized: 10/06/87 Prepared: 10/15/87 Analyzed: 10/15/87

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	500
Bromomethane	ND	µg/L	500
Vinyl chloride	ND	µg/L	500
Chloroethane	ND	µg/L	500
Methylene chloride	680	µg/L	200
Acetone	1,300	µg/L	5,000
Carbon disulfide	ND	µg/L	200
1,1-Dichloroethene	ND	µg/L	200
1,1-Dichloroethane	ND	µg/L	200
trans-1,2-Dichloroethene	270	µg/L	200
Chloroform	ND	µg/L	200
1,2-Dichloroethane	ND	µg/L	200
2-Butanone	ND	µg/L	1,000
1,1,1-Trichloroethane	ND	µg/L	200
Carbon tetrachloride	ND	µg/L	200
Vinyl acetate	ND	µg/L	1,000
Bromodichloromethane	ND	µg/L	200
1,2-Dichloropropane	ND	µg/L	200
trans-1,3-Dichloropropene	ND	µg/L	200
Trichloroethene	ND	µg/L	200
Dibromochloromethane	ND	µg/L	200
1,1,2-Trichloroethane	ND	µg/L	200
Benzene	ND	µg/L	200
cis-1,3-Dichloropropene	ND	µg/L	200
2-Chloroethyl vinyl ether	ND	µg/L	1,000
Bromoform	ND	µg/L	200
4-Methyl-2-pentanone	ND	µg/L	1,000
2-Hexanone	ND	µg/L	1,000
1,1,2,2-Tetrachloroethane	ND	µg/L	200
Tetrachloroethene	ND	µg/L	200
Toluene	300	µg/L	200
Chlorobenzene	ND	µg/L	200
Ethyl benzene	ND	µg/L	200
Styrene	ND	µg/L	200
Total xylenes	4,600	µg/L	200

ND = Not detected.

Reported by _____ Approved by _____

Enseco

HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: Hatcher Incorporated

Client ID: RC31021814 (RC-3)

Laboratory ID: 5521-13

Matrix: Water Sampled: 10/02/87 Received: 10/06/87

Authorized: 10/06/87 Prepared: 10/16/87 Analyzed: 10/16/87

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	500
Bromomethane	ND	µg/L	500
Vinyl chloride	ND	µg/L	500
Chloroethane	ND	µg/L	500
Methylene chloride	690	µg/L	200
Acetone	2,400	µg/L	5,000
Carbon disulfide	ND	µg/L	200
1,1-Dichloroethene	ND	µg/L	200
1,1-Dichloroethane	ND	µg/L	200
trans-1,2-Dichloroethene	ND	µg/L	200
Chloroform	ND	µg/L	200
1,2-Dichloroethane	ND	µg/L	200
2-Butanone	ND	µg/L	1,000
1,1,1-Trichloroethane	ND	µg/L	200
Carbon tetrachloride	ND	µg/L	200
Vinyl acetate	ND	µg/L	1,000
Bromodichloromethane	ND	µg/L	200
1,2-Dichloropropane	ND	µg/L	200
trans-1,3-Dichloropropene	ND	µg/L	200
Trichloroethene	ND	µg/L	200
Dibromochloromethane	ND	µg/L	200
1,1,2-Trichloroethane	ND	µg/L	200
Benzene	540	µg/L	200
cis-1,3-Dichloropropene	ND	µg/L	200
2-Chloroethyl vinyl ether	ND	µg/L	1,000
Bromoform	ND	µg/L	200
4-Methyl-2-pentanone	ND	µg/L	1,000
2-Hexanone	ND	µg/L	1,000
1,1,2,2-Tetrachloroethane	ND	µg/L	200
Tetrachloroethene	ND	µg/L	200
Toluene	27,000	µg/L	200
Chlorobenzene	ND	µg/L	200
Ethyl benzene	12,000	µg/L	200
Styrene	ND	µg/L	200
Total xylenes	57,000	µg/L	200

ND = Not detected.

Reported by _____ Approved by _____

EXTNAME: Hatcher/I (R)P: (10/22) 10

Enseco

HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: Hatcher Incorporated

Client ID: WW1011812 (WW-0)

Laboratory ID: 5521-07

Matrix: Water Sampled: 10/02/87 Received: 10/06/87

Authorized: 10/06/87 Prepared: 10/17/87 Analyzed: 10/17/87

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	5
Bromomethane	ND	µg/L	5
Vinyl chloride	ND	µg/L	5
Chloroethane	ND	µg/L	5
Methylene chloride	ND	µg/L	2
Acetone	170	µg/L	50
Carbon disulfide	14	µg/L	2
1,1-Dichloroethene	ND	µg/L	2
1,1-Dichloroethane	ND	µg/L	2
trans-1,2-Dichloroethene	ND	µg/L	2
Chloroform	ND	µg/L	2
1,2-Dichloroethane	ND	µg/L	2
2-Butanone	ND	µg/L	10
1,1,1-Trichloroethane	ND	µg/L	2
Carbon tetrachloride	ND	µg/L	2
Vinyl acetate	ND	µg/L	10
Bromodichloromethane	ND	µg/L	2
1,2-Dichloropropane	ND	µg/L	2
trans-1,3-Dichloropropene	ND	µg/L	2
Trichloroethene	ND	µg/L	2
Dibromochloromethane	ND	µg/L	2
1,1,2-Trichloroethane	ND	µg/L	2
Benzene	ND	µg/L	2
cis-1,3-Dichloropropene	ND	µg/L	2
2-Chloroethyl vinyl ether	ND	µg/L	10
Bromoform	ND	µg/L	2
4-Methyl-2-pentanone	ND	µg/L	10
2-Hexanone	ND	µg/L	10
1,1,2,2-Tetrachloroethane	ND	µg/L	2
Tetrachloroethene	3.0	µg/L	2
Toluene	ND	µg/L	2
Chlorobenzene	ND	µg/L	2
Ethyl benzene	2.5	µg/L	2
Styrene	13	µg/L	2
Total xylenes	10	µg/L	2

ND = Not detected.

Reported by _____ Approved by _____

Enseco

HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: Hatcher Incorporated

Client ID: WW102910 (WW-1)

Laboratory ID: 5521-15

Matrix: Water Sampled: 10/02/87 Received: 10/06/87

Authorized: 10/06/87 Prepared: 10/17/87 Analyzed: 10/17/87

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	5
Bromomethane	ND	µg/L	5
Vinyl chloride	ND	µg/L	5
Chloroethane	ND	µg/L	5
Methylene chloride	3.8	µg/L	2
Acetone	92	µg/L	50
Carbon disulfide	ND	µg/L	2
1,1-Dichloroethene	ND	µg/L	2
1,1-Dichloroethane	ND	µg/L	2
trans-1,2-Dichloroethene	3.3	µg/L	2
Chloroform	ND	µg/L	2
1,2-Dichloroethane	ND	µg/L	2
2-Butanone	ND	µg/L	10
1,1,1-Trichloroethane	ND	µg/L	2
Carbon tetrachloride	ND	µg/L	2
Vinyl acetate	ND	µg/L	10
Bromodichloromethane	ND	µg/L	2
1,2-Dichloropropane	ND	µg/L	2
trans-1,3-Dichloropropene	ND	µg/L	2
Trichloroethene	ND	µg/L	2
Dibromochloromethane	ND	µg/L	2
1,1,2-Trichloroethane	ND	µg/L	2
Benzene	ND	µg/L	2
cis-1,3-Dichloropropene	ND	µg/L	2
2-Chloroethyl vinyl ether	ND	µg/L	10
Bromoform	ND	µg/L	2
4-Methyl-2-pentanone	ND	µg/L	10
2-Hexanone	ND	µg/L	10
1,1,2,2-Tetrachloroethane	ND	µg/L	2
Tetrachloroethene	ND	µg/L	2
Toluene	17	µg/L	2
Chlorobenzene	ND	µg/L	2
Ethyl benzene	4.5	µg/L	2
Styrene	3.1	µg/L	2
Total xylenes	110	µg/L	2

ND = Not detected.

Reported by OB Approved by

Enseco

HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: Hatcher Incorporated

Client ID: WW1021925 (WW-2)

Laboratory ID: 5521-10

Matrix: Water Sampled: 10/02/87 Received: 10/06/87

Authorized: 10/06/87 Prepared: 10/20/87 Analyzed: 10/20/87

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	50
Bromomethane	ND	µg/L	50
Vinyl chloride	ND	µg/L	50
Chloroethane	ND	µg/L	50
Methylene chloride	24	µg/L	20
Acetone	790	µg/L	500
Carbon disulfide	ND	µg/L	20
1,1-Dichloroethene	ND	µg/L	20
1,1-Dichloroethane	ND	µg/L	20
trans-1,2-Dichloroethene	ND	µg/L	20
Chloroform	ND	µg/L	20
1,2-Dichloroethane	ND	µg/L	20
2-Butanone	180	µg/L	100
1,1,1-Trichloroethane	ND	µg/L	20
Carbon tetrachloride	ND	µg/L	20
Vinyl acetate	ND	µg/L	100
Bromodichloromethane	ND	µg/L	20
1,2-Dichloropropane	ND	µg/L	20
trans-1,3-Dichloropropene	ND	µg/L	20
Trichloroethene	ND	µg/L	20
Dibromochloromethane	ND	µg/L	20
1,1,2-Trichloroethane	ND	µg/L	20
Benzene	43	µg/L	20
cis-1,3-Dichloropropene	ND	µg/L	20
2-Chloroethyl vinyl ether	ND	µg/L	100
Bromoform	ND	µg/L	20
4-Methyl-2-pentanone	52	µg/L	100
2-Hexanone	ND	µg/L	100
1,1,2,2-Tetrachloroethane	ND	µg/L	20
Tetrachloroethene	ND	µg/L	20
Toluene	670	µg/L	20
Chlorobenzene	ND	µg/L	20
Ethyl benzene	350	µg/L	20
Styrene	ND	µg/L	20
Total xylenes	1,200	µg/L	20

ND = Not detected.

Reported by _____ Approved by _____

Enseco

HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: Hatcher Incorporated

Client ID: WW1030815 (WW-3)

Laboratory ID: 5521-04

Matrix: Water Sampled: 10/02/87 Received: 10/06/87

Authorized: 10/06/87 Prepared: 10/15/87 Analyzed: 10/15/87

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	5
Bromomethane	ND	µg/L	5
Vinyl chloride	ND	µg/L	5
Chloroethane	ND	µg/L	5
Methylene chloride	6.9	µg/L	2
Acetone	64	µg/L	50
Carbon disulfide	ND	µg/L	2
1,1-Dichloroethene	ND	µg/L	2
1,1-Dichloroethane	ND	µg/L	2
trans-1,2-Dichloroethene	ND	µg/L	2
Chloroform	ND	µg/L	2
1,2-Dichloroethane	ND	µg/L	2
2-Butanone	ND	µg/L	10
1,1,1-Trichloroethane	ND	µg/L	2
Carbon tetrachloride	ND	µg/L	2
Vinyl acetate	ND	µg/L	10
Bromodichloromethane	ND	µg/L	2
1,2-Dichloropropane	ND	µg/L	2
trans-1,3-Dichloropropene	ND	µg/L	2
Trichloroethene	ND	µg/L	2
Dibromochloromethane	ND	µg/L	2
1,1,2-Trichloroethane	ND	µg/L	2
Benzene	ND	µg/L	2
cis-1,3-Dichloropropene	ND	µg/L	2
2-Chloroethyl vinyl ether	ND	µg/L	10
Bromoform	ND	µg/L	2
4-Methyl-2-pentanone	ND	µg/L	10
2-Hexanone	ND	µg/L	10
1,1,2,2-Tetrachloroethane	ND	µg/L	2
Tetrachloroethene	ND	µg/L	2
Toluene	52	µg/L	2
Chlorobenzene	ND	µg/L	2
Ethyl benzene	39	µg/L	2
Styrene	ND	µg/L	2
Total xylenes	220	µg/L	2

ND = Not detected.

Reported by _____ Approved by _____

Enseco

HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: Hatcher Incorporated

Client ID: Effluent (EF-0)

Laboratory ID: 5521-02

Matrix: Water Sampled: 10/02/87 Received: 10/06/87

Authorized: 10/06/87 Prepared: 10/16/87 Analyzed: 10/16/87

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	5
Bromomethane	ND	µg/L	5
Vinyl chloride	ND	µg/L	5
Chloroethane	ND	µg/L	5
Methylene chloride	ND	µg/L	2
Acetone	ND	µg/L	50
Carbon disulfide	ND	µg/L	2
1,1-Dichloroethene	ND	µg/L	2
1,1-Dichloroethane	ND	µg/L	2
trans-1,2-Dichloroethene	ND	µg/L	2
Chloroform	ND	µg/L	2
1,2-Dichloroethane	ND	µg/L	2
2-Butanone	ND	µg/L	10
1,1,1-Trichloroethane	ND	µg/L	2
Carbon tetrachloride	ND	µg/L	2
Vinyl acetate	ND	µg/L	10
Bromodichloromethane	ND	µg/L	2
1,2-Dichloropropane	ND	µg/L	2
trans-1,3-Dichloropropene	ND	µg/L	2
Trichloroethene	ND	µg/L	2
Dibromochloromethane	ND	µg/L	2
1,1,2-Trichloroethane	ND	µg/L	2
Benzene	ND	µg/L	2
cis-1,3-Dichloropropene	ND	µg/L	2
2-Chloroethyl vinyl ether	ND	µg/L	10
Bromoform	ND	µg/L	2
4-Methyl-2-pentanone	ND	µg/L	10
2-Hexanone	ND	µg/L	10
1,1,2,2-Tetrachloroethane	ND	µg/L	2
Tetrachloroethene	ND	µg/L	2
Toluene	ND	µg/L	2
Chlorobenzene	ND	µg/L	2
Ethyl benzene	ND	µg/L	2
Styrene	ND	µg/L	2
Total xylenes	3.7	µg/L	2

ND = Not detected.

Reported by _____ Approved by _____

Enseco

HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: Hatcher Incorporated

Client ID: E1022137 (EF-1)

Laboratory ID: 5521-12

Matrix: Water Sampled: 10/02/87 Received: 10/06/87

Authorized: 10/06/87 Prepared: 10/16/87 Analyzed: 10/16/87

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	5
Bromomethane	ND	µg/L	5
Vinyl chloride	ND	µg/L	5
Chloroethane	ND	µg/L	5
Methylene chloride	4.2	µg/L	2
Acetone	ND	µg/L	50
Carbon disulfide	ND	µg/L	2
1,1-Dichloroethene	ND	µg/L	2
1,1-Dichloroethane	ND	µg/L	2
trans-1,2-Dichloroethene	ND	µg/L	2
Chloroform	ND	µg/L	2
1,2-Dichloroethane	ND	µg/L	2
2-Butanone	ND	µg/L	10
1,1,1-Trichloroethane	ND	µg/L	2
Carbon tetrachloride	ND	µg/L	2
Vinyl acetate	ND	µg/L	10
Bromodichloromethane	ND	µg/L	2
1,2-Dichloropropane	ND	µg/L	2
trans-1,3-Dichloropropene	ND	µg/L	2
Trichloroethene	ND	µg/L	2
Dibromochloromethane	ND	µg/L	2
1,1,2-Trichloroethane	ND	µg/L	2
Benzene	ND	µg/L	2
cis-1,3-Dichloropropene	ND	µg/L	2
2-Chloroethyl vinyl ether	ND	µg/L	10
Bromoform	ND	µg/L	2
4-Methyl-2-pentanone	ND	µg/L	10
2-Hexanone	ND	µg/L	10
1,1,2,2-Tetrachloroethane	ND	µg/L	2
Tetrachloroethene	ND	µg/L	2
Toluene	ND	µg/L	2
Chlorobenzene	ND	µg/L	2
Ethyl benzene	ND	µg/L	2
Styrene	ND	µg/L	2
Total xylenes	ND	µg/L	2

ND = Not detected.

Reported by _____ Approved by _____

Enseco

HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: Hatcher Incorporated

Client ID: E1030830 (EF-2)

Laboratory ID: 5521-05

Matrix: Water Sampled: 10/02/87 Received: 10/06/87

Authorized: 10/06/87 Prepared: 10/15/87 Analyzed: 10/15/87

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	5
Bromomethane	ND	µg/L	5
Vinyl chloride	ND	µg/L	5
Chloroethane	ND	µg/L	5
Methylene chloride	4.3	µg/L	2
Acetone	540	µg/L	50
Carbon disulfide	ND	µg/L	2
1,1-Dichloroethene	ND	µg/L	2
1,1-Dichloroethane	ND	µg/L	2
trans-1,2-Dichloroethene	2.0	µg/L	2
Chloroform	ND	µg/L	2
1,2-Dichloroethane	ND	µg/L	2
2-Butanone	45	µg/L	10
1,1,1-Trichloroethane	ND	µg/L	2
Carbon tetrachloride	ND	µg/L	2
Vinyl acetate	ND	µg/L	10
Bromodichloromethane	ND	µg/L	2
1,2-Dichloropropane	ND	µg/L	2
trans-1,3-Dichloropropene	ND	µg/L	2
Trichloroethene	ND	µg/L	2
Dibromochloromethane	ND	µg/L	2
1,1,2-Trichloroethane	ND	µg/L	2
Benzene	7.8	µg/L	2
cis-1,3-Dichloropropene	ND	µg/L	2
2-Chloroethyl vinyl ether	ND	µg/L	10
Bromoform	ND	µg/L	2
4-Methyl-2-pentanone	8.2	µg/L	10
2-Hexanone	ND	µg/L	10
1,1,2,2-Tetrachloroethane	ND	µg/L	2
Tetrachloroethene	ND	µg/L	2
Toluene	110	µg/L	2
Chlorobenzene	ND	µg/L	2
Ethyl benzene	99	µg/L	2
Styrene	3.6	µg/L	2
Total xylenes	120	µg/L	2

ND = Not detected.

Reported by _____ Approved by _____

Enseco

HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: Hatcher Incorporated

Client ID: E1031500 (EF-3)

Laboratory ID: 5521-06

Matrix: Water Sampled: 10/02/87 Received: 10/06/87

Authorized: 10/06/87 Prepared: 10/15/87 Analyzed: 10/15/87

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	5
Bromomethane	ND	µg/L	5
Vinyl chloride	ND	µg/L	5
Chloroethane	ND	µg/L	5
Methylene chloride	7.3	µg/L	2
Acetone	130	µg/L	50
Carbon disulfide	ND	µg/L	2
1,1-Dichloroethene	ND	µg/L	2
1,1-Dichloroethane	ND	µg/L	2
trans-1,2-Dichloroethene	3.3	µg/L	2
Chloroform	ND	µg/L	2
1,2-Dichloroethane	ND	µg/L	2
2-Butanone	ND	µg/L	10
1,1,1-Trichloroethane	ND	µg/L	2
Carbon tetrachloride	ND	µg/L	2
Vinyl acetate	ND	µg/L	10
Bromodichloromethane	ND	µg/L	2
1,2-Dichloropropane	ND	µg/L	2
trans-1,3-Dichloropropene	ND	µg/L	2
Trichloroethene	ND	µg/L	2
Dibromochloromethane	ND	µg/L	2
1,1,2-Trichloroethane	ND	µg/L	2
Benzene	9.3	µg/L	2
cis-1,3-Dichloropropene	ND	µg/L	2
2-Chloroethyl vinyl ether	ND	µg/L	10
Bromoform	ND	µg/L	2
4-Methyl-2-pentanone	ND	µg/L	10
2-Hexanone	ND	µg/L	10
1,1,2,2-Tetrachloroethane	ND	µg/L	2
Tetrachloroethene	ND	µg/L	2
Toluene	300	µg/L	2
Chlorobenzene	ND	µg/L	2
Ethyl benzene	180	µg/L	2
Styrene	ND	µg/L	2
Total xylenes	750	µg/L	2

ND = Not detected.

Reported by _____ Approved by _____

Enseco

HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: Hatcher Incorporated

Client ID: SS102946 (Sludge Supernatant)

Laboratory ID: 5521-01

Matrix: Water Sampled: 10/02/87 Received: 10/06/87

Authorized: 10/06/87 Prepared: 10/15/87 Analyzed: 10/15/87

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	5
Bromomethane	ND	µg/L	5
Vinyl chloride	ND	µg/L	5
Chloroethane	ND	µg/L	5
Methylene chloride	3.1	µg/L	2
Acetone	64	µg/L	50
Carbon disulfide	ND	µg/L	2
1,1-Dichloroethene	ND	µg/L	2
1,1-Dichloroethane	ND	µg/L	2
trans-1,2-Dichloroethene	ND	µg/L	2
Chloroform	ND	µg/L	2
1,2-Dichloroethane	ND	µg/L	2
2-Butanone	ND	µg/L	10
1,1,1-Trichloroethane	ND	µg/L	2
Carbon tetrachloride	ND	µg/L	2
Vinyl acetate	ND	µg/L	10
Bromodichloromethane	ND	µg/L	2
1,2-Dichloropropane	ND	µg/L	2
trans-1,3-Dichloropropene	ND	µg/L	2
Trichloroethene	ND	µg/L	2
Dibromochloromethane	ND	µg/L	2
1,1,2-Trichloroethane	ND	µg/L	2
Benzene	ND	µg/L	2
cis-1,3-Dichloropropene	ND	µg/L	2
2-Chloroethyl vinyl ether	ND	µg/L	10
Bromoform	ND	µg/L	2
4-Methyl-2-pentanone	ND	µg/L	10
2-Hexanone	ND	µg/L	10
1,1,2,2-Tetrachloroethane	ND	µg/L	2
Tetrachloroethene	ND	µg/L	2
Toluene	ND	µg/L	2
Chlorobenzene	ND	µg/L	2
Ethyl benzene	ND	µg/L	2
Styrene	ND	µg/L	2
Total xylenes	2.6	µg/L	2

ND = Not detected.

Reported by _____ Approved by _____

Enseco

HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 8240/HSL List

Client Name: Hatcher Incorproated

Client ID: Sarkville POTW (Sludge)

Laboratory ID: 5562-07

Matrix: Sludge Sampled: 10/07/87 Received: 10/09/87

Authorized: 10/09/87 Prepared: 10/15/87 Analyzed: 10/24/87

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/kg (wet wt)	130
Bromomethane	ND	µg/kg (wet wt)	130
Vinyl chloride	ND	µg/kg (wet wt)	130
Chloroethane	ND	µg/kg (wet wt)	130
Methylene chloride	690	µg/kg (wet wt)	1,300
Acetone	ND	µg/kg (wet wt)	50
Carbon disulfide	ND	µg/kg (wet wt)	50
1,1-Dichloroethene	ND	µg/kg (wet wt)	50
1,1-Dichloroethane	ND	µg/kg (wet wt)	50
trans-1,2-Dichloroethene	ND	µg/kg (wet wt)	50
Chloroform	ND	µg/kg (wet wt)	50
1,2-Dichloroethane	ND	µg/kg (wet wt)	250
2-Butanone	ND	µg/kg (wet wt)	50
1,1,1-Trichloroethane	ND	µg/kg (wet wt)	50
Carbon tetrachloride	ND	µg/kg (wet wt)	250
Vinyl acetate	ND	µg/kg (wet wt)	50
Bromodichloromethane	ND	µg/kg (wet wt)	50
1,2-Dichloropropane	ND	µg/kg (wet wt)	50
trans-1,3-Dichloropropene	ND	µg/kg (wet wt)	50
Trichloroethene	ND	µg/kg (wet wt)	50
Dibromochloromethane	ND	µg/kg (wet wt)	50
1,1,2-Trichloroethane	ND	µg/kg (wet wt)	50
Benzene	ND	µg/kg (wet wt)	50
cis-1,3-Dichloropropene	ND	µg/kg (wet wt)	250
2-Chloroethyl vinyl ether	ND	µg/kg (wet wt)	50
Bromoform	ND	µg/kg (wet wt)	250
4-Methyl-2-pentanone	ND	µg/kg (wet wt)	250
2-Hexanone	ND	µg/kg (wet wt)	50
1,1,2,2-Tetrachloroethane	ND	µg/kg (wet wt)	50
Tetrachloroethene	ND	µg/kg (wet wt)	130
Toluene	ND	µg/kg (wet wt)	50
Chlorobenzene	ND	µg/kg (wet wt)	50
Ethyl benzene	ND	µg/kg (wet wt)	50
Styrene	ND	µg/kg (wet wt)	50
Total xylenes	ND	µg/kg (wet wt)	50

Solid content = 2.3%

ND = Not detected.

Reported by LS Approved by CB

Enseco

HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: Hatcher Incorporated

Client ID: RC41021845 (Field Blank)

Laboratory ID: 5521-11

Matrix: Water Sampled: 10/02/87 Received: 10/06/87

Authorized: 10/06/87 Prepared: 10/16/87 Analyzed: 10/16/87

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	5
Bromomethane	ND	µg/L	5
Vinyl chloride	ND	µg/L	5
Chloroethane	ND	µg/L	5
Methylene chloride	8.5	µg/L	2
Acetone	ND	µg/L	50
Carbon disulfide	ND	µg/L	2
1,1-Dichloroethene	ND	µg/L	2
1,1-Dichloroethane	ND	µg/L	2
trans-1,2-Dichloroethene	ND	µg/L	2
Chloroform	ND	µg/L	2
1,2-Dichloroethane	ND	µg/L	2
2-Butanone	ND	µg/L	10
1,1,1-Trichloroethane	ND	µg/L	2
Carbon tetrachloride	ND	µg/L	2
Vinyl acetate	ND	µg/L	10
Bromodichloromethane	ND	µg/L	2
1,2-Dichloropropane	ND	µg/L	2
trans-1,3-Dichloropropene	ND	µg/L	2
Trichloroethene	ND	µg/L	2
Dibromochloromethane	ND	µg/L	2
1,1,2-Trichloroethane	ND	µg/L	2
Benzene	ND	µg/L	2
cis-1,3-Dichloropropene	ND	µg/L	2
2-Chloroethyl vinyl ether	ND	µg/L	10
Bromoform	ND	µg/L	2
4-Methyl-2-pentanone	ND	µg/L	10
2-Hexanone	ND	µg/L	10
1,1,2,2-Tetrachloroethane	ND	µg/L	2
Tetrachloroethene	ND	µg/L	2
Toluene	11	µg/L	2
Chlorobenzene	ND	µg/L	2
Ethyl benzene	7.2	µg/L	2
Styrene	ND	µg/L	2
Total xylenes	23	µg/L	2

ND = Not detected.

Reported by _____ Approved by _____

Enseco

HAZARDOUS SUBSTANCE LIST (HSL) VOLATILE ORGANICS

EPA Method 624/HSL List

Client Name: Hatcher Incorporated

Client ID: Trip Blank

Laboratory ID: 5521-18

Matrix: Water Sampled: 10/02/87 Received: 10/06/87

Authorized: 10/06/87 Prepared: 10/20/87 Analyzed: 10/20/87

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	µg/L	5
Bromomethane	ND	µg/L	5
Vinyl chloride	ND	µg/L	5
Chloroethane	ND	µg/L	5
Methylene chloride	4.7	µg/L	2
Acetone	ND	µg/L	50
Carbon disulfide	ND	µg/L	2
1,1-Dichloroethene	ND	µg/L	2
1,1-Dichloroethane	ND	µg/L	2
trans-1,2-Dichloroethene	ND	µg/L	2
Chloroform	ND	µg/L	2
1,2-Dichloroethane	ND	µg/L	2
2-Butanone	ND	µg/L	10
1,1,1-Trichloroethane	ND	µg/L	2
Carbon tetrachloride	ND	µg/L	2
Vinyl acetate	ND	µg/L	10
Bromodichloromethane	ND	µg/L	2
1,2-Dichloropropane	ND	µg/L	2
trans-1,3-Dichloropropene	ND	µg/L	2
Trichloroethene	ND	µg/L	2
Dibromochloromethane	ND	µg/L	2
1,1,2-Trichloroethane	ND	µg/L	2
Benzene	ND	µg/L	2
cis-1,3-Dichloropropene	ND	µg/L	2
2-Chloroethyl vinyl ether	ND	µg/L	10
Bromoform	ND	µg/L	2
4-Methyl-2-pentanone	ND	µg/L	10
2-Hexanone	ND	µg/L	10
1,1,2,2-Tetrachloroethane	ND	µg/L	2
Tetrachloroethene	ND	µg/L	2
Toluene	ND	µg/L	2
Chlorobenzene	ND	µg/L	2
Ethyl benzene	ND	µg/L	2
Styrene	ND	µg/L	2
Total xylenes	ND	µg/L	2

ND = Not detected.

Reported by _____ Approved by _____

Enseco

VOLATILE ORGANICS

Surrogate Recovery Summary

Client Name: Hatcher Incorporated

Matrix: Water

Authorized: 10/06/87 Received: 10/06/87

		Surrogate Compound		
Erco ID	Client ID	d_4-1,2,-Dichloro-ethane	d_8-Toluene	p-Bromofluoro-benzene
5521-01	SS102946	111	98	105
5521-02	Effluent	94	101	112
5521-03	RC-2	98	100	103
5521-04	WW1030815	92	101	91
5521-05	E1030830	86	102	100
5521-06	E1031500	86	112	84
5521-07	WW1011812	95	101	103
5521-08	DW211041520	97	104	98
5521-09	DW291041605	92	102	96
5521-10	WW1021925	90	102	87
5521-11	RC41021845	95	98	102
5521-12	E1022137	94	102	97
5521-13	RC31021814	96	106	104
5521-14	RC11021639	95	101	100
5521-15	WW102910	86	96	108
5521-16	DW291041605	104	103	103
5521-17	DW241041700	90	101	116
5521-18	Trip Blank	84	96	110
QC Advisory Limits:		76-114%	61-110%	74-115%

Reported by _____ Approved by _____

Enseco

VOLATILE ORGANICS

Surrogate Recovery Summary

Client Name: Hatcher Incorporated

Matrix: Soil

Authorized: 10/09/87 Received: 10/09/87

		Surrogate Compound		
Erco ID	Client ID	d_4-1,2,-Dichloro-ethane	d_8-Toluene	p-Bromofluoro-benzene
5562-07	Sarkville POTW	95	102	103
QC Advisory Limits:		70-121%	61-117%	74-121%

Reported by LS Approved by CB