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TABLE 2
WHYCO CHROMIUM
GROUND WATER MONITORING PROGRAM - PARAMETERS EXCEEDING DRINKING WATER STANDARDS

PARAMETER: CADMIUM
STANDARD: 0.01 mg/L (a)

DATE:	9/83	10/83	1/84	5/84	10/84	1/85	4/85	7/85	1/86	4/86	7/86	10/86	1/87	4/87	7/87	10/87	1/88	4/88	7/88	10/88
WELL																				
MW-1	----	----	----	----	----	----	----	----	----	----	NS	NS	----	----	NS	NS	NS	NS	NS	NS
MW-1D										----	----	----	----	----	----	----	----	0.03	----	----
MW-2	----	----	----	----	----	----	----	0.02	----	----	----	----	----	----	----	----	----	0.08	----	----
MW-3	----	0.015	----	0.057	----	----	0.01	0.04	----	0.02	0.07	----	0.02	0.10	0.06	0.02	0.23	----	----	----
MW-3D										0.12	----	0.07	----	----	----	----	----	----	----	----
MW-4	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.03	NS	NS	NS	NS	NS	NS
WC-1A								3.5	0.37	2.28	0.87	0.65	0.55	0.26	0.16	0.19	0.24	0.1	----	----
WC-2								0.03	----	0.02	0.11	0.26	0.20	0.11	0.12	0.16	----	----	0.20	----
WC-3								0.05	----	----	----	0.03	----	----	----	----	0.014	0.1	----	----
WC-4								0.07	0.02	----	----	0.04	0.02	0.04	----	----	0.018	0.03	----	----
WC-4D										----	----	----	----	----	----	----	----	0.03	----	----
MW-5										----	0.02	0.04	----	----	----	----	0.021	0.02	0.04	----
MW-6										----	----	----	----	----	----	0.02	0.014	----	----	----
MW-7										0.02	----	----	----	----	----	----	0.014	0.02	----	----
MW-8										----	----	----	----	----	----	----	----	----	----	----
MW-9										----	----	----	----	----	----	----	----	----	----	----
WC-1D										3.11	3.04	1.4	0.28	----	0.41	0.09	0.25	----	0.08	----
MW-1BD																		----	----	----
MW-3BD																		----	----	----
MW-4BD																		----	----	----
MW-7BD																		----	----	----

KEY:
a - Interim Primary Drinking Water Standard
b - State of Connecticut Standard
c - National Secondary Drining Water Standard
d - EPA Concentration used as Drinking Water
Concern Level in Delisting Petitions
----- Less Than Standard
NS - Well Not Sampled

TABLE 2 (continued)
WHYCO CHROMIUM
GROUND WATER MONITORING PROGRAM - PARAMETERS EXCEEDING DRINKING WATER STANDARDS (mg/L)

PARAMETER: CHROMIUM (total)
STANDARD: 0.05 mg/L (a)

DATE:	9/83	10/83	1/84	5/84	10/84	1/85	4/85	7/85	1/86	4/86	7/86	10/86	1/87	4/87	7/87	10/87	1/88	4/88	7/88	10/88
WELL																				
MW-1	----	0.072	----	----	----	----	----	----	----	----	NS	NS	----	----	NS	NS	NS	NS	NS	NS
MW-1D										34.0	10.40	2.60	----	----	----	----	----	----	----	----
MW-2	----	0.050	----	----	----	----	----	0.13	----	----	----	0.13	----	----	----	----	----	----	----	----
MW-3	----	----	----	----	----	----	----	----	----	----	----	0.09	----	----	----	----	----	----	----	----
MW-3D										----	----	0.06	----	----	----	----	----	----	----	----
MW-4	NS	NS	NS	NS	NS	NS	----	----	NS	NS	NS	NS	NS	----	NS	NS	NS	NS	NS	NS
WC-1A								----	10.60	35.70	1.98	0.98	1.6	1.5	0.29	0.24	1.4	3.0	----	0.40
WC-2								1.5	3.73	0.92	2.85	2.2	1.9	0.34	1.6	1.2	2.1	1.1	----	1.08
WC-3								0.07	0.01	----	----	----	0.18	----	----	----	----	----	----	0.13
WC-4								----	----	----	----	----	----	----	----	----	----	----	----	----
WC-4D										----	----	----	----	----	----	----	----	----	----	----
MW-5										----	----	0.12	----	----	----	----	----	----	----	----
MW-6										----	----	----	----	----	----	----	----	----	----	----
MW-7										----	----	0.09	0.07	----	----	----	----	----	----	0.12
MW-8										0.09	0.23	----	0.29	0.24	0.25	0.31	0.25	0.34	0.25	0.23
MW-9										0.10	0.22	0.19	0.16	0.19	0.27	0.21	0.20	0.20	0.23	0.31
WC-1D										34.00	10.40	2.60	0.3	0.21	----	----	----	----	----	0.38
MW-1BD																		----	----	0.17
MW-3BD																		----	----	----
MW-4BD																		----	----	0.06
MW-7BD																		----	----	----

TABLE 2 (continued)
WHYCO CHROMIUM
GROUND WATER MONITORING PROGRAM - PARAMETERS EXCEEDING DRINKING WATER STANDARDS (mg/L)

PARAMETER: IRON
STANDARD: 0.02 mg/L (b,c)

DATE:	9/83	10/83	1/84	5/84	10/84	1/85	4/85	7/85	1/86	4/86	7/86	10/86	1/87	4/87	7/87	10/87	1/88	4/88	7/88	10/88
WELL																				
MW-1	0.65	----	----	----	0.04	0.16	----	----	----	----	NS	NS	----	----	NS	NS	NS	NS	NS	NS
MW-1D										----	1.09	0.72	0.5	----	----	----	----	2.6	----	----
MW-2	----	----	----	----	0.04	0.25	----	----	----	----	----	----	----	0.37	----	0.39	----	0.68	----	----
MW-3	----	----	----	----	0.06	0.92	----	----	----	0.45	0.83	----	1.2	0.71	----	----	----	0.38	----	----
MW-3D										24.60	41.60	0.45	0.53	18.7	18.0	1.7	2.8	10.6	10.88	13.49
MW-4	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	----	NS	NS	NS	NS	NS	NS
WC-1A								----	----	8.70	19.00	30.00	8.2	----	0.56	----	----	----	0.59	1.84
WC-2								----	----	----	0.85	----	0.72	0.59	----	----	----	----	----	----
WC-3								----	----	7.40	3.11	0.75	3.6	1.0	----	----	----	1.3	----	----
WC-4								----	----	0.31	0.31	----	----	----	----	0.50	----	----	----	----
WC-4D										0.56	----	----	2.2	----	----	0.39	----	----	----	0.37
MW-5										0.32	0.42	----	1.1	----	0.34	0.63	0.73	----	----	0.38
MW-6										----	1.02	----	1.2	0.85	0.65	0.72	0.52	0.73	1.77	0.43
MW-7										2.27	4.08	8.2	9.6	0.74	1.3	2.3	3.3	0.62	2.01	1.46
MW-8										0.44	----	----	----	----	0.44	0.49	----	----	----	----
MW-9										0.33	----	----	----	----	0.34	----	----	0.49	----	----
WC-1D										1.95	124.0	54.00	2.0	6.2	----	----	----	2.6	14.94	16.26
MW-1BD																		----	----	0.34
MW-3BD																		----	0.46	9.54
MW-4BD																		----	----	0.54
MW-7BD																		----	----	----

TABLE 2 (continued)
WHYCO CHROMIUM
GROUND WATER MONITORING PROGRAM - PARAMETERS EXCEEDING DRINKING WATER STANDARDS (mg/L)

PARAMETER: LEAD
STANDARD: 0.05mg/L (a)

DATE:	9/83	10/83	1/84	5/84	10/84	1/85	4/85	7/85	1/86	4/86	7/86	10/86	1/87	4/87	7/87	10/87	1/88	4/88	7/88	10/88
WELL																				
MW-1	----	----	----	----	----	----	----	0.1	----	----	NS	NS	----	----	NS	NS	NS	NS	NS	NS
MW-1D										----	----	----	----	----	----	----	----	----	----	----
MW-2	----	----	----	----	----	----	----	0.1	----	----	----	----	----	----	----	----	----	----	----	----
MW-3	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
MW-3D										----	----	----	----	----	----	----	----	----	----	----
MW-4	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	----	NS	NS	NS	NS	NS	NS
WC-1A								----	----	----	----	----	----	----	----	----	----	----	----	----
WC-2								0.1	----	----	----	----	----	----	----	----	----	----	----	----
WC-3								0.3	----	----	----	----	----	----	----	----	----	----	----	----
WC-4								0.2	----	----	----	----	----	----	----	----	0.057	----	----	----
WC-4D										----	----	----	----	----	0.09	----	----	----	----	----
MW-5										----	----	0.19	----	----	----	0.06	----	----	----	----
MW-6										----	----	0.09	----	----	----	0.05	----	----	----	----
MW-7										----	----	----	----	----	----	----	----	----	----	----
MW-8										----	----	----	----	----	----	0.05	----	0.06	----	----
MW-9										----	----	0.10	----	----	----	0.09	----	----	----	----
WC-1D										----	----	----	----	----	----	----	----	----	----	----
MW-1BD																		----	----	----
MW-3BD																		----	----	----
MW-4BD																		----	----	----
MW-7BD																		----	----	----

TABLE 2 (contined)
WHYCO CHROMIUM
GROUND WATER MONITORING PROGRAM - PARAMETERS EXCEEDING DRINKING WATER STANDARDS (mg/L)

PARAMETER: NICKEL
STANDARD: 0.35 mg/L (d)

DATE:	9/83	10/83	1/84	5/84	10/84	1/85	4/85	7/85	1/86	4/86	7/86	10/86	1/87	4/87	7/87	10/87	1/88	4/88	7/88	10/88
MW-1	----	----	----	----	----	----	----	----	----	----	NS	NS	----	----	NS	NS	NS	NS	NS	NS
MW-1D										----	----	----	----	----	----	----	----	----	----	5.02
MW-2	0.37	----	0.53	0.41	0.86	2.25	----	----	0.86	0.35	0.92	0.52	1.0	0.88	0.94	0.57	1.2	2.0	0.47	0.86
MW-3	0.62	0.70	1.24	2.18	0.05	0.05	----	----	0.39	3.69	0.75	0.73	0.77	0.54	0.44	0.47	0.51	0.99	----	0.64
MW-3D										0.94	5.09	1.5	1.4	3.0	2.2	1.4	0.98	0.85	---	0.78
MW-4	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.65	NS	NS	NS	NS	NS	NS
WC-1A								----	5.10	46.80	19.50	19.0	9.9	5.2	3.5	4.3	4.4	2.5		4.11
WC-2								----	2.14	1.04	5.30	6.6	3.5	2.5	2.8	3.7	3.6	1.6	----	3.60
WC-3								----	----	----	----	----	3.9	0.35	----	0.38	0.36	----	0.54	0.49
WC-4								----	0.62	----	----	1.2	0.62	0.78	----	----	----	----	0.38	----
WC-4D										----	----	----	----	----	----	----	----	----	----	----
MW-5										----	----	----	----	----	----	----	----	----	----	----
MW-6										----	----	0.41	0.44	----	----	----	----	----	----	----
MW-7										----	----	----	0.39	----	----	----	----	----	----	----
MW-8										0.89	0.71	0.73	0.85	1.3	0.78	0.79	0.42	0.83	0.80	1.66
MW-9										1.22	0.59	1.1	0.71	0.86	0.38	0.48	----	0.59	----	0.82
WC-1D										66.00	68.00	36.0	11.0	4.5	3.4	2.2	3.2	2.3	----	----
MW-1BD																		----	----	----
MW-3BD																		----	----	----
MW-4BD																		----	----	----
MW-7BD																		----	----	----

TABLE 2 (continued)
WHYCO CHROMIUM
GROUND WATER MONITORING PROGRAM - PARAMETERS EXCEEDING DRINKING WATER STANDARDS (mg/L)

PARAMETER: FLUORIDE
STANDARD: 1.4-2.4 mg/L (a)

DATE:	1/85	4/85	7/85	1/86	4/86	7/86	10/86	1/87	4/87	7/87	10/87	1/88	4/88	7/88	10/88
WELL															
MW-1	----	----	----	----	----	NS	NS	----	----	NS	NS	NS	NS	NS	NS
MW-1D					----	----	----	----	----	----	----	----	----	----	----
MW-2	----	----	----	----	----	----	----	----	----	----	----	----	4.4	----	----
MW-3	----	2.35	1.68	----	----	----	----	----	----	----	2.8	----	----	----	----
MW-3D					----	----	----	----	----	----	2.4	1.5	----	----	1.70
MW-4	NS	NS	NS	NS	NS	NS	NS	NS	----	NS	NS	NS	NS	NS	NS
WC-1A			9.94	4.5	18.00	47.00	7.5	7.8	5.9	3.4	5.1	2.7	3.4	----	1.50
WC-2			3.17	2.4	10.00	21.00	13.4	8.2	6.5	3.8	7.8	4.5	2.6	2.7	3.80
WC-3			22.7	12.00	30.00	17.00	14.0	11.0	9.9	12.0	19.0	18	16.4	----	41.0
WC-4			15.0	11.0	23.00	34.00	16.0	18.00	18.00	23.0	23.0	10	12.8	----	20.5
WC-4D					13.00	16.00	13.0	17.0	14.0	16.0	20.0	10	15.0	----	14.5
MW-5					8.00	13.00	9.7	7.1	7.4	7.3	11.0	6.5	5.7	----	15.4
MW-6					27.00	18.00	16.0	11.0	5.1	7.7	9.6	7.0	7.0	----	11.2
MW-7					23.00	4.30	3.7	16.0	14.0	----	3.5	3.3	3.8	3.3	2.60
MW-8					----	----	----	----	----	----	----	----	----	----	----
MW-9					----	----	----	----	----	----	----	----	----	----	----
WC-1D					8.00	10.00	7.8	4.5	2.9	----	2.6	1.4	1.7	----	----
MW-1BD													----	----	----
MW-3BD													----	----	----
MW-4BD													----	----	----
MW-7BD													----	----	----

TABLE 2 (continued)
WHYCO CHROMIUM
GROUND WATER MONITORING PROGRAM - PARAMETERS EXCEEDING DRINKING WATER STANDARDS

PARAMETER: CYANIDE (total)
STANDARD: 0.2 mg/L (b)

DATE:	9/83	10/83	1/84	5/84	10/84	1/85	4/85	7/85	1/86	4/86	7/86	10/86	1/87	4/87	7/87	10/87	1/88	4/88	7/88	10/88
WELL																				
MW-1	----	----	----	----	----	----	----	----	----	0.39	NS	NS	----	----	NS	NS	NS	NS	NS	NS
MW-1D										----	----	----	----	----	----	----	----	----	----	----
MW-2	----	----	----	----	----	----	----	----	----	0.27	0.90	0.54	----	0.30	0.44	----	0.24	----	0.21	----
MW-3	----	----	----	----	----	----	----	----	0.81	----	0.90	----	----	0.28	----	----	----	----	----	----
MW-3D										2.70	----	----	----	----	----	----	----	----	----	----
MW-4	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	0.37	NS	NS	NS	NS	NS	NS
WC-1A								----	----	0.64	----	----	----	0.2	----	----	----	----	----	----
WC-2								----	----	----	----	----	----	0.2	----	----	0.24	----	----	0.25
WC-3								----	0.69	1.83	1.09	0.6	0.5	1.0	0.24	----	0.40	----	----	----
WC-4								----	----	0.27	0.37	0.3	0.45	----	0.42	0.24	0.40	----	0.79	1.07
WC-4D										0.64	0.26	0.4	----	----	0.48	0.30	----	----	0.29	0.25
MW-5										----	----	----	----	----	----	----	----	----	0.31	1.92
MW-6										----	0.92	----	0.27	----	0.32	----	----	----	0.33	----
MW-7										2.38	2.57	1.5	0.54	0.37	1.16	----	3.4	0.97	0.52	0.82
MW-8										0.90	0.49	----	----	----	----	----	----	----	----	0.45
MW-9										----	----	----	----	----	----	----	----	----	----	----
WC-1D										0.77	----	----	----	----	----	----	----	----	----	----
MW-1BD																		----	----	----
MW-3BD																		----	----	----
MW-4BD																		----	----	----
MW-7BD																		----	----	----

Distribution of cyanide and fluoride contamination in the unconsolidated upper aquifer differs from that for the heavy metals. The highest concentrations have been observed primarily downgradient of the effluent recharge lagoons, at wells WC-3, WC-4, WC-4D and MW-7 (refer to Table 2). Deep and shallow overburden wells were found to exhibit similar levels of contamination. An overall decrease in cyanide and fluoride concentrations has been observed since 1986 as well, after use of the discharge lagoons was discontinued.

With respect to the bedrock aquifer, analytical results for well WC-1D had shown the greatest levels of heavy metals contamination up through 1986, often on the order of 50 to 300 times relevant drinking water standards (DWS) (refer to Table 2). This well is adjacent to overburden well WC-1A as seen in Figure 4. As was the case for the shallow wells discussed above, an overall decrease in heavy metal concentrations was seen since 1986, possibly due to the discontinuation of the discharge lagoons.

Ground water samples have been collected quarterly by Fuss and O'Neill at the four bedrock wells installed in 1988 since June 1988, in addition to well WC-1D. To date, two quarters of data have been received and reviewed (July 1988 and October 1988) since the expanded monitoring program was initiated. As indicated in Table 2, cyanide and flouride were not detected in these bedrock wells during these sampling rounds. Well WC-1D exhibited the highest levels of dissolved metals with cadmium, chromium, iron and nickel all detected at levels above DWS. These most recent sets of data reveal concentrations generally within the same ranges as those results for 1987 and early 1988 sampling events. Well MW-1BD exhibited chromium and iron concentrations detected over the DWS. This well is situated adjacent to but slightly deeper than WC-1D. At well MW-3BD iron was detected twice above DWS and at well MW-4BD chromium was detected once above DWS. Data for well MW-7BD did not reveal any excursions above DWS.

Wells WC-1D and MW-1BD were also found by Fuss & O'Neill to have elevated levels of specific conductance and total organic halogens (TOX) in comparison to the other three bedrock wells. In the January 1989 sampling event Fuss & O'Neill determined that the cause of the elevated specific conductance readings in well MW-1BD was the presence of major ions (e.g., calcium, potassium, sodium, magnesium and sulfate) at much higher levels than the other three wells. TOX levels in well WC-1D ranged from 54.6 ppb to 118 ppb, while those at MW-1BD ranged from 43.9 ppb to 51.5 ppb. Ranges of TOX levels at the remaining three wells were 3 ppb to 54 ppb at MW-3BD, 3.3 ppb to 9.4 ppb at MW-4BD and 3 to 7.9 ppb at MW-7BD.

It can be determined from Fuss and O'Neill's bedrock investigation that the water quality of the bedrock aquifer has been degraded. The water quality data collected from the overburden monitoring wells suggests that the degradation of the deeper bedrock aquifer results from past waste disposal activities. Bedrock wells MW-1BD and WC-1D and adjacent overburden wells WC-1A and WC-2 exhibited the highest levels of contamination within their respective aquifers (refer to Table 2).

Determining the extent of contamination in the bedrock aquifer is complicated by the ground water flow and contaminant transport occurs within discrete fractures in the bedrock. The extent and orientation of fractures as well as ground water flow direction will determine contaminant distribution. Therefore, groundwater results from a bedrock well do not necessarily reflect the area surrounding the screened zone but may more accurately reflect the quality of ground water within a discrete fracture or fractures it intercepts. As indicated earlier, a majority of the fractures are suspected to parallel the north-south orientation of the major regional foliation. This, in conjunction with the observed southwesterly ground water flow, suggests a southerly direction of contaminant transport. Based on the collected data, presented in Table 2, contamination is apparently concentrated in the vicinity of WC-1D and MW-1BD. These wells are located near the banks of the Naugatuck River, southwest of the sludge landfill. Data from wells MW-3BD to the north and MW-4BD to the south of WC-1D and MW-1BD revealed relatively low levels of contamination suggesting that contamination does not extend appreciably beyond this area.

With respect to the vertical extent of contamination, data is available from the well pair WC-1D, screened in the upper ten feet of bedrock, and MW-1BD, screened for 74 feet below the bottom of WC-1D. Based on the available analytical data from these wells, presented in Table 2, it is apparent that the contaminant levels generally decrease with depth. However, as indicated earlier, MW-1BD still exhibits cadmium and chromium levels which exceed DWS and elevated levels of TOX and specific conductance. The actual vertical extent cannot truly be determined due to the fractured nature of the bedrock.

2.3.5 Soil Sampling

CDM FPC conducted soil sampling at the Whyco facility in April 1989 to determine if soil erosion from the sludge landfill has spread contaminated soils on-site and possibly off-site. Soil samples were collected at 10 locations - one on the landfill itself, eight around its perimeter and one off-site, to represent background (Figure 5). Duplicate samples were collected at location SS-8. Surface soil was obtained from the first 0-6 inches at each location. These samples were analyzed for target compound list (TCL) metals and cyanide through the contract laboratory program (CLP). A summary of the analytical results is given in Table 3. The analytical results for chromium, copper, nickel and zinc are flagged as estimated due to failure of certain quality control data to meet specific criteria. The data validation letter report and data summary are included in Appendix B.

A review of the soil sampling data was conducted with respect to the primary contaminants of concern at the Whyco facility: cadmium, chromium, cobalt, copper, iron, lead, nickel and zinc.

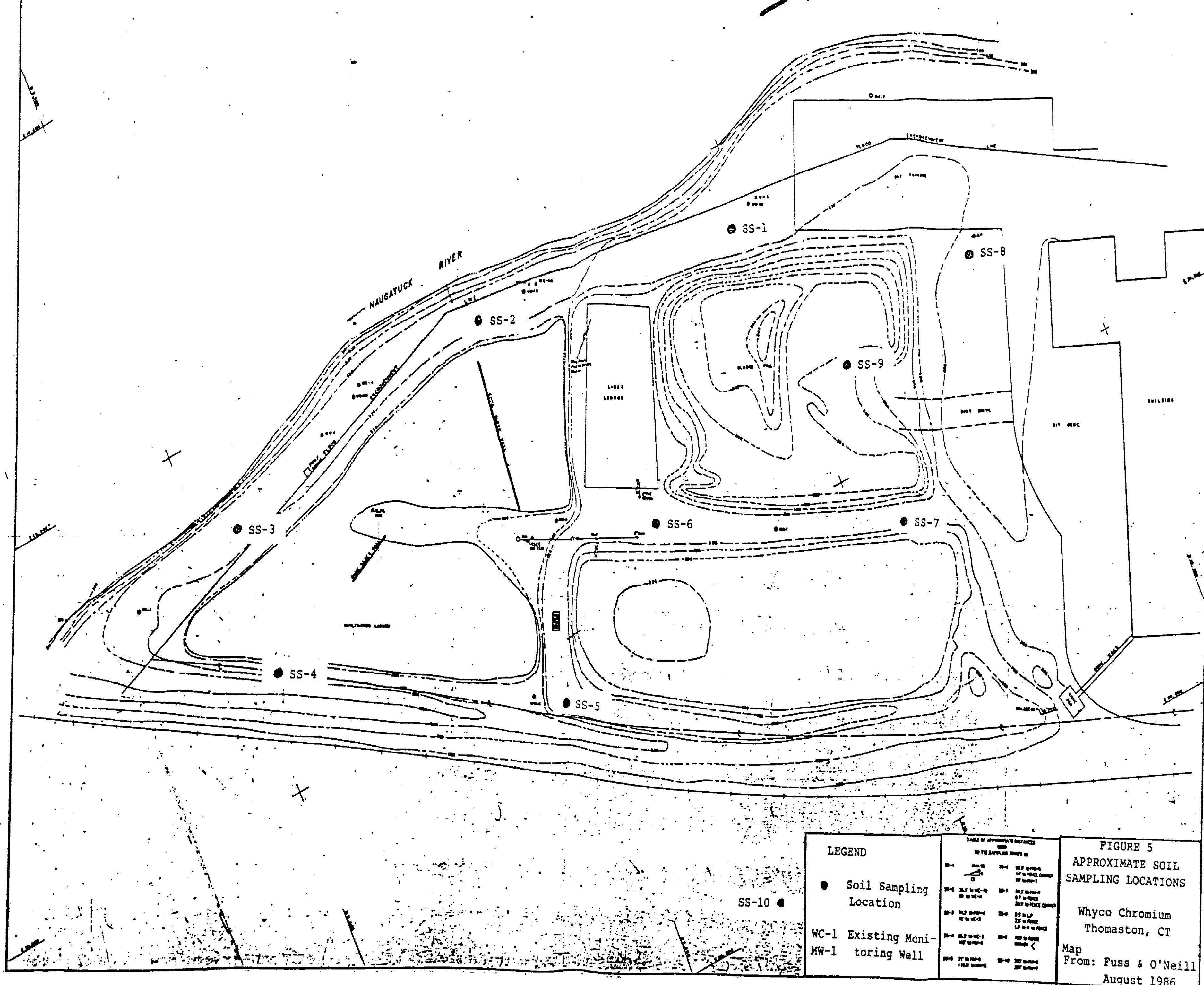

FIGURE 5
APPROXIMATE SOIL SAMPLING LOCATIONS

Whyco Chromium
Thomaston, CT

Map
From: Fuss & O'Neill
August 1986

TABLE 3
WHYCO CHROMIUM
INORGANIC SOIL ANALYSIS RESULTS (mg/kg)

SAMPLE LOCATION: INORGANIC ELEMENTS	SS-1	SS-2	SS-3	SS-4	SS-5	SS-6	SS-7	SS-8	SS-8 DUPLICATE	SS-9	SS-10 BACKGROUND	CRDL
ALUMINUM	4480	12700	8250	7630	4250	7770	6620	6470	6640	7880	9900	40
ANTIMONY	5.5 uJ	6.1 uJ	5.5 uJ	5.6 uJ	5.4 uJ	5.7 uJ	5.5 uJ	5.6 uJ	5.6 uJ	5.6 uJ	6.1 uJ	12
ARSENIC	0.98	1.7	1.4	1.8	1.1	1.7	0.66	1.0	1.1	1.3	11.8	2
BARIUM	32.0	59.2	42.4	45.1	21.0	56.1	45.0	39.3	38.9	47.2	71.8	40
BERYLLIUM	0.33	0.59	0.49	0.51	0.26	0.56	0.41	0.46	0.46	0.45	0.53	1
CADMIUM	4.3	8.2	6.9	4.2	2.4	16.7	123	16.2	16.1	52.0	1.2	1
CALCIUM	11900 J	3400 J	1510 J	1860 J	911 J	1550 J	3200 J	1740 J	1580 J	5470 J	2580 J	1000
CHROMIUM	85.2 J	168 J	199 J	159 J	87.8 J	918 J	1510 J	334 J	351 J	924 J	45.8 J	2
COBALT	8.8	22.0	21.4	12.7	7.5	35.1	117	28.9	28.2	71.1	9.3	10
COPPER	56.0 J	119 J	154 J	306 J	88.7 J	466 J	1150 J	305 J	273 J	527 J	100 J	5
IRON	7690	17600	13500	12500	7300	12900	12600	11700	12600	17800	15700	20
LEAD	41.7	42.4	46.4	44.0	17.6	75.7	256	68.6	53.8	189	119	5
MAGNESIUM	2120	3740	2990	2950	1590	3060	2700	2700	2990	3460	3610	1000
MANGANESE	154 J	354 J	342 J	220 J	158 J	297 J	322 J	268 J	274 J	373 J	502 J	3
MERCURY	--	--	--	--	--	--	--	--	--	--	--	0.1
NICKEL	77.9J	176J	197J	113J	56.3J	731J	1650J	378J	386J	1100J	29.7J	8
POTASSIUM	1110	1460	963	992	586	1070	927	933	982	1170	1510	1000
SELENIUM	--	--	--	--	--	--	--	--	--	--	--	1
SILVER	--	--	--	--	--	--	--	--	--	--	--	2
SODIUM	--	--	--	--	--	--	--	--	--	--	--	1000
THALLIUM	--	--	--	--	--	--	--	--	--	--	--	2
VANADIUM	18.1	27.8	20.9	20.7	13.2	20.8	19.3	19.3	19.7	24.8	32.1	10
ZINC	63.5 J	137 J	160 J	196 J	82.9 J	423 J	846 J	292 J	296 J	741 J	215 J	4
CYANIDE	6.2	20.5	16.7	8.3	16.4	28.2	--	22.1	15.8	34.1	1.8	0.5

NOTE:
J - QUANTITATION IS APPROXIMATE DUE TO LIMITATIONS IDENTIFIED IN THE DATA REVIEW
U - ANALYTE NOT DETECTED. ASSOCIATED NUMERICAL VALUE IS INSTRUMENT DECTION LIMIT
R - VALUE IS REJECTED.
-- VALUE IS NONDETECT.
CRDL - CONTRACT REQUIRED DETECTION LIMIT (mg/kg)

Iron was found at fairly consistent levels (11,700 mg/kg to 17,800 mg/kg) at eight of the 10 locations, with slightly lower levels at SS-1 (7,690 mg/kg) and SS-5 (7,300 mg/kg). It should be noted that relatively high levels of iron (15,700 mg/kg) and to a lesser extent, lead (119 mg/kg) were found in the background soil sample SS-10. Iron may be present in the soil as a natural component of parent rock material.

The samples from locations SS-7 and SS-9 exhibited the highest concentrations of almost all contaminants of concern. Sample SS-7, located at the northeast corner of the sludge landfill, exhibited the highest levels of all contaminants except iron: cadmium - 123 mg/kg, chromium - 1,510 mg/kg, cobalt - 117 mg/kg, copper - 1,150 mg/kg, lead - 256 mg/kg, nickel - 1,650 mg/kg and zinc - 846 mg/kg. Sample SS-9, from the landfill itself exhibited the second highest levels of these compounds: cadmium - 52 mg/kg, chromium - 924 mg/kg, cobalt - 71.1 mg/kg, copper - 527 mg/kg, lead - 189 mg/kg, nickel - 1,100 mg/kg and zinc - 741 mg/kg; and the highest levels of iron (17,800 mg/kg).

Samples from locations SS-6 and SS-8 revealed lower but still significant levels of these analytes. Sample SS-6, taken east of the hypalon lined lagoon and southeast of the landfill exhibited the following concentrations: cadmium - 16.7 mg/kg, chromium - 918 mg/kg, cobalt - 35.1 mg/kg, copper - 466 mg/kg, lead - 75.7 mg/kg, nickel - 731 mg/kg and zinc - 423 mg/kg. Sample SS-8 from the northwest corner of the landfill, where a duplicate was taken, exhibited similar levels of cadmium (16.1 and 16.2 mg/kg), cobalt (28.9 and 28.2 mg/kg) and lead (68.6 and 53.8 mg/kg) and lower levels of chromium (334 and 351 mg/kg), copper (305 and 273 mg/kg), nickel (378 mg/kg and 376 mg/kg) and zinc (292 and 296 mg/kg).

Remaining locations on-site (SS-1, SS-2, SS-3, SS-4 and SS-5) had cadmium concentrations ranging from 2 to 7 times above the background sample concentration of 1.2 mg/kg; chromium values ranging from 2 to 4.3 times the background of 45.8 mg/kg and nickel values ranging from 2 to 6.6 times the background of 29.7 mg/kg. Cobalt concentrations ranged from below to 2.4 times above the background sample concentration of 9.3 mg/kg; copper values ranged below to 3.1 times the background of 100 mg/kg. All of these locations had lead values below the background sample concentration of 119 mg/kg and zinc values below the background of 215 mg/kg.

Location SS-7 clearly exhibits the highest level of contamination for the primary parameters of concern (with the exception of iron) even in comparison to sample SS-9 taken from the landfill itself. It is difficult to determine the extent to which soil erosion is responsible. These elevated levels may be the results of an underestimation of the boundaries of the sludge landfill during sampling. In addition, contamination of this area may have occurred during the excavation of the sludge thickening lagoons and drying bed located to the east of the landfill and SS-7. These areas were excavated and the soils placed in the landfill. A similar argument may be made for location SS-6 at the southeast corner of the landfill and exhibiting similar to slighter lower levels of contamination. By comparison, the samples taken at location SS-8 were significantly lower in all levels of contaminants relative to SS-7 and SS-9, and significantly lower in levels of chromium, copper, nickel and zinc relative to SS-6.

Sample locations SS-1, SS-2, SS-3, SS-4 and SS-5, which encircle the southern portion of the site from the southwest corner of the sludge landfill to the northeast corner of the effluent recharge basins, generally exhibited relatively low levels of contamination.

Due to the topography of the sludge pile, erosion would result in contamination to the samples around its perimeter. This was seen at SS-7 and to a much lesser extent at SS-6 and SS-8; this was not the case at location SS-1, although, as seen in Figure 5, this location is downslope of the steepest side of the landfill.

Other analytes included in the soil analyses were present. However, these analytes were generally found at levels at or below that detected in the background sample (SS-10) or levels at or below the instrument and/or CLP contract required detection limits. The primary exception to this observation is cyanide which was seen in all but one of the on-site samples at levels 3.3 to 19 times that of 1.8 mg/kg found in the background sample. Sample SS-9, from the landfill had the highest level of cyanide, 34.1 mg/kg. Sample SS-6, at the southeast corner of the landfill, had the second highest level at 28.2 mg/kg. The one sample in which cyanide was not detected was SS-7 just east of the landfill. However, cyanide was detected at significant levels in samples SS-8 (22.1 mg/kg, 15.8 mg/kg in the duplicate), SS-2 (20.5 mg/kg) SS-3 (16.7 mg/kg) and SS-5 (16.4 mg/kg).

3.0 SOLID WASTE MANAGEMENT UNITS

Under RCRA Section 1004(28), the term "solid waste management" means the systematic administration of activities which provide for the collection, source separation, storage, transportation, transfer, processing, treatment and disposal of solid waste. A solid waste management unit (SWMU) is defined as any discernible waste management unit at a RCRA facility from which hazardous constituents might migrate, regardless of whether the unit was intended for the management of solid and/or hazardous waste.

This section discusses the solid waste management units and releases from those units at the Whyco Chromium facility. In response to EPA request for information pursuant to Section 3007 of RCRA, Whyco has identified the following SWMUs in a letter dated December 10, 1985. This discussion will not include those waste management units regulated under Whyco's NPDES permit; specifically the effluent recharge/infiltration lagoon system.

The location of SWMU Nos. 1 through 4 are indicated in Figure 4. Refer to Appendix A - VSI Photographic Log, Photos 1 and 4 for photographs of these units.

No. 1 - Waste Pile/Landfill

This unit has been in existence since 1970. Originally referred to as a waste pile (storage unit), Whyco revised their Part A submission in July 1986 to indicate that this unit is a landfill (disposal unit). This unit measuring approximately 200 feet by 140 feet and 10 feet in height has received metal hydroxide sludge resulting from the treatment of the wastewaters from the electroplating operations (F006). This landfill also received the material excavated from the two hypalon-lined sludge thickening lagoons and sludge drying bed in 1984, as part of their closure. Use of this landfill for disposal discontinued after Whyco's loss of interim status (LOIS) went into effect on November 8, 1985. The volume of the landfill as of that time was approximately 10,000 cubic yards. The landfill is presently considered closed in accordance with the closure plan, but will be listed as active until certification of closure is received.

No. 2 - Hypalon-Lined Sludge Thickening Lagoons

These two lagoons on the eastern side of the waste management area received metal hydroxide sludge from the clarifier formerly used as part of the wastewater treatment system. Both lagoons measure approximately 40 feet by 120 feet. Whyco began excavation of these lagoons in 1984 as part of their closure. In accordance with the procedures outlined in the closure plan these units are presently considered closed but will be listed as active until certification of closure is received.

No. 3 - Sludge Drying Bed

This unit received metal hydroxide sludge (F006) from the thickening lagoons under the former wastewater treatment system in operation until 1985. As was the case with the thickening lagoons, excavation of this bed began in 1984 as part of its closure. At this time this unit is considered closed in accordance with the closure plan, but it will remain listed as active until certification of closure is received.

No. 4 - Production Building

The entire production building at the Whyco site is considered a single SWMU. Any spills or leakage within the facility is contained within the facility and eventually reaches the NPDES-regulated waste water treatment system. This applies primarily to the areas associated with the electroplating process lines. Exceptions include dedicated waste storage areas, self-contained by perimeter berming. These areas are described separately as individual SWMU's.

The locations of the following tank storage areas, SWMU Nos. 5 through 8, are depicted in Figure 6.

No. 5 - No. 2 Fuel Oil Tank

This 10,000 gallon capacity underground tank is located outside the southeast corner of the production building. It has been in existence since 1979 and remains in use as No. 2 fuel oil storage tank.

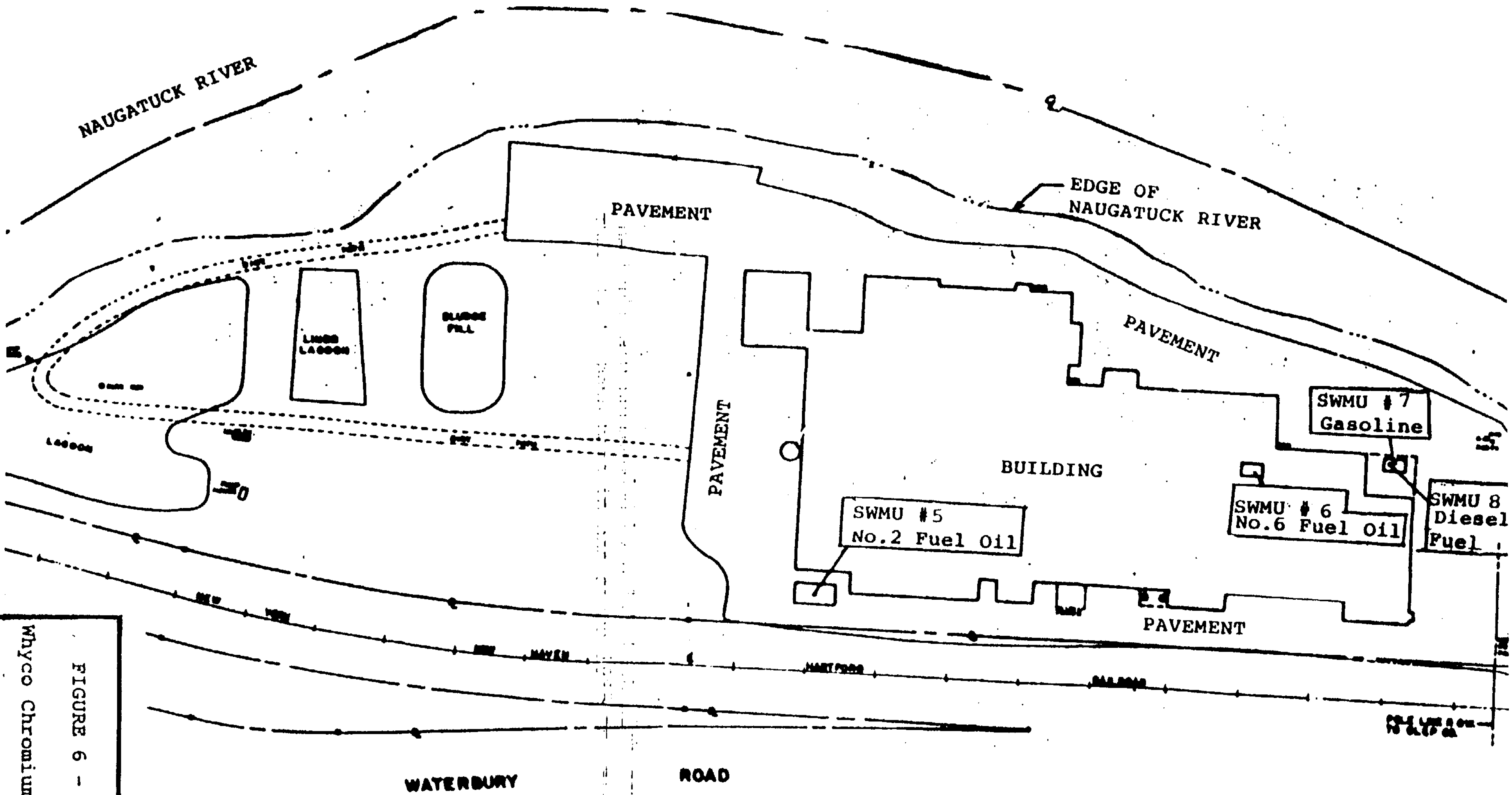

FIGURE 6 - TANK LOCATIONS
Whyco Chromium, Thomaston, CT
From: Fuss & O'Neill
Closure Plan

No. 6 - No. 6 Oil Tank

This is a second 10,000 gallon underground tank located within the northwest section of the building. This tank predated the No. 2 fuel oil tank discussed above; it was in use from 1962 to 1979. The tank has been out of use since that time. At the time of Whyco's 3007 response, this tank was undergoing abandonment in accordance with the NFPA guidelines.

No. 7 - Steel Gasoline Tank

This 500 gallon tank was in existence from 1972 to 1979 for storage of gasoline. After this time it was removed from the from the ground. This tank had been located at the northwest corner of the building.

No. 8 - Fiberglass Diesel Fuel Tank

This is a second 500 gallon tank in use from 1979 to 1983. It was situated in the same area as the steel gasoline tank, in the northwest corner of the building. It was subsequently abandoned and removed from the ground.

No. 9 - Liquid Cyanide Contaminated Liquid Bulk Storage

These two tanks, with a maximum capacity of 5,500 gallons, are located within the main building and are used to store spent cyanide solutions. The cyanide waste is generated during the copper and cadmium plating processes. This wastewater is subsequently treated in the wastewater treatment system. The tanks are surrounded by a 1.5 foot high concrete berm. These tanks have been in use since 1985 and are still in use. During the August 1988 Compliance Evaluation Inspection (CEI) these tanks were noted to be in good condition.

No. 10 - Cyanide Waste Drum Storage Area

This area is located adjacent to the bulk liquid cyanide storage tanks. Here, solid cyanide wastes are stored at the rate of approximately five 55-gallon drums per month. These drums are periodically taken off site by a licensed hauler for proper disposal. This drum storage area has been used since 1985. During the August 1988 CEI, nine drums were present, labelled and appeared in good condition.

No. 11 - Acid/Alkali Drum Storage Area

This area is used to store 55 gallon drums containing acid/ alkali waste solids generated during the electroplating process.

This area has been used for such storage since 1982 and is still in use. Whyco's 3007 letter response reports a capacity of 60 drums, however the CEI found a total storage capacity of 28 drums. During the CEI, 17 drums were present consisting of cadmium, chromium, and lead contaminated wastes (D006, D007 and D008, respectively). The area was blocked off and marked with a "hazardous material" warning sign.

No. 12 - Flammable Waste Drum Storage Area

This area is located in a shed outside of the main building and has a capacity for twenty-four 55-gallon drums. The exterior and interior of this SWMU can be seen in photos 6, 7, and 8 in Appendix A-VSI Photographhty Log. During the CEI, Whyco personnel stated that ignitable materials have not been stored there "for some time now". This area, which has been in existence since 1981, was reported to store raw materials used in Whyco's waxing process. The March 1989 site visit noted waste paint, virgin methyl isobutyl ketone (MIBK), isopropyl alcohol and methyl ethyl ketone (MEK) stored in this area.

No. 13 - Arsenic Contaminated Liquid Bulk Storage Area

Two 500 gallon steel tanks are kept in this area. Wastewater potentially containing arsenic is stored here until a tank is full, at which time a licensed hauler removes it for disposal. This waste is generated from an in-house process for IBM. These tanks have been in this area since 1983 and are still used.

No. 14 - Waste Methylene Chloride Bulk Storage Area

This 1,200 gallon steel tank has been used to store still bottoms from the vapor degreasing operations and off-spec methylene chloride. This tank, seen in Photo 9 of Appendix A - VSI Photographic Log, has been in use since 1970. During the VSI it was noted that methylene chloride wastes are no longer placed in this tank. Fifty-five gallon drums are now used to store these wastes, which are periodically removed by a licensed hauler. The tank was slated for cleaning and decontamination in accordance with the closure plan in late March, for later removal. Certification of closure of the tank, however, has not yet been received.

No. 15 - Acid/Alkali Wastewater Bulk Storage Tanks
& 16

These SWMUs are two separate concrete tanks each with a capacity of 80,000 gallons and located under the facility floor. These tanks contain acid/alkali wastewater influent to the NPDES regulated treatment system. This wastewater is generated during alkali cleaning rinses and acid dipping during the plating process. During the VSI, the tanks were found to have a leak detection system, with secondary containment provided. An alarm system is also present which notifies personnel when levels within a storage tank get too high or overflow. These tanks have been in place since 1982 and are still in use.

No. 17 – Cyanide Wastewater Bulk Storage Tanks
& 18

These two SWMUs are two separate 25,000 gallon concrete tanks. Cyanide contaminated influent wastewater to the NPDES treatment system is stored here. This wastewater is generated during certain plating processes. These tanks are also equipped with leak detection, water level alarm and secondary containment systems. They have been in place since 1982 and are still in use.

4.0 AREAS OF CONCERN

An Area of Concern (AC) is defined as "any area at a facility where hazardous waste or hazardous constituents have been managed or have come to be located and from which releases may occur." This definition is broader than that for a SWMU, which refers to discernible waste management unit. An AC includes probable disposal locations established by historical or topographic evidence; a category which is encountered at the Whyco facility with respect to their early waste management practices.

AC No.1 – Rolloff Pad and Containers

This waste management unit was not identified by Whyco in their 3007 letter response. During the August 1988 CEI this area was identified. The rolloff pad is located outside the fence at the northwest corner of the sludge landfill, where two 30 cubic yard rolloff containers are located (refer to Photos 10 and 11 in Appendix A – VSI Photographic Log). The rolloff pad area is not enclosed. At the time of the CEI, warning signs were not visible within 25 feet of the rolloffs; also the shipment labels on the containers were not Whyco's and therefore did not accurately reflect the contents. The rolloff was also not covered, however, Whyco stated that sludge generation was continuous and sludge was placed in the rolloff approximately every 45 minutes. Covers are placed on the rolloffs when it is raining and after operating hours. Sludge is stored within a rolloff for two days – the time it takes to fill one 30 cy container (18 tons), at which time the container is hauled off site for disposal. Two containers are always kept present at the rolloff pad. During the VSI in March 1989, a cover was present on a portion of a filled container. The container was also labeled as "Hazardous Waste Solids F006 Accumulation" with a place for the accumulation start date to be written.

Several waste management areas have been identified by Whyco as in use only prior to and shortly after the flood of 1955 washed out the facility. Information regarding the facility and waste management practices prior to 1955 is based solely on interviews that have been conducted with long time facility employees, as no records survive from the initial operations.

Several additional waste management units were in existence since the reconstruction of the facility after the flood until the early 1970s, however, little specific information is available on these units as well.

AC No.2 - Liquid Disposal Lagoon

The liquid disposal lagoon is believed to have been located south of the original production building, roughly halfway between the edge of the river and the railroad right-of-way. This lagoon received plating baths and rinsewater from production operations. The areal extent and volume of this lagoon is unknown. Following the flood, a majority of the liquid wastes were redirected to the Naugatuck River. The exact period of use is unknown but reported by Whyco to be out of use as of 1957 in their 3007 letter response.

AC No.3 - Solid Waste Burning Area

This area was also in existence prior to and only shortly after the 1955 flood. Located just west of the liquid disposal area, this area received solids from electroplating baths, scrap metal and general refuse. Items which were flammable were segregated and open burned. As is the case with the lagoon, the areal extent and quantity of wastes disposed are unknown. This "rear yard" area was still used as a solid waste disposal site after the 1955 flood, reportedly up until 1957, however the exact period of use is unknown.

AC No.4 - Former Production Well Used for Injection

This well was also located in the "rear yard" of the facility. The exact dates of the use of this well is also unknown. This well was utilized by the facility until the quality was found to have degraded to a point at which it was unsuitable for process use - sometime between 1955 and 1965. Unfortunately, no documentation exists on the construction details or exact location. Its location is estimated based on the recollection of facility employees. The importance of this well is two-fold. Based on assumptions that this former well drew water at rates comparable to present conditions, Fuss and O'Neill estimated a yield of 150 gpm. It is likely that this well drew constituents from the former surface lagoons into the well. Further, it has also been reported that once the well was determined as unsuitable for process operations, it was utilized as an injection well to dispose of liquid wastes, such as plating baths.

AC No.5 - Waste Pipe to Naugatuck River

It is believed that the use of this pipe began subsequent to the 1955 flood to direct laboratory wastes, formerly disposed in the liquid disposal lagoon, to the Naugatuck River. Information as to the dates of use or the volume of waste discharged is unknown. Use of this pipe was reportedly discontinued in 1973.

AC No.6 - Waste Pipe to the Naugatuck River

This pipe is also believed to have been installed following the 1955 flood, diverting liquid electroplating wastewaters, formerly disposed of in the liquid disposal lagoon, to the Naugatuck River. Again, specific information is lacking as to when it was installed and the volume of waste discharged. Use of this waste pipe was discontinued in 1971.

AC No.7- Sludge Trench

Prior to the establishment of the above ground waste pile, it has been reported that metal hydroxide sludge wastes from the electroplating operations were deposited in an on-site trench. Once the waste pile was initiated (in 1970), it has been reported that this material was removed and placed in the waste pile.

5.0 MIGRATION PATHWAYS AND ENVIRONMENTAL RECEPTORS

This section discusses potential migrational pathways via which hazardous constituents released from SWMU's or Areas of Concern could migrate to various enviromental receptors. A discussion of the pathways for ground water, surface water soil and air are discussed.

5.1 Ground Water

At the Whyco Facility, past waste management practices and the existing sludge landfill are the most significant contributors for contaminant migration via ground water. As described in Section 2.0, 3.0 and 4.0, Whyco has historically managed much of their waste in that portion of their property south of the facility building; initially in what has been referred to as the "rear yard" and later in land-based waste management units. In addition, a former production well was reportedly used for the injection of wastes once the quality of the ground water obtained from the well deteriorated to the point at which it could not be used.

Ground water monitoring of the unconsolidated aquifer has been performed at Whyco since 1983; that of the bedrock aquifer since 1986. Water level measurements taken at all wells on-site by Fuss & O'Neill, as part of the monitoring program, suggest a potentionmetric surface causing ground water flow in a southwesterly direction. This is particularly true for the overburden aquifer, whereas flow direction may vary locally somewhat within the bedrock aquifer depending on the orientation and extent of fractures.

Analytical data reported in the quarterly ground water monitoring reports, initially submitted by YWC, Inc. in 1984 and subsequently submitted by Fuss & O'Neill, Inc. indicates the highest levels of contamination are in the bedrock (MW-1BD, WC-1D) and overburden (WC-1A, WC-2) wells located southwest of the sludge landfill and west of the former effluent recharge lagoons. Refer to Table 2 for a summary of analytical data, Figure 4 for well locations and Section 2.3.4 for detailed ground water monitoring discussion.

Moderate to high levels of cadmium, chromium, copper, nickel, cyanide and fluoride were detected in the samples obtained from unconsolidated aquifer. The highest concentrations of the metals were observed in samples collected from wells WC-1A, WC-2 and, to a lesser extent, at the MW-3 well cluster. The highest levels of cyanide and fluoride were detected at wells WC-3, WC-4, WC-4D and MW-7, primarily at the southern end of the site. Moderate to high levels of cadmium, chromium, iron and nickel were seen in the bedrock well WC-1D. Cyanide was not detected and fluoride detected only once in the bedrock wells.

It is apparent that the waste management units, existing or historical, situated hydraulically upgradient of these wells are responsible to various extents for the contaminants detected in the groundwater at the Whyco site. Most evident is the existing sludge landfill (SWMU No. 1) upgradient of wells WC-1A, WC-2, WC-1D and MW-1BD and east of the MW-3 well cluster. The former sludge thickening lagoons (SWMU No. 2) and sludge drying bed (SWMU No. 3) are located further upgradient, to the east of the sludge landfill; however, these areas have been excavated and placed in the landfill. Historically these units may have contributed contaminants to the ground water, particularly the drying bed which was not reported to be lined. The area and extent of the contribution of those Areas of Concern used for waste management in the early years of Whyco operations are impossible to pinpoint. The use of certain areas - liquid disposal lagoon (AC No. 5), solid waste burning area (AC No. 6), former production/injection well (AC No. 7), and sludge trench (AC No. 10) would have clearly impacted ground water beneath the site. It is also possible that the former waste pipes (AC Nos. 8 and 9) may have contributed, depending on their integrity. Evidence of the contribution of the NPDES regulated effluent recharge lagoons was observed when a significant decrease in contaminant levels was observed (in both bedrock and overburden wells) subsequent to discontinuing their use.

5.2 Surface Water

The Naugatuck River flows in a southerly direction along the western edge of the Whyco site. This river is classified as a Category C surface water by the Connecticut Department of Environmental Protection (CT DEP). For approximately 3.25 miles it forms the boundary between the small towns of Thomaston (population 3,500) and Watertown (population 6,000). The Mattatuck State forest comprises large parcels of land on either side of the Naugatuck within these towns. Further south, the Naugatuck flows for 10.5 miles through the more densely populated city of Waterbury (population 105,000).

It is possible for material to reach the Naugatuck via runoff or wind action. However, the possibilities for such migration pathways are relatively remote. The topography of the site, with the exception of the land based waste management units, is virtually flat. Portions of the land based units have developed a grass cover. Both of these factors impede runoff and erosion. It remains possible for runoff to carry soil particles eroded from areas of exposed soil, and to which contaminants, heavy metals in particular, may be bound. This is particularly true for runoff from the side slopes of the sludge landfill. If dry conditions exist on site, soil particles may also be carried from the exposed areas and eventually reach the adjacent river.

The ground water beneath the Whyco site flows in the direction of and eventually discharges into the Naugatuck. This pathway is a likely scenario for contaminant migration to this surface water body. No surface water or sediment samples are reported to have been taken from the Naugatuck River in an effort to determine whether releases of to the river have potentially occurred.

5.3 Soil

As is the case for ground water, past waste management practices and the existing sludge landfill have contributed to contamination of soil at the Whyco site. The wastes managed by the early practices - sludge trench, liquid disposal lagoon, burning and well injection - all result in direct contact of wastes with soil. Portions of the site contaminated by these former waste management units are difficult to pinpoint since information on their use is so limited. The later use of unlined sludge drying beds and landfill for managing wastes, and the NPDES effluent recharge lagoons, also resulted in direct contact of waste and soil. It is also possible that further contamination of site soils occurred during the excavation of the sludge drying beds and thickening lagoon to the landfill.

Soil sampling conducted by FPC detected the highest levels of inorganic contamination at locations (SS-7) east of the sludge landfill and on the landfill itself (SS-9). Much lower levels, although still significantly above background (SS-10), were found at locations outside the southeast (SS-6) and northwest (SS-8 and SS-8D) corners of the landfill. It is possible that erosion, from wind or runoff, is responsible, at least in part, for elevated levels of contamination. However, location SS-1 to the west of the landfill did not show contaminant levels significantly above background even though it is downslope of a steeper side of the landfill. Excavation of the sludge drying beds and thickening lagoon may have contributed to the high levels seen at SS-7 and, to a lesser extent, at SS-6. Samples taken at locations along the southern and eastern edge of the site (SS-2, SS-3, SS-4, and SS-5) exhibited relatively low levels of contaminants for this portion of the site. Based on the sampling conducted, contamination is apparently centered around the sludge landfill, although past waste practices may also have contributed in other portions of the site. Refer to Section 2.3.5 and Table 3 for a detailed discussion of soil sampling results.

5.4 Air

The only SWMU or Area of Concern that could possibly have a release would be the Production Building, SWMU No. 4. Numerous roof vents are present on the building where it is possible for hazardous constituents to be released. In their 3007 letter response, Whyco indicated that they had been informed by the CT DEP Air Compliance Unit that air permits for the vents were not required due to the de minimus quantities of any potential releases through the vents.

6.0 CONCLUSIONS AND RECOMMENDATIONS

The Whyco Chromium Company has operated a number of waste management units or areas of concern over the course of its existence. A number of the earlier practices, noted in Section 4.0 are no longer conducted. Information available regarding their operation and volumes of waste handled is minimal at best. The land based units were subsequently employed in the late 1960s. Operation of these units is well documented and they are still in existence although no longer in use. (These units have not been certified as closed.) Together these practices handled process wastes which invariably contaminated soils through direct contact, ground water through infiltration and potentially surface water as ground water beneath the site discharges to the Naugatuck River.

FPC has conducted one round of soil sampling at the Whyco site. Contamination was generally seen at or above background levels across the site. The highest levels were detected at or in the vicinity of the onsite sludge landfill. It does not appear that soil from the landfill is contributing to the spread of contamination across the site based on the relatively low levels detected west and downslope of the landfill. Past disposal practices have most likely resulted in contamination seen over the remainder of the site.

Extensive ground water monitoring conducted by Fuss & O'Neill has determined the releases to the ground water have occurred underneath the portion of site where the land based waste management units have been located. Cadmium, chromium, copper, nickel, cyanide and fluoride were found at moderate to high concentrations in the upper unconsolidated aquifer, primarily in the wells southwest of the sludge landfill (WC-1A, WC-2 and MW-3). Bedrock well WC-1D in this same area, also exhibited high concentrations of these heavy metals. The effect of the NPDES regulated effluent recharge lagoons was observed as concentrations of these heavy metals, cyanide and fluoride in all wells decreased following discontinuation of their use. The remaining contamination is primarily due to the leaching of these constituents from the former sludge thickening lagoon and drying beds and the existing sludge landfill.

The direction of ground water flow has been determined to be south/southwesterly with discharge to the Naugatuck River. There is no record of surface water or sediment sampling of the Naugatuck River having been performed. Such sampling conducted up and downstream of the site would aid in determining whether the Whyco facility, particularly the sludge landfill, is a continuing source of contamination to the river.

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