

Chromium in the Pine River

Alma College Study

Chromium (III) and hexavalent chromium (Cr VI) are indicative of materials used in Lobdell Emery's operations and are found at elevated levels in river sediment in Horse Creek and the Pine River in areas downstream of known point source discharges of former Lobdell Emery/Oxford operations in Alma. The attached Table 1 shows elevated levels of chromium and hexavalent chromium in river sediment as compared with background levels downstream of known as part of an Alma College study conducted in 2002.

U.S. EPA and Weston Environmental Sampling

High levels of chromium were also found in water seeps leaching out from the former Velsicol Superfund Site (see attached Table 2). Chromium was not a significant product or by-product of Velsicol Chemical/Michigan Chemical operations. Pine River sediment was routinely dredged and deposited on the plant site proper (see 1980, Correspondence from Velsicol to U.S. EPA, and 1997, U.S. EPA Remedial Investigation Report). Therefore, it is possible that the chromium observed in the seeps is a result of the leaching of sediment in the plant site containing contaminants from upstream sources. Since the only documented historic source of chromium discharges into the Pine River was from Lobdell Emery/Oxford, it is possible this is the source.

TABLE 1

**Sediment Sampling Results In Conjunction With
Benthic Invertebrate Survey, May, 2002
METALS - Cr III and Cr VI**

(ppm)	SITE 8 P.R. Control	SITE 6 P.R.	SITE 1 P.R.	SITE 3 P.R.	SITE 4 H.C. Control	SITE 9 H.C.	SITE 5 H.C.
Total Chromium (Cr)	2.9	7.9*	6.1*	74*	4.7	4.2	200*
Hexavalent Chromium (Cr VI)	ND	1.89*	1.86*	4.58*	ND	ND	1.97*

*Indicates site is located downstream from known historic discharge from Lobdell-Emery/Oxford

TABLE 2

Sample analysis of seeps taken from side wall of Velsicol Superfund Site, 2001. See Table 6 of the MDEQ/WESTON Phase I Tech Memo, May 2002

Sample ID (Units)	Sample 001 Water (ug/L) 10/26/01 12:30	Sample 002 Water (ug/L) 10/26/01 13:15	Sample 001 Soil (mg/kg) 10/26/01 12:30	Sample 002 Soil (mg/kg) 10/26/01 13:15	Sample 003 Soil (mg/kg) 10/26/01 14:05
PESTICIDES					
4,4'-DDD	460	420	2300	300	2900
4,4'-DDE	210	200	1200	190	1600
DDT's*	3700	4300	18200	1930	29000
VOC's (8260)					
Benzene	2100	1100	<74	20	<120
Chlorobenzenes*	93000	45000	6900	1900	14240
Naphthalene	85000	39000	<370	<91	<590
Tetrachloroethanes*	1400	1200	<150	<36	<240
Tetrachloroethene	<1000	<500	<74	<18	<120
Trichloroethene	<1000	<500	<74	<18	<120
SVOC's (8270)					
Phenol	14	<5.0	<1.7	<0.33	<17
Chlorobenzenes*	185	62	81.2	9.11	790
2,4,6-Trichlorophenol	6	<4.0	<1.7	<0.33	<17
2-Chlorophenol	22	<5.0	<1.7	<0.33	<17
4-Methylphenol	56	<5.0	<1.7	<0.33	<17
METALS					
Aluminum	740	90	3260	3060	1880
Arsenic	1400	53	3.5	2.7	2.0
Calcium	5280	569	75700	69400	73200
Chromium	<10	<10	8.6	6.5	4.2
Cobalt	61	10	3.8	3	2.1
Iron	27900	<100	8170	7310	3690
Magnesium	727	138	22100	22400	15000
Manganese	2680	890	177	151	128
Selenium	659	59	1.5	1.5	1.5
Vanadium	90	17	8.7	8.7	6.7