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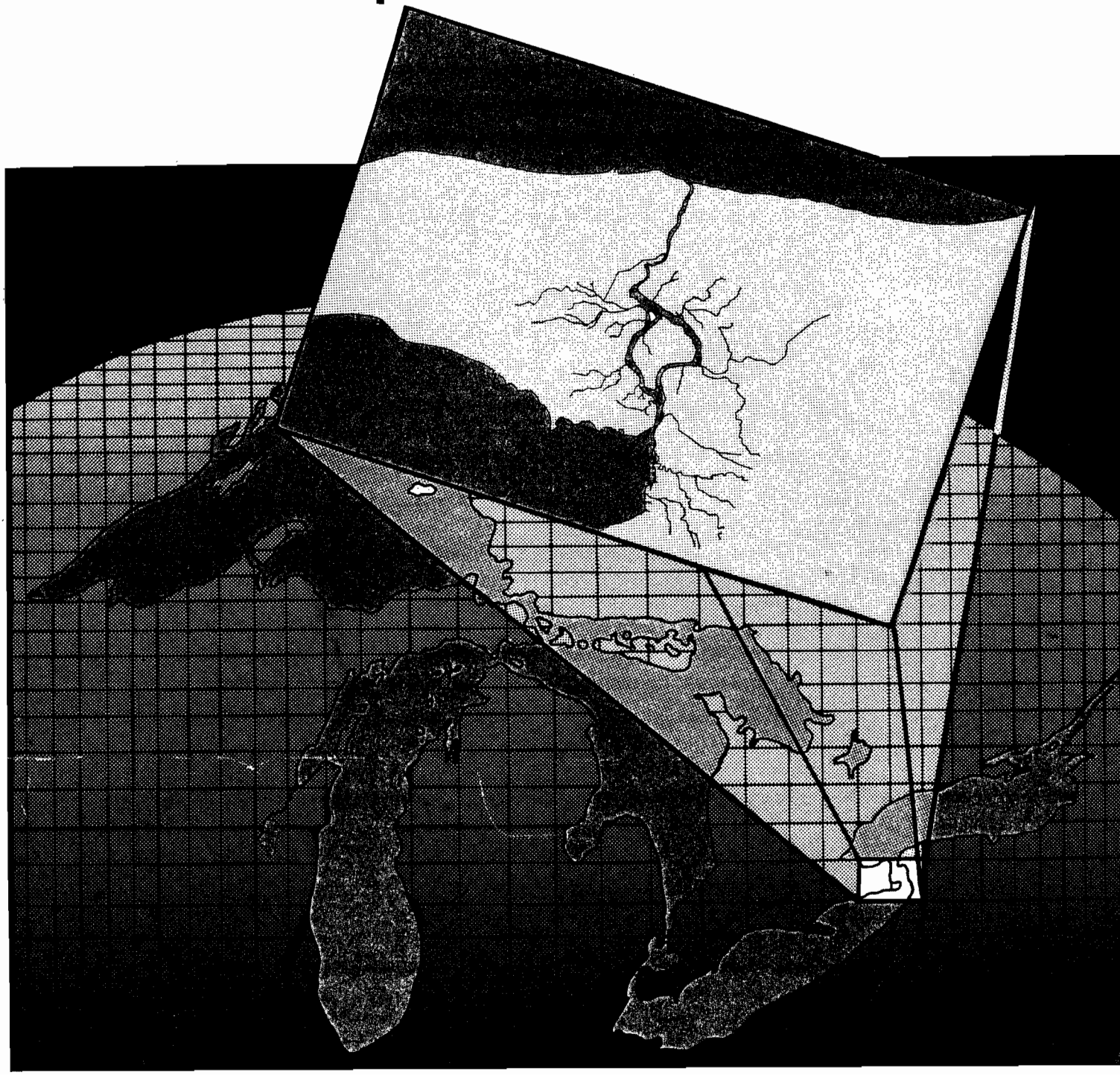
Preliminary Evaluation Of Chemical Migration To Groundwater and The Niagara River from Selected Waste-Disposal Sites



58, 59, 248. OLIN, BUFFALO AVENUE (USGS field reconnaissance) NYSDEC 932051-a, b, 932038

General information and chemical-migration potential.--These three sites, at the Olin Buffalo Avenue plant in the city of Niagara Falls, were used for land-spreading of brine sludge containing mercury and possibly polychlorinated biphenyls. Also on the property is a pond that was used to collect overflow water from site 248, which contains traces of mercury.

Chemical data, proximity to the Niagara River, and the shallow overburden indicate a major potential for contaminant migration. Some samples indicated mercury concentrations to be above background levels. Additional sampling would be needed to determine whether the contaminant is migrating into the ground-water system.

Geologic information.--The sites consists of fill and debris underlain by a sandy clay. The U.S. Geological Survey drilled four test borings on site 58 and six along the perimeter of sites 59 and 248 in 1982 (fig. C-31). The geologic logs are on page 347.

Hydrologic information.--No ground water was encountered. If ground water were in the unconsolidated deposits, the direction of flow would probably be southward toward the river.

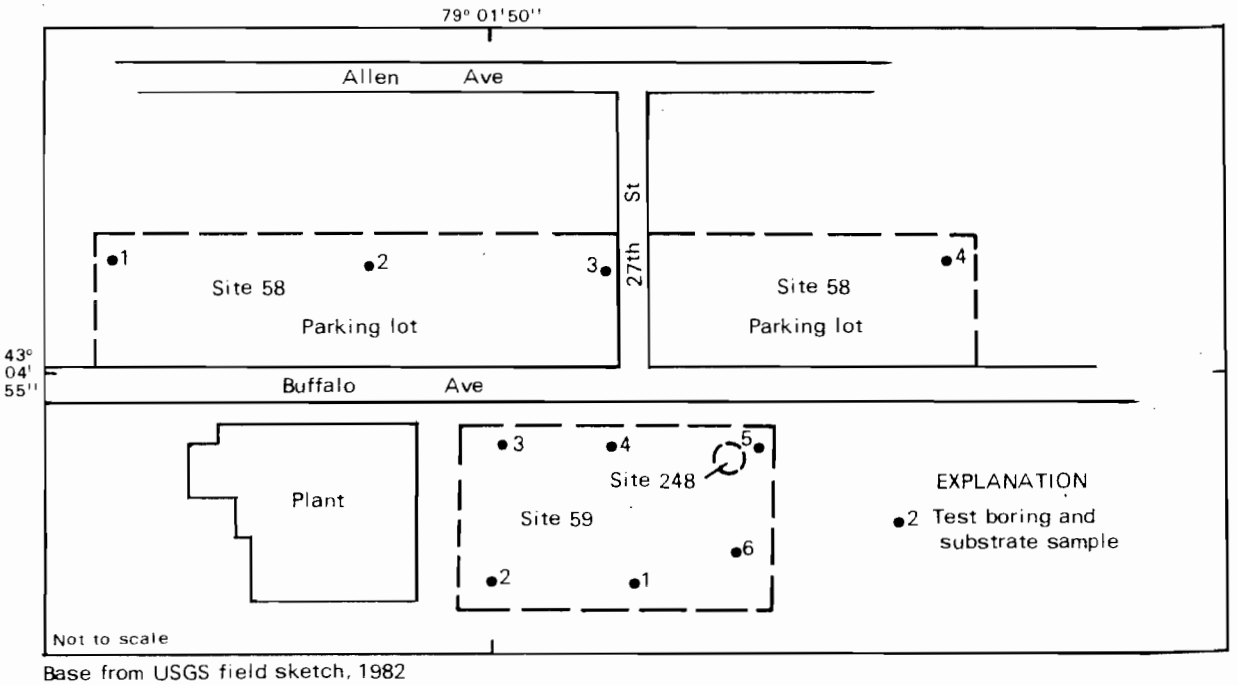


Figure C-31. Location of monitoring wells at Olin Buffalo Avenue, sites 58, 59, and 248, Niagara Falls.

Boring no.	Depth (ft)	Description
	Site 58	
1	0 - 3.0	Topsoil.
	3.0 - 3.5	Clay, sandy, yellowish, damp.
	3.5 - 8.0	Clay, reddish, gravel, sandy. Bedrock at 8.0 ft.
		SAMPLE: 3 ft.
2	0 - 2	Black topsoil
	2 - 4.5	Clay, sandy, gravel, yellowish. Bedrock at 4.8 ft.
		SAMPLE: 4 ft.
3	0 - 3.0	Topsoil, brown to black at 2.0 ft.
	3.0 - 3.5	Clay, red.
		SAMPLE: 3 ft.
4	0 - 1.5	Topsoil and gravel.
	1.5 - 2.5	Sand soil, black.
		SAMPLE: 2.5 ft.
	Sites 59 and 248	
1	0 - 3.5	Soil, sand, gravel fill.
	3.5 - 5.5	Clay, sandy, tan, damp.
		SAMPLE: 3.5 ft.
2	0 - 3.0	Gravel fill.
	3.0 - 6.5	Sandy clay.
		SAMPLE: 4 ft.
3	0 - 1.0	Topsoil, brown.
	1.0 - 4.0	Clay, sandy.
		SAMPLE: 2 ft.
4	0 - 2	Fill, debris, bricks.
		SAMPLE: 2 ft.
5	0 - 3.0	Topsoil, debris.
		SAMPLE: 2.5 ft.
6	0 - 1	Topsoil, debris.
		SAMPLE: 1 ft.

Chemical information.--Olin installed 10 monitoring wells in the eastern area of the plant site adjacent to Gill Creek in 1980. Sampling during 1980-82 indicates the following concentrations at the downgradient well, which was drilled to the top of bedrock in the southeastern area of the plant:

Olin Plant Site - Downgradient Well

	Concentration (µg/L)	
Priority pollutants	Maximum	Mean
Mercury	21.5	13.5
2-Chlorophenol	170	56
2,3 and 2,4 and 2,5 Dichlorophenol	83	33
Pentachlorophenol	50	23
γ-BHC (Lindane)	4,200	1,248
Nonpriority pollutants		
Total halogenated organics	14,000	4,087
Total volatile halogenated organics	9,400	4,287
3-Chlorophenol & 4-Chlorophenol	98	47
2,4,5 and 2,3,4 Trichlorophenol	140	49
2,3,4,6 Tetrachlorophenol	50	23

The U.S. Geological Survey collected soil samples from each test boring for iron and mercury analysis. Each sample was split with the site owner. Results of the U.S. Geological Survey analyses are shown in table C-13. Mercury concentration in sample 6 of the pond borings exceeded concentrations from undisturbed soils in the area. The samples contained eight organic priority pollutants, of which only benzene (48,000 µg/kg) exceeded the quantifiable detection limit, and two organic nonpriority pollutants.

Results of the site owner's analyses are shown in table C-14, which indicates high concentrations of mercury in samples 3 and 4 from the parking lot and samples 2, 4, 5, and 6 of the pond borings. Relative concentrations of organic compounds between samples are indeterminable because the quantifiable detection limits are unknown.

Table C-13.--U.S. Geological Survey analyses of substrate samples from Olin parking lot and Olin mercury ponds, sites 58, 59, and 248, Niagara Falls, N.Y., August 9, 1982.
[Locations shown in fig. C-31. Concentrations are in µg/kg; dashes indicate that constituent or compound was not found, LT indicates it was found but below the quantifiable detection limit.]

PARKING LOT	Sample number and depth below land surface (ft)				
	1 (3.5)	(Split)	2 (4.0)	3 (3.0)	4 (2.5)
Inorganic constituents					
Iron	1,300,000	(7,100,000)	830,000	2,800,000	1,800,000
Mercury	--	(--)	--	330††	10
Organic compounds	***	***	***	***	***
Nonpriority pollutant					
Hexamethylcyclo-trisiloxane[1]	--	(--)	3,000	3,200	--

MERCURY PONDS	Sample number and depth below land surface (ft)					
	1 (3.5)	2 (4.0)	3 (2.0)	4 (2.0)	5 (2.5)	6 (2.0)
Inorganic constituents						
Iron	2,600,000	1,800,000	1,000,000	1,900,000	940,000	1,400,000
Mercury	40	80	--	14	60	220
Organic compounds	***	***	***	***	***	***
Priority pollutants		LT				
Phenanthrene	--	LT	--	--	--	--
Fluoranthene	--	LT	--	--	--	--
Pyrene	--	LT	--	--	--	--
Benzoanthracene	--	LT	--	--	--	--
Chrysene	--	LT	--	--	--	--
Benzo(a)pyrene	--	LT	--	--	--	--
Benzo(b)fluoranthene	--	LT	--	--	--	--
Benzo(k)fluoranthene	--	LT	--	--	--	--
Benzene	--		48,000	--	--	--
Nonpriority pollutants						
3-Hexen-2-one[1]	5,100	--	--	--	--	--
Hexamethylcyclotri-siloxane[1]	2,700	--	--	--	--	--

[1] Tentative identification based on comparison with the National Bureau of Standards (NBS) library. No external standard was available. The concentration reported is semiquantitative and is based only on an internal standard. GC/MS spectra were examined and interpreted by GC/MS analysts.

†† Exceeds concentrations in samples taken from undisturbed soils in the Niagara Falls area. Undisturbed soils not analyzed for iron.

*** Samples analyzed at detection limit above that required by this study.

Table C-14.--Site owner's analyses of substrate split samples from Olin parking lot and Olin mercury ponds, sites 58, 59, and 248, Niagara Falls, N.Y., August 9, 1982.
[Locations shown in fig. C-31. Concentrations are in µg/kg; dashes indicate that constituent or compound was not found. Data from Olin Incorporated, 1982.]

PARKING LOT	Sample number and depth below land surface (ft)			
	1 (3.5)	2 (4.0)	3 (3.0)	4 (2.5)
Inorganic constituents				
Cyanide, total	--	--	1,400	4,800
Mercury, total	170	300	4,500††	20,000††
Mercury extract	<500	<500	<500	<500
Organic compounds				
Polycyclic aromatic hydrocarbons (PAH)	--	<<6,000	<<10,000	<<12,000
Chlorobenzenes	--	--	<<4,000	<<12,000
Hexachlorobutadiene	--	--	<2,000	--
Chlorinated methanes and ethanes	<10	<52	<580	<50
Other volatiles	<10	<20	<138	<30
Pesticides, Non-BHC	--	--	<55	--
Pesticides, BHC	--	<41	<45	<137

MERCURY PONDS	Sample number and depth below land surface (ft)					
	1 (3.5)	2 (4.0)	3 (2.0)	4 (2.0)	5 (2.5)	6 (2.0)
Inorganic constituents						
Cyanide, total	2,000	1,200	--	--	--	--
Mercury, total	17,000†	6,700††	<80	40,000†	5,900†	2,800††
Mercury extract	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Organic compounds						
Polycyclic aromatic hydrocarbons	<<<27,200	<<<37,300	--	<<<44,300	--	<<<22,000
Chlorobenzenes	<<4,000	<2,000	--	<4,000	--	<2,000
Hexachlorobutadiene	<2,000	--	--	--	--	<2,000
Chlorinated methanes and ethanes	<<<59	<<140	11	<229	<10	<<52
Other volatiles	<66	<21	--	<420	--	<10
Pesticides, Non-BHC	40	40	--	--	--	--
Pesticides, BHC	92	<20	--	<125	--	106

†† Exceeds concentrations in samples taken from undisturbed soils in the Niagara Falls area.