Edison Township, New Jersey Region 2

NJD980484653

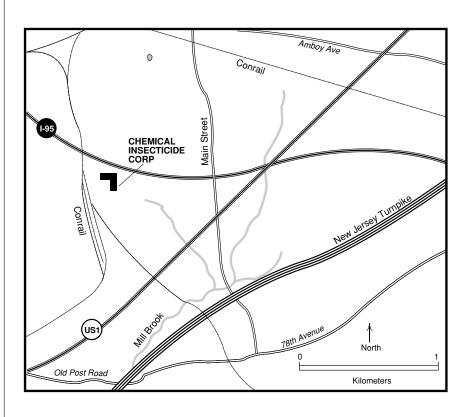
Site Exposure Potential

Chemical Insecticide Corporation (CIC) is an abandoned, 2.3-hectare pesticide manufacturing facility in Edison Township, New Jersey (Figure 1). From 1958 to 1970, CIC produced insecticides, fungicides, rodenticides, and herbicides, including 2,4,5-trichlorophenoxy-acetic acid (2,4,5-T), noted for being contaminated with dioxins and related compounds. Improper manufacturing and product handling resulted in numerous complaints and citations against the company during the period of operation. The company went bankrupt in 1970 and in 1975 all buildings were demolished, leaving only concrete building pads, residual roadways, buried drums, and debris on the site (Ebasco 1990).

On-site surface water includes small amounts of standing water and numerous erosional drainage channels. The erosion channels flow eastward and discharge into a drainage ditch adjacent to the eastern site boundary. The ditch leads to a subsurface storm drain system that discharges to an unnamed creek. This unnamed creek flows for about 450 m before



Figure 1.
The Chemical
Insecticide
Corporation,
Edison
Township, New
Jersey.



Site Exposure Potential,

cont.

discharging into Mill Brook, which enters the Raritan River 3.5 km downstream.

The CIC site is underlain by several aquifers. Measurements from both on-site and nearby wells have indicated that groundwater in both shallow and deep aquifers generally flows to the east.

Surface drainage, remnant floor drains, and exposed sewer lines suggest the presence of an on-site sewer system. Chemicals used on the site may have been disposed of into this system.

Based on site characteristics and historical practices, surface water transport through the storm water collection system that discharged into the unnamed creek is the major pathway of contamination to NOAA resources. Groundwater in the shallow aquifer may contribute some contaminants if it enters the surface drainage to the east of the site (unnamed tributary). Contaminated sediment and soil represent secondary sources of contamination and may be transported off-site by surface or subsurface drainages.

Site-Related Contamination

Results from the RI (Ebasco 1990) confirmed that surface water, groundwater, soil, and sediment from the CIC site and nearby areas are contaminated with a variety of chemicals, including inorganic substances, pesticides, PCBs, and dioxin/furans. Low concentrations of numerous volatile and semi-volatile organic compounds were detected at the site. Tables 1 and 2 (Ebasco 1990) show contaminant concentrations that are of major concern to NOAA.

On-site groundwater was contaminated with eight trace elements, with arsenic and mercury present at exceptionally high levels. Concentrations of these substances were substantially lower in off-site groundwater. Maximum concentrations of inorganic contaminants in surface water were substantially lower than the concentrations in groundwater. Arsenic, cadmium, copper, nickel, and zinc exceeded their respective chronic AWQC in on-site surface water while only chromium,

Site-Related Contamination,

cont.

Table 1.
Maximum
concentrations
(μg/l) of
contaminants
of concern at
the Chemical
Insecticide site.

copper, and zinc exceeded their respective AWQC in surface water off-site.

Polychlorinated dibenzodioxins (dioxins) and related compounds were measured in groundwater, surface water, sediment, and soil at the CIC site. The maximum concentration of

	Groundwater		Surface	AWQC ¹ Marine	
	On Site	Off Site	On Site	Off Site	Chronic
INORGANIC SUBSTANCES					
arsenic	89200	63	1680	6.4	36
cadmium	1840	13	10	3	9.3
chromium	855	277	31	90	50
copper	2600	117	19	11	2.9
lead	543	136	<6.7	NR	5.6
mercury	47	ND	ND	NR	0.025
nickel	1560	414	46	NR	8.3
zinc	3890	1420	287	428	86
ORGANIC CON Pesticides	MPOUNDS				
alpha BHC	3400	0.2	<1.8	0.2	NA
gamma BHC	1400	NR			0.16**
dieldrin	55	NR	<0.3	<0.1	0.0019
endrin	230	ND	<0.3	<0.1	0.0023
DDT	2100	0.3	2.5	<0.1	0.001
chlordane	88	ND	ND	ND	0.004
Total Dioxins	.0004	ND	ND	ND	NA

Ambient water quality criteria for the protection of aquatic organisms. Marine chronic criteria presented (EPA 1986).

total dioxins in groundwater on-site was 0.0004 μ g/l, 40 times greater than the chronic freshwater AWQC (there are no marine AWQC). No dioxins were detected in off-site groundwater samples. Total polychlorinated dibenzofurans (furans) were detected in one on-site surface water sample at 0.00024 μ g/l. No dioxins or furans were detected in off-site surface water but were detected in on-site sediment and soil at very high levels.

Contaminants in the soil showed a pattern similar to the contamination in the sediment with both on-site and off-site concentrations exceeding the average levels observed in U.S. soil. Chromium was the only element that was present in soil at higher concentrations off-site than on-site.

^{*} Marine acute criteria presented, no chronic criteria available.

ND: Not detected at method detection limit.

NR: Not reported.

NA: Screenling level not available.

Site-Related Contamination,

cont.

Table 2.
Maximum concentrations (mg/kg) of contaminants in sediment and soil from the CIC site.

	Soil			Sediment					
			Average						
	On-Site	Off-Site	U.S. Soil ¹	On -Site	Off-Site	ER-L ²			
INORGANIC S	UBSTANCES	<u>.</u>		-					
arsenic	8010	24	5	2660	79	33			
cadmium	177	6	0.06	21	9.4	5			
chromium	128	196	100	39	133	80			
copper	4410	83	30	150	216	70			
lead	1980	80	10	1170	1130	35			
mercury	72	0.6	0.03	0.7	0.2	0.15			
nickel	119	108	40	143	38	30			
zinc	1040	226	50	552	1840	120			
ORGANIC COMPOUNDS									
alpha BHC	45000	0.031	NA	590	.012	NA			
gamma BHC	23000	0.00.	NA	0.25	ND	NA			
dieldrin	17.0	ND	NA	1.9	0.063	0.0004			
DDT	6900	0.240	NA	820	0.074	3			
chlordane	39	ND	NA	ND	ND	NA			
PCBs	ND	ND	NA	0.42	10	50			
Total Dioxins	0.0073	0.000022	NA	0.00079	ND	NA			
TCDD	0.0073	0.000022 ND	NA NA	0.00076	ND	NA NA			
Total Furans	0.079	ND	NA	0.00076	ND	NA			

1: Lindsay (1979).

2: Effective range-low; the concentration representing the lowest 10 percentile value for the data in which effects were observed or predicted in studies compiled by Long and Morgan (1990)

ND: Not detected at method detection limit NA: Screening level not available

Trace elements were detected in sediment on- and off the site at concentrations above ER-L values (Long and Morgan 1990). Arsenic concentrations were greatly elevated on-site. Arsenic (15 mg/kg), cadmium (1.5 mg/kg), and lead (59 mg/kg) were detected in sediment from Mill Brook. Concentrations of other trace elements were not reported for Mill Brook sediment. Chromium, copper, and zinc had higher concentrations off-site than on-site.

Elevated concentrations of several pesticides were observed in groundwater on-site (Table 2). Pesticides were reported to be substantially lower in off-site groundwater samples, although results were not presented for all pesticides. Pesticide concentrations in surface water were reported to be less than the detection limits. However, the detection limits used for dieldrin, endrin, and DDT were much higher than their chronic marine AWQC. Pesticides were measured at high concentrations in sediment on site, particularly for a-BHC, dieldrin, and DDT, but sediment cores were lower off-site (Table 2). Pesticide concentrations were also high in soil on the site, but were

Chemical Insecticide Corporation Site-Related lower in off-site soil. PCBs were not detected in surface water or groundwater samples from the CIC site or adjacent areas. Contamination, cont. Mill Brook is in a heavily industrialized area and has had **NOAA Trust** chronic pollution problems. The New Jersey Department of Habitats and Environmental Protection has not surveyed the stream since Species 1980; it is not known whether pollution abatement efforts have since restored anadromous species use of the stream. Blueback herring, alewife, blue crab, silverside, American eel, and mummichog may have used the stream, especially in the lower reaches near its confluence with the Raritan River (Stuart personal communication 1990). Table 3. Species and habitat use in the lower Raritan River. Table available in hardcopy The Raritan River serves as habitat for migratory and estuarine-dependent marine fish (Table 3; Boriek personal communication 1990; Stuart personal communication 1990). The Raritan River is a major crabbing and fishing area, though

NOAA Trust Habitats and Species,

cont.

only blue crab are harvested commercially. Recreational fisheries exist for blue crab, bluefish, striped bass, American shad, American eel, white perch, and summer flounder. American shad have been stocked in the upper Raritan River to encourage the restoration of a fishery upriver, but spawning has yet to occur (Boriek personal communication 1990).

Fishing advisories are in effect in the Raritan River for American shad, striped bass, bluefish, and white perch due to high levels of PCB contamination (Boriek personal communication 1990).

References

Boriek, M., New Jersey Bureau of Freshwater Fisheries, Division of Fish, Game, and Wildlife, Lebanon, New Jersey, personal communication, January 16, 1990.

Ebasco Services, Inc. 1990. Remedial Investigation report. Chemical Insecticide Corporation. Edison Township, New Jersey. Draft Final Report. Volumes 1 and 2. Philadelphia: U.S. Environmental Protection Agency, Region 3.

Lindsay, W.L. 1979. <u>Chemical Equilibria in Soils</u>. New York: John Wiley & Sons. 449pp.

Long, E.R., and L.G. Morgan. 1990. The potential for biological effects of sediment-sorbed contaminants tested in the National Status and Trends Program. Seattle: Coastal and Estuarine Assessment Branch, NOAA. NOAA Technical Memorandum NOS OMA-52. 175 pp.+ Appendices.

Stuart, Robert, Principal Fisheries Biologist, New Jersey Bureau of Freshwater Fisheries, Lebanon, New Jersey, personal communication, June 20, 1990.

U.S. Environmental Protection Agency. 1986. Quality criteria for water. Washington, D.C.: Office of Water Regulations and Standards, Criteria and Standards Division. EPA 440/5-87-003.