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Helena Chemical Company

Tampa, Florida

CERCLIS #FLD053502696

Site Exposure Potential

The Helena Chemical Company site is in Tampa, Hillsborough County, Florida (Figure 1). The 3.2-hectare site is bordered to the south by the Seaboard Coastline Railroad, to the west by 71st Street, to the north by 14th Avenue, and to the east by Orient Road. The site is relatively level and is in a mixed industrial-residential area beyond the 500-year flood zone. However, the site occasionally floods in heavy rains due to saturation of the surficial aquifer (NUS 1990). The site is about .5 km west of the Tampa Bypass Canal, which discharges into the Palm River, about 2 km downstream from the site. The Palm River enters McKay Bay 4 km below the confluence of the river and the canal. The confluence of Palm River and McKay Bay is about 3 km from Hillsborough Bay. The site is about 64 km from the Gulf of Mexico. Stauffer Chemical Company is immediately southeast (downstream) of the Helena site. No culverts or drainage pathways could be identified which would allow drainage between the Stauffer Chemical Company site and the Helena Chemical Company site (NUS 1988).

The site was built for sulfur production in 1929. It was purchased from Flas Sulphur in 1967 and converted to an agricultural chemical manufacturing operation that included pesticide production. In 1981, the agricultural chemical manufacturing shifted to Helena Chemical Company's Cordele,

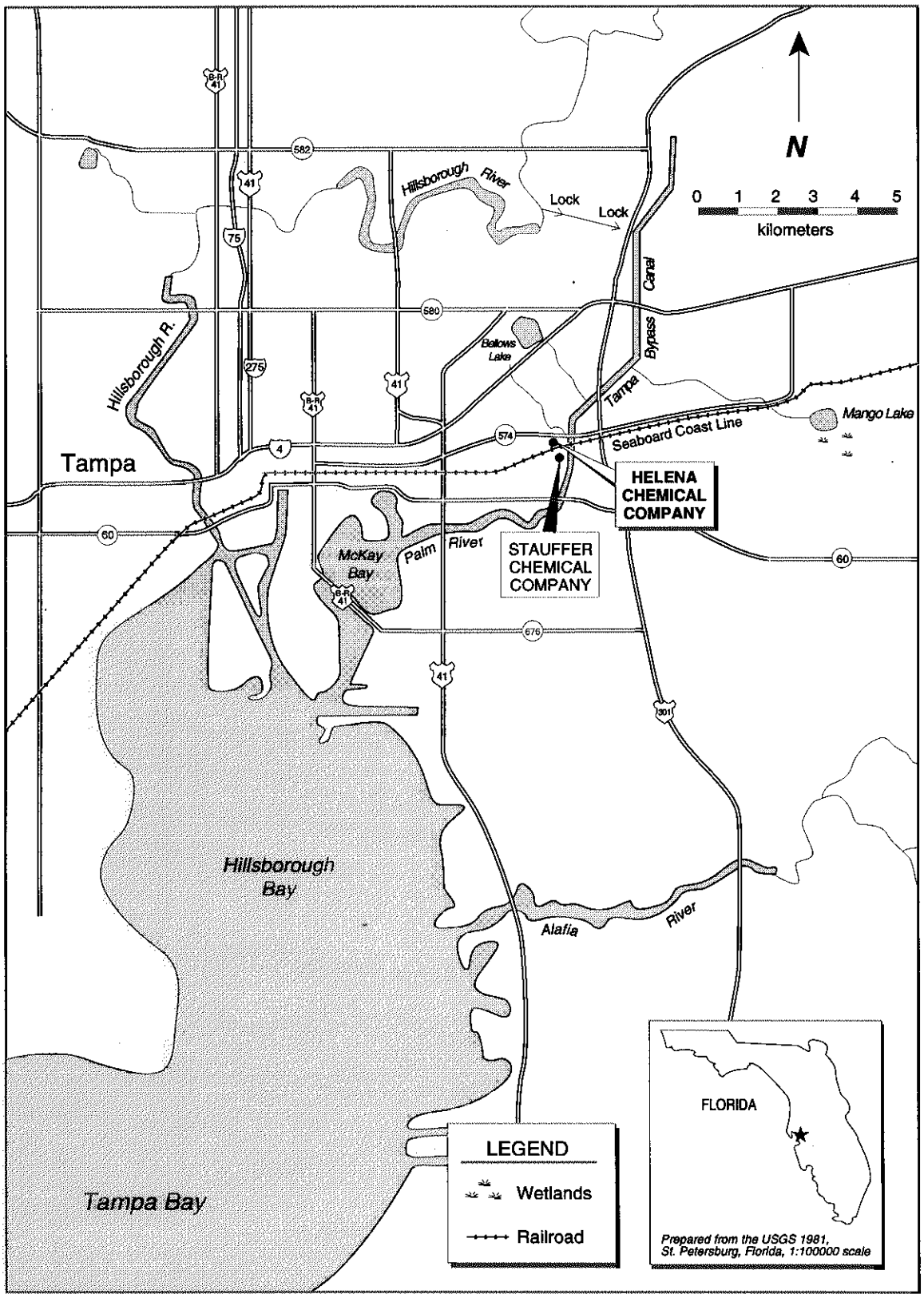

Figure 1. Helena Chemical Company, Tampa, Florida.

Georgia facility. Site operations mostly ceased but continued to involve repacking bulk agricultural chemicals, warehousing, distribution, and the manufacture of liquid fertilizers on a demand basis. Several potential sources of contamination have been identified on the site, including three tanks from the former pollution control system, an unlined retention pond, and areas of contaminated soils. Surface water and groundwater are potential pathways for migration of contaminants to NOAA trust habitats.

Drains in the pesticide manufacturing areas emptied into the first tank of the pollution control system. The size and construction of this tank is unknown. Wastes from the first tank were mixed with caustic soda in a second tank constructed of poured concrete and rebar, measuring 1.8 m wide by 2.4 m long by 1.8 m deep. The mixture was then transferred to a third tank, constructed of concrete blocks, poured cement, and rebar, measuring 3.0 m wide by 6.1 m long by 1.8 m deep. This tank was equipped with a circulation pump and aeration system for liquid phase evaporation. The sludge was removed from tank three and shipped to an approved hazardous substances landfill off-site. In 1981, the pollution control system was closed and the three tanks were cleaned and scrubbed. The first tank was filled with concrete. The above-ground portions of the second and third tanks were knocked down and the remaining structures were filled with sand and gravel and capped with concrete. These tanks remain on-site (Figure 2; NUS 1990).

The 970-m^2 retention pond, with an estimated volume of 890 m^3, is at the southeast corner of the site. Drainage on the site is directed to a concrete culvert which channels into the pond. There is no liner or leachate collection system. A concrete spillway at the southeast corner of the pond allows overflow to leave the site, go under Orient Road, and proceed east to the Tampa Bypass Canal. The pond has overflowed more than once a year since 1979 (NUS 1990).

Groundwater contamination in the surficial aquifer could discharge into the canal, or enter the Upper Floridan aquifer, which is the public water supply. The unconfined surficial aquifer occurs within terrace deposits, and flows south and southwest, except locally to streams and ponds. The terrace deposits average 7.6 m thick. The Hawthorn Formation of clay provides a semi-permeable confining layer 7.6 to 10.7 m below ground surface. The limestone formations containing the Upper Floridan aquifer are below the Hawthorn Formation. Groundwater in the Upper Floridan aquifer flows south to southwest. On-site, the status of the clay separating the surficial aquifer from the Upper Floridan aquifer is unknown. However, the clay layer thins near the canal. This confining layer was breached several times during construction of the canal, leaving the limestones of the Upper Floridan aquifer in contact with the canal water (NUS 1988).

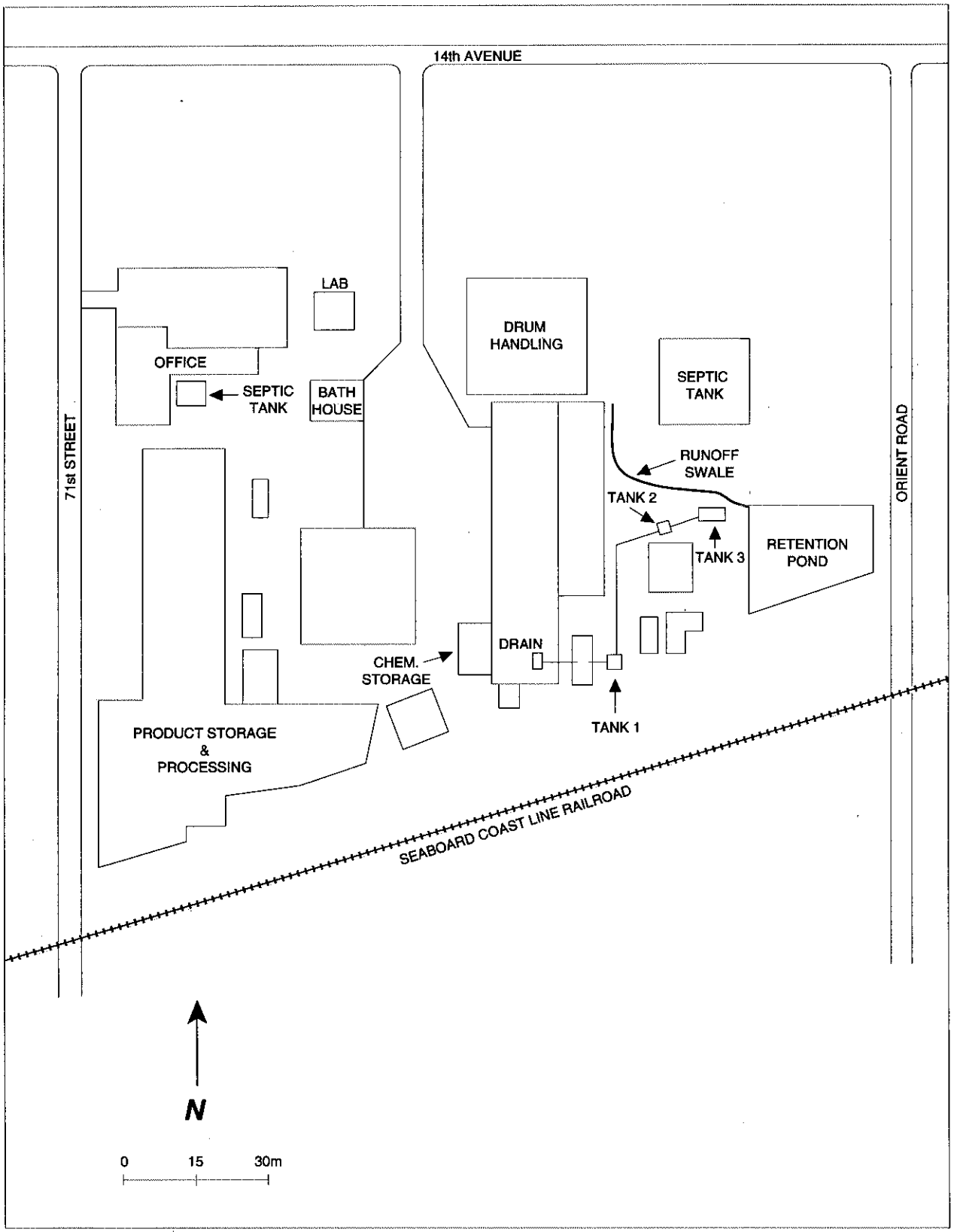

Figure 2. Site map showing components of the waste treatment system and holding areas (NUS 1990).

NOAA Trust Habitats and Species

Habitats of primary concern to NOAA are surface waters and associated bottom substrates of the Palm River, McKay Bay, and Hillsborough Bay. Secondary habitats of concern are surface waters and associated bottom substrates of the Tampa Bypass Canal. The Palm River and McKay Bay are tidally influenced estuarine systems that are generally less than 8 m deep. Salinities in McKay Bay generally range from 22 to 25 ppt and fluctuate throughout the year depending on rainfall, saltwater intrusion, and urban runoff (Estevez 1989). The tidal amplitude in McKay Bay is generally less than 1 m (McMichael personal communication 1992). Water-quality problems in the Tampa Bypass Canal and Palm River include low dissolved oxygen levels (annual averages ranging from 1.8 to 3.2 mg/l between 1980 and 1983) and high coliform counts, elevated nutrient and chlorophyll a concentrations, and elevated biological oxygen demand. General water-quality conditions tend to worsen toward McKay Bay, which is more urbanized and has more point sources (Wolfe 1990). The bottom substrate is dominated by silty sand (Dial and Deis 1986).

The tidally influenced reaches of the Palm River, McKay Bay, and Hillsborough Bay provide nursery and adult habitat for fish and invertebrates (Table 1; Beccasio et al. 1982; Kunneke and Palik 1984; McMichael personal communication 1992). Estuarine-dependent species that are economically important include red and black drum, spotted seatrout, snook, sheepshead, southern flounder, Florida pompano, striped mullet, and gulf menhaden. Most of these species are offshore or coastal spawners whose larvae move inshore with the currents. Juveniles remain in protected estuaries until sexual maturity (Kunneke and Palik 1984). Snook and red drum juveniles use the upper reaches of estuaries and commonly use brackish streams and canals and tidal freshwater streams (Gilmore et al. 1983; Peters and McMichael 1987). Finfish species known to occur in greatest numbers in McKay Bay include tidewater silversides, striped mullet, longnose killifish, bay anchovy, spot, scaled sardine, and pinfish (Wolfe 1990; McMichael personal communication 1992). There are blue crab in McKay Bay and likely in the tidally influenced portions of the Palm River (McMichael personal communication 1989). There have been no monitoring studies in the Tampa Bypass Canal to determine the presence of marine species, but it is believed that there are few, if any, marine species to be found in the canal. The Palm River would most likely be the nearest habitat to be used by NOAA trustee resources (McMichael personal communication 1992).

Species targeted for commercial harvest in Hillsborough Bay include blue crab, menhaden, mullet, pink shrimp, spot, and spotted seatrout. Striped mullet is the most important commercial species in the bay. Generally, species in McKay Bay are fished recreationally, including red drum, sheepshead, snook, and spotted seatrout. There are no restrictions on these fisheries other than general regulations regarding take limit and minimum size. Periodically, blue crab is harvested

Table 1. NOAA trust fish and invertebrate species that use Hillsborough Bay, McKay Bay, and the Palm River.

Species		Habitat Use			Fisheries	
Common Name	Scientific Name	Spawning Ground	Nursery Ground	Adult Forage	Comm. Fishery	Recr. Fishery
MARINE/ESTUARINE FISH SPECIES						
Bay anchovy	*Anchoa mitchilli*		♦	♦		
Sheepshead	*Archosargus probatocephalus*			♦		♦
American eel	*Anguilla rostrata*			♦		
Silver perch	*Bairdiella chrysoura*		♦	♦		
Gulf menhaden	*Brevoortia patronus*		♦	♦	♦	
Crevelle jack	*Caranx hippos*		♦	♦		
Snook	*Centropomus undecimalis*		♦	♦		♦
Sand seatrout	*Cynoscion arenarius*		♦	♦		
Spotted seatrout	*Cynoscion nebulosus*		♦	♦	♦	♦
Lady fish	*Elops saurus*		♦	♦		
Mojarra	*Eucinostomus* spp.		♦	♦		
Gulf killifish	*Fundulus grandis*	♦	♦	♦		
Longnose killifish	*Fundulus similis*	♦	♦	♦		
Scaled sardine	*Harengula jaguana*		♦	♦		
Pinfish	*Lagodon rhomboides*		♦	♦		
Spot	*Leiostomus xanthurus*		♦	♦	♦	
Gray snapper	*Lutjanus griseus*			♦		
Tarpon	*Megalops atlanticus*		♦	♦		
Tidewater silverside	*Menidia peninsula*		♦	♦		
Southern kingfish	*Menticirrhus americanus*			♦		
Atlantic croaker	*Micropogonias undulatus*			♦		
Striped mullet	*Mugil cephalus*		♦	♦	♦	
Atlantic thread herring	*Opisthonema oglinum*		♦	♦		
Pigfish	*Orthopristis chrysoptera*		♦	♦		
Gulf flounder	*Paralichthys albigutta*		♦	♦		
Southern flounder	*Paralichthys lethostigma*		♦	♦		
Black drum	*Pogonias cromis*		♦	♦		
Bluefish	*Pomatomus saltatrix*		♦	♦		
Red drum	*Sciaenops ocellatus*		♦	♦		♦
Spanish mackerel	*Scomberomorus maculatus*		♦	♦		
Florida pompano	*Trachinotus carolinus*		♦			
INVERTEBRATE SPECIES						
Blue crab	*Callinectes sapidus*		♦	♦	♦	
American oyster	*Crassostrea virginica*	♦	♦	♦		
Spiny lobster	*Panulirus argus*		♦			
Pink shrimp	*Penaeus duorarum*		♦		♦	
Common rangia	*Rangia cuneata*	♦	♦	♦		

from McKay Bay (McMichael personal communication 1992). In the region, most commercial and recreational fishing activities concentrate in Tampa Bay and in Old Tampa Bay, both south and west of Hillsborough Bay (Beccasio et al. 1982; McMichael personal communication 1992).

The surface waters of Hillsborough and Tampa bays provide habitat for several threatened and endangered species. The federally endangered West Indian manatee (*Trichechus manatus*) uses these bays as a habitat on a seasonal basis. Several federally protected species of turtles are found in this area. These include the threatened green turtle (*Chelonia mydas*) and loggerhead turtle

(*Caretta caretta*), along with the endangered hawksbill turtle (*Eretmocheyls imbricata*), Kemp's ridley turtle (*Lepidochelys kempi*), and the leatherback turtle (*Dermochelys coriacea*; Beccasio et al. 1982).

Site-Related Contamination

Pesticides were the predominant site contaminants, although some trace element contamination was also observed (Table 2). Arsenic was detected in soil and pond sediment collected from the site in unknown concentrations. Arsenic was also detected in the groundwater (46 µg/l), but at concentrations below the chronic AWQC for the protection of freshwater organisms. Zinc was found at 1,600 µg/l in the groundwater, more than ten times the freshwater chronic AWQC.

Organochlorine pesticides were detected in soil, sediment, and groundwater. Organophosphate pesticides were detected in soil only. No pesticides were detected in surface water samples from the retention pond.

The highest concentrations of pesticides were generally found in the soil and included aldrin, heptachlor epoxide, delta-BHC, endosulfan I, 4,4'-DDT and its associated degradation products, endrin, toxaphene, methyl parathion, malathion, parathion, and EPN (ethyl-p-nitrophenyl thionobenzenephosphonate). DDT and its metabolites were the primary sediment contaminants with concentrations that exceeded the ER-L concentration of Long and Morgan (1990) by more than 10,000 times. Toxaphene was also a sediment contaminant (260 mg/kg).

Groundwater contaminants included alpha-BHC. beta-BHC, BHC, endrin, endosulfan sulfate, and dieldrin. Endrin and dieldrin contamination exceeded the freshwater chronic AWQC by more than 100 times. The only surface water sample taken was from the retention pond (Table 2).

Documentation noted that, of the pesticides detected, alpha-BHC, endrin, toxaphene, methyl parathion, malathion, parathion and EPN were attributable to on-site activities (NUS 1990).

Summary

Arsenic, zinc, and organo-chlorine pesticides were detected in soil, sediment, and groundwater associated with the site. The closest habitat of concern to NOAA is the Palm River, 2 km downstream of the site, with McKay and Hillsborough bays also of concern.
Overflow from an unlined retention pond that holds surface water runoff from the site empties into the Tampa Bypass Canal. Groundwater in the contaminated surficial aquifer could discharge into the canal.

Table 2. Maximum concentrations of contaminants in samples collected for the Final Screening Site Inspection Report of June 1990 and HRS Documentation Record of August 1991.

Chemicals	Soil mg/kg	Sediment mg/kg	ER-L1 mg/kg	Groundwater µg/l	Surface water µg/l	AWQC2 µg/l
INORGANIC SUBSTANCES						
Arsenic	D	D	33	46	ND	190
Zinc	ND	D	120	1,600	ND	110+
PESTICIDES						
Organo-chlorine pesticides						
Aldrin	.36	ND	NA	ND	ND	NA
Heptachlor epoxide	.63	ND	NA	ND	ND	NA
Alpha-BHC	ND	ND	NA	0.79	ND	NA
Beta-BHC	ND	ND	NA	0.68	ND	NA
Delta-BHC	.20	ND	NA	0.49	ND	NA
Endosulfan I (alpha)	.88	ND	NA	ND	ND	0.056
4,4'-DDT	100	.67	0.001	ND	ND	0.001
4,4'-DDE	41	34	0.002	ND	ND	NA
4,4'-DDD	150	190	0.002	ND	ND	NA
DDT Total	210	220	0.003	ND	ND	NA
Endrin	.37	ND	0.00002	3.50	ND	0.0023
Endosulfan sulfate	ND	ND	NA	0.28	ND	NA
Toxaphene	3,900	260	NA	ND	ND	0.0002
Dieldrin	ND	ND	0.00002	0.78	ND	0.0019
Organo-phosphate pesticides						
Methyl parathion	3.8	ND	NA	ND	ND	NA
Malathion	1.8	ND	NA	ND	ND	0.1
Parathion	5.3	ND	NA	ND	ND	0.013
EPN	1.4	ND	NA	ND	ND	NA

1: Effects range-low; the concentration representing the lowest 10-percentile concentration for the data in which effects were observed or predicted in studies compiled by Long and Morgan (1990).
2: Ambient water quality criteria for the protection of aquatic organisms. Freshwater chronic criteria presented (U.S. EPA 1986).
D: Detected, but concentration is unknown.
ND: Not detected at method detection limit.
NA: Screening level not available.
+: Hardness-dependent (100 mg/kg $CaCO_3$ used).

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