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Li Tungsten

Glen Cove, New York

Cerclis # NYD986882660

Site Exposure Potential

The 11-hectare Li Tungsten site is in Glen Cove, New York adjacent to the Mattiace Petrochemical Superfund Site (Figure 1). The site is within the one hundred-year floodplain of Glen Cove Creek which borders the site to the south. Glen Cove Creek discharges to Hempstead Harbor 1 km west of the site. Hempstead Harbor is connected directly to Long Island Sound and the Atlantic Ocean.

From the 1940s to the early 1980s, tungsten ore smelting operations were conducted at the site. Waste materials from the smelting operations, including radioactive compounds, were stored in piles, wooden crates, tanks, and drums throughout the property. Several of the crates and drums were crushed and opened during disposal. In addition, the northeastern portion of the site was

used as a landfill for various site-generated wastes. In 1990, 38 electrical transformers and an unspecified number of drums were removed from the site. However, over 15 million kg of solid wastes and 1.4 million l of liquid wastes remain on the site (NUS, 1990).

There is groundwater in two aquifers beneath the site: the shallow Upper Glacial Aquifer and the deeper Lloyd Sand Aquifer. These aquifers are shared by the Mattiace Petrochemical Superfund site to the west. The average depth to shallow groundwater beneath the Li Tungsten site is 2.4 m below ground surface. Shallow groundwater flows south-southwest toward Glen Cove Creek. Perched water table conditions occur in some areas of the site. The deeper, confined aquifer is located approximately 70 m below

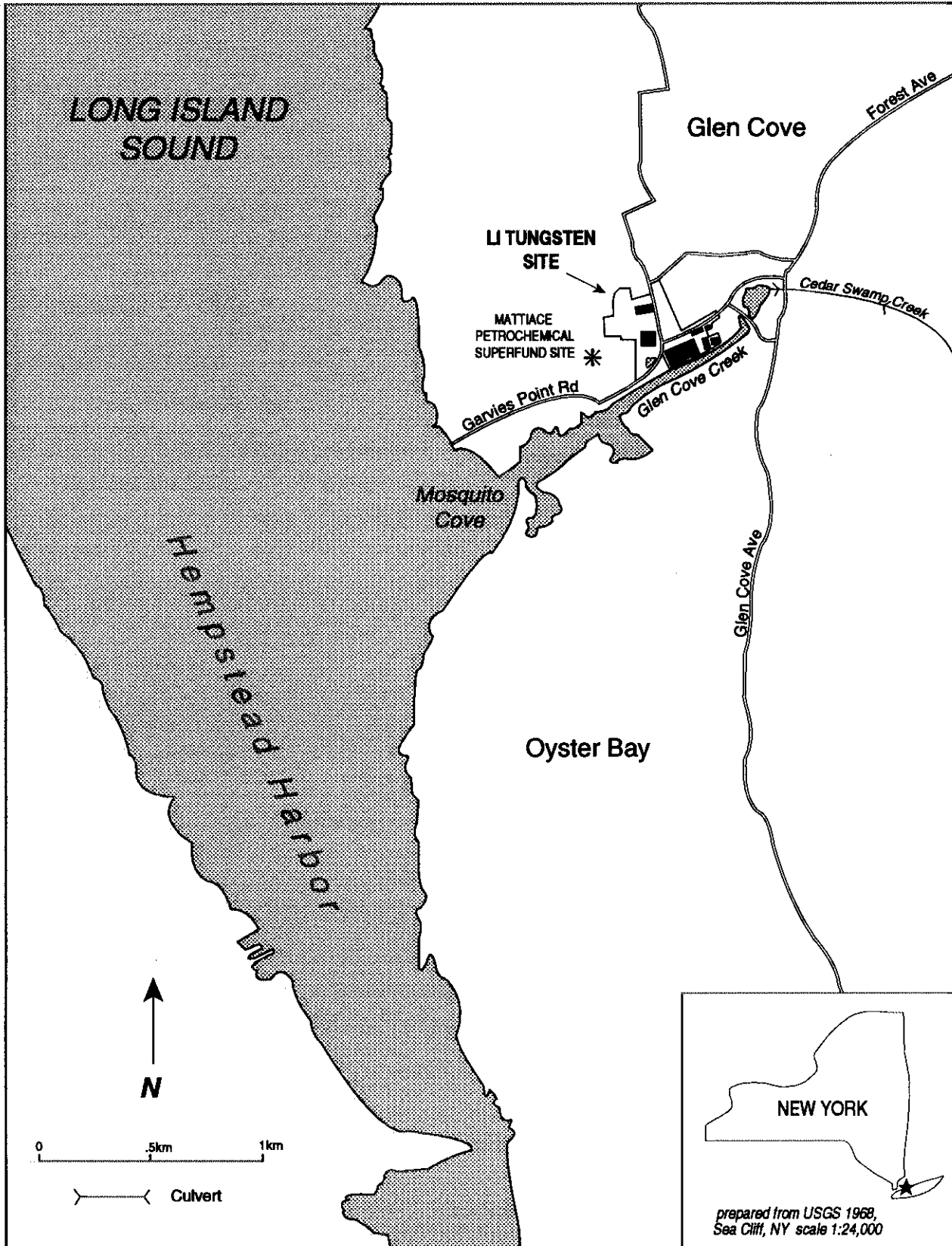


Figure 1. Location of the Li Tungsten site in Glen Cove, New York.

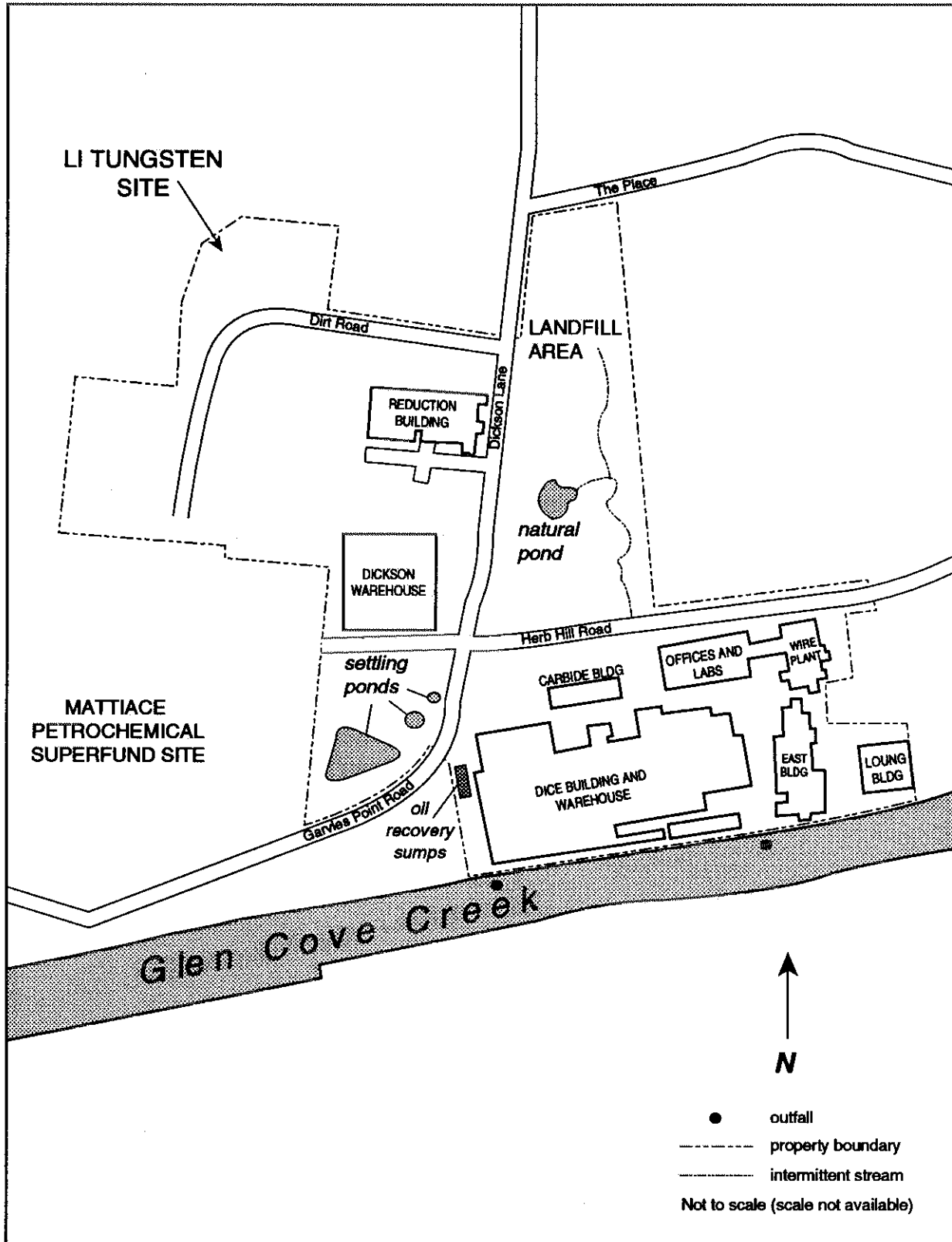


Figure 2. Features of the Li Tungsten site.

ground surface and generally flows from north to south. On-site surface water features include three wastewater settling ponds in the southwestern corner of the site, a natural pond, an intermittent stream in the northeastern portion of the site, and a storm drainage system of unknown location (Figure 2). Only one of the three settling ponds was lined, but its liner is no longer intact, and therefore all three ponds are discharging to shallow groundwater. In addition, at least two drainage outfalls discharge directly to Glen Cove Creek (RTP, 1988; NUS, 1990). Groundwater, surface water, and direct discharge are the potential pathways of contamination from the site to NOAA resources and associated habitats.

NOAA Trust Habitats and Species

Habitats of primary concern to NOAA are the surface water and associated bottom substrates of Glen Cove Creek and Hempstead Harbor. Glen Cove Creek is tidally influenced along its entire 1.5 km length. Freshwater input to Glen Cove Creek comes mainly from Cedar Swamp Creek (Mackay, personal communication 1990).

Surface water near the site provides spawning, nursery, and adult habitat for many species (Table 1; Beccasio et al., 1980; Freudenthal, personal communication 1990; Zawacki, personal

communication 1990; Briggs, personal communication 1991; Hastback, personal communication 1991). Although limited data were available about the resource use of Glen Cove Creek, the tidal exchange in the creek and its proximity to Hempstead Harbor suggest that trustee species could occur periodically in the creek.

Anadromous blueback herring, alewife, American shad, and striped bass use Hempstead Harbor for spawning and nursery habitat. Catadromous American eel are ubiquitous. In addition, sensitive life stages of numerous marine fish occur in the harbor, including winter flounder, tautog, bluefish, and Atlantic menhaden. Bluefish have also been observed in Glen Cove Creek. American lobster, blue mussel, and hard- and soft-shell clams use Hempstead Harbor throughout their life cycles and are likely present in the general vicinity of the site. Blue crab are seen infrequently in the harbor (Zawacki, personal communication 1991), but are known to occur in Glen Cove Creek.

Northern Hempstead Harbor is subject to low-oxygen events that occur in Long Island Sound and can cause significant fish kills. There is a fish kill known locally as "The Jubilee" in Hempstead Harbor during July or August when northeast winds combine with upwelling currents. At high tide, deeper anoxic water pushes onto the shore. The anoxic water forces fish and invertebrates out of the water and onto the beach, causing large fish kills which include American eel, flounder, Atlantic menhaden, and bluefish (Freudenthal, personal communication 1990).

Table I. Species, habitat use, and commercial and recreational fisheries in Hempstead Harbor.

Species		Habitat			Fisheries	
Common	Scientific Name	Spawning	Nursery	Adult Forage	Comm.	Recr.
ANADROMOUS SPECIES						
blueback herring	<i>Alosa aestivalis</i>	♦	♦			
alewife	<i>Alosa pseudoharengus</i>	♦	♦			
American shad ¹	<i>Alosa sapidissima</i>	♦	♦			
striped bass	<i>Morone saxatilis</i>	♦	♦			♦
CATADROMOUS SPECIES						
American eel	<i>Anguilla rostrata</i>		♦	♦		
RESIDENT SPECIES						
<u>Fish</u>						
Atlantic menhaden	<i>Brevoortia tyrannus</i>		♦	♦		
black sea bass ¹	<i>Centropristis striata</i>		♦			
weakfish ¹	<i>Cynoscion regalis</i>	♦	♦			
mummichog	<i>Fundulus heteroclitus</i>	♦	♦	♦		
striped killifish	<i>Fundulus majalis</i>	♦	♦	♦		
Atlantic silversides	<i>Menidia menidia</i>	♦	♦	♦		
northern kingfish ¹	<i>Menticirrhus spp.</i>	♦	♦			
summer flounder ¹	<i>Paralichthys dentatus</i>	♦	♦	♦		♦
bluefish	<i>Pomatomus saltatrix</i>			♦		♦
winter flounder	<i>Pseudopleuronectes americanus</i>	♦	♦	♦		♦
windowpane	<i>Scophalmus aquosus</i>	♦	♦	♦		
northern puffer ¹	<i>Sphoeroides maculatus</i>			♦		
scup	<i>Stenotomus chrysops</i>	♦	♦			♦
tautog	<i>Tautoga onitis</i>	♦	♦	♦	♦	♦
oyster toadfish	<i>Opsanus tau</i>	♦	♦	♦		
red hake	<i>Urophycis chuss</i>	♦	♦			
white hake	<i>Urophycis tenuis</i>	♦	♦			
<u>Invertebrate</u>						
blue crab ¹	<i>Callinectes sapidus</i>	♦	♦	♦		♦
sand shrimp	<i>Crangon septemspinosa</i>	♦	♦	♦		
American lobster	<i>Homarus americanus</i>	♦	♦	♦	♦	♦
hard shell clam ²	<i>Mercenaria mercenaria</i>	♦	♦	♦	♦	♦
soft shell clam	<i>Mya arenaria</i>	♦	♦	♦		
blue mussel	<i>Mytilus edulis</i>	♦	♦	♦		♦
grass shrimp	<i>Palaemonetes pugio</i>	♦	♦	♦		
manta shrimp	<i>Squilla empusa</i>	♦	♦	♦		
¹ Rare or infrequent in Hempstead Harbor . ² Hard shell clams harvested west of Matinicock Point (including Hempstead Harbor) must be transferred to certified waters in eastern Long Island Sound for depuration lasting at least 21 days.						

Hempstead Harbor supports important commercial and recreational fisheries for American lobster, tautog, and hard-shell clam (Zawacki, personal communication 1990; Briggs, personal

communication 1991). The harbor also supports significant recreational fisheries for striped bass, winter flounder, and bluefish. There is a recreational fishery for blue crab in Glen Cove Creek

(Briggs, personal communication 1991). All of these species are subject to human health advisories because of contamination by fecal coliform bacteria or PCBs. Since 1970, the New York Department of Environmental Conservation has required depuration in certified waters of all shellfish harvested commercially from Hempstead Harbor (Hastback, personal communication 1991).

Site-Related Contamination

Data from preliminary site investigations indicate that groundwater, soils, surface water, and sediments are contaminated at the site (RTP, 1988; Aschwanden, 1990; NUS, 1990). The primary contaminants of concern to NOAA are trace elements, pesticides, and PCBs. Maximum concentrations of these inorganic substances and organic compounds are summarized in Table 2, along with applicable screening criteria. Secondary contaminants of concern at the site include cyanide, tetrachloroethene (PCE), PAHs, and radioactive compounds (e.g., thorium and uranium).

Concentrations of copper, lead, mercury, and nickel exceeded applicable ambient water quality criteria (AWQC; U.S. EPA, 1986) in over 60 percent of the groundwater monitoring wells sampled at the site. Arsenic and zinc were de-

tected less frequently in on-site groundwater at concentrations greater than screening criteria. Surface water samples were collected from the on-site natural and settling ponds, the intermittent stream, waste oil sumps, and two unidentified surface water features. Concentrations of copper, lead, and nickel in surface water samples from over 50 percent of the sampling locations exceeded screening criteria. High concentrations of arsenic, cadmium, chromium, mercury, silver, and zinc were detected less frequently in on-site surface waters. Trace element concentrations in surface water samples collected near two outfalls in Glen Cove Creek did not exceed screening criteria.

Elevated concentrations of arsenic, cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc were detected in soils throughout the site. These metals were also detected in sediment samples collected from the on-site surface water features at concentrations exceeding screening criteria. Except for arsenic and chromium, these elements were also detected at high concentrations in sediments collected near the outfalls in Glen Cove Creek.

High concentrations of tungsten were measured in groundwater, soils, surface waters, and sediments collected throughout the site. Data on the toxicity of tungsten are not available.

DDE and DDT were measured in soil samples collected near the settling ponds and the intermittent stream. DDD and DDE were detected in sediments collected from the natural pond in

Table 2. Maximum concentrations of contaminants of concern at the site.

	Water			Soil		Sediment		
	Ground-water	Surface Water	AWQC ¹	Soil	Average ² U.S. Soil	On site	Glen Cove Creek	ER-L ³
	µg/l	µg/l	µg/l	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
INORGANIC SUBSTANCES								
Trace Elements								
arsenic	2,800	150	36	3,700	5	1,800	20	33
cadmium	54	15	9.3	49	0.06	10	8.3	5
chromium	50	66	50	170	100	88	47	80
copper	2,100	1,600	2.9	4,200	30	990	280	70
lead	210	200	5.6	16,000	10	5,100	350	35
mercury	13	0.84	0.025	13	0.03	9	0.53	0.15
nickel	530	76,000	8.3	9,100	40	3,300	82	30
silver	ND	35	2.3 ⁺	160	0.05	140	38	1
tungsten	150,000	41,000	NA	43,000	NA	20,000	1,000	NA
zinc	6,200	1,500	86	3,000	50	620	1,700	120
ORGANIC COMPOUNDS								
PCBs								
Aroclor 1248	ND	2.6	0.03 [*]	4.7	NA	50	ND	0.05 [*]
Aroclor 1254	ND	2.2	0.03 [*]	2.9	NA	1.6	ND	0.05 [*]
Pesticides								
DDD	ND	0.17	NA	ND	NA	0.15	0.07	0.002
DDE	ND	ND	14 ⁺	0.034	NA	0.17	ND	0.002
DDT	ND	ND	0.001	0.071	NA	ND	ND	0.001
<p>1: Ambient water quality criteria for the protection of aquatic organisms. chronic criteria presented (U.S. EPA, 1986).</p> <p>2: Lindsay (1979).</p> <p>3: Effects 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).</p> <p>+ : Acute criteria presented; chronic criteria not available.</p> <p>* : Criteria presented is for total PCBs.</p> <p>NA: Screening level not available.</p> <p>ND: Not detected at method detection limit.</p>								

the northern portion of the site at concentrations exceeding screening criteria. DDD was also detected in one sediment sample collected near the easternmost outfall in Glen Cove Creek at a concentration greater than the screening criterion. DDD was detected in one surface water sample collected from the natural pond, but AWQC are not available for comparison. Pesticides were not detected in groundwater at concentrations exceeding screening criteria.

PCBs (Aroclors 1248 and 1254) were detected in soil samples collected in the northeastern portion of the site. These mixtures were also measured in surface water and sediment samples from the on-site settling ponds at concentrations exceeding the screening criterion. PCBs were not detected in groundwater at concentrations exceeding the screening criterion.

Concentrations of cyanide exceeding screening criteria were measured infrequently in on-site groundwater and surface water. High concentrations of PCE (19,000 µg/l) were measured in groundwater south of the natural pond. A plume of PCE contamination extends southwest from this area. However, the PCE contamination is considered to be the result of dry-cleaning operations previously conducted upgradient of this area, and therefore was not attributed to activities at the Li Tungsten site. Concentrations of total PAHs in sediments near the two outfalls in Glen Cove Creek (up to a maximum of 25 mg/kg) were higher than the ER-L concentration of 4.0 mg/kg.

In 1989, a survey for the presence and extent of radionuclide contamination was conducted at the Li Tungsten site. High levels of radiation (up to a maximum of 1,000 pCi/g) were frequently detected in soils and equipment. New York State background soil radiation levels are 55 pCi/g for thorium and 180 pCi/g for uranium (NUS, 1990). In a separate study, sediment samples were collected from Glen Cove Creek and Hempstead Harbor in the vicinity of the site for radionuclide analysis. Results indicated that sediments did not contain elevated levels of radionuclides (Linsalata and Cohen, 1989).

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