Consolidated Iron and Metal

Newburgh, New York

USEPA Facility ID: NY0002455756

Basin: Hudson-Wappinger

HUC: 02020008

Executive Summary

The Consolidated Iron and Metal site is an inactive automobile/scrap metal junkyard and dealership in Newburgh, New York. The site is located adjacent to the Hudson River in a mixed industrial, commercial, and residential area. Originally a municipal landfill, the site was subsequently operated as a shipyard and was last used for scrap metal recycling and storage before becoming inactive in 1999. A series of investigations indicates that metals, SVOCs, pesticides, and PCBs are the primary contaminants of concern at the site. NOAA trust habitats of concern are the surface water and sediments of the Hudson River, which provides a migratory corridor for several anadromous fish species, as well as habitat for several marine/estuarine fish species. Surface water is the primary pathway for the migration of contaminants from the site to adjacent NOAA trust resources and habitats.

Site Background

The Consolidated Iron and Metal (Consolidated Iron) site is an inactive automobile/scrap metal junkyard and dealership in Newburgh, New York (Figure 1) that operated from approximately 1960 to 1999. The site is located adjacent to the Hudson River and encompasses approximately 2.8 ha (7 acres) in a mixed industrial, commercial, and residential area. It is bounded by Conrail railroad tracks to the west, the Hudson River to the east, and Washington Street to the north. Features on the Consolidated Iron site include a tire pile adjacent to the southern boundary, scrap metal piles throughout the property, a staging area and smelter in the southwest corner of the site, a compactor and metal shear near the western boundary, and a scale and several buildings along the northern boundary (Figure 2) (USEPA 2001).

During the early 1900s, the City of Newburgh used the property as a municipal landfill. Subsequently, it became the site of the Eureka Shipyard, which operated during World War I through the early 1940s, when the site's use shifted to an automobile/scrap metal junkyard and dealership operation. Between 1975 and 1995, a smelter operated at the site. The smelter was primarily used to melt aluminum transmissions but other metallic materials were also smelted at the site. Iron and other scrap metal was sorted on-site for recycling (Weston 2000b).

Between 1997 and 1999, the New York State Department of Environmental Conservation (NYSDEC) conducted several investigations at the Consolidated Iron site. During these investigations, oil and other liquid wastes were observed on-site soils, as indicated by staining throughout the site, and stormwater from the northeast corner of the site was observed discharging directly into the Hudson River without required testing or permits. In March 1999, NYSDEC noted an oily sheen on stormwater discharging into the Hudson River, on the Hudson River itself, and on puddles throughout the site (USEPA 2001).

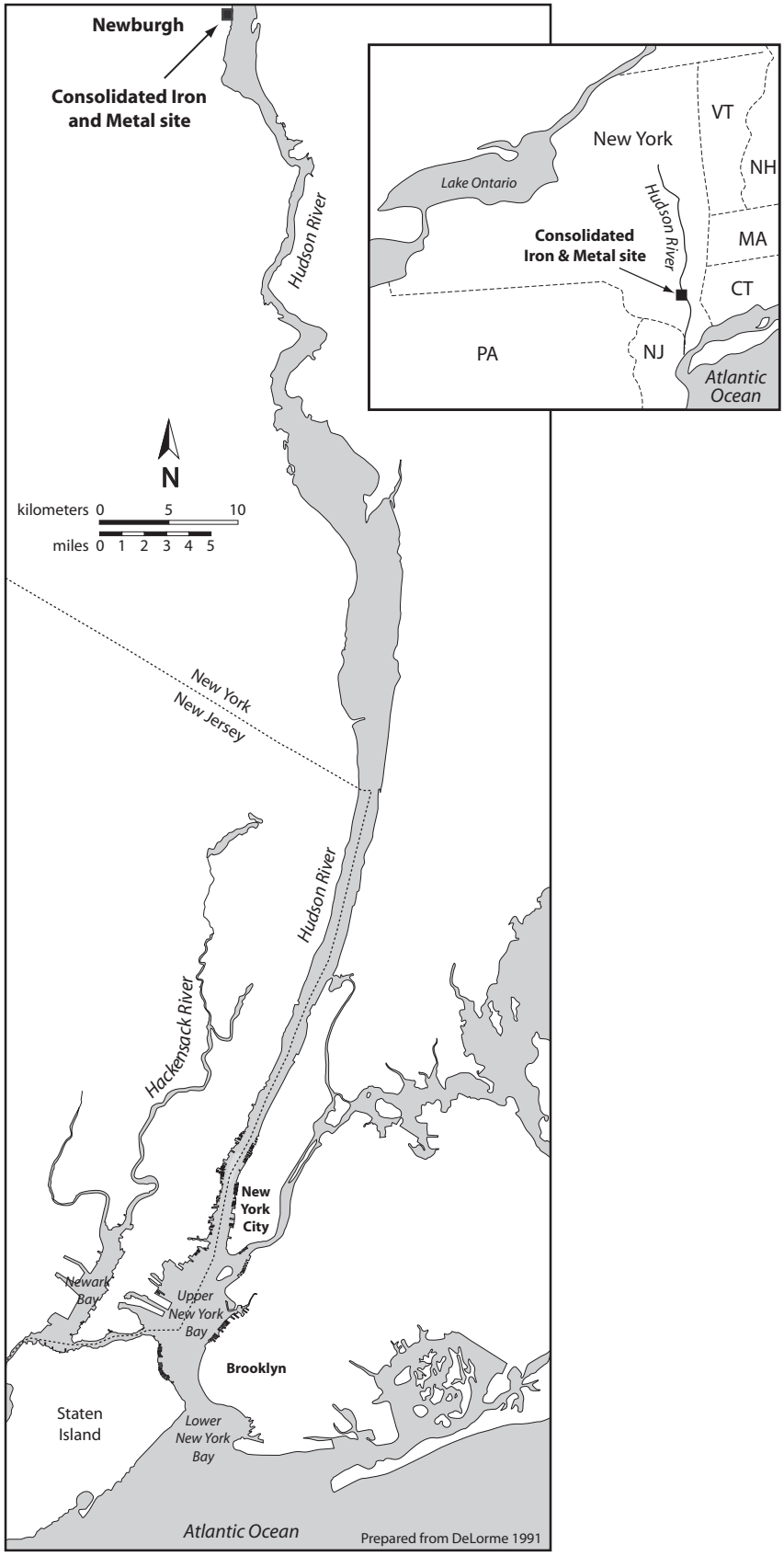

Figure 1. Location of Consolidated Iron and Metal site, Newburgh, New York.

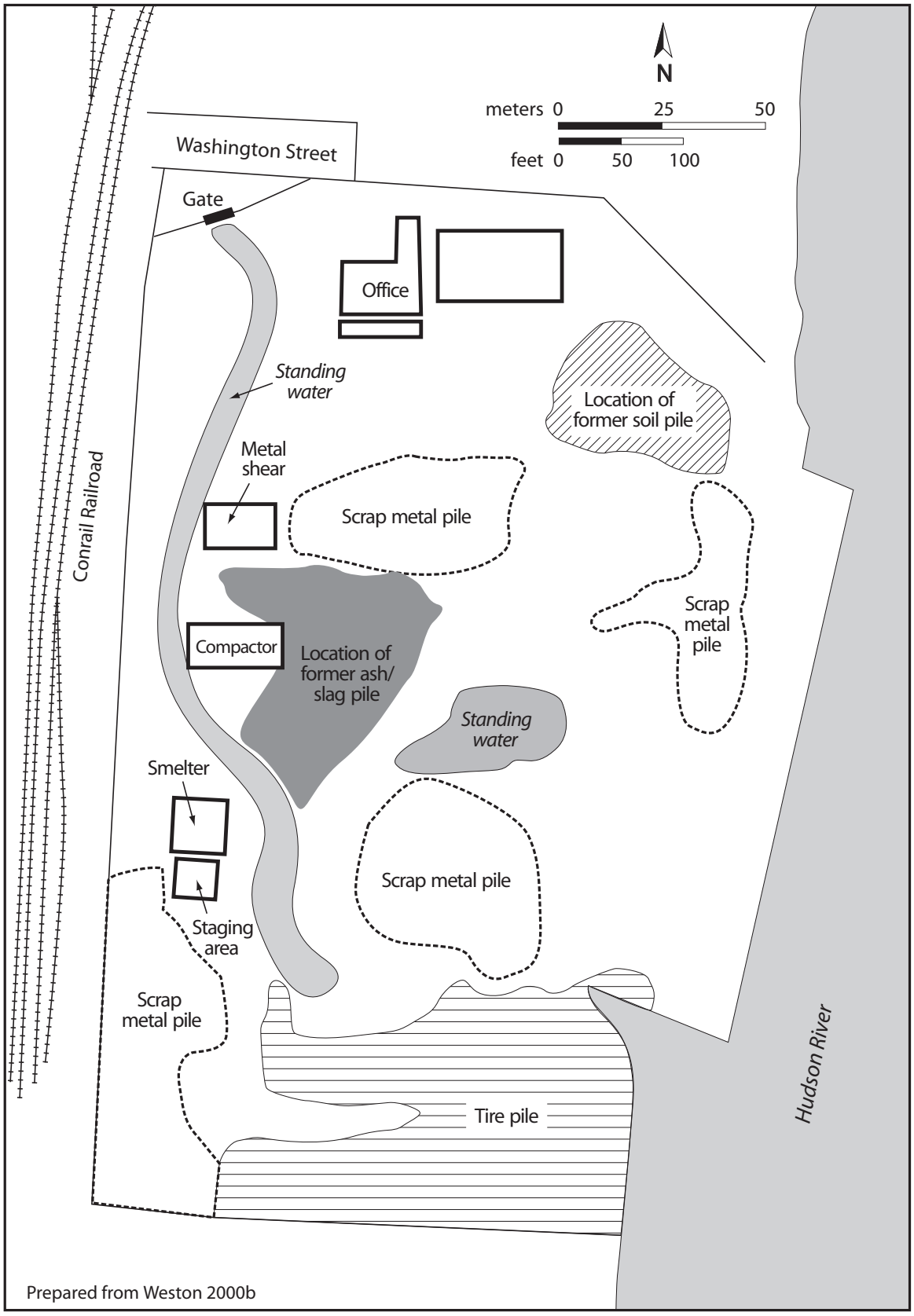

Figure 2. Detail of Consolidated Iron and Metal site.

In 1998, the U.S. Environmental Protection Agency (USEPA) collected samples from the ash/slag pile generated by the on-site smelting operation. Analysis of these samples indicated elevated concentrations of lead and polychlorinated biphenyls (PCBs) (USEPA 2001). In June 1999, Materials Recovery Service, Inc. (MRS) began processing the ash/slag pile, removing large pieces of metal, and segregating the scrap metal into ferrous, non-ferrous, and fine piles. The fine pile, which consisted of approximately 6,000 metric tons (6,600 tons) of material, was removed from the site. In July 1999, the USEPA collected samples from a soil pile generated by MRS during its recycling of the ash/slag pile. The USEPA removed the soil pile after analytical results indicated elevated concentrations of lead and PCBs in the soil (Weston 2000b).

In July 1999, an on-site hazardous characterization of 27 drums found scattered throughout the perimeter of the Consolidated Iron site was conducted by the Region II Superfund Technical Assessment and Response Team (START). Several of the drums contained liquids that exhibited the characteristics of ignitability or corrosivity, and/or contained PCBs; many of the drums were severely deteriorated, with contents leaking into the surrounding soils (Weston 2000b).

In August 1999, soil samples were collected at the former location of the ash/slag pile for analysis. Analytical results indicated the presence of elevated lead concentrations. The Region II START conducted an integrated assessment of the Consolidated Iron site in September and November 1999. The results from this investigation indicated that metals, semivolatile organic compounds (SVOCs), pesticides, and PCBs remained contaminants of concern at the site. The Consolidated Iron site was proposed to the National Priorities List (NPL) on December 1, 2000, and was placed on the NPL on June 14, 2001 (USEPA 2001).

Contaminant releases to the Hudson River (through the direct deposition of hazardous substances along the site's southeastern corner and via the flooding of soils containing hazardous substances at the site's northeast corner), have been documented during several site investigations (USEPA 2001). The release of contaminants to surface water is the primary pathway for the migration of contaminants from the site to NOAA trust resources and habitats.

NOAA Trust Resources

The NOAA trust habitats of concern are the surface water and associated bottom substrates (sediments) of the Hudson River near Newburgh, New York. The Consolidated Iron site is approximately 97 km (60 mi) up the Hudson River from the Atlantic Ocean. Several NOAA trust resources depend on habitat near and upstream of the site, and are summarized in Table 1. There are no dams along this stretch of the river to prevent the upstream migration of anadromous fish species.

The majority of the trust resources listed in Table 1 use this section of river as a migratory corridor. In addition, Atlantic sturgeon, Atlantic tomcod, bay anchovy, blue crab, shortnose sturgeon, and white perch all use the river near Newburgh, New York, for adult forage habitat. This section of the river also provides nursery habitat for alewife, American shad, Atlantic sturgeon, Atlantic tomcod, blue crab, blueback herring, striped bass, and all the marine/estuarine species listed in Table 1. Atlantic tomcod and striped bass are also known to spawn in this area of the river (Kahnle 2002).

Commercial and recreational fishing both occur in the Hudson River near Newburgh, New York. Alewife and blueback herring are fished both commercially and recreationally. American shad are fished commercially, and American eel, blue crab, striped bass, and white perch are fished recreationally (Kahnle 2002).

Table 1. NOAA trust resources present in the Hudson River near Newburgh, New York (Kahnle 2002).

Species		Habitat Use				Fisheries	
Common Name	Scientific Name	Migratory Route	Spawning Area	Nursery Area	Adult Habitat	Comm.	Rec.
ANADROMOUS FISH							
Alewife	*Alosa pseudoharengus*	◆		◆		◆	◆
American shad	*Alosa sapidissima*	◆		◆		◆	
Atlantic rainbow smelt	*Osmerus mordax mordax*	◆					
Atlantic sturgeon	*Acipenser oxyrhynchus*	◆		◆	◆		
Atlantic tomcod	*Microgadus tomcod*	◆	◆	◆	◆		
Blueback herring	*Alosa aestivalis*	◆		◆		◆	◆
Sea lamprey	*Petromyzon marinus*	◆					
Striped bass	*Morone saxitilis*	◆	◆	◆			◆
White perch	*Morone americana*	◆		◆	◆		◆
CATADROMOUS FISH							
American eel	*Anguilla rostrata*	◆					◆
MARINE/ESTUARINE FISH							
Atlantic menhaden	*Brevoortia tyrannus*			◆			
Bay anchovy	*Anchoa mitchilli*			◆	◆		
Bluefish	*Pomatomus saltatrix*			◆			
Shortnose sturgeon	*Acipenser brevirostrum*	◆		◆	◆		
INVERTEBRATES							
Blue crab	*Callinectes sapidus*	◆		◆	◆		◆

A fish-consumption advisory is in effect for this section of the Hudson River; the advisory recommends that women of childbearing age, infants, and children under the age of 15 should not eat any fish species from these waters. For others, the advisory recommends consuming no gizzard shad, and no more than one meal per month of American eel, Atlantic needlefish, bluefish, carp, channel catfish, goldfish, largemouth bass, smallmouth bass, rainbow smelt, striped bass, walleye, white catfish, and white perch because of elevated levels of PCBs present in the fish tissues. The advisory also recommends consuming no more than six blue crabs per week because of contamination by cadmium and PCBs. There is also an advisory to "eat none" of the hepatopancreas of blue crab and an advisory to "discard" cooking liquid associated with cooking blue crab because of cadmium and PCB contamination. (NYSDOH 2002).

Site-Related Contamination

In September and November 1999, the Region II START conducted an integrated assessment of the Consolidated Iron site. During this investigation, a total of 126 soil, 5 groundwater, and 18 sediment samples were collected at the site to determine the horizontal and vertical extent of contamination. All samples were analyzed for volatile organic compounds (VOCs), SVOCs, pesticides, PCBs, and metals. Table 2 summarizes the maximum concentrations of the primary contaminants of concern (SVOCs, pesticides, PCBs, and metals) detected in the samples collected (Weston 2000a).

Table 2. Maximum concentrations of contaminants of concern at the Consolidated Iron and Metal site (Weston 2000a). Bold values indicate contaminant exceeded the screening criteria.

	Soil (mg/kg)		Water (µg/L)		Sediment (mg/kg)	
Contaminant	Soil	Mean U.S.[a] Soil	Ground-water	AWQC[b]	Sediment	TEL[c]
METALS/INORGANICS						
Arsenic	**120**	5.2	10	150	**13**	5.9
Cadmium	**180**	0.06	**9.2**	0.25[d]	**1**	0.596
Chromium[e]	**260**	37	11	11	**71**	37.3
Copper	**15,000**	17	**160**	9d	**99**	35.7
Lead	**25,000**	16	**360**	2.5[d]	**180**	35
Mercury	**5.4**	0.058	**0.9**	0.77[f]	**1**	0.174
Nickel	**2,100**	13	26	52[d]	**37**	18
Selenium	**17**	0.26	ND	5.0[f]	3.4	NA
Silver	**18**	0.05	ND	3.2[d,g]	3.5	NA
Zinc	**15,000**	48	**1,100**	120[d]	**290**	123.1
SVOCs						
Acenaphthene	7.3	NA	0.8	520[h]	0.2	NA
Acenaphthylene	0.87	NA	0.8	NA	0.4	NA
Anthracene	13	NA	ND	NA	0.58	NA
Benz(a)anthracene	20	NA	3	NA	**2.3**	0.0317
Chrysene	20	NA	3	NA	**2.6**	0.0571
Dibenz(a,h)anthracene	4.7	NA	0.9	NA	0.16	NA
Fluoranthene	35	NA	6	NA	**4.5**	0.111
Fluorene	7.8	NA	0.5	NA	0.2	NA
2-Methylnaphthalene	18	NA	ND	NA	ND	NA
Naphthalene	17	NA	0.6	620[h]	ND	NA
Pentachlorophenol	ND	NA	ND	NA	ND	NA
Phenanthrene	42	NA	4	NA	**2.6**	0.0419
Pyrene	48	NA	5	NA	**5.3**	0.053
PESTICIDES/PCBs						
Aldrin	ND	NA	ND	3.0[g]	ND	NA
Chlordane	1.5	NA	ND	0.0043	ND	0.0045
4,4′-DDE	1.6	NA	0.091	NA	**0.016**	0.00142
4,4′-DDT	2.8	NA	**0.25**	0.001	**0.017**	0.00698[i]
Dieldrin	1.1	NA	ND	0.056	ND	0.00285
Endosulfan (alpha + beta)	3.1	NA	ND	0.056	ND	NA
Endrin	0.32	NA	ND	0.036	ND	0.00267
Gamma-BHC (Lindane)	0.18	NA	ND	0.95[g]	ND	0.00094
Heptachlor	0.0028	NA	ND	0.0038	ND	NA
Heptachlor Epoxide	0.036	NA	ND	0.0038	ND	0.0006
Total PCBs	**420**	0.371[k]	**5.7**	0.014	**1.2**	0.0341
Toxaphene	ND	NA	ND	0.0002	ND	NA

a: Shacklette and Boerngen (1984), except for cadmium and silver, which represent average concentrations in the Earth's crust from Lindsay (1979).

b: Ambient water quality criteria for the protection of aquatic organisms (USEPA 2002). Freshwater chronic criteria presented.

c: Threshold effects level is the geometric mean of the 15th percentile of the effects data and the 50th percentile of the no-effects data. The TEL is intended to represent the concentration below which adverse biological effects rarely occurred (Smith et al. 1996).

d: Criterion expressed as a function of total hardness; concentrations shown correspond to hardness of 100 mg/L $CaCO_3$.

e: Screening guidelines represent concentrations for Cr^{+6}.

f: Criterion expressed as total recoverable metal.

g: Chronic criterion not available; acute criterion presented.

h: Lowest Observable Effects Level (LOEL) (USEPA 1986).

i: Expressed as total DDT.

k: Final Preliminary Remedial Goal for the protection of wildlife (Efroymson et al. 1997).

NA: Screening guidelines not available.

ND: Not detected.

Analyses of soil samples indicated the presence of metals, SVOCs, pesticides, and PCBs. The maximum concentrations of all the metals listed in Table 2 exceeded the average concentrations found in U.S. soil (mean U.S. soil concentrations). Concentrations of cadmium and lead exceeded the mean U.S. soil concentrations by three orders of magnitude; concentrations of copper, nickel, silver, and zinc exceeded the mean U.S. soil concentrations by two orders of magnitude. The remaining metals ranged from seven times the mean U.S. soil concentrations to one order of magnitude greater than the mean U.S. soil concentrations. The greatest concentrations of metals were detected at one of two locations: northeast of the tire pile that is adjacent to the Hudson River, or in the area where the former ash/slag pile was located. Several SVOCs were detected in the soil samples at concentrations ranging from 0.87 mg/kg (acenaphthylene) to 48 mg/kg (pyrene). A majority of the greatest concentrations of SVOCs were detected in the area northeast of the tire pile, next to the Hudson River. Several pesticides were also detected in soil samples. The maximum concentrations of pesticides ranged from 0.0028 mg/kg (heptachlor) to 3.1 mg/kg (endosulfan (alpha + beta)). The greatest concentration of PCBs, and a majority of the pesticide concentrations were detected in the area where the former ash/slag pile was located (Dorneman 1999). The maximum concentration of PCBs detected in soil exceeded the screening guideline by three orders of magnitude. Currently, there are no screening guidelines available for SVOCs and pesticides in soil.

Analyses of groundwater samples indicated the presence of metals, SVOCs, pesticides, and PCBs. The maximum concentration of lead exceeded the ambient water quality criterion (AWQC) by two orders of magnitude, and the maximum concentration of cadmium and copper exceeded the AWQC by one order of magnitude. Maximum concentrations of mercury, and zinc exceeded the AWQC by less than one order of magnitude. Arsenic, chromium, and nickel were also detected; however, concentrations of these metals did not exceed the AWQC. All of the maximum concentrations of metals were detected in a sample collected in the area where the former ash/slag pile was located. Several SVOCs were detected in the groundwater samples. No AWQC are available for several of the detected SVOCs, and none of the maximum concentrations exceeded the AWQC, when available. The maximum concentrations of SVOCs ranged from 0.5 µg/L (fluorene) to 6.0 µg/L (fluoranthene). A majority of the greatest concentrations of SVOCs were detected in a sample collected just north of the former soil pile. Two pesticides, DDE and DDT, were detected in the groundwater samples. The maximum concentration of DDT exceeded the AWQC by two orders of magnitude; no AWQC is available for DDE. PCBs were detected at a maximum concentration that exceeded the AWQC by two orders of magnitude. The maximum concentrations of pesticides and PCBs were found in a sample collected from the former ash/slag pile (Dorneman 1999).

Metals, SVOCs, pesticides, and PCBs were detected in sediment samples collected from the Hudson River, near the Consolidated Iron site. Maximum concentrations of cadmium, chromium, copper, nickel, selenium, silver, and zinc were detected in samples collected approximately 240 m (800 ft) downstream of the site. Arsenic and mercury were detected at maximum concentrations in sediment samples collected approximately 30 m (100 ft) east of the site. All the metals listed in Table 2 exceeded the screening guidelines (threshold effects level or TEL); there are no TELs currently available for selenium and silver. Several SVOCs were also detected in the sediment samples. The maximum concentration of pyrene exceeded the TEL by two orders of magnitude, and the maximum concentrations of benz(a)anthracene, chrysene, fluoranthene, and phenanthrene exceeded the TELs by one order of magnitude. Other SVOCs were also detected but no screening guidelines were available for comparison. Maximum concentrations of nine of the ten SVOCs detected in sediment were found in a sample collected approximately 240 m (800 ft) downstream of the site. DDT and DDE were the only pesticides detected in the sediment samples, and maximum concentrations of both exceeded the screening guidelines: DDE by an order of magnitude, and DDT by a factor of roughly

2.4. The maximum PCB concentration in was detected in a sediment sample collected approximately 240 m (800 ft) downstream of the site and exceeded the TEL by one order of magnitude.

References

DeLorme Mapping Company (DeLorme). 1991. New York State atlas and gazetteer. 1:150,000. DeLorme. Freeport, ME.

Dorneman, Kiersten. 1999. Sampling trip report, Consolidated Iron and Metal. Edison, NJ: Region II Superfund Technical Assessment and Response Team of Roy F. Weston Inc.

Efroymson, R. A., G. W. Suter II, B. E. Sample, and D. S. Jones. 1997. Preliminary remediation goals for ecological endpoints. Available: http://www.esd.ornl.gov/programs/ecorisk/tm162r2.pdf.

Kahnle, A. Fisheries biologist for the Hudson Fisheries Unit of the New York State Department of Environmental Conservation, Bureau of Fisheries. Personal communication December 20, 2002.

Lindsay, W.L. 1979. *Chemical Equilibria in Soils*. New York, NY: John Wiley & Sons. 449 pp.

New York State Department of Health (NYSDOH). 2002. 2002-2003 Health advisories: chemicals in sportfish and game. Available: http://www.health.state.ny.us/nysdoh/environ/fish.htm.

Roy F. Weston Inc. (Weston). 2000a. Analytical summary report, Consolidated Iron and Metal, Newburgh, Orange County, New York. Edison, NJ: Region II Superfund Technical Assessment and Response Team. 146 pp.

Roy F. Weston Inc. (Weston). 2000b. Final preliminary assessment/integrated assessment, Consolidated Iron and Metal, Newburgh, Orange County, New York, volume 1 of 2. Edison, NJ: Prepared for the U.S. Environmental Protection Agency (USEPA).

Shacklette, H.T. and J.G. Boerngen. 1984. Element concentrations in soils and other surficial materials of the conterminous United States. USGS Professional Paper 1720. Washington, DC: U.S. Geological Survey.

Smith, S.L, D.D. MacDonald, K.A. Keenleyside, C.G. Ingersoll, and L.J. Field. 1996. A preliminary evaluation of sediment quality assessment values for freshwater ecosystems. *J. Great Lakes Res* 22(3):624-638.

U.S. Environmental Protection Agency (USEPA). 1986. Quality criteria for water 1986. EPA 440/5-86-001. Washington D.C.: U.S. Environmental Protection Agency, Office of Water.

U.S. Environmental Protection Agency (USEPA). 2001. NPL site narrative for Consolidated Iron and Metal, Newburgh, New York. Available: http://www.epa.gov/superfund/sites/npl/nar1614.htm.

U.S. Environmental Protection Agency (USEPA). 2002. National recommended water quality criteria: 2002: Washington D.C.: U.S. Environmental Protection Agency, Office of Water.