Price Battery

Hamburg, Pennsylvania
EPA Facility ID: PAN000305679
Basin: Schuylkill
HUC: 02040203

Executive Summary

The Price Battery site is a former lead battery manufacturing and recycling plant in Hamburg, Berks County, Pennsylvania. During the recycling process, a lead smelter was used to melt the lead plates from batteries and separate the lead from other components in the plates. Price Battery disposed of battery casings and wastes as fill material at numerous locations throughout the county, including along the banks of Kaercher Creek, which flows through the site and is a tributary to the Schuylkill River, and along the banks of the Schuylkill River. The primary contaminant of concern to NOAA is lead. The habitats of concern to NOAA are the Schuylkill River and Kaercher Creek. There are currently ten dams on the Schuylkill River that impede migratory fish from reaching the river in the vicinity of the site. However, a program to restore access for migratory fish is in progress. When fish passage to the upper reaches of the Schuylkill River is restored, anadromous alewife, American shad, blueback herring, and striped bass, and the catadromous American eel are expected to use the habitat near the site. Particulate deposition, surface water runoff, and direct discharge from battery casings are the primary pathways for the migration of contaminants to NOAA trust resources.

Site Background

The Price Battery site is a former lead battery manufacturing and recycling plant in a residential area of Hamburg, Berks County, Pennsylvania (Figure 1). From the 1940s to 1971, lead batteries were manufactured and recycled at the 3-ha (8-acre) site. Three manufacturing buildings, referred to as the East Building, the West Building, and the Oxide Department, and one large warehouse are present on the Price Battery property (Tetra Tech 2002). The general layout of the property is shown on Figure 2. Kaercher Creek, a tributary to the Schuylkill River, passes under the Price Battery property in a culvert (Figure 2) and then flows southwest before emptying into the Schuylkill River approximately 1 km (0.6 mi) west of the site.

During the recycling process, a lead smelter was used to melt the lead plates from batteries and separate the lead from other components in the plates. The lead smelter emitted particles containing lead into the air (USEPA 2004). In addition, Price Battery disposed of battery casings and wastes as fill material at numerous locations throughout the county, including along the banks of Kaercher Creek and the Schuylkill River, and allowed citizens to pick up old battery casings for use as fill material as well. Emissions from the smelter and the burial of old battery casings have contributed to elevated concentrations of lead in soil throughout Hamburg.

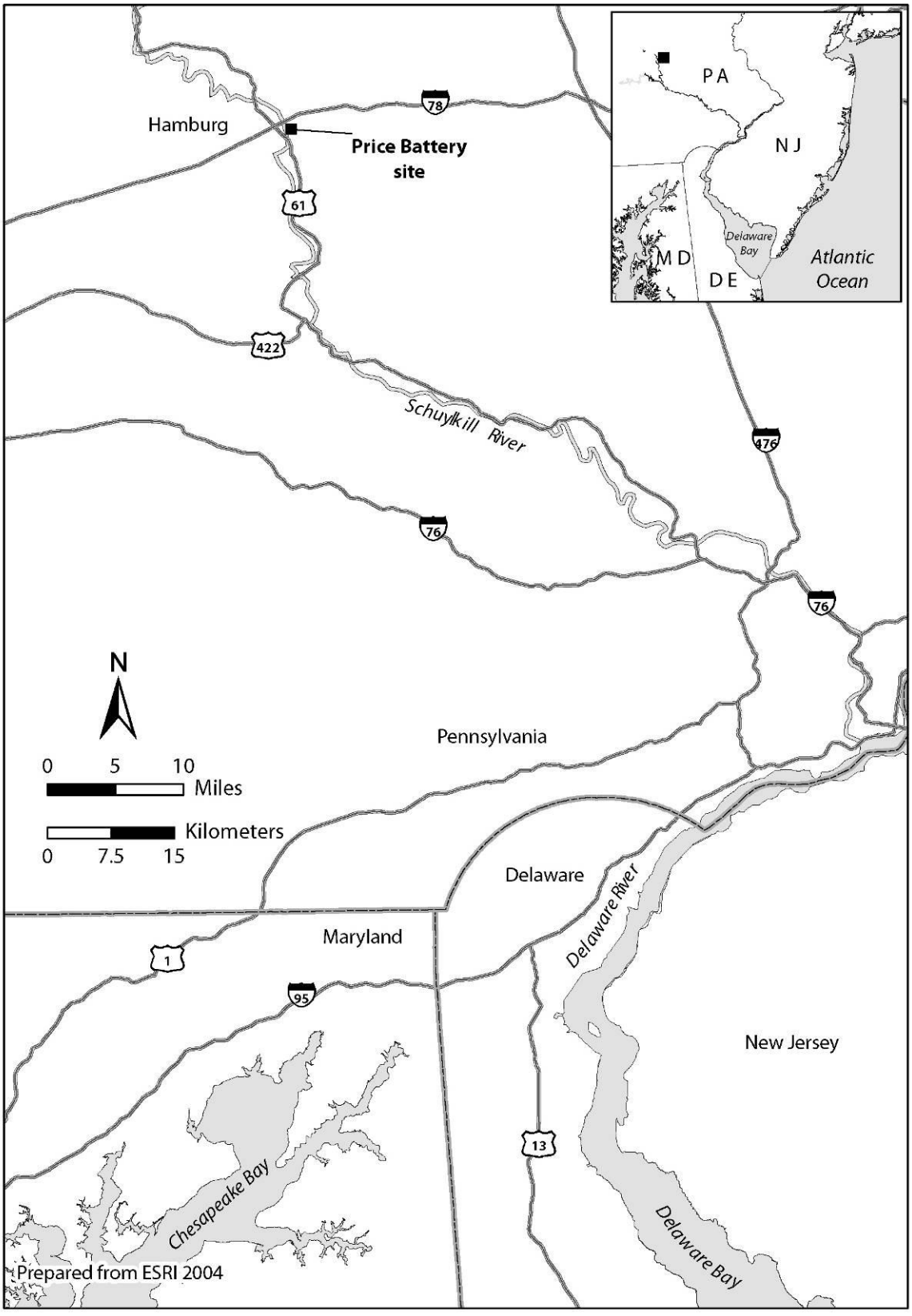

Figure 1. Location of the Price Battery site, Hamburg, Pennsylvania.

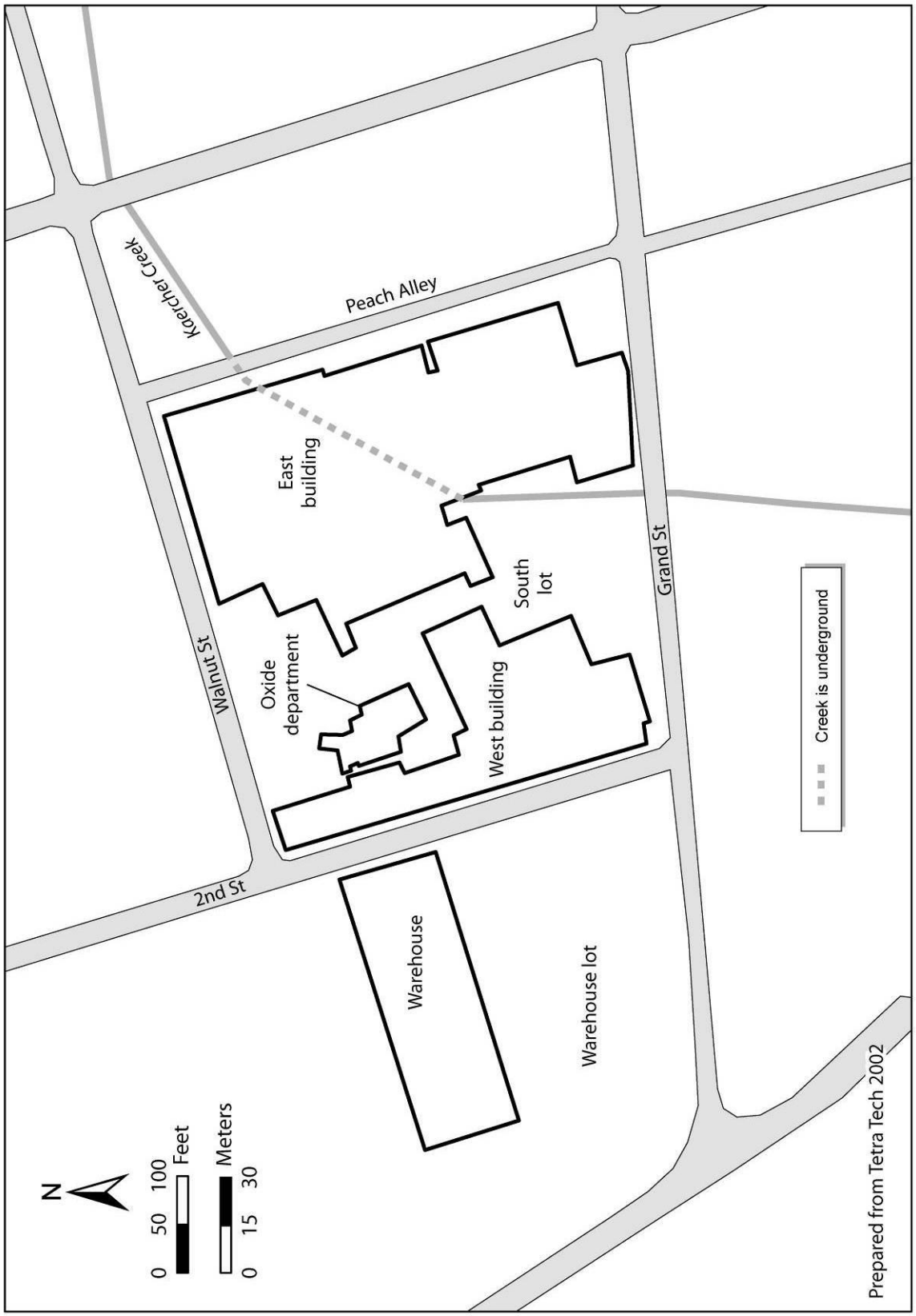

Figure 2. Detail of the Price Battery property.

Investigations conducted by and for the U.S. Environmental Protection Agency (USEPA) have detected elevated concentrations of lead and other metals in samples of soil, sediment, groundwater, and surface water. The Price Battery site was placed on the National Priorities List on April 27, 2005 (USEPA 2006a).

Pathways for the migration of contaminants from the site to NOAA trust resources are (1) deposition of particulate air emissions to Kaercher Creek and the SchuylkillRiver, and the site property (2) surface water runoff from contaminated soil at the property, and (3) direct discharge from battery casings that were disposed of in and adjacent to, Kaercher Creek and the Schuylkill River. Information regarding groundwater transport of contaminants, the depth of groundwater below the site, and the direction of groundwater flow was not available in the documents reviewed for this report.

NOAA Trust Resources

The habitats of concern to NOAA are the Schuylkill River and Kaercher Creek. Kaercher Creek flows under the site in a culvert and then flows southwest before emptying into the Schuylkill River approximately 1 km (0.6 mi) west of the site. Before entering the Schuylkill River, Kaercher Creek flows through areas, both upgradient and downgradient of the property, where old battery casings were used as fill. The creek is 0.9 to 3 m (3 to 10 ft) in width and 0.3 to 0.9 m (1 to 3 ft) in depth; sections of the creek are channelized by concrete walls.

Currently, there are ten dams on the Schuylkill River that impede the passage of migratory fish; seven of these dams are downstream of the site. However, a program to restore access for migratory fish is in progress. Plans call for breaching, removing, or adding fish passage to the seven dams downstream of the site, which would allow fish access to historical spawning reaches (Snyder 2004). As of 2008, fish passage facilities have been added to three dams; construction of a fish passage facility is currently in progress on another dam; two of the dams have been breached; and one dam is in the process of being breached (PFBC 2008a). The lower Schuylkill River provides habitat for anadromous alewife, American shad, blueback herring, and striped bass, and the catadromous American eel. Historically, these fish species were abundant throughout most of the Schuylkill River (Fairchild et al. 1998). When fish passage is restored to the upper reaches of the Schuylkill River, these species are expected to use habitat near the site for spawning, nursery, and adult habitat (Kaufmann 1992). Table 1 lists NOAA trust resources that will have access to habitat near the site after impediments to migratory fish passage are removed or modified.

The Pennsylvania Fish and Boat Commission regularly stocks juvenile American shad in the Schuylkill River as part of the Schuylkill River American Shad Restoration Program. In 2008, American shad were stocked in the Schuylkill River in the reach nearest the site (PFBC 2008b). The goal of the stocking to create a self-sustaining population of American shad that is not dependent on stocking (PFBC 2008a). Kaercher Creek does not provide suitable habitat for American Shad, which rarely enter small streams and are typically found in rivers (Steiner 2000).

Table 1. NOAA trust resources present in the Schuylkill River downstream of the Price Battery site (Kauffman 1992; Snyder 2004).

Species		Habitat Use			Fisheries	
Common Name	Scientific Name	Spawning Area	Nursery Area	Adult Habitat	Comm.	Rec.
ANADROMOUS FISH						
American shad[a]	*Alosa sapidissima*	♦	♦	♦		♦
Alewife[b]	*Alosa pseudoharengus*	♦	♦	♦		
Blueback herring[b]	*Alosa aestivalis*	♦	♦	♦		
Striped bass[b]	*Morone saxatilis*	♦	♦	♦		♦
CATADROMOUS FISH						
American eel[b]	*Anguilla rostrata*			♦		

a: Although American shad are present near the site because of stocking, not through natural migration, the goal of the stocking program is to create a self-migrating population.

b: Species is not currently present near the site but would likely be present after impediments to fish passage in lower sections of the Schuylkill River are removed or modified.

NOAA trust resources are not fished commercially on the Schuylkill River or its tributaries. American shad and striped bass are targeted by recreational fishers throughout the Schuylkill River (PFBC 2006b).

A 2006 fish consumption advisory is in effect for the section of the Schuylkill River adjacent to the site because of contamination with polychlorinated biphenyls (PCBs) (PDEP 2007). The advisory recommends that people reduce their consumption of bluegill, brown bullhead, brown trout, and rainbow trout and that they avoid consuming brook trout from reaches of the Schuylkill River near the site. No fish consumption advisories are in effect for Kaercher Creek.

Site-Related Contamination

During investigations conducted in 1994, 2000, and 2002, a total of 78 sediment and 33 surface water samples were collected from Kaercher Creek and the Schuylkill River downstream of and adjacent to, the Price Battery property. Approximately 50 percent of the surface water and sediment samples were analyzed for metals; the remaining 50 percent were analyzed only for lead (USEPA 1994; Weston 2000; Tetra Tech 2002).

In 2002, four groundwater samples were collected from monitoring wells at the Price Battery property and analyzed for lead (Tetra Tech 2002). Also in 2002, 48 soil samples were collected from the Price Battery property (Tetra Tech 2002). Eleven of these soil samples were analyzed for volatile organic compounds, semivolatile organic compounds, pesticides, PCBs, metals, and cyanide, and 37 of the samples were analyzed only for lead. In addition, 74 soil samples were collected from the banks of Kaercher Creek and two soil samples were collected from the banks of the Schuylkill River in 2002; these samples were analyzed for lead (Tetra Tech 2002). The primary contaminant of concern to NOAA is lead.

Table 2 summarizes the maximum concentrations of contaminants of concern to NOAA detected during the site investigations and compares them to relevant screening guidelines. Site-specific or regionally specific screening guidelines are always included when available. In the absence of such guidance, the screening guidelines for groundwater and surface water are the ambient water quality criteria (AWQC; USEPA 2006b), and the screening guidelines for sediment in a freshwater environment are the threshold effects concentrations (TECs; MacDonald et al. 2000). The screening guidelines for soil are the Oak Ridge National Laboratory final preliminary remediation goals (ORNL-PRGs; Efroymson et al. 1997) and the USEPA's ecological soil screening guidelines (USEPA 2008). Exceptions to these screening guidelines, if any, are noted in Table 2. Only maximum concentrations that exceeded relevant screening guidelines or for which no screening guidelines are currently available, are discussed below. When known, the general sampling locations are also provided (refer to Figures 1 and 2).

Surface Water

Three metals were detected in surface water samples collected from the site at maximum concentrations that exceeded the AWQC (Table 2). The maximum concentration of lead, which was detected in a sample collected from Kaercher Creek where it flows beneath the site (Figure 2), exceeded the AWQC by one order of magnitude. Maximum concentrations of copper and silver were detected in a sample collected from Kaercher Creek approximately 150 m (500 ft) upstream of the Price Battery property. The maximum concentration of silver exceeded the AWQC by a factor of 7.5; copper exceeded the AWQC by a factor of approximately 3.5.

Sediment

Seven metals were detected in sediment samples collected from Kaercher Creek at maximum concentrations that exceeded the TECs (Table 2). The maximum concentration of lead, which was detected in a sample collected approximately 550 m (1,800 ft) downstream of the Price Battery property, exceeded the TEC by three orders of magnitude. Maximum concentrations of arsenic, copper, and mercury were detected in samples collected approximately 430 m (1,400 ft) upstream of the Price Battery property. The maximum concentration of mercury exceeded the TEC by one order of magnitude; arsenic and copper exceeded the TECs by factors of two and three, respectively. The maximum concentrations of nickel and zinc were detected in samples collected from the Schuylkill River just upstream of its confluence with Kaercher Creek. The maximum concentration of nickel exceeded the TEC by a factor of 7.5, and zinc exceeded the TEC by a factor of five. The maximum concentration of silver, which was detected in a sample collected approximately 150 m (500 ft) upstream of the Price Battery property, exceeded the TEC by a factor of two.

Groundwater

The maximum concentration of lead, which was detected in a groundwater sample collected from a monitoring well in the west side of the south lot (Figure 2), exceeded the AWQC by a factor of approximately 7.5.

Table 2. Maximum concentrations of contaminants of concern to NOAA at the Price Battery site (USEPA 1994; Weston 2000; Tetra Tech 2002). Contaminant values in bold exceed or are equal to screening guidelines.

	Soil (mg/kg)		Water (µg/L)			Sediment (mg/kg)	
Contaminant	Soil	ORNL-PRG[a]	Ground-water	Surface Water	AWQC[b]	Sediment	TEC[c]
METALS/INORGANICS							
Arsenic	**320**	9.9	N/A	11	150	**20**	9.79
Cadmium	**11**	0.36[d]	N/A	ND	0.25[e]	ND	0.99
Chromium	**25**	0.4	N/A	ND	11[f]	27	43.4
Copper	**440**	60	N/A	**33**	9[e]	**99**	31.6
Lead	**160,000**	40.5	**19**	**86**	2.5[e]	**62,000**	35.8
Mercury	**0.45**	0.00051	N/A	ND	0.77[g]	**2.8**	0.18
Nickel	27	30	N/A	4.4	52[e]	**170**	22.7
Selenium	**4.0**	0.21	N/A	ND	5.0[h]	ND	NA
Silver	**4.4**	2	N/A	**24**	3.2[e,i]	**11**	4.5[j]
Zinc	**280**	8.5	N/A	40	120[e]	**600**	121
PCBs							
Aroclor 1260[k]	**0.98**	0.371	N/A	N/A	0.014	N/A	0.0598

a: Oak Ridge National Laboratory (ORNL) final preliminary remediation goal (PRG) for ecological endpoints (Efroymson et al. 1997).
b: Ambient water quality criteria (AWQC) for the protection of aquatic organisms (USEPA 2006b). Freshwater chronic criteria presented.
c: Threshold effects concentration (TEC), the concentration below which harmful effects are unlikely to be observed (MacDonald et al. 2000).
d: Ecological soil screening guidelines (USEPA 2008).
e: Criterion expressed as a function of total hardness; concentrations shown correspond to hardness of 100 mg/L $CaCO_3$.
f: Screening guidelines represent concentrations for $Cr.^{+6}$
g: Derived from inorganic, but applied to total mercury.
h: Criterion expressed as total recoverable metal.
i: Chronic criterion not available; acute criterion presented.
j: Freshwater upper effects threshold (UET) for bioassays. The UET represents the concentration above which adverse biological impacts would be expected.
k: Screening guidelines are for Total PCBs
NA: Screening guideline not available.
N/A: Contaminant not analyzed for.
ND: Not detected.

Soil

Eight metals and selenium were detected in soil samples from the Price Battery property at maximum concentrations that exceeded screening guidelines (Table 2). The maximum concentrations of arsenic, cadmium, chromium, copper, lead, mercury, and silver were all detected in samples collected from the south lot (Figure 2). The maximum concentration of lead exceeded the ORNL-PRG by three orders of magnitude; mercury exceeded the ORNL-

PRG by two orders of magnitude, and arsenic and chromium exceeded the ORNL-PRGs by one order of magnitude. The maximum concentration of cadmium exceeded the USEPA ecological soil screening guideline by one order of magnitude. The maximum concentration of copper exceeded the ORNL-PRG by a factor of seven, and silver exceeded the ORNL-PRG by a factor of two. The maximum concentrations of selenium and zinc, which were detected in samples collected from the warehouse lot (Figure 2), exceeded the ORNL-PRGs by one order of magnitude.

The maximum concentration of PCB Aroclor 1260, which was detected in a soil sample collected from the north side of the property, exceeded the ORNL-PRG by a factor of approximately 2.5.

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