# Brine Service Company

*Corpus Christi, Texas*

*EPA Facility ID: TX0000605264*

*Basin: South Corpus Christi Bay*

*HUC: 12110202*

## Executive Summary

The Brine Service Company site is west of Corpus Christi, Texas. The site contains two pit areas originally used as sand and caliche quarries and later for waste disposal. The primary contaminants of concern at the site are metals and SVOCs. A drainage ditch directs surface water runoff from the site to the north, where it empties into the wetlands adjacent to Tule Lake. Several NOAA trust resources use the surface waters of Tule Lake and Tule Lake Channel, which are NOAA habitats of concern.

## Site Background

The Brine Service Company (BSC) site is approximately 10 km (6.5 mi) west of downtown Corpus Christi, northeast of the intersection of Interstate Highway 37 (IH-37) and Goldston Road (Figure 1). The total area of the site is unavailable or unknown. The BSC site consists of two former waste disposal pit areas, referred to as the North Pit and the South Pit, which were originally used as quarries for sand and caliche (gravel, sand, and desert debris cemented by calcium carbonate). The South Pit area, which is the larger of the two, is currently occupied by a communications tower, a heavy equipment repair shop, and a video store. The North Pit is currently the site of a fabrication shop and warehouse (Figure 2) (TNRCC 2000).

Excavation of the South Pit area, which was reportedly owned and operated by the Brine Service Company, Inc. from 1946 through the 1960s, documented oil field wastes, drilling fluids, and/or refinery wastes (TNRCC 2001). The North Pit, owned by a Mr. Goldston since the early 1970s, has been the location of several different operations conducted by several different companies, including a trucking depot/construction yard and a tire warehouse (EMCON 1998; TNRCC 2000).

The site was identified in November 1997, when a representative of Koch Pipeline Company (Koch) reported an apparent waste disposal site to the Texas Natural Resource Conservation Commission (TNRCC). Koch had been advancing an excavation trench along the eastern side of the BSC site to install interconnecting pipelines between Koch's East and West Refineries. A TNRCC inspector observed that the floor and walls of the excavated trench were visibly stained with phase-separate hydrocarbons, which were also evident in the groundwater seeping into the excavation. In addition, the inspector noted a strong organic-compound odor in the area of the excavation (TNRCC 2000).

A meeting was held in early November 1997 between TNRCC Region 14 representatives and Koch officials to discuss disposal options for the excavated soils. During that meeting, Mr. Goldston, a current owner of part of the BSC site, reported that the site had formerly been owned and operated by BSC, Inc. He indicated that between 1946 and the 1960s, refineries had used a pit (likely

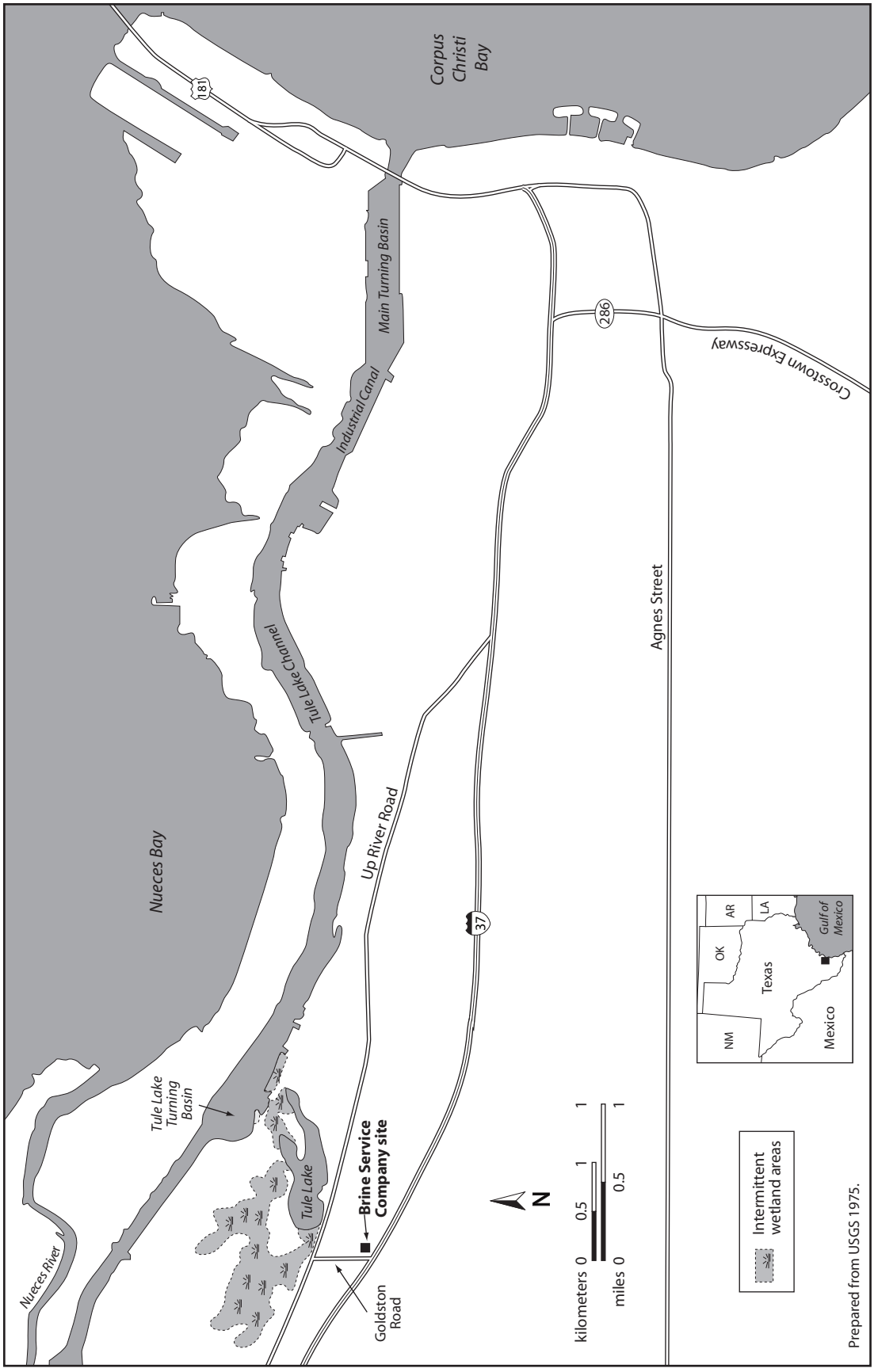


Figure 1. Location of Brine Service Company site, Corpus Christi, Texas.

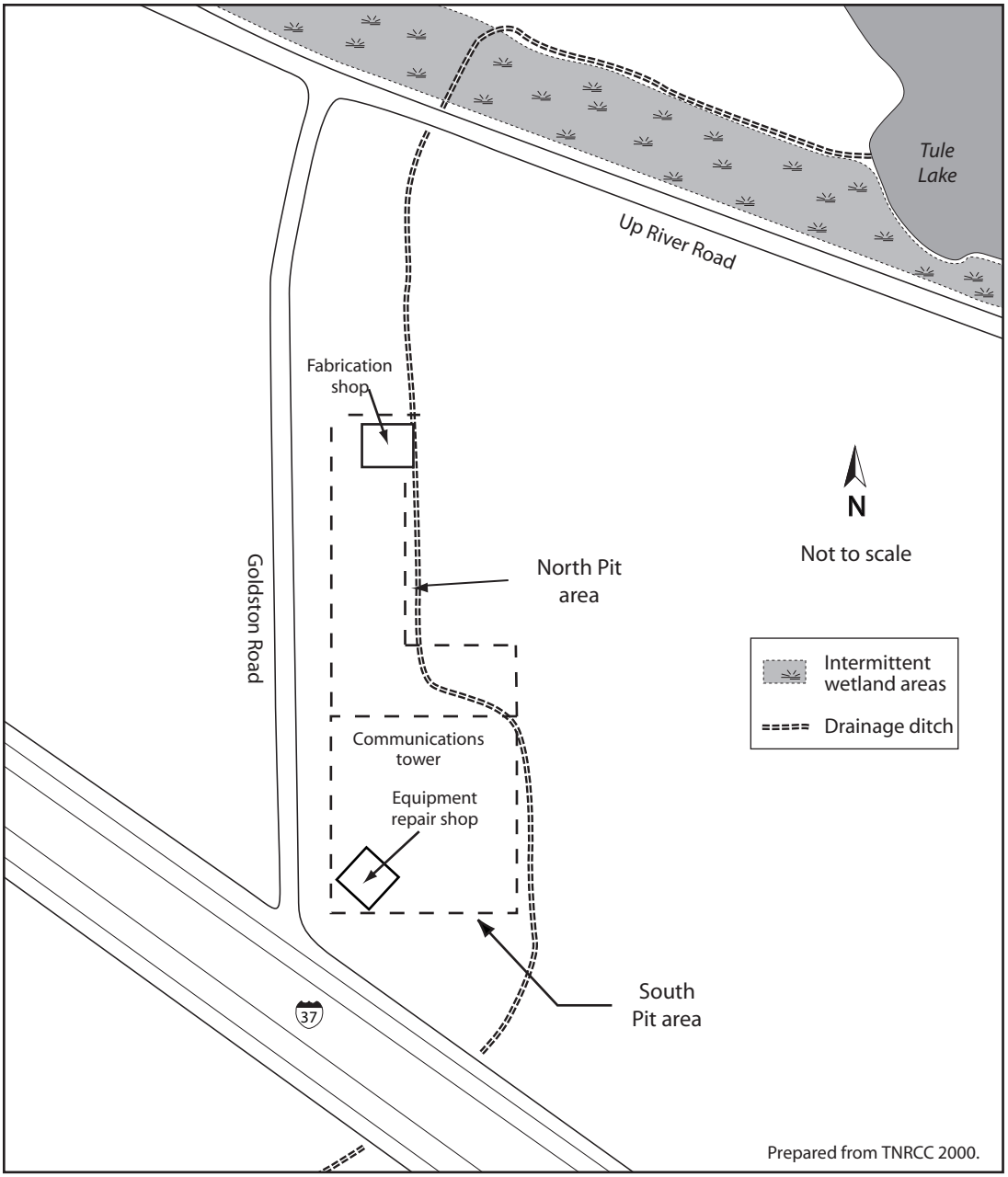


Figure 2. Detail of Brine Service Company site.

the South Pit) for waste disposal. In a 1999 interview, the president of BSC, Inc., revealed that during the mid-1950s, the site was used to store drilling fluid. Aerial photographs show that the pit excavations began prior to 1956 and that the excavations contained liquid until they were filled. The North Pit was filled sometime between 1962 and 1965, and the South Pit was completely filled by late 1973 (TNRCC 2000).

Laboratory analysis of samples of the soils excavated by Koch indicated elevated levels of total petroleum hydrocarbons and total metals, as well as volatile and semivolatile organic compounds (VOCs and SVOCs). In February 2000, the TNRCC's Superfund Site Discovery and Assessment Program conducted sampling at the BSC site as part of a screening site inspection. A hazard ranking

system package was completed for the BSC site on September 1, 2001, and on September 13, 2001, the site was proposed to the National Priorities List (TNRCC 2000).

The main pathway for the migration of contaminants to NOAA trust resources at Tule Lake is via surface water runoff from the South Pit, which flows into a drainage ditch that empties into a wetland area. The wetlands area is contiguous to the lake's estuarine intertidal emergent areas that are regularly and irregularly flooded (TNRCC 2000).

## NOAA Trust Resources

The NOAA habitats of concern are the surface waters of Tule Lake and Tule Lake Channel. The NOAA trust resources that use these habitats are summarized in Table 1.

Table 1. NOAA trust resources present in Tule Lake (Lee 2001; Lee 2002).

| Species | | Habitat Use | | | Fisheries | |
|---|---|---|---|---|---|---|
| Common Name | Scientific Name | Spawning Area | Nursery Area | Adult Habitat | Comm. Fishery | Rec. Fishery[a] |
| **MARINE/ESTUARINE FISH** | | | | | | |
| Atlantic croaker | *Micropogonias undulatus* | | ◆ | | | ◆ |
| Black drum | *Pogonias cromis* | | ◆ | | | |
| Gulf killifish | *Fundulus grandis* | ◆ | ◆ | ◆ | | ◆ |
| Gulf menhaden | *Brevoortia patronus* | ◆ | ◆ | ◆ | | ◆ |
| Hardhead catfish | *Arius felis* | ◆ | ◆ | ◆ | | ◆ |
| Pinfish | *Lagodon rhomboides* | ◆ | ◆ | ◆ | | ◆ |
| Red drum | *Sciaenops ocellatus* | | ◆ | ◆ | | |
| Sheepshead minnow | *Cyprinodon variegatus* | ◆ | ◆ | ◆ | | ◆ |
| Spot | *Leiostomus xanthurus* | ◆ | ◆ | ◆ | | ◆ |
| Striped mullet | *Mugil cephalus* | | ◆ | ◆ | | ◆ |
| **INVERTEBRATES** | | | | | | |
| Blue crab | *Callinectes sapidus* | | ◆ | ◆ | | ◆ |

a: These represent possible recreationally fished species within Tule Lake.

The BSC site is located in the Nueces-Rio Grande Coastal Basin. Surface water runoff from the site flows into a man-made drainage ditch along the east side of the property, travels north in the ditch as it passes below Up River Road, and continues north to the probable point of entry on the west shore of Tule Lake, a distance of approximately 0.8 km (0.5 mi). The discharge point is located in the wetlands (TNRCC 2000).

Tule Lake empties into Tule Lake Channel, which continues to Corpus Christi Bay. The lake serves as a sanctuary for several aquatic bird species, including gulls and pelicans. Corpus Christi Bay is listed under the National Estuary Program as one of the most important estuarine systems along the Gulf Coast (TNRCC 2000).

The upper northeast end of Tule Lake, near the mouth, ranges from approximately 0.61 to 0.76 m (2 to 2.5 ft) in depth. Tidal influence at this end of the lake extends from the ship channel approxi-

mately 0.20 km (0.13 mi) into the lake. The remainder of the lake is shallow, with an average depth of 30 to 46 cm (12 to 18 in). The lake bottom is soft, silty mud with minimal vegetation. Salinity in the lake ranges from 5 to 35 parts per thousand, depending on the rainfall and season (Lee 2001).

NOAA trust resources commonly found in shallower parts of the lake are striped mullet, sheepshead minnow, and gulf killifish. NOAA trust resources found in deeper parts of the lake include both black and red drum, gulf menhaden, and Atlantic croaker (Lee 2001). Many of these species use the lake for nursery and adult habitat (Table 1). Because Tule Lake is privately owned, it is not popular for recreational fishing. However, the lake is accessible and a small amount of recreational fishing does take place. Species that are occasionally recreationally fished include gulf killifish, gulf menhaden, hardhead catfish, and blue crab (Lee 2002). There is no commercial fishing in Tule Lake or the Tule Lake Channel. No fish consumption advisories are in effect for Tule Lake or the Tule Lake Channel. However, a consumption advisory in effect for the Gulf of Mexico recommends limited consumption of king mackerel between 94 cm (37 in) and 110 cm (43 in) in length and recommends against consumption of king mackerel greater than 110 cm (43 in) in length (TDH 2002).

## Site-Related Contamination

The primary contaminants of concern at the BSC site are inorganic compounds (metals) and SVOCs (including polynuclear aromatic hydrocarbons [PAHs]). Soil, groundwater, and sediment samples have been collected from the site; sediment samples have also been collected from Tule Lake and the adjacent wetlands. Seventeen soil and 41 sediment samples were analyzed for metals, VOCs, SVOCs, pesticides, and polychlorinated biphenyls (PCBs). Approximately three groundwater samples were analyzed for only metals and SVOCs. The maximum concentrations of metals, SVOCs, pesticides, and PCBs detected in these media are summarized in Table 2. Surface water samples have not been collected from the BSC site to date (TNRCC 2000).

### Sediment

In sediment samples, several metals were detected at maximum concentrations that exceeded the Effects Range-Low (ERL) guidelines. The maximum concentration of selenium exceeded the ERL by at least one order of magnitude. Concentrations of mercury and zinc were at least five times the ERLs. The majority of the maximum metals concentrations were detected in a sampled collected north of the site from the drainage ditch that flows to Tule Lake. Several SVOCs also were detected; however, only the maximum concentrations of anthracene and dibenz(a,h)anthracene exceeded the ERLs. Several maximum concentrations of SVOCs were detected in a sample collected from the drainage ditch at the point where the ditch enters the wetlands. Three pesticides also were detected in the sediment samples: aldrin, chlordane, and DDE. The maximum concentration of chlordane was detected in a sample collected to the east of the North Pit area. A sample collected from where the drainage ditch flows into Tule Lake, contained the maximum concentration of DDE. Concentrations of chlordane and DDE exceeded the ERLs by at least a factor of three; there is no ERL for aldrin.

### Groundwater

In groundwater samples, metals were the most frequently detected contaminants. The maximum concentrations of arsenic, cadmium, chromium, and mercury were detected in a sample collected near the center of the North Pit area. All of the six metals detected had maximum concentrations in excess of the ambient water quality criteria (AWQC). Maximum concentrations of arsenic, lead, and silver exceeded the AWQC by an order of magnitude. Concentrations of chromium and mercury exceeded the AWQC by six and eight times respectively. No SVOCs were detected in the groundwater samples, and analysis for pesticides and PCBs was not performed.

Table 2. Maximum concentrations of contaminants of concern to NOAA at the Brine Service Company site (UE 1999; TNRCC 2000). Contaminant values in bold exceeded screening guidelines.

| | Soil (mg/kg) | | Water (µg/L) | | Sediment (mg/kg) | |
|---|---|---|---|---|---|---|
| **Contaminant** | Soil | ORNL-PRG[a] | Ground-water | AWQCb | Sediment | ERL[c] |
| **METALS/INORGANICS** | | | | | | |
| Arsenic | **12** | 9.9 | **740** | 36 | 7.9 | 8.2 |
| Cadmium | **37** | 0.38[d] | **13** | 8.8 | **5.4** | 1.2 |
| Chromium[e] | **640** | 0.4 | **340** | 50 | 29 | 81 |
| Copper | **93** | 60 | N/A | 3.1 | **48** | 34 |
| Lead | **430** | 40.5 | **270** | 8.1 | **110** | 46.7 |
| Mercury | **11** | 0.00051 | **0.8** | 0.094[f] | **0.76** | 0.15 |
| Nickel | 11 | 30 | N/A | 8.2 | 19 | 20.9 |
| Selenium | <5.0 | 0.21 | <25 | 71 | **19** | 1.0[g] |
| Silver | <5.0 | 2 | **140** | 1.9[h] | <2.0 | 1 |
| Zinc | **60** | 8.5 | N/A | 81 | **850** | 150 |
| **PAHs** | | | | | | |
| Acenaphthene | **39** | 20 | <5.0 | 710[i] | <0.63 | 0.016 |
| Anthracene | 4.4 | NA | <5.0 | 300[h,i,j] | **0.22** | 0.0853 |
| Benz(a)anthracene | 3.3 | NA | <5.0 | 300[h,i,j] | 0.2 | 0.261 |
| Chrysene | 3.1 | NA | <5.0 | 300[h,i,j] | 0.34 | 0.384 |
| Dibenz(a,h)anthracene | <33 | NA | <5.0 | 300[h,i,j] | **0.15** | 0.0634 |
| Fluoranthene | 5.0 | NA | <5.0 | 16[i] | 0.34 | 0.6 |
| Fluorene | 67 | NA | <5.0 | NA | <0.63 | 0.019 |
| 2-Methylnaphthalene | 360 | NA | <5.0 | 300[h,i,j] | 0.058 | 0.07 |
| Naphthalene | 120 | NA | <5.0 | 2350[h,i] | <0.63 | 0.16 |
| Phenanthrene | 330 | NA | <5.0 | NA | 0.22 | 0.24 |
| Pyrene | 8.9 | NA | <5.0 | 300[h,i,j] | 0.41 | 0.665 |
| **PESTICIDES/PCBs** | | | | | | |
| Aldrin | <0.0029 | NA | N/A | 1.3[h] | 0.0063 | NA |
| Chlordane | <0.0029 | NA | N/A | 0.004 | **0.0016** | 0.0005 |
| 4,4-DDE | 0.0058 | NA | N/A | NA | **0.01** | 0.0022 |
| Dieldrin | **0.015** | 0.00028[d] | N/A | 0.0019 | <0.0044 | 0.00002 |
| Total PCBs | **17** | 0.371 | N/A | 0.03 | <0.044 | 0.0227 |

a: Oak Ridge National Laboratory (ORNL) final preliminary remediation goals (PRG) for ecological endpoints (Efroymson et al. 1997).

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

c: Effects Range-Low represents the 10th percentile for the dataset in which effects were observed or predicted in studies compiled by Long et al. (1998).

d. Ecological soil screening guidelines (USEPA 2004).

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

f: Derived from inorganics, but applied to total mercury.

g: Marine (AET) for amphipod bioassay. The Apparent Effects Threshold (AET) represents the concentration above which adverse biological impacts would be expected.

h: Chronic criterion not available; acute criterion presented.

i: Lowest Observable Effect Level (LOEL) (USEPA 1986).

j: Value for chemical class.

NA: Screening guidelines not available.

N/A: Contaminant not analyzed for.

Soil

Soil sample analysis indicated the presence of several contaminants of concern. Seven metals were detected at maximum concentrations in excess of the screening guidelines. Arsenic, cadmium, chromium, copper, lead, mercury, and nickel were detected at maximum concentrations in soil from the South Pit area. Maximum concentrations of cadmium and lead exceeded the screening guidelines by one order of magnitude. Mercury and chromium were detected at concentrations that exceeded the screening guidelines by four and three orders of magnitude respectively. Seven SVOCs were detected at maximum concentrations in samples from the South Pit area and three were detected in samples from the North Pit area. The pesticides, dieldrin and DDE were detected in the soil samples. Dieldrin was detected in a sample collected from the North Pit area at a concentration that exceeded the screening guideline by one order of magnitude. PCBs were detected in a sample from the South Pit area at a maximum concentration that exceeded the screening guideline by one order of magnitude.

## References

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