# 2 OBJECTIVES OF THE SOIL AND TERRESTRIAL BIOTA INVESTIGATION

The objective of the SAP for soil at the Rayonier mill site is to collect and analyze scientifically valid data to assess surface and subsurface soil chemistry and chemicals found in terrestrial biota. Data collected in this SAP will be used to supplement existing information derived from the EPA's 1998 investigation. The new data will be used to complete the Remedial Investigation (RI) process by closing existing data gaps and permitting a more comprehensive evaluation of the lateral and vertical extent of soil contaminants. The terrestrial biota data will characterize the potential of chemicals to accumulate in food chains.

All soil investigation field activities will be conducted in accordance with the specifications presented in the SAP, the Quality Assurance Project Plan (QAPP), and the Health and Safety Plan (HASP). All field measurements will be performed in a manner that is scientifically valid, legally defensible, and of known and acceptable quality to meet established objectives.

## 2.1 OVERALL DESIGN

The objective of the soil investigation will be to collect sufficient additional data to define the nature and extent of soil contamination and to identify those areas, if any, where the chemicals in the soil may pose a significant threat to human health or the environment. The general approach is to develop a data set adequate for evaluating the chemicals present in the soils to the standards presented in the Washington State Model Toxics Control Act (MTCA). Surface and subsurface samples will be collected in the existing areas where chemical concentrations are known to exceed standards, such that the horizontal and vertical extent of the areas of concern can be delineated and contaminant gradients can be assessed. Areas of the site not characterized during the EPA-conducted Expanded Site Inspection (ESI) (E&E 1998) will be sampled to delineate areas of concern.

During the ESI (E&E 1998), data were collected in areas specific to known sources of contamination. These studies and data were reviewed, the aerial extent of coverage was evaluated, and contaminant levels were compared to standards outlined in MTCA (see Volume I: Work Plan). This sampling and analysis plan identifies specific chemicals in areas where additional sampling of soils is warranted.

Soil sampling locations are discussed by source area in the sections below. The identified source areas are:

- Bone Yard
- Chlorine Dioxide Generator and Pre-Fab Building

- Log Yard
- Wood Mill
- Hog-fuel Pile
- Sump Sediments
- Spent Sulfite Liquor (SSL) Lagoon

Soils associated with Main Process Area

- Finishing Room and Machine Room Area
- Air Pollution Control Equipment
- Recovery Boiler Room
- Blowpits
- Transformer Building
- Digester Building
- Acid Plant
- Bleach Plant
- Laboratory Area
- Screen Room
- Automotive Repair (Buck's Shop) Area
- Log Yard Transformer Area
- Sawmill Transformer Area

The soil sampling program has been designed to address these source areas. Samples will be collected within the areas listed above where previous COPC values were reported above relevant standards. Additional samples will also be collected in the vicinity of those locations to better characterize the potential boundaries and gradients of contamination. Additional information, such as horizontal and vertical extent of ESI sampling, was used to help evaluate sampling requirements.

The soil sampling plan also proposes an evaluation of ecological receptors (i.e., plants, soil biota, and wildlife). Plants and soil invertebrates will be collected along with associated soil. The resulting samples will allow for the development of relationships between soil and tissue chemical levels. Food web exposure modeling will be performed to determine potential risks to local wildlife species of the area.

Once the results of the analytical chemistry and other testing are available, an evaluation will be made as to the need for a second phase of sampling. This would be

undertaken to better define the potential extent of contamination, horizontally and vertically, around those stations where unacceptable risks may occur. A specific scope for the Phase II sampling will be developed, if necessary, following review of the RI report.

## 2.2 CHEMICAL ANALYTES

Soil samples obtained from each soil boring location will be analyzed for the presence of COPCs utilizing the following EPA-approved laboratory methodologies:

- selected metals (EPA Method SW6010B/7000 or 6020)
- semivolatile organic compounds (SVOCs) (EPA Method 8270)
- pesticides and polychlorinated biphenyls (PCBs) (EPA Method 8082)
- dioxins/furans (17 congeners) (EPA Method 1613B)
- total petroleum hydrocarbons (TPHs) (Northwest total petroleum hydrocarbon-diesel extended [NWTPH-Dx] and extractable petroleum hydrocarbon [EPH]; Northwest total petroleum hydrocarbon-gasoline extended [NWTPH-$G_x$] and volatile petroleum hydrocarbons [VPH])

Specific analytes will be evaluated for each sampling location as noted in below.

## 2.3 SAMPLING LOCATIONS

The soil sampling locations are discussed below. Each location was selected based on the following considerations:

- The locations and nature of past, known, or likely chemical releases to the soil
- Results from previous sampling activities
- Soil characteristics
- Types of chemicals released

Concentrations of chemicals detected in soil samples collected during the ESI (E&E 1998) were screened against MTCA Method B unrestricted land use cleanup values to help identify areas in need of further characterization during the RI/FS.

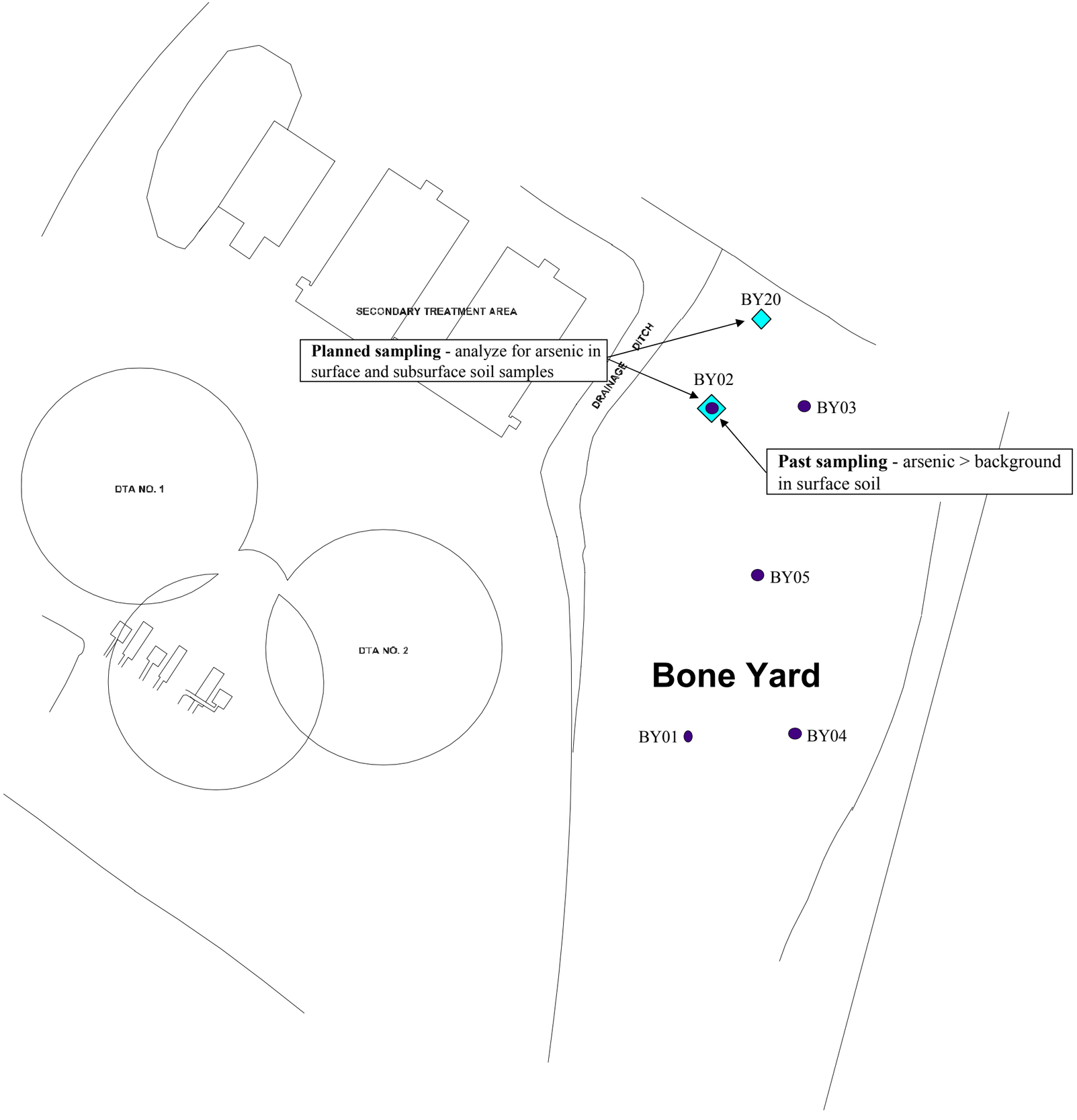
### 2.3.1 BONE YARD

The Bone Yard is an unpaved area located east of the secondary wastewater treatment plant. Its surface is level and covers an area of approximately 150 feet by 200 feet. The Bone Yard was used to store various pieces of equipment including, perhaps, electrical transformers (Figure 2-1). EPA (E&E 1998) collected five samples from the Bone Yard: four at each corner and one in the middle of the area. Each sample collected soil from

0 to 2 feet and 2 to 4 feet below ground surface (bgs). This sampling pattern provided broad coverage of the area. At BY05, additional sampling occurred at 2-foot intervals to 10 feet bgs, where groundwater was encountered. The Bone Yard is situated at a higher elevation than other site source areas, therefore, samples consisted primarily of native materials. Samples were analyzed for a full suite of chemical pollutants except dioxins/furans because dioxins/furans were not considered a known contaminant of concern in this area. However, particulates containing dioxins/furans were emitted from boiler stacks at the mill. Typically, particulate deposition from stack emissions is rather uniform over a localized geographic area. Therefore, dioxins/furans concentrations are expected to be similar in soil across the eastern portion of the mill site. Dioxins/furans data from samples collected from a number a sample locations across the eastern portion of the mill site will be representative of the area, including the Bone Yard.

Analytical results of the EPA (E&E 1998) sampling at the Bone Yard detected 45 chemicals (Table 2-1), most of which were below MTCA unrestricted land use criteria or are trace nutrients with levels that do not warrant further concern. Of the remaining chemicals, the following do not have unrestricted land use MTCA criteria and were evaluated as noted below:

- *Aroclor 1260*. Although no MTCA criterion exists for Aroclor 1260 specifically, MTCA provides an unrestricted land use criterion value of 0.5 milligrams per kilogram (mg/kg) for PCB mixtures. Neither the Aroclor 1260 nor Total Carcinogenic PCB concentrations exceed the MTCA criterion.
- *Benzo(g,h,i)perylene and phenanthrene*. No criteria were found to evaluate these compounds.
- *Cobalt*. EPA (1998) provides a risk-based criteria table for screening chemical concentrations and suggests a value of 4,700 mg/kg. Values found on site are substantially below these levels.
- *Endosulfan sulfate*. Unrestricted land use MTCA criterion is available for endosulfan, a similar compound at a concentration of 480 mg/kg. The levels found during this investigation are substantially below this concentration.
- *Lead*. Although MTCA does not provide a Method B human health unrestricted land use criteria, a value of 400 mg/kg for residential soils is suggested as a screening or "preliminary remediation goal" by EPA (2002a). Levels noted in this area were below this concentration and judged not to warrant further concern.

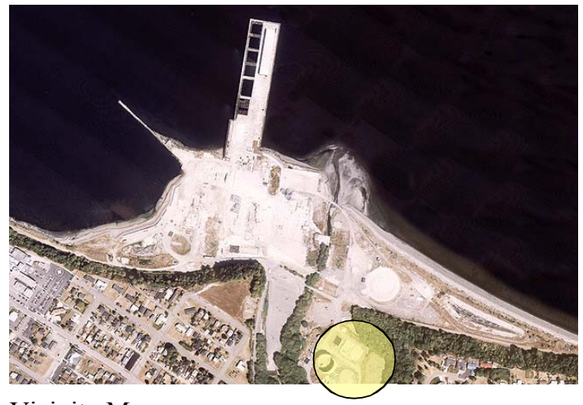



Planned sampling location

Past sampling location

SCALE IN FEET
0 40 80 120

N



Vicinity Map

**Figure 2-1.** Past and Planned Soil Sampling Locations at the Bone Yard.

Table 2-1. Concentrations of Detected Chemicals (mg/kg) in Soils Collected from the Bone Yard (Part 1 of 2)

| ANALYTE | BY01-0SS | BY01-2SB | BY02-0SS | BY02-2SB | BY03-0SS | BY03-2SB | BY04-0SS | BY04-2SB | BY05-0SS | BY05-2SB | BY05-4SB | BY05-6SB | BY05-8SB | *Unrestricted Land Use* | *Industrial Land Use* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4,4'-DDE | 0.0013 | -- | -- | 0.0011 | -- | 0.00029 | 0.00086 | -- | -- | -- | -- | -- | -- | *2.94* | *386.03* |
| 4,4'-DDT | -- | 0.0014 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | *2.94* | *386.03* |
| 4-Methylphenol | -- | -- | -- | -- | -- | 1.2 | -- | -- | 0.9 | -- | -- | -- | -- | *400* | *17500* |
| Acetone | -- | 0.17 | -- | -- | -- | -- | -- | 0.11 | -- | -- | -- | -- | -- | *8000* | *350000* |
| Aldrin | -- | 0.0014 | -- | -- | -- | -- | -- | -- | -- | 0.00029 | -- | -- | -- | *0.0588* | *7.7206* |
| Aluminum | 18100 | 31300 | 15400 | 10700 | 15500 | 17600 | 15000 | 23300 | 18200 | 18800 | 24500 | 27800 | 19300 | *32581* [b] | -- |
| Anthracene | -- | -- | -- | -- | -- | 0.048 | -- | -- | 0.047 | -- | -- | -- | -- | *24000* | *1050000* |
| Aroclor 1254 | -- | 0.012 | -- | 0.077 | -- | -- | -- | -- | -- | -- | -- | -- | -- | *1.6* | *70* |
| Aroclor 1260 [f] | 0.066 | -- | 0.19 | -- | 0.054 | 0.021 | 0.065 | -- | 0.087 | 0.0089 | -- | -- | -- | -- | -- |
| Total Carcinogenic PCBs [f] | 0.066 | 0.012 | 0.19 | 0.077 | 0.054 | 0.021 | 0.065 | -- | 0.087 | 0.0089 | -- | -- | -- | *0.5* [f] | *66* [f] |
| Arsenic | 3.2 | 4.2 | 27.5 | 2.2 | 3.9 | 3.6 | 3.1 | 3.9 | 0.89 | 2.9 | 4.4 | 4.9 | 2 | *0.67* | *87.5* |
| Barium | 37 | 244 | 96.6 | 96.7 | 75.7 | 131 | 78.5 | 103 | 74.2 | 153 | 124 | 96.8 | 73.9 | *5600* | *245000* |
| Benzo(a)anthracene | -- | -- | -- | -- | -- | 0.11 | -- | -- | 0.09 | -- | -- | -- | -- | -- [g] | -- [g] |
| Benzo(a)pyrene | -- | -- | -- | -- | -- | 0.13 | -- | -- | 0.11 | -- | -- | -- | -- | -- [g] | -- [g] |
| Benzo(b)fluoranthene | 0.047 | -- | -- | -- | -- | 0.16 | -- | -- | 0.11 | -- | -- | -- | -- | -- [g] | -- [g] |
| Benzo(ghi)perylene | 0.049 | -- | -- | -- | -- | 0.1 | -- | -- | 0.081 | -- | -- | -- | -- | -- | -- |
| Benzo(k)fluoranthene | -- | -- | -- | -- | -- | 0.065 | -- | -- | 0.065 | -- | -- | -- | -- | -- [g] | -- [g] |
| Beryllium | 0.22 | 0.4 | 0.24 | 0.14 | 0.21 | 0.27 | 0.27 | 0.46 | 0.16 | 0.23 | 0.48 | 0.56 | 0.35 | *160* | *7000* |
| beta-BHC | 0.002 | -- | 0.005 | -- | 0.0015 | 0.0052 | -- | -- | 0.0012 | 0.001 | 0.00082 | 0.00031 | -- | *0.556* | *72.917* |
| Cadmium | 0.86 | 0.64 | 0.36 | 0.24 | 0.14 | 0.3 | 0.16 | -- | 0.08 | 0.42 | -- | -- | -- | *80* | *3500* |
| Calcium [c] | 11200 | 56100 | 12000 | 25900 | 11800 | 25400 | 11500 | 5900 | 18000 | 30900 | 11700 | 6800 | 5110 | -- | -- |
| Chromium | 29.2 | 43.4 | 35.1 | 23.6 | 31.3 | 60.8 | 27.7 | 45.4 | 49.4 | 29 | 47.4 | 52 | 38.6 | *240* | *10500* |
| Chrysene | -- | -- | -- | -- | -- | 0.12 | -- | -- | 0.099 | -- | -- | -- | -- | -- [g] | -- [g] |
| Cobalt | 12.1 | 16.7 | 13.5 | 8 | 13.4 | 15.3 | 12.8 | 18 | 13.9 | 8.3 | 15.9 | 21.6 | 13.9 | *1600* [a] | *41000* [a] |
| Copper | 99.7 | 115 | 187 | 92.9 | 147 | 68.7 | 132 | 39.4 | 125 | 96.3 | 47.9 | 40 | 34.3 | *2960* | *129500* |
| Dieldrin | -- | -- | 0.0026 | -- | -- | 0.0015 | 0.0025 | -- | -- | -- | -- | -- | -- | *0.0625* | *8.203* |

Table 2-1. Concentrations of Detected Chemicals (mg/kg) in Soils Collected from the Bone Yard (Part 2 of 2)

| ANALYTE | BY01-0SS | BY01-2SB | BY02-0SS | BY02-2SB | BY03-0SS | BY03-2SB | BY04-0SS | BY04-2SB | BY05-0SS | BY05-2SB | BY05-4SB | BY05-6SB | BY05-8SB | *Unrestricted Land Use* | *Industrial Land Use* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Endosulfan sulfate | -- | 0.002 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | *480* [e] | *21000* [e] |
| Fluoranthene | 0.059 | -- | 0.04 | -- | -- | 0.28 | 0.048 | -- | 0.24 | -- | -- | -- | -- | *3200* | *140000* |
| Heptachlor epoxide | -- | -- | -- | -- | -- | 0.0018 | -- | -- | 0.00034 | -- | -- | -- | -- | *0.110* | *14.423* |
| Indeno(1,2,3-cd)pyrene | -- | -- | -- | -- | -- | 0.083 | -- | -- | 0.068 | -- | -- | -- | -- | *--* [g] | *--* [g] |
| Iron [c] | 29700 | 30500 | 34000 | 14900 | 31400 | 27400 | 33700 | 31800 | 24500 | 20700 | 32900 | 41300 | 27300 | -- | -- |
| Lead | 28.6 | 31.1 | 151 | 186 | 90 | 54.1 | 166 | 5.2 | 29.9 | 67.4 | 9.9 | 6.6 | 4.1 | *400* [d] | *750* [d] |
| Magnesium [c] | 8070 | 13500 | 7170 | 6110 | 7680 | 9090 | 8170 | 8750 | 10900 | 8660 | 9590 | 10400 | 8700 | -- | -- |
| Manganese | 448 | 4290 | 607 | 1790 | 598 | 3670 | 544 | 547 | 1590 | 2000 | 846 | 694 | 301 | *11200* | *490000* |
| Mercury | 0.09 | -- | 0.15 | 0.1 | 0.12 | 0.09 | 0.23 | 0.07 | -- | 0.12 | 0.09 | -- | -- | *24* | *1050* |
| Nickel | 44.1 | 150 | 56.8 | 101 | 56.9 | 107 | 45.3 | 42.1 | 29.1 | 54.2 | 42.3 | 50.3 | 34.4 | *1600* | *70000* |
| Phenanthrene | 0.049 | 0.077 | -- | -- | -- | 0.24 | 0.043 | -- | 0.18 | -- | -- | -- | -- | -- | -- |
| Potassium [c] | 727 | 20800 | 1120 | 5020 | 903 | 2120 | 789 | 1030 | 1300 | 5240 | 5280 | 3090 | 941 | -- | -- |
| Pyrene | 0.067 | -- | -- | -- | -- | 0.21 | -- | -- | 0.18 | -- | -- | -- | -- | *2400* | *105000* |
| Silver | 0.31 | 0.49 | 0.18 | 0.36 | 0.31 | 0.96 | -- | 0.65 | 0.44 | 0.6 | 14.9 | -- | 0.18 | *400* | *17500* |
| Sodium [c] | 1260 | 13100 | 623 | 3830 | 978 | 844 | 526 | 804 | 1320 | 5920 | 1740 | 581 | 561 | -- | -- |
| Thallium | -- | 1.2 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.82 | -- | *5.6* | *245* |
| Total Carcinogenic PAHs [g] | 0.0047 | -- | -- | -- | -- | 0.173 | -- | -- | 0.144 | -- | -- | -- | -- | *0.137* | *17.98* |
| Toluene | 0.002 | -- | -- | -- | 0.001 | -- | -- | -- | -- | -- | -- | -- | -- | *16000* | *700000* |
| Vanadium | 69.5 | 180 | 84.4 | 98.5 | 88.1 | 115 | 75.4 | 84.1 | 57.3 | 70.9 | 87 | 89.4 | 65.5 | *560* | *24500* |
| Xylene (total) | -- | -- | -- | -- | -- | 0.002 | -- | -- | -- | -- | -- | -- | -- | *160000* | *7000000* |
| Zinc | 73 | 152 | 163 | 249 | 123 | 133 | 237 | 67.2 | 58.2 | 237 | 86.1 | 83.5 | 51.2 | *24000* | *1050000* |

[a] Cobalt is based on EPA (2002) risk-based criteria.
[b] Based on the upper 90th percentile of background as noted for Puget Sound by Ecology (1994)
[c] Trace nutrients are not considered priority pollutants as organisms have wide ranges of tolerance (EPA 1989)
[d] Lead is based on a preliminary remediation goal developed and promulgated by EPA Region 9 based on the IEUBK model
[e] Value based on endosulfan
[f] Total carcinogenic PCBs are a sum of the detected Aroclor concentrations and are compared to MTCA carcinogenic levels for PCB mixtures using high risk and high persistence actors (Ecology 2001)
[g] Total Carcinogenic PAHs are presented as a sum of Benzo(a)pyrene toxicity equivalents (CalEPA 1994)

Arsenic and total carcinogenic polynuclear aromatic hydrocarbons (PAHs) were the only two compounds detected in soils above MTCA unrestricted land use criteria. The state criterion for arsenic is based on carcinogenicity of the inorganic form of arsenic. Because the measurements conducted by EPA (E&E 1998) were of total arsenic, comparison of the sampling results to the MTCA criterion is invalid. Thus, the values seen were compared to regional background levels as published by the Washington State Department of Ecology (Ecology) (Ecology, 1994). Background concentrations observed in soils that are not located near any known sources have arsenic levels that range from 1.45 to 17.17 mg/kg with the 90th percentile being 7.30 mg/kg. Only one sample (BY02-055) exceeded the 90th percentile background value for arsenic.

Total carcinogenic PAH concentrations exceeded the Method B unrestricted land use criterion in samples BY03-2SB and BY05-0SS. No carcinogenic PAH were detected in the surface soil at location BY03 or at samples from location BY02, effectively bounding this exceedence. Likewise, no carcinogenic PAHs were detected in the any of the subsurface soil samples at location BY05 or in any samples from BY01, BY02, or BY04, effectively bounding that exceedence. Therefore, additional characterization of carcinogenic PAH concentrations in the Bone Yard are not required.

Additional sampling at the Bone Yard focuses on arsenic at two locations: location BY02 which was previously sampled, and one additional location bounding BY02 to the north (Figure 2-1). Sampling near the drainage ditch was not required because the recent drainage ditch removal action (see Section 3.1.1.6 of the Work Plan [Volume I]) disturbed the soil within approximately 40 feet of either side of the drainage ditch. Each location will be sampled at two depths: 0 to 3 inches and 3 inches to 15 feet or groundwater. The surface sample (from 0 to 3 inches) is the depth that routinely would be in contact with wildlife and people working or residing on the site daily.

### 2.3.2 CHLORINE DIOXIDE GENERATOR AND PRE-FAB AREA

The Chlorine Dioxide Generator is located between Ennis Creek and the primary clarifier. It produced chlorine dioxide for use in pulp-bleaching processes. The land around the Chlorine Dioxide Generator is paved except on the south, toward the Pre-Fab Area. The Pre-Fab Area, comprising approximately 400 feet by 400 feet, contained several buildings and was used as a storage area and parking lot. EPA (1998) collected samples at three locations in the Pre-Fab Area from 0 to 2 feet bgs and 2 to 4 feet bgs (Figure 2-2). An additional location was also sampled in 2-foot intervals to 18 feet bgs, where groundwater was encountered. Three additional locations were also selected for sampling in a triangular pattern surrounding the Chlorine Dioxide Generator. Two of these locations were sampled at 0 to 2- and 2 to 4-foot intervals, and the third location at 2-foot intervals to 8 feet bgs where groundwater was encountered. All samples were analyzed for the full suite of chemicals except for dioxins and furans.

Fifty-four analytes were detected in soils near the Chlorine Dioxide Generator (Table 2-2), and twenty-seven analytes were detected in the Pre-Fab Area (Table 2-3). Although arsenic exceeded the MTCA unrestricted land use criteria, it was detected at levels below background for Puget Sound and does not warrant additional evaluation. Chrysene was detected at a concentration of 0.16 mg/kg at only one sampling location (CD01-0SS) to slightly exceed the residential criteria of 0.14 mg/kg. As this was a surface sample collected under asphalt, it is likely that this marginal exceedance resulted from contamination of the soil sample by asphalt particles during drilling through the pavement. It is unlikely that PAHs at this location are a result of past activities because no other sample contained significant concentrations of PAHs. Thus, the average concentration level of PAHs in the Chlorine Dioxide Generator is likely to be below levels of concern.

Copper was detected at sample PF02-0SS at a concentration of 9,370 mg/kg which exceeds the MTCA unrestricted land use criteria of 2,960, but not the industrial standard of 129,500 mg/kg. Copper concentrations from the remaining surface and subsurface soil samples from the Pre-Fab Area were below the MTCA unrestricted land use criterion. The concentration at PF02-0SS is almost 100 times greater than at any other location in this area.

Because soil with this concentration level would be discolored, and no note of discoloration was made, the copper level may be associated with a small piece of metallic copper that was inappropriately included in the soil sample. Thus, additional sampling is focused on physically inspecting the area of the original sample and resampling to confirm the original concentration level (Figure 2-2).

### 2.3.3 LOG YARD

The Log Yard, approximately 300 feet by 600 feet, is located at the southwest corner of the site and includes both paved and unpaved areas (Figure 2-3). During operations the Log Yard was filled as the mill expanded and was used to store logs prior to processing. Additionally, a section of the paved area (near the concrete retaining wall) was used to temporarily store boiler ash prior to transport and disposal off site. Trucks were loaded by scooping the ash against the wall.

EPA (1998) proposed 16 sampling locations at various depths throughout the Log Yard to evaluate chemical concentrations in more than 40 discrete soil samples. Because the soil in this area was shallow, with underlying large rock fill, soil boring at depths originally planned was difficult, and in many cases not enough surface or subsurface soil was obtained to evaluate at all locations as originally planned (Figure 2-3). The analytical results of the EPA (1998) evaluation are reported in Table 2-4.

Table 2-2 Concentrations of Detected Chemicals (mg/kg) in Soils Collected from the Chlorine Dioxide Generator (Part 1 of 2)

| ANALYTE | CD01-0SS | CD01-2SB | CD02-0SS | CD02-2SB | CD02-4SB | CD02-6SB | CD03-0SS | CD03-3SB | *Unrestricted Land Use* | *Industrial Land Use* |
|---|---|---|---|---|---|---|---|---|---|---|
| 2-Methylnaphthalene | 0.045 | -- | -- | -- | -- | -- | 0.074 | -- | *16000* [h] | *70000* [h] |
| 4,4'-DDE | -- | -- | 0.001 | -- | -- | -- | -- | -- | *2.94* | *386.03* |
| 4,4'-DDT | -- | -- | 0.001 | -- | -- | -- | -- | -- | *2.94* | *386.03* |
| Acenaphthene | 0.066 | -- | -- | -- | -- | -- | -- | -- | *4800* | *210000* |
| Acetone | -- | -- | -- | 0.1 | -- | -- | -- | 0.026 | *8000* | *350000* |
| Aldrin | 0.0042 | 0.00039 | -- | -- | 0.00057 | -- | 0.00041 | 0.00049 | *0.059* | *7.721* |
| alpha-BHC | -- | -- | -- | -- | 0.00031 | 0.00039 | -- | -- | *0.159* | *20.83* |
| Aluminum | 17500 | 11600 | 14000 | 28400 | 24100 | 28800 | 6340 | 16700 | *32581* [b] | -- |
| Anthracene | 0.1 | -- | -- | -- | -- | -- | -- | -- | *24000* | *1050000* |
| Arsenic | 2.42 | 2.3 | 4.2 | 4.5 | 3.3 | 4.8 | 4.7 | 2.6 | *0.67* | *87.5* |
| Barium | 43.5 | 63.3 | 58 | 115 | 75 | 82.6 | 60.9 | 50.3 | *5600* | *245000* |
| Benzo(a)anthracene [g] | 0.067 | -- | -- | -- | -- | -- | -- | 0.031 | -- [g] | -- [g] |
| Benzo(a)pyrene [g] | 0.072 | -- | -- | -- | -- | -- | -- | -- | -- [g] | -- [g] |
| Benzo(b)fluoranthene [g] | 0.096 | -- | 0.091 | -- | -- | -- | -- | 0.077 | -- [g] | -- [g] |
| Benzo(ghi)perylene | -- | -- | 0.044 | -- | -- | -- | -- | -- | -- | -- |
| Benzo(k)fluoranthene [g] | 0.1 | -- | 0.035 | -- | -- | -- | -- | 0.029 | -- [g] | -- [g] |
| Beryllium | 0.467 | 0.19 | 0.27 | 0.46 | 0.43 | 0.47 | 0.1 | 0.25 | *160* | *7000* |
| beta-BHC | 0.0049 | 0.0012 | -- | -- | -- | -- | 0.0012 | 0.0012 | *0.56* | *72.92* |
| Cadmium | 1 | 0.71 | 0.63 | 0.88 | 0.61 | 0.81 | 0.55 | 0.59 | *80* | *3500* |
| Calcium [c] | 47300 | 83200 | 4520 | 5560 | 5670 | 8320 | 8120 | 22200 | -- | -- |
| Carbon disulfide | -- | 0.003 | -- | -- | -- | -- | 0.014 | 0.005 | *8000* | *350000* |
| Chromium | 37.1 | 30.6 | 29 | 47.4 | 43.4 | 50.7 | 25.7 | 31.9 | *240* | *10500* |
| Chrysene [g] | 0.16 | 0.033 | 0.068 | -- | -- | -- | -- | 0.056 | -- [g] | -- [g] |
| Cobalt | 10.5 | 7.4 | 8.4 | 20 | 14.4 | 16.4 | 3.7 | 10 | *1600* [a] | *41000* [a] |
| Copper | 140 | 70.8 | 55.2 | 118 | 69.8 | 73.5 | 32.7 | 62.7 | *2960* | *129500* |
| Dibenzofuran | 0.041 | -- | -- | -- | -- | -- | -- | -- | *310* [i] | *8200* [i] |
| Dimethyl phthalate | -- | -- | -- | -- | -- | -- | -- | 0.057 | *80000* | *3500000* |
| Endosulfan sulfate | -- | -- | 0.00076 | -- | -- | -- | -- | -- | *480* [e] | *21000* [e] |
| Endosulfan-II | 0.0017 | -- | -- | -- | -- | -- | -- | -- | *480* [e] | *21000* [e] |
| Endrin ketone | 0.0095 | 0.00069 | 0.011 | -- | -- | -- | 0.00059 | -- | *23* [f] | *610* [f] |
| Ethylbenzene | -- | -- | -- | -- | -- | -- | 0.003 | -- | *8000* | *350000* |

Table 2-2 Concentrations of Detected Chemicals (mg/kg) in Soils Collected from the Chlorine Dioxide Generator (Part 2 of 2)

| Analyte | CD01-0SS | CD01-2SB | CD02-0SS | CD02-2SB | CD02-4SB | CD02-6SB | CD03-0SS | CD03-3SB | *Unrestricted Land Use* | *Industrial Land Use* |
|---|---|---|---|---|---|---|---|---|---|---|
| Fluoranthene | 0.23 | -- | 0.081 | -- | -- | -- | -- | 0.075 | *3200* | *140000* |
| Fluorene | 0.068 | -- | -- | -- | -- | -- | -- | -- | *3200* | *140000* |
| gamma-BHC | -- | -- | 0.00041 | -- | -- | -- | -- | -- | *0.769* | *100.962* |
| Heptachlor epoxide | 0.0015 | 0.0004 | -- | -- | -- | -- | 0.00045 | 0.00034 | *0.11* | *14.42* |
| Hexachlorobenzene | -- | -- | -- | -- | -- | -- | -- | 0.041 | *0.625* | *82.03* |
| Hexachlorobutadiene | -- | -- | 0.11 | 0.11 | -- | -- | -- | 0.061 | *12.821* | *1682.69* |
| Iron [c] | 27300 | 17000 | 31300 | 33100 | 31600 | 37500 | 28000 | 23000 | -- | -- |
| Lead | 17.9 | 276 | 79.3 | 85.7 | 8 | 5.8 | 42.9 | 21.1 | *400* [d] | *750* [d] |
| Magnesium [c] | 9670 | 9440 | 5910 | 9090 | 9230 | 13300 | 2780 | 6850 | -- | -- |
| Manganese | 496 | 475 | 397 | 372 | 385 | 494 | 139 | 369 | *11200* | *490000* |
| Mercury | 0.06 | 0.07 | 0.15 | 0.14 | 0.07 | 0.06 | 0.11 | -- | *24* | *1050* |
| Naphthalene | -- | -- | -- | -- | -- | -- | 0.07 | -- | *3200* | *140000* |
| Nickel | 31.4 | 36 | 28.2 | 43 | 35 | 54.6 | 11.7 | 35.8 | *1600* | *70000* |
| Phenanthrene | 0.38 | 0.042 | 0.063 | -- | -- | -- | -- | 0.064 | -- | -- |
| Potassium [c] | 880 | 791 | 656 | 1490 | 1100 | 863 | 1100 | 963 | -- | -- |
| Pyrene | 0.22 | -- | -- | -- | -- | -- | -- | 0.065 | *2400* | *105000* |
| Silver | -- | -- | -- | 0.46 | 0.46 | -- | 0.3 | -- | *400* | *17500* |
| Sodium [c] | 534 | 481 | 327 | 758 | 887 | 2890 | 530 | 810 | -- | -- |
| Toluene | -- | -- | -- | 0.002 | -- | -- | 0.001 | -- | *16000* | *700000* |
| Total Carcinogenic PAHs [g] | 0.0999 | 0.00033 | 0.01328 | -- | -- | -- | -- | 0.01426 | *0.137* [g] | *17.979* [g] |
| Vanadium | 71.8 | 45.9 | 53 | 86.9 | 83.9 | 83.6 | 51.6 | 55.5 | *560* | *24500* |
| Xylene (total) | -- | -- | -- | -- | -- | -- | 0.074 | -- | *160000* | *7000000* |
| Zinc | 61.3 | 69.5 | 50.6 | 106 | 60.7 | 83.8 | 18.2 | 49.3 | *24000* | *1050000* |

[a] Cobalt is based on EPA (2002) risk-based criteria.
[b] Based on the upper 90th percentile of background as noted for Puget Sound by Ecology (1994)
[c] Trace nutrients are not considered priority pollutants as organisms have wide ranges of tolerance (EPA 1989)
[d] Lead is based on a preliminary remediation goal developed and promulgated by EPA Region 9 based on the IEUBK model
[e] Value based on endosulfan
[f] Value based on endrin
[g] Total Carcinogenic PAHs are presented as a sum of Benzo(a)pyrene toxicity equivalents (CalEPA 1994 )
[h] Value based on naphthalene
[i] Dibenzofuran is based on EPA (2002) risk-based criteria.

Table 2-3 Concentrations of Detected Chemicals (mg/kg) in Soils Collected from the PreFab Area

| ANALYTE | PF01-0SS | PF01-2SB | PF02-0SS | PF02-2SB | PF03-0SS | PF03-16SB | PF03-2SB | PF03-4SB | PF03-6SB | PF03-8SB | *Unrestricted Land Use* | *Industrial Land Use* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Dioxins/Furans** | | | | | | | | | | | | |
| OCDD | -- | -- | -- | -- | -- | -- | 9.9E-06 | -- | -- | -- | | |
| 2,3,7,8-TCDD (TEQ) | -- | -- | -- | -- | -- | -- | 9.9E-09 | -- | -- | -- | *6.67E-06* | *8.75E-04* |
| **Other Chemicals** | | | | | | | | | | | | |
| 4,4'-DDT | 0.0008 | -- | -- | -- | 0.00047 | -- | -- | -- | 0.00058 | -- | *2.94* | *386.03* |
| Aluminum | 11000 | 16300 | 20900 | 19400 | 16600 | 12300 | 13000 | 19300 | 20100 | 13200 | *32581* [b] | -- |
| Arsenic | 1.4 | 1.8 | 3.1 | 2.7 | 1.6 | 2.3 | 2.6 | 2.6 | 4.1 | 1.6 | *0.67* | *87.5* |
| Barium | 37.2 | 49.9 | 95.1 | 61.9 | 46.3 | 27.9 | 44.1 | 61.1 | 67 | 48.3 | *5600* | *245000* |
| Beryllium | 0.2 | 0.27 | 0.28 | 0.34 | 0.29 | 0.2 | 0.27 | 0.4 | 0.44 | 0.24 | *160* | *7000* |
| bis(2-Ethylhexyl) phthalate | -- | -- | -- | -- | 0.07 | -- | -- | 0.046 | -- | -- | *71.4* | *9375* |
| Cadmium | 0.12 | 0.52 | 0.36 | -- | 0.4 | 0.63 | 0.32 | -- | 0.12 | -- | *80* | *3500* |
| Calcium [c] | 5660 | 5130 | 27900 | 5760 | 4240 | 5210 | 3420 | 4230 | 4930 | 3530 | -- | -- |
| Chromium | 18.6 | 29.8 | 63.8 | 36.2 | 30.7 | 21.3 | 25 | 37.1 | 40.8 | 24.5 | *240* | *1050* |
| Cobalt | 8.7 | 11.7 | 11.7 | 11.3 | 12.4 | 12.1 | 11.4 | 12.7 | 14.9 | 8 | *1600* [a] | *41000* [a] |
| Copper | 30.8 | 148 | 9370 | 165 | 161 | 183 | 103 | 37.5 | 88.7 | 32.5 | *2960* | *129500* |
| Endrin | 0.00044 | 0.0022 | -- | -- | -- | -- | -- | -- | -- | -- | *24* | *1050* |
| Fluoranthene | -- | -- | -- | -- | 0.042 | -- | -- | -- | -- | -- | *3200* | *140000* |
| gamma-Chlordane | -- | -- | 0.00049 | -- | -- | -- | -- | -- | -- | -- | *2.86* [e] | *40* [e] |
| Iron [c] | 14600 | 24400 | 25100 | 29700 | 27100 | 18500 | 18800 | 28600 | 28700 | 16500 | -- | -- |
| Lead | 2.4 | 9.9 | 17.2 | 5.4 | 10 | 5.8 | 5.6 | 4.3 | 5.9 | 3.5 | *400* [d] | *750* [d] |
| Magnesium [c] | 4780 | 7600 | 9650 | 8440 | 8320 | 6360 | 5480 | 7860 | 8650 | 5560 | -- | -- |
| Manganese | 303 | 456 | 1760 | 417 | 486 | 189 | 367 | 401 | 483 | 244 | *11200* | *490000* |
| Mercury | 0.07 | -- | -- | -- | -- | -- | 0.06 | 0.08 | -- | -- | *24* | *1050* |
| Nickel | 19 | 33.5 | 45.8 | 33.6 | 34.1 | 25.8 | 23.7 | 32 | 36.4 | 22 | *1600* | *70000* |
| Potassium [c] | 535 | 653 | 5540 | 898 | 642 | 446 | 476 | 578 | 590 | 546 | -- | -- |
| Pyrene | -- | -- | -- | -- | 0.05 | -- | -- | -- | -- | -- | *2400* | *105000* |
| Silver | 0.22 | 0.23 | 42.3 | 0.7 | 0.3 | 0.2 | 0.67 | 0.29 | 0.3 | -- | *400* | *17500* |
| Sodium [c] | 514 | 446 | 6020 | 644 | 1590 | 332 | 491 | 436 | 436 | 300 | -- | -- |
| Toluene | -- | -- | -- | -- | -- | -- | 0.002 | -- | -- | -- | *16000* | *700000* |
| Vanadium | 38 | 52.7 | 82.7 | 62.7 | 50.5 | 49.1 | 44.3 | 62.7 | 65.4 | 35.5 | *560* | *24500* |
| Zinc | 25.1 | 63.6 | 56.7 | 63.5 | 72.3 | 53.2 | 51.5 | 53.1 | 65.3 | 39.8 | *24000* | *1050000* |

[a] Cobalt is based on EPA (2002) risk-based criteria.
[b] Based on the upper 90th percentile of background as noted for Puget Sound by Ecology (1994)
[c] Trace nutrients are not considered priority pollutants as organisms have wide ranges of tolerance (EPA 1989)
[d] Lead is based on a preliminary remediation goal developed and promulgated by EPA Region 9 based on the IEUBK model
[e] Value based on chlordane

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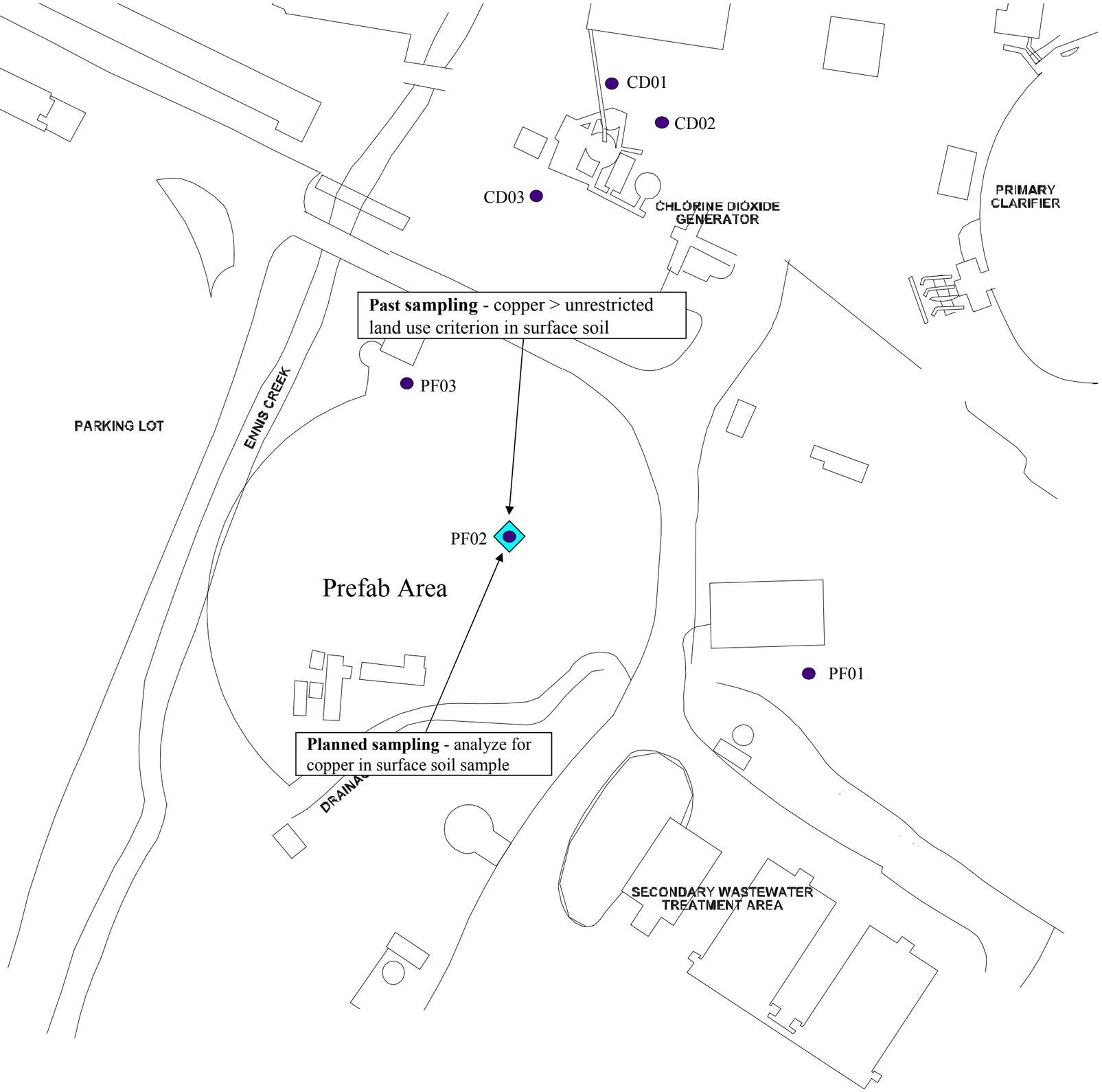
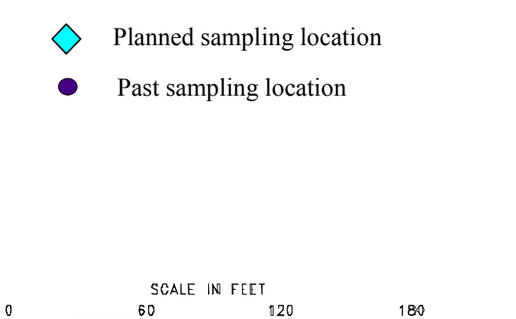
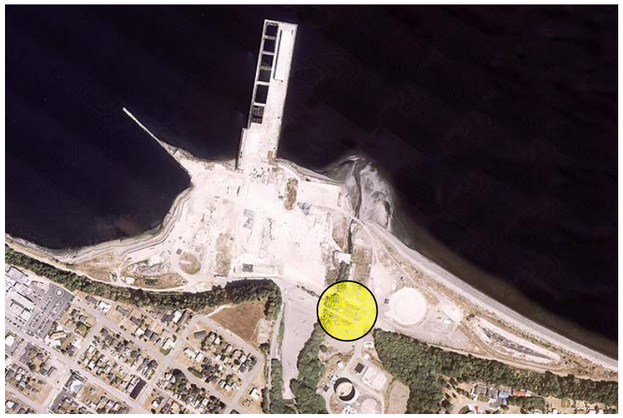


Vicinity Map

**Figure 2-2.** Past and Planned Soil Sampling Locations at the Chlorine Dioxide Generator and Prefab Area.


Past sampling location

Planned sampling location

**Scale in Feet**

0 270

N

Vicinity Map

**Figure 2-3.** Past and Planned Soil Sampling Locations at the Log Yard.

Table 2-4. Concentrations of Detected Chemical (mg/kg) in Soils Collected from the Log Yard Area (Part 1 of 2)

| Analyte | LY07SS-GB01 | LY08SB-GB01 | LY25SB-GB01 | LY17SS-GB02 | LY18SB-GB02 | LY19SS-GB03 | LY20SB-GB03 | LY01SS-GB04 | LY02SB-GB04 | LY05SS-GB05 | LY06SB-GB05 | LY09SS-GB06 | LY11SS-GB07 | LY12SB-GB07 | LY14SB-GB07 | LY27SB-GB07 | LY13SS-GB08 | LY29SB-GB08 | LY02SS-GB09 | LY03SS-GB09 | LY04SB-GB09 | LY10SB-GB10 | LY15SS | LY16SS | PA01-0SS | PA02-0SS | PA03-0SS | PA04-0SS | PA04-2SB | PA04-4SB | *Unrestricted Land Use* | *Industrial Land Use* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Dioxins/Furans** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1,2,3,4,6,7,8-HpCDD | -- | -- | -- | -- | -- | 8.50E-05 | -- | -- | -- | -- | -- | -- | 5.30E-05 | 5.90E-06 | -- | -- | -- | -- | -- | -- | -- | -- | 5.70E-05 | -- | 1.50E-05 | 3.10E-05 | -- | -- | -- | -- | -- | -- |
| 1,2,3,4,6,7,8-HpCDF | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 4.50E-06 | 3.00E-06 | -- | -- | -- | -- | -- | -- | -- | -- | 3.70E-06 | -- | 3.40E-06 | -- | -- | -- | -- | -- | -- | -- |
| 1,2,3,4,7,8-HxCDD | -- | -- | -- | -- | -- | 7.70E-06 | -- | -- | -- | -- | -- | -- | 5.40E-06 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 8.00E-06 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 1,2,3,4,7,8-HxCDF | -- | -- | -- | -- | -- | 2.40E-06 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 1,2,3,6,7,8-HxCDD | -- | -- | -- | -- | -- | 1.70E-05 | -- | -- | -- | -- | -- | -- | 1.00E-05 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1.30E-05 | -- | -- | 5.60E-06 | -- | -- | -- | -- | -- | -- |
| 1,2,3,7,8,9-HxCDD | -- | -- | -- | -- | -- | 1.80E-05 | -- | -- | -- | -- | -- | -- | 1.00E-05 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1.60E-05 | -- | -- | 5.50E-06 | -- | -- | -- | -- | -- | -- |
| 1,2,3,7,8-PeCDD | -- | -- | -- | -- | -- | 5.20E-06 | -- | -- | -- | -- | -- | -- | 4.30E-06 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 5.50E-06 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 2,3,4,7,8-PeCDF | -- | -- | -- | -- | -- | 2.90E-06 | -- | -- | -- | -- | -- | -- | 2.70E-06 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 3.10E-06 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 2,3,7,8-TCDD | -- | -- | -- | -- | -- | 9.20E-07 | -- | -- | -- | -- | -- | -- | 1.00E-06 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 9.70E-07 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 2,3,7,8-TCDF | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 8.70E-07 | -- | -- | -- | -- | -- | -- | -- | -- | 2.90E-06 | -- | 1.70E-06 | -- | -- | -- | -- | -- | -- | -- |
| OCDD | -- | -- | -- | -- | -- | 1.20E-04 | -- | -- | -- | -- | -- | -- | 2.20E-04 | 2.80E-05 | -- | -- | -- | -- | -- | -- | -- | -- | 9.50E-05 | -- | 7.80E-05 | 5.40E-05 | -- | -- | 6.70E-06 | -- | -- | -- |
| OCDF | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1.20E-05 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 8.30E-06 | -- | -- | -- | -- | -- | -- | -- |
| 2,3,7,8-TCDD (TEQ) | -- | -- | -- | -- | -- | 1.05E-05 | -- | -- | -- | -- | -- | -- | 7.85E-06 | 2.04E-07 | -- | -- | -- | -- | -- | -- | -- | -- | 9.96E-06 | -- | 4.40E-07 | 1.47E-06 | -- | -- | 6.70E-09 | -- | *6.67E-06* | *8.75E-04* |
| **Other Chemicals** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2-Butanone | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.006 | -- | -- | -- | -- | -- | 0.007 | -- | -- | 0.014 | -- | -- | -- | -- | -- | -- | -- | -- | -- | *48000* | *2100000* |
| 4,4'-DDD | -- | -- | -- | -- | 0.0007 | -- | -- | 0.0011 | -- | 0.0038 | -- | -- | 0.0005 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | *4.167* | *546.875* |
| 4,4'-DDE | -- | -- | -- | -- | -- | 0.00068 | -- | 0.0016 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | *2.941* | *386.029* |
| 4,4'-DDT | -- | -- | -- | -- | 0.0012 | 0.00097 | 0.0012 | 0.0023 | 0.00073 | -- | 0.0013 | -- | -- | -- | -- | -- | -- | -- | 0.0012 | -- | 0.0012 | -- | -- | -- | -- | -- | -- | -- | -- | -- | *2.941* | *386.029* |
| 4-Methylphenol | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.16 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | *400* | *17500* |
| Acetone | -- | -- | -- | -- | -- | -- | -- | -- | 0.063 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | *8000* | *350000* |
| Aldrin | -- | -- | -- | -- | -- | -- | -- | -- | 0.0014 | -- | -- | -- | -- | 0.0026 | 0.00025 | 0.00076 | -- | -- | -- | -- | -- | -- | 0.00037 | -- | -- | -- | -- | -- | -- | -- | *0.059* | *7.721* |
| alpha-BHC | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | *0.159* | *20.833* |
| Aluminum | 21800 | 10800 | 13000 | 18800 | 19200 | 32300 | 17000 | 19300 | 30700 | 11800 | 16600 | 31400 | 9970 | 14400 | 12900 | 11300 | 11500 | 1360 | -- | 15100 | 16600 | 20800 | 13700 | 9460 | 13600 | 20200 | 21500 | 17300 | 15900 | 15600 | *32581* [b] | -- |
| Anthracene | 0.08 | -- | -- | -- | 0.063 | -- | 0.035 | -- | -- | -- | -- | 0.022 | 0.028 | 0.08 | -- | -- | 0.034 | -- | -- | 0.11 | -- | -- | -- | 0.047 | -- | -- | -- | -- | -- | -- | -- | *24000* | *1050000* |
| Antimony | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | *32* | *1400* |
| Arsenic | 3.4 | -- | -- | 1.4 | 2.7 | 0.96 | -- | 2.7 | -- | -- | 4.7 | -- | 2.6 | 3 | 2.4 | 1.5 | 2.9 | 9.2 | -- | 2.4 | 2.4 | -- | 3.3 | 2.5 | 3 | 1.8 | 1.9 | 4 | 4.4 | 3 | *0.67* | *87.5* |
| Barium | 214 | 55.4 | 31.9 | 26.8 | 46.3 | 30.6 | 27.3 | 133 | 31.9 | 45 | 41.9 | 40.8 | 27.5 | 32.3 | 36.9 | 25.6 | 49.8 | 28.7 | -- | 52.6 | 46.6 | 60.7 | 59.1 | 28.4 | 102 | 37.3 | 27.8 | 49.5 | 53 | 47.4 | *5600* | *245000* |
| Benzo(a)anthracene | 0.087 | -- | -- | -- | 0.088 | -- | 0.042 | -- | -- | -- | -- | 0.044 | 0.051 | -- | -- | -- | 0.052 | -- | -- | -- | -- | -- | -- | 0.063 | -- | -- | -- | -- | -- | -- | -- | *-- [g]* | *-- [g]* |
| Benzo(a)pyrene | 0 | 0.05 | -- | -- | 0.063 | -- | -- | -- | -- | -- | -- | 0.05 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.068 | -- | -- | -- | -- | -- | -- | -- | *-- [g]* | *-- [g]* |
| Benzo(b)fluoranthene | 0.062 | -- | -- | -- | 0.056 | -- | 0.044 | -- | -- | -- | -- | 0.054 | 0.043 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.056 | -- | -- | -- | -- | -- | -- | -- | *-- [g]* | *-- [g]* |
| Benzo(ghi)perylene | 0.089 | -- | -- | -- | -- | 0.046 | -- | -- | -- | -- | -- | 0.087 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Benzo(k)fluoranthene | 0.056 | -- | -- | -- | -- | -- | 0.026 | -- | -- | 0.13 | -- | 0.052 | 0.04 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.044 | -- | -- | -- | -- | -- | -- | -- | *-- [g]* | *-- [g]* |
| Beryllium | 0.25 | 0.14 | 0.2 | 0.26 | 0.24 | 0.34 | 0.24 | 0.19 | 0.33 | 0.16 | 0.24 | 0.39 | 0.12 | 0.2 | 0.21 | 0.18 | 0.19 | -- | -- | 0.23 | 0.27 | 0.36 | 0.25 | 0.14 | 0.19 | 0.29 | 0.25 | 0.28 | 0.27 | 0.26 | *160* | *7000* |
| beta-BHC | -- | -- | -- | -- | -- | -- | 0.0017 | 0.0037 | -- | -- | 0.0011 | -- | -- | 0.0038 | 0.00061 | 0.0016 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | *0.555555556* | *72.91666667* |
| bis(2-Ethylhexyl) phthalate | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.21 | -- | -- | -- | 0.06 | -- | 0.036 | -- | -- | -- | *71.42857143* | *9375* |
| Butyl benzyl phthalate | -- | -- | -- | -- | -- | -- | -- | 0.095 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | *16000* | *700000* |
| Cadmium | 3.7 | 0.42 | -- | 0.69 | -- | 1.3 | -- | 3 | -- | 0.71 | -- | 0.57 | 0.53 | -- | -- | -- | 0.56 | -- | -- | 0.95 | -- | -- | 0.57 | 0.96 | -- | -- | -- | -- | -- | -- | -- | *80* | *3500* |
| Calcium [c] | 43600 | 68100 | 56800 | 16200 | 11100 | 21400 | 14600 | 37000 | 14600 | 20000 | 16900 | 21500 | 44100 | 8820 | 12100 | 4670 | 28500 | 102000 | -- | 11000 | 5100 | 5680 | 9640 | 22000 | 37800 | 6940 | 10100 | 5120 | 4960 | 5040 | -- | -- |
| Chromium | 35.5 | 27.1 | 25.4 | 22.8 | 31.9 | 29.3 | 30.3 | 27.7 | 35.6 | 17.3 | 32.2 | 8.5 | 14.9 | 23.1 | 25.4 | 23 | 18.4 | 13.6 | -- | 31.7 | 28.9 | 36.2 | 26 | 18.1 | 27JK | 34.3 | 19.9 | 32.3 | 31.7 | 29.5 | *240* | *10500* |
| Chrysene | 0.16 | 0.05 | -- | -- | 0.17 | -- | 0.055 | -- | -- | -- | -- | 0.098 | 0.077 | -- | -- | -- | 0.075 | -- | -- | 0.56 | -- | -- | -- | 0.11 | 0.048 | -- | -- | -- | -- | -- | -- | *-- [g]* | *-- [g]* |
| Cobalt | 13.9 | 7.3 | 9.9 | 12.7 | 11.2 | 23.3 | 11.1 | 12.8 | 22.8 | 8.9 | 10.4 | 15.7 | 8.8 | 8.7 | 9.1 | 8.7 | 8.2 | 1 | -- | 10.9 | 9.9 | 16.5 | 10.5 | 7.7 | 12.6 | 14.5 | 13.3 | 11.1 | 10.5 | 10.8 | *1600* [a] | *41000* [a] |
| Copper | 129 | 37.3 | 36.3 | 49 | 43.1 | 101 | 51.4 | 89 | 89.5 | 47.2 | 49.4 | 48.4 | 37.2 | 30.5 | 29.1 | 21.9 | 34.5 | 18.8 | -- | 50 | 35.8 | 70.4 | 32.7 | 41.1 | 89.5 | 65.9 | 79.7 | 48 | 45.1 | 32.2 | *2960* | *129500* |
| Dieldrin | -- | -- | -- | -- | 0.0011 | -- | -- | 0.00094 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | *0.0625* | *8.203125* |
| Diethyl phthalate | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.75 | 0.8 | 0.66 | -- | -- | -- | *64000* | *2800000* |
| Dimethyl phthalate | 0.2 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | *80000* | *3500000* |
| Endosulfan sulfate | 0.0023 | -- | -- | 0.00069 | 0.001 | -- | 0.0015 | 0.0034 | 0.00072 | 0.0065 | 0.0018 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.00071 | -- | -- | -- | -- | -- | -- | -- | *480* [e] | *21000* [e] |

Table 2-4. Concentrations of Detected Chemical (mg/kg) in Soils Collected from the Log Yard Area (Part 2 of 2)

| Analyte | LY07SS-GB01 | LY08SB-GB01 | LY25SB-GB01 | LY17SS-GB02 | LY18SB-GB02 | LY19SS-GB03 | LY20SB-GB03 | LY01SS-GB04 | LY02SB-GB04 | LY05SS-GB05 | LY06SB-GB05 | LY09SS-GB06 | LY11SS-GB07 | LY12SB-GB07 | LY14SB-GB07 | LY27SB-GB07 | LY13SS-GB08 | LY29SB-GB08 | LY02SS-GB09 | LY03SS-GB09 | LY04SB-GB09 | LY10SB-GB10 | LY15SS | LY16SS | PA01-0SS | PA02-0SS | PA03-0SS | PA04-0SS | PA04-2SB | PA04-4SB | *Unrestricted Land Use* | *Industrial Land Use* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Other Chemicals** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Endosulfan-I | -- | -- | -- | 0.00039 | -- | -- | -- | -- | 0.00049 | -- | -- | -- | 0.00028 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | *480* [e] | *21000* [e] |
| Endrin ketone | 0.00088 | -- | -- | -- | 0.0013 | -- | -- | -- | -- | -- | -- | -- | 0.00052 | 0.0087 | 0.0005 | 0.0011 | -- | -- | 0.014 | -- | 0.014 | -- | -- | -- | -- | -- | -- | 0.0094 | -- | 0.0063 | *24* [f] | *1050* [f] |
| Ethylbenzene | -- | -- | -- | -- | -- | -- | -- | 0.004 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | *8000* | *350000* |
| Fluoranthene | 0.34 | 0.085 | -- | -- | 0.11 | -- | 0.13 | 0.16 | 0.046 | -- | -- | 0.1 | 0.09 | -- | -- | -- | 0.16 | -- | -- | 0.44 | -- | -- | -- | 0.16 | -- | -- | -- | -- | -- | -- | *3200* | *140000* |
| gamma-Chlordane | 0.00082 | -- | -- | -- | -- | -- | -- | -- | -- | 0.0011 | -- | -- | 0.00026 | -- | -- | -- | 0.0014 | -- | 0.00082 | -- | 0.00082 | -- | -- | 0.00045 | 0.00041 | 0.00029 | -- | 0.00066 | -- | -- | *2.86* [h] | *400* [h] |
| Heptachlor | -- | -- | 0.0011 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | *0.222* | *29.167* |
| Heptachlor epoxide | -- | -- | -- | -- | 0.0018 | -- | -- | 0.0039 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.0013 | -- | 0.0011 | -- | -- | -- | *0.110* | *14.423* |
| Iron [c] | 27800 | 15200 | 20000 | 28900 | 25800 | 46300 | 25500 | 25000 | 40200 | 17000 | 26200 | 24000 | 16200 | 19200 | 19900 | 18500 | 17200 | 3680 | -- | 25600 | 24200 | 35700 | 21800 | 18700 | 20300 | 30500 | 24500 | 27500 | 25500 | 24800 | -- | -- |
| Lead | 64.2 | 9.1 | 24.7 | 3.6 | 12.3 | 1.7 | 14.4 | 37.8 | 5.3 | 24 | 28 | 8.5 | 19.7 | 144 | 51.6 | 7.5 | 33.2 | 8610 | -- | 65 | 4.8 | 25 | 26.7 | 62.8 | 30 | 9.2 | 3.3 | 5.9 | 5.1 | 4.1 | *400* [d] | *750* [d] |
| Magnesium [c] | 12000 | 7910 | 7420 | 9360 | 9760 | 15600 | 9060 | 9800 | 17500 | 6540 | 9480 | 8480 | 5410 | 6340 | 6200 | 6380 | 6260 | 999 | -- | 8030 | 8310 | 11300 | 6870 | 6590 | 12000 | 10300 | 8390 | 8010 | 7360 | 7220 | -- | -- |
| Manganese | 1770 | 697 | 323 | 411 | 638 | 660 | 353 | 1230 | 546 | 627 | 539 | 602 | 565 | 298 | 302 | 239 | 1320 | 132 | -- | 525 | 402 | 511 | 330 | 347 | 1900 | 506 | 334 | 510 | 408 | 419 | *11200* | *490000* |
| Mercury | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.12 | -- | -- | -- | -- | -- | -- | -- | -- | 0.22 | -- | -- | -- | -- | -- | *24* | *1050* |
| Methylene Chloride | -- | 0.006 | -- | -- | 0.008 | -- | 0.008 | -- | -- | 0.024 | 0.008 | -- | -- | -- | 0.012 | -- | -- | -- | -- | -- | 0.007 | -- | -- | -- | -- | -- | -- | -- | -- | -- | *133.3* | *17500* |
| Naphthalene | 0.07 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | *1600* | *70000* |
| Nickel | 41.3 | 27.9 | 30.5 | 22.2 | 30.6 | 31.8 | 32.3 | 31.7 | 57.5 | 23.4 | 47.8 | 13.4 | 24.1 | 27.9 | 27.6 | 27.3 | 27.9 | 8.9 | -- | 34.6 | 33.6 | 37.9 | 29.5 | 23.2 | 153 | 36.4 | 26.3 | 31.1 | 32.1 | 28.6 | *1600* | *70000* |
| Pentachlorophenol | -- | -- | -- | 0.043 | -- | -- | -- | 0.11 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | *8.333* | *1093.750* |
| Phenanthrene | 0.28 | 0.096 | -- | -- | 0.089 | -- | 0.079 | 0.16 | -- | -- | -- | 0.05 | 0.084 | -- | -- | 0.041 | 0.078 | -- | -- | 0.2 | -- | -- | -- | 0.15 | -- | -- | -- | -- | -- | -- | -- | -- |
| Phenol | -- | 0.096 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | *48000* | *2100000* |
| Potassium [c] | 4720 | 4110 | 1810 | 1020 | 951 | 1320 | 1290 | 3660 | 634 | 1130 | 1240 | 1120 | 777 | 822 | 776 | 461 | 948 | 395 | -- | 1080 | 699 | 794 | 976 | 844 | 799 | 751 | 551 | 924 | 758 | 825 | -- | -- |
| Pyrene | 0.27 | -- | -- | -- | 0.16 | -- | 0.09 | 0.14 | -- | 0.14 | -- | -- | -- | -- | -- | -- | 0.11 | -- | -- | 0.79 | -- | -- | -- | 0.14 | -- | -- | -- | -- | -- | -- | *2400* | *105000* |
| Selenium | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1.2 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | *400* | *17500* |
| Silver | 0.79 | 0.33 | 4.2 | 0.59 | 0.5 | 0.28 | 0.55 | 0.69 | 0.74 | -- | 0.48 | 0.27 | 0.31 | 0.39 | 0.4 | 0.35 | 0.44 | -- | -- | 0.49 | 0.43 | 0.91 | 0.35 | 0.41 | 0.58 | 0.51 | 0.49 | 0.62 | 0.63 | 0.5 | *400* | *17500* |
| Sodium [c] | 4770 | 2210 | 983 | 1400 | 2290 | 1760 | 3140 | 3700 | 5600 | 1680 | 3370 | 3790 | 690 | 1130 | 631 | 422 | 723 | 279 | -- | 1680 | 1580 | 514 | 1240 | 1860 | 1970 | 980 | 2800 | 498 | 495 | 351 | -- | -- |
| Thallium | -- | -- | -- | -- | -- | -- | -- | -- | 0.98 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1.1 | -- | -- | 1.4 | -- | 0.59 | -- | 1.1 | -- | *5.6* | *245* |
| Toluene | -- | -- | -- | -- | -- | 0.009 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.002 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.004 | -- | *16000* | *700000* |
| Total Carcinogenic PAHs [g] | 0.0221 | 0.0505 | -- | -- | 0.0791 | -- | 0.01175 | -- | -- | 0.013 | -- | 0.06598 | 0.01417 | -- | -- | -- | 0.00595 | -- | -- | 0.0056 | -- | -- | -- | 0.0854 | 0.00048 | -- | -- | -- | -- | -- | *0.137* | *17.98* |
| Vanadium | 70.5 | 44.3 | 44.7 | 59.1 | 52.8 | 103 | 58 | 70 | 78.3 | 46.5 | 71.2 | 70.2 | 38.9 | 48.1 | 49.6 | 37.9 | 38.8 | 43.8 | -- | 45.4 | 47.5 | 85.4 | 48.2 | 38.5 | 138 | 60.1 | 53.6 | 52.4 | 47 | 49.1 | *560* | *24500* |
| Xylene (total) | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.002 | -- | *160000* | *7000000* |
| Zinc | 638 | 58.6 | 37.3 | 49.6 | 50.3 | 57.5 | 85.4 | 402 | 54.3 | 69.1 | 83.3 | 37.1 | 58.3 | 39.6 | 44.4 | 36.1 | 83.2 | 28.6 | -- | 153 | 40.6 | 58.8 | 55 | 142 | 57.9 | 47.6 | 33.1 | 49 | 43.5 | 43.7 | *24000* | *1050000* |

[a] Cobalt is based on EPA (2002) risk-based criteria.
[b] Based on the upper 90th percentile of background as noted for Puget Sound by Ecology (1994)
[c] Trace nutrients are not considered priority pollutants as organisms have wide ranges of tolerance (EPA 1989)
[d] Lead is based on a preliminary remediation goal developed and promulgated by EPA Region 9 based on the PBYK model
[e] Value based on endosulfan
[f] Value based on endrin
[g] Total Carcinogenic PAHs are presented as a sum of Benzo(a)pyrene toxicity equivalents (CalEPA 1994)
[h] Value based on chlordane

Lead was detected at levels above the screening criteria. Lead was found in subsurface soil (2 to 4 foot depth) at one station (GB08) at a concentration of 8,610 mg/kg. The lead concentration in the surface soil sample (0 to 2 foot depth) from station GB08 was 33.2 mg/kg, which was below the screening criteria. Subsurface samples at depths greater than 4 feet presumably could not be collected. Also, lead concentrations in surface and subsurface soil samples collected from station surrounding GB08 were below the screening criteria. The lead level in the subsurface soil sample at GB08 may be associated with a small piece of metallic lead that was inappropriately included in the soil sample. The subsurface soil at station GB08 will be resampled to confirm the original lead concentration level (Figure 2-3).

Concentrations of dioxins/furans (TEQs) were above the MTCA unrestricted land use criterion in surface soil at three locations: GB03 (1.05e-5 mg/kg or 0.0000105 mg/kg), LY15SS (9.96e-6 mg/kg), and GB07 (7.85e-6 mg/kg) (Figure 2-3). None of these levels are above the industrial screening level of 8.75e-4 mg/kg. Because the higher concentrations were detected in surface soils at stations where pavement was not present, the dioxin source is likely particulate deposition from air emission sources, stack emissions, and fugitive dust associated with past ash handling activities. Therefore, additional characterization of dioxins/furans in the Log Yard is likely to result in the same levels and patterns demonstrated by the EPA (1998) data set.

A new soil sample, LY20 (Figure 2-3), will be collected on the far west end of the area and analyzed for dioxins/furans to bound the area's western portion. Another sample (LY21) will be collected southeast of GB03, the sampling location with the highest dioxin levels. This bounds the unpaved soils area on the south. Two samples, one at the 0- to 3-inch depth, and one 3 inches to groundwater, will be collected and analyzed for dioxins/furans from LY20 and LY21. Sampling at these depth intervals focuses sampling where the greatest chemical concentrations are expected to occur (i.e., the surface layer at 0- to 3-inches) and a depth sufficient to define the vertical extent of contamination. Groundwater is expected to be encountered at depths less than six feet across most of the industrialized portion of the site (see Section 2.2.5 of the Work Plan [Volume I]).

Samples will also be collected at locations LY22 and LY23 (Figure 2-3) to further characterize the extent of dioxins/furans in the vicinity of stations GB07, GB03, and LY15. Soil samples will be collected at the 0- to 3-inch and 3 inches to groundwater depths.

Two samples are planned to improve the spatial coverage of the area. The two samples, designated LY24 and LY25 are illustrated in Figure 2-3. At each station a surface soil sample will be collected from 0 to 3 inches, and a subsurface soil sample collected from 3 inches to groundwater. Chemical analytes at these stations are based on those associated with ash handling activities and include inorganics, dioxins/furans, and PAHs. Inorganics and PAHs will also be evaluated in soil samples from LY21 to improve the spatial coverage in this area.

### 2.3.4 WOOD MILL

No previous samples were collected from the Wood Mill; therefore, two locations are identified for sampling, as shown in Figure 2-4. Soil samples will be collected from 0 to 3 inches and 3 inches to groundwater; however, subsurface sampling may not be possible due to the cobbles and boulders present in this area. Samples will be analyzed for PCBs, PAHs, dioxins/furans, and inorganic chemicals.

### 2.3.5 ROLL STORAGE AREA

EPA did not collect samples from the Roll Storage Area during the ESI (E&E 1998). Therefore, two locations will be sampled, as shown in Figure 2-5. Soil samples will be collected from 0 to 3 inches and 3 inches to groundwater and for SVOCs, Pest/ PCBs, and inorganic chemicals. In addition, dioxins/furans will be analyzed in the surface and subsurface soil samples from station RS20 to determine the concentrations from stack emissions in the area.

### 2.3.6 SPENT SULFITE LIQUOR LAGOON

During the mill's operations, SSL was produced during the pulping process and either recovered for reuse or recycled as a fuel to power the plant operations. As part of the recovery process, SSL was temporarily pumped to and stored in the SSL Lagoon prior to burning in the recovery boiler. The SSL Lagoon was constructed in 1974 with a 1 to 2 foot, 10-5 centimeters per second (cm/sec) permeability clay liner, and later a 60-mil high density polyethylene (HDPE) floating cover. EPA (E&E 1998) did not sample this area, but Rayonier conducted a sampling event at this location in 1997. Samples were collected from the clay liner, the berm, and the residual material in the SSL Lagoon. The results of this sampling event are reported in Table 2-5. No chemicals were detected above MTCA industrial cleanup levels and only arsenic was detected at levels above the MTCA unrestricted land use soil criteria. However, the detected arsenic concentrations were below the regional soil background level of 7.30 mg/kg (Ecology 1994).

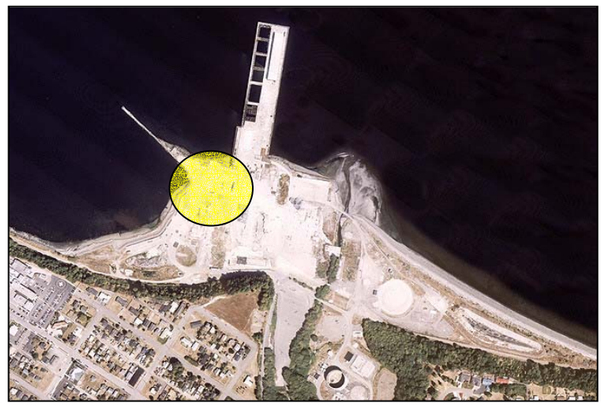
The material in the SSL Lagoon was removed during 2001 to the Mt. Pleasant landfill as part of the landfill closure activities (see Section 3.1.1.5 of the Work Plan [Volume I]). The area of excavation is shown in Figure 2-6. The clay liner and associated stained soil located above the groundwater table were excavated and the excavation was backfilled and compacted with soil from the berm. Areas of discolored soil were noted on the floor of the excavation before it was back-filled. Soil samples will be collected from station SSL22 in the SSL Lagoon (Figure 2-6) from the surface and just above the groundwater and analyzed for metals, PAHs, and dioxins/furans. The subsurface soil sample will be used to characterize the quality of the soil not removed during the excavation. Additionally, the pipeline that transferred SSL to the lagoon may have leaked and will be sampled as shown in Figure 2-6. Two subsurface soil samples will be collected from 3 inches to groundwater and analyzed for inorganics and PAHs. In addition, surface soil quality in this area has not been sufficiently characterized for the presence of dioxins/furans. Surface soil samples will be collected from the 0- to 3-inch depth from station SSL20 and SSL21 and analyzed for dioxins/furans.


Planned sampling location

**Scale in Feet**

0 270

N



Vicinity Map

**Figure 2-4.** Planned Soil Sampling Locations at the Wood Mill.


Vicinity Map

**Figure 2-5.** Planned Soil Sampling Locations in Roll Storage Area.

Table 2-5. Concentrations of Detected Chemicals (mg/kg) in Material Collected from the SSL Lagoon

| ANALYTE | SSL-1 | SSL-2 | SSL-4 | SSL-5 | SSL-6 | SSL-12 | SSL-1 | SSL-2 | SSL-4 | SSL-5 | SSL-6 | SSL-12 | SSL-BG | SSL-SG-01 | *Unrestricted Land Use* | *Industrial Land Use* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | LINER | | | | | | SUBGRADE | | | | | | MPL | SLUDGE | | |
| **Dioxins/Furans** | | | | | | | | | | | | | | | | |
| 1,2,3,4,6,7,8-HpCDD | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 5.00E-06 | 4.10E-05 | | |
| 1,2,3,4,6,7,8-HpCDF | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1.00E-05 | | |
| 1,2,3,6,7,8-HxCDD | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 4.60E-06 | | |
| 2,3,7,8-TCDF | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1.20E-06 | | |
| OCDD | -- | 7.50E-06 | 5.80E-06 | -- | -- | -- | 5.10E-06 | 8.30E-06 | -- | -- | -- | -- | 2.80E-05 | 2.50E-04 | | |
| OCDF | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1.90E-05 | | |
| 2,3,7,8-TCDD (TEQ) | -- | 7.50E-09 | 5.80E-09 | -- | -- | -- | 5.10E-09 | 8.30E-09 | -- | -- | -- | -- | 7.80E-08 | 1.36E-06 | *6.67E-06* | *8.75E-04* |
| **Other Chemicals** | | | | | | | | | | | | | | | | |
| 3- and 4-methylphenol (Coelution) | -- | 10 | -- | 12 | -- | -- | -- | 4.9 | -- | 6.5 | -- | -- | -- | -- | *400* | *17500* |
| Aluminum | -- | 18800 | -- | 18700 | -- | -- | -- | 22900 | -- | 15300 | -- | -- | -- | 764 | *32581* [b] | -- |
| Arsenic | -- | 3 | -- | 4 | -- | -- | -- | 5 | -- | 4 | -- | -- | -- | -- | *0.67* | *87.5* |
| Barium | -- | 75 | -- | 70 | -- | -- | -- | 96 | -- | 67 | -- | -- | -- | 140 | *5600* | *22400* |
| Calcium [c] | -- | 3180 | -- | 3260 | -- | -- | -- | 5100 | -- | 2260 | -- | -- | -- | 902 | -- | -- |
| Chromium | -- | 33 | -- | 42 | -- | -- | -- | 92 | -- | 37 | -- | -- | -- | 4 | *240* | *10500* |
| Cobalt | -- | 9 | -- | 16 | -- | -- | -- | 23 | -- | 12 | -- | -- | -- | -- | *4700* | |
| Copper | -- | 28 | -- | 33 | -- | -- | -- | 46 | -- | 24 | -- | -- | -- | 118 | *2960* | *129500* |
| Di-n-octyl phthalate | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 16.2 | *1600* | *70000* |
| Iron [c] | -- | 19100 | -- | 36600 | -- | -- | -- | 45500 | -- | 23800 | -- | -- | -- | 1340 | -- | -- |
| Lead | -- | 5 | -- | 5 | -- | -- | -- | 9 | -- | 5 | -- | -- | -- | -- | *400* [a] | *750* [a] |
| Magnesium [c] | -- | 4840 | -- | 6600 | -- | -- | -- | 13400 | -- | 5330 | -- | -- | -- | 555 | -- | -- |
| Manganese | -- | 178 | -- | 349 | -- | -- | -- | 570 | -- | 392 | -- | -- | -- | 55 | *11200* | *490000* |
| Nickel | -- | 33 | -- | 44 | -- | -- | -- | 82 | -- | 33 | -- | -- | -- | -- | *1600* | *70000* |
| Potassium [c] | -- | 857 | -- | 860 | -- | -- | -- | 741 | -- | 593 | -- | -- | -- | -- | -- | -- |
| Sodium [c] | -- | 214 | -- | 208 | -- | -- | -- | 315 | -- | 150 | -- | -- | -- | 267 | -- | -- |
| Vanadium | -- | 44 | -- | 68 | -- | -- | -- | 98 | -- | 56 | -- | -- | -- | 8 | *560* | *24500* |
| Zinc | -- | 44 | -- | 50 | -- | -- | -- | 79 | -- | 39 | -- | -- | -- | 2 | *24000* | *1050000* |

[a] Lead is based on a preliminary remediation goal developed and promulgated by EPA Region 9 based on the IEUBK model
[b] Based on the upper 90th percentile of background as noted for Puget Sound by Ecology (1994)
[c] Trace nutrients are not considered priority pollutants as organisms have wide ranges of tolerance (EPA 1989)

### 2.3.7 MAIN PROCESS AREA

To characterize contamination in the Main Process Area, EPA (E&E 1998) collected soil samples from 54 locations beneath and adjacent to 13 buildings. At locations accessible to soil boring equipment, samples were collected at various depths in 2-foot intervals.

Because several of the buildings were constructed on wood pilings and the soil beneath them was exposed, surface soil samples were collected from 0 to 3 inches bgs using a stainless steel spoon and bowl.

Chemicals above MTCA unrestricted land use criteria in the Main Process Area were dioxins/furans, arsenic, cadmium, lead, PCP, Aroclor 1260, thallium, and carcinogenic PAHs (expressed as benzo(a)pyrene equivalents). Only three chemicals (arsenic, lead and dioxins/furans) exceeded MTCA industrial criteria (Table 2-6).

The sampling design discussed in this report and subsequent data analyses are based on the assumption that this property will remain zoned and used under an industrial setting.

Arsenic was found in subsurface soil at one location (RB01-0SS) to exceed industrial criteria (Figure 2-7). Arsenic exceeded 90th percentile background concentrations (7.3 mg/kg) at 18 locations and was above the state reported maximum background at 11 locations. Further sampling will confirm and delineate the areas of arsenic where concentrations appear elevated. Sample location RB01 will be resampled to confirm the previous concentrations detected in the surface soil (0 to 3 inches) and to delineate the vertical extent of the arsenic in subsurface soil. Two additional samples (RB20 and RB21) will be collected to bound RB01 in the north and south. These locations will be analyzed for arsenic in the surface soil and subsurface soil (3 inches to groundwater). Laboratory analyses will be performed in a phased approach on soil samples from the Main Process Area. The first phase will evaluate total arsenic levels in all eight samples. If the average arsenic level within a depth contour is greater than the MTCA industrial cleanup levels, the bioavailability of the arsenic will be evaluated according to the methods outlined by Ruby et al. (1996).

Lead was found at three locations (AP03, DB02, and MR03) at concentrations greater than the industrial criteria (Figure 2-8). Further sampling will confirm and delineate areas where lead concentrations appear elevated. Sample locations AP03, DB02, and MR03 will be resampled to confirm the previous concentrations detected in the surface soil (0 to 3 inches) and to delineate the vertical extent of the lead in subsurface soil. Two additional samples (AP20 and SR23) will be collected to bound AP03 and DB02 in the west and east. One additional sample (MR20) will be collected to bound MR03 to the west. These locations will be analyzed for lead in the surface soil and subsurface soil (3 inches to groundwater). A phased approach will be used to delineate lead concentrations at these sample locations. The surface soil samples from AP03, DB02, and MR03 will be analyzed to confirm the presence of elevated lead concentrations in these locations. If the reanalysis shows elevated lead concentrations, appropriate subsurface and bounding samples will be analyzed.

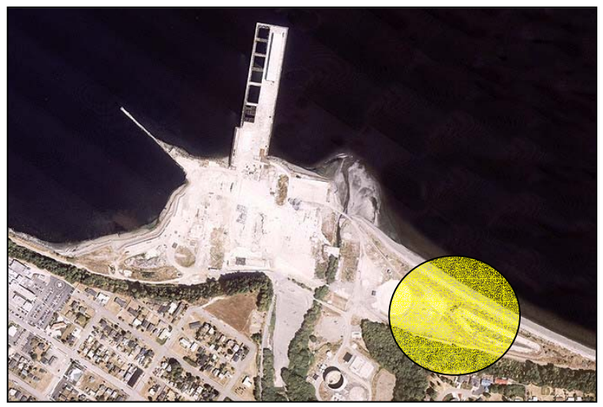

Approximate area of excavation

Planned sampling location

**Scale in Feet**

0 450

N



Vicinity Map

**Figure 2-6.** Area of Excavation and Planned Soil Sampling Locations for the SSL Lagoon and Pipeline.

Table 2-6. Concentrations of Detected Chemicals (mg/kg) in Soils from the Main Process Area

Part 1 of 4

| Analyte | AP01SS | AP02SS | AP03SS | AP04SS | BL01SS | BL02SS | BL03SS | BP01SS | BP02SS | BP03SS | BP04SS | BS01-SS | BS02-SS | DB01SS | DB02SS | FR01SS | FR02SS | FR03SS | FR04SS | FR05SS | FR06SS | FR07SS | FR08SS | FR09SS | FR10SS | FR11SS | LB01-0SS | LB02-0SS | *Unrestricted Land Use* | *Industrial Land Use* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Dioxins/Furans** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1,2,3,4,6,7,8-HpCDD | -- | 5.50E-03 | 1.20E-02 | -- | -- | -- | 3.70E-04 | -- | -- | -- | 1.40E-02 | -- | -- | -- | -- | -- | 1.20E-01 | -- | -- | -- | 5.20E-02 | -- | -- | -- | 4.70E-04 | 3.90E-03 | -- | -- | | |
| 1,2,3,4,6,7,8-HpCDF | -- | 4.90E-04 | 1.30E-03 | -- | -- | -- | 4.60E-05 | -- | -- | -- | 2.20E-03 | -- | -- | -- | -- | -- | 1.30E-02 | -- | -- | -- | 8.10E-03 | -- | -- | -- | 8.70E-05 | 4.00E-04 | -- | -- | | |
| 1,2,3,4,7,8,9-HpCDF | -- | 4.70E-05 | 1.20E-04 | -- | -- | -- | 5.20E-06 | -- | -- | -- | 1.10E-04 | -- | -- | -- | -- | -- | 1.50E-03 | -- | -- | -- | 6.40E-04 | -- | -- | -- | 8.00E-06 | 2.70E-05 | -- | -- | | |
| 1,2,3,4,7,8-HxCDD | -- | 2.90E-04 | 1.50E-04 | -- | -- | -- | 1.00E-05 | -- | -- | -- | 2.40E-04 | -- | -- | -- | -- | -- | 1.40E-03 | -- | -- | -- | 5.00E-04 | -- | -- | -- | 4.00E-06 | 1.00E-04 | -- | -- | | |
| 1,2,3,4,7,8-HxCDF | -- | 1.20E-04 | 7.50E-05 | -- | -- | -- | 3.40E-05 | -- | -- | -- | 1.60E-04 | -- | -- | -- | -- | -- | 5.70E-04 | -- | -- | -- | 6.90E-04 | -- | -- | -- | 1.10E-05 | 6.80E-05 | -- | -- | | |
| 1,2,3,6,7,8-HxCDD | -- | 5.30E-04 | 4.60E-04 | -- | -- | -- | 3.60E-05 | -- | -- | -- | 1.10E-03 | -- | -- | -- | -- | -- | 3.50E-03 | -- | -- | -- | 1.90E-03 | -- | -- | -- | 1.90E-05 | 3.00E-04 | -- | -- | | |
| 1,2,3,6,7,8-HxCDF | -- | 7.80E-05 | 7.10E-05 | -- | -- | -- | 5.90E-06 | -- | -- | -- | 1.10E-04 | -- | -- | -- | -- | -- | 3.30E-04 | -- | -- | -- | 2.70E-04 | -- | -- | -- | 3.00E-06 | 3.10E-05 | -- | -- | | |
| 1,2,3,7,8,9-HxCDD | -- | 5.50E-04 | 3.00E-04 | -- | -- | -- | 3.30E-05 | -- | -- | -- | 5.10E-04 | -- | -- | -- | -- | -- | 2.80E-03 | -- | -- | -- | 9.80E-04 | -- | -- | -- | 1.20E-05 | 1.90E-04 | -- | -- | | |
| 1,2,3,7,8,9-HxCDF | -- | 7.90E-06 | 4.00E-06 | -- | -- | -- | -- | -- | -- | -- | 7.70E-06 | -- | -- | -- | -- | -- | 1.40E-05 | -- | -- | -- | 2.70E-05 | -- | -- | -- | -- | 3.90E-06 | -- | -- | | |
| 1,2,3,7,8-PeCDD | -- | 2.30E-04 | 8.40E-05 | -- | -- | -- | 6.80E-06 | -- | -- | -- | 1.30E-04 | -- | -- | -- | -- | -- | 5.80E-04 | -- | -- | -- | 1.60E-04 | -- | -- | -- | 4.60E-06 | 7.30E-05 | -- | -- | | |
| 1,2,3,7,8-PeCDF | -- | 8.80E-05 | 3.60E-05 | -- | -- | -- | 1.20E-05 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 2.60E-06 | -- | -- | -- | | |
| 2,3,4,6,7,8-HxCDF | -- | 4.40E-05 | 3.30E-05 | -- | -- | -- | 5.50E-06 | -- | -- | -- | 8.60E-05 | -- | -- | -- | -- | -- | 1.80E-04 | -- | -- | -- | 1.30E-04 | -- | -- | -- | -- | 2.00E-05 | -- | -- | | |
| 2,3,4,7,8-PeCDF | -- | 1.20E-04 | 4.30E-05 | -- | -- | -- | 2.10E-05 | -- | -- | -- | 7.80E-05 | -- | -- | -- | -- | -- | 1.90E-04 | -- | -- | -- | 2.50E-04 | -- | -- | -- | 4.50E-06 | 5.30E-05 | -- | -- | | |
| 2,3,7,8-TCDD | -- | 2.60E-05 | 1.30E-05 | -- | -- | -- | 1.90E-06 | -- | -- | -- | 1.50E-05 | -- | -- | -- | -- | -- | 7.40E-05 | -- | -- | -- | 1.50E-05 | -- | -- | -- | 1.10E-06 | 1.50E-05 | -- | -- | | |
| 2,3,7,8-TCDF | -- | 7.60E-05 | 3.20E-05 | -- | -- | -- | 6.40E-05 | -- | -- | -- | 5.70E-05 | -- | -- | -- | -- | -- | 1.40E-04 | -- | -- | -- | 1.00E-04 | -- | -- | -- | 4.70E-06 | 4.60E-05 | -- | -- | | |
| OCDD | -- | 2.70E-02 | 8.10E-02 | -- | -- | -- | 1.70E-03 | -- | -- | -- | 6.70E-02 | -- | -- | -- | -- | -- | 2.50E-01 | -- | -- | -- | 1.50E-01 | -- | -- | -- | 4.10E-03 | 2.50E-02 | -- | -- | | |
| OCDF | -- | 1.30E-03 | 8.00E-03 | -- | -- | -- | 5.90E-05 | -- | -- | -- | 3.70E-03 | -- | -- | -- | -- | -- | 6.80E-02 | -- | -- | -- | 3.50E-02 | -- | -- | -- | 5.30E-04 | 7.90E-04 | -- | -- | | |
| 2,3,7,8-TCDD (TEQ) | -- | 4.64E-04 | 4.14E-04 | -- | -- | -- | 4.12E-05 | -- | -- | -- | 5.80E-04 | -- | -- | -- | -- | -- | 3.02E-03 | -- | -- | -- | 1.47E-03 | -- | -- | -- | 2.14E-05 | 2.23E-04 | -- | -- | *6.67E-06* | *8.75E-04* |
| **Other Chemicals** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2,4-Dichlorophenol | -- | 0.095 | -- | 0.19 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | *240* | *10500* |
| 2-Butanone | -- | -- | -- | -- | -- | 0.021 | -- | -- | 2.2 | 3.1 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.005 | 0.011 | -- | -- | -- | -- | *48000* | *2100000* |
| 2-Methylnaphthalene | 0.12 | 0.29 | -- | 0.13 | -- | -- | -- | -- | -- | -- | -- | -- | 0.056 | -- | -- | -- | -- | -- | 0.17 | -- | 0.16 | 0.079 | -- | -- | 0.16 | 0.21 | -- | -- | *16000* [h] | *70000* [h] |
| 4,4'-DDD | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | *4.167* | *546.875* |
| 4,4'-DDE | -- | -- | -- | 0.0028 | 0.012 | -- | 0.0051 | -- | -- | 0.0055 | 0.0006 | -- | -- | 0.0048 | 0.0026 | 0.001 | 0.009 | -- | 0.00057 | -- | 0.0055 | 0.0034 | 0.00081 | 0.0065 | -- | -- | -- | -- | *2.941* | *386.029* |
| 4,4'-DDT | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.014 | 0.0017 | -- | -- | 0.0058 | 0.0025 | -- | 0.019 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.00078 | -- | *2.941* | *386.029* |
| 4-Methylphenol | -- | -- | -- | -- | -- | 0.088 | -- | -- | 2.1 | 0.47 | -- | -- | -- | -- | -- | -- | 0.68 | -- | 0.16 | -- | -- | -- | -- | -- | -- | -- | -- | -- | *400* | *17500* |
| 4-Nitrophenol | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | *630* [i] | *16000* [i] |
| Acenaphthene | 0.12 | 0.81 | 0.075 | 0.21 | -- | 0.07 | -- | -- | -- | -- | -- | -- | 0.41 | -- | -- | -- | -- | -- | 0.15 | -- | 0.082 | 0.047 | -- | -- | 1 | -- | -- | -- | *4800* | *210000* |
| Acenaphthylene | -- | 0.15 | 0.098 | 0.067 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.088 | -- | 0.085 | -- | -- | -- | 0.12 | -- | -- | -- | | |
| Acetone | -- | -- | -- | -- | -- | -- | -- | 0.096 | 10 | 3.9 | -- | -- | -- | 1 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.47 | -- | -- | *8000* | *350000* |
| Aldrin | -- | -- | 0.0047 | 0.022 | -- | -- | -- | -- | -- | -- | -- | -- | 0.00098 | -- | 0.0031 | -- | -- | 0.001 | -- | -- | -- | -- | 0.00045 | 0.003 | -- | -- | -- | -- | *0.059* | *7.721* |
| alpha-BHC | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.00037 | -- | -- | -- | -- | -- | -- | -- | -- | *0.159* | *20.833* |
| alpha-Chlordane | -- | -- | -- | -- | 0.0081 | -- | 0.00074 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | *2.86* [a] | *375* [a] |
| Aluminum | 7990 | 14900 | 20900 | 13700 | 7660 | 9730 | 12400 | 1160 | 3100 | 1470 | 16400 | 9640 | 10900 | 703 | 9600 | 13600 | 9580 | 11800 | 11900 | 14100 | 10800 | 15300 | 15500 | 4270 | 8990 | 20700 | 20100 | 21000 | *32581* [b] | |
| Anthracene | 0.2 | 1.3 | 0.28 | 0.5 | 0.052 | 0.078 | -- | -- | 0.33 | -- | -- | -- | 0.21 | -- | 0.11 | -- | 0.29 | 0.034 | 0.33 | 0.033 | 3.3 | 0.043 | -- | -- | 1.4 | 0.44 | -- | -- | *24000* | *1050000* |
| Antimony | -- | 27.5 | 20.4 | 23.1 | -- | 1.7 | 1 | -- | -- | -- | -- | -- | -- | -- | 32.2 | -- | -- | -- | -- | -- | -- | -- | 1 | -- | -- | 2.5 | -- | -- | *32* | *1400* |
| Aroclor 1260 | -- | -- | -- | -- | 0.6 | 0.29 | 1.1 | -- | -- | -- | -- | -- | -- | -- | -- | 0.12 | -- | 0.047 | 0.17 | 0.41 | 2.2 | 0.13 | 0.65 | 0.46 | 0.053 | 1.4 | -- | -- | *0.5* [c] | *66* [c] |
| Arsenic | 51.4 | 70.1 | 149 | 126 | 42.5 | 16.2 | 1.6 | -- | -- | -- | -- | -- | -- | 4.8 | 115.5 | 3 | 16.4 | 2.4 | 8.1 | 7.6 | 3.6 | 5.2 | 5.3 | 33.2 | 2.4 | 3.3 | 6 | 2.1 | *0.67* | *87.5* |
| Barium | 518 | 340 | 450 | 309 | 35.9 | 30.3 | 40.7 | 63.8 | 27.5 | 24.8 | 85.9 | 30.1 | 32.1 | 67.7 | 221 | 34.4 | 673 | 23.6 | 46.5 | 49.2 | 70.6 | 22.9 | 19.9 | 40.7 | 36.7 | 78.1 | 40.7 | 83.3 | *5600* | *245000* |
| Benzo(a)anthracene | 0.49 | 6.5 | 0.95 | 1.4 | 0.16 | 0.27 | -- | -- | 0.5 | -- | -- | -- | 0.14 | -- | 0.37 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 6.4 | 0.21 | -- | -- | -- [g] | -- [g] |
| Benzo(a)pyrene | 0.38 | 3.3 | 0.73 | 1 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.081 | 0.32 | -- | -- | -- | -- | -- | -- | 0.042 | -- | -- | -- | -- | -- | -- | -- [g] | -- [g] |
| Benzo(b)fluoranthene | 0.62 | -- | -- | -- | -- | -- | -- | -- | 0.52 | -- | -- | -- | 0.06 | 0.081 | 0.58 | 0.039 | -- | -- | -- | 0.067 | -- | 0.064 | -- | -- | -- | 0.17 | -- | -- | -- [g] | -- [g] |
| Benzo(ghi)perylene | -- | -- | 0.059 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.074 | -- | -- | 0.45 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Benzo(k)fluoranthene | 0.25 | 8.3 | 1.9 | 2.3 | -- | -- | -- | 0.044 | 0.28 | -- | -- | -- | 0.03 | 0.039 | 0.25 | -- | -- | -- | -- | 0.039 | -- | 0.025 | -- | -- | 8.3 | -- | -- | -- | -- [g] | -- [g] |
| Beryllium | 0.12 | 0.35 | 0.42 | 0.27 | 0.09 | 0.16 | 0.2 | 0.04 | -- | -- | 0.33 | 0.17 | 0.21 | -- | 0.1 | 0.18 | 0.14 | 0.16 | 0.15 | 0.16 | 0.12 | 0.23 | 0.23 | 0.21 | 0.16 | 0.26 | 0.32 | 0.39 | *160* | *7000* |
| beta-BHC | 0.091 | 0.047 | 0.014 | 0.076 | -- | 0.23 | 0.001 | -- | -- | -- | -- | 0.00028 | 0.0038 | -- | 0.012 | -- | -- | 0.0041 | 0.025 | -- | 0.048 | 0.02 | 0.0021 | 0.029 | -- | -- | -- | -- | *0.556* | *72.917* |
| bis(2-Ethylhexyl) phthalate | 1.4 | 1 | 2.5 | 0.66 | 0.12 | 0.095 | 0.077 | -- | -- | 0.32 | 0.17 | -- | -- | 13 | 0.93 | 0.15 | 4.6 | -- | -- | 0.07 | -- | 0.17 | -- | -- | 0.75 | 0.55 | -- | 0.053 | *71.43* | *9375* |
| Butyl benzyl phthalate | -- | -- | 0.1 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | *16000* | *700000* |
| Cadmium | -- | 3.1 | 3.6 | 3 | 0.17 | -- | 0.08 | -- | -- | 0.46 | 0.16 | 0.67 | 0.68 | 0.73 | 2.1 | -- | -- | -- | 0.11 | 0.41 | 1 | -- | -- | -- | -- | -- | -- | -- | *80* | *3500* |
| Calcium [f] | 11000 | 62300 | 51800 | 40800 | 3780 | 7010 | 4540 | 1250 | 4590 | 2390 | 9940 | 3330 | 3840 | 2840 | 5950 | 4800 | 6040 | 4720 | 3820 | 3580 | 4000 | 5020 | 5180 | 2300 | 3410 | 4410 | 6610 | 6700 | -- | -- |
| Carbazole | 0.12 | 1 | 0.18 | 0.32 | -- | -- | -- | -- | -- | -- | -- | -- | 0.061 | -- | 0.068 | -- | -- | -- | 0.14 | -- | 0.3 | 0.038 | -- | -- | 1.3 | 0.2 | -- | -- | *50* | *6562.5* |
| Carbon disulfide | -- | -- | -- | -- | -- | -- | -- | 0.002 | -- | 0.046 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | *8000* | *350000* |

Table 2-6. Concentrations of Detected Chemicals (mg/kg) in Soils from the Main Process Area

Part 2 of 4

| Analyte | AP01SS | AP02SS | AP03SS | AP04SS | BL01SS | BL02SS | BL03SS | BP01SS | BP02SS | BP03SS | BP04SS | BS01-SS | BS02-SS | DB01SS | DB02SS | FR01SS | FR02SS | FR03SS | FR04SS | FR05SS | FR06SS | FR07SS | FR08SS | FR09SS | FR10SS | FR11SS | LB01-0SS | LB02-0SS | *Unrestricted Land Use* | *Industrial Land Use* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Other Chemicals** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Chloroform | -- | -- | -- | -- | -- | -- | -- | -- | 0.065 | 0.011 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | *163.9* | *21516.4* |
| Chromium | 69.8 | 86.5 | 176 | 153 | 104 | 116 | 32.1 | 7.9 | 40.6 | -- | 90.7 | 20.4 | 22.9 | 102 | 357 | 28.9 | 124 | 24.5 | 99.9 | 69.6 | 49.8 | 35.2 | 38.3 | 83.6 | 26.5 | 54.6 | 42.5 | 39.7 | *240* | *10500* |
| Chrysene | 0.69 | 3.7 | 1.2 | 1.9 | 0.24 | 0.26 | -- | 0.064 | 1 | -- | -- | -- | 0.12 | 0.075 | 0.58 | -- | 0.36 | -- | -- | 0.16 | -- | 0.12 | -- | -- | 2.9 | 0.36 | -- | -- | *-- [g]* | *-- [g]* |
| Cobalt | 8.2 | 21.5 | 30.9 | 20.9 | 4 | 19.8 | 9.3 | 1.4 | 6.3 | 3 | 13.9 | 7.3 | 7.7 | 1.8 | 21.3 | 8.4 | 10.9 | 7.3 | 9.3 | 7.3 | 10.7 | 11.3 | 10.5 | 39.7 | 7.1 | 7 | 14.8 | 16.5 | *4700 [i]* | -- |
| Copper | 510 | 1590 | 1530 | 1110 | 154 | 211 | 157 | 1120 | 171 | 177 | 140 | 25.2 | 37.9 | 514 | 789 | 52.3 | 447 | 71.4 | 446 | 177 | 78.4 | 39.7 | 68.8 | 356 | 68.9 | 134 | 47.7 | 67.5 | *2960* | *129500* |
| delta-BHC | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.0028 | -- | -- | -- | -- | -- | -- | 0.002 | -- | -- | -- | -- | -- | -- | -- | *--* | *--* |
| Dibenzo(a,h)anthracene | -- | 0.62 | -- | 0.14 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.52 | -- | -- | -- | *-- [g]* | *-- [g]* |
| Dibenzofuran | -- | 0.37 | 0.057 | 0.12 | -- | -- | -- | -- | -- | -- | -- | -- | 0.32 | -- | -- | -- | 0.087 | -- | 0.14 | -- | 0.16 | 0.078 | -- | -- | 0.39 | -- | -- | -- | *310 [l]* | *8200 [l]* |
| Dieldrin | -- | -- | -- | -- | 0.017 | -- | -- | -- | -- | -- | 0.0021 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.044 | -- | -- | -- | -- | 0.028 | 0.00039 | -- | *0.063* | *8.203* |
| Diethyl phthalate | -- | -- | -- | -- | 0.8 | 2.7 | 1.2 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 2.5 | 1.7 | 4.3 | -- | 2.1 | -- | -- | *64000* | *2800000* |
| Dimethyl phthalate | 0.16 | 0.1 | 0.1 | 0.51 | 0.24 | 0.16 | -- | 0.12 | -- | -- | 0.074 | -- | -- | -- | -- | 0.11 | 1.1 | -- | 0.2 | -- | -- | 0.28 | -- | -- | 0.14 | 0.24 | -- | -- | *80000* | *3500000* |
| Di-n-butyl phthalate | -- | -- | 0.082 | 0.066 | 0.18 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.084 | -- | -- | -- | -- | -- | -- | -- | -- | -- | *8000* | *350000* |
| Di-n-octyl phthalate | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.048 | -- | -- | -- | *1600* | *70000* |
| Endosulfan sulfate | -- | -- | 0.00088 | 0.016 | -- | -- | 0.014 | -- | -- | -- | -- | -- | -- | -- | 0.0021 | -- | 0.011 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | *480 [d]* | *21000 [d]* |
| Endosulfan-I | 0.0065 | 0.0018 | -- | 0.0033 | -- | 0.0019 | -- | -- | -- | -- | 0.00038 | -- | -- | -- | 0.0011 | -- | -- | -- | 0.0012 | -- | -- | -- | -- | 0.0043 | -- | -- | -- | -- | *480 [d]* | *21000 [d]* |
| Endosulfan-II | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | *480 [d]* | *21000 [d]* |
| Endrin | -- | -- | -- | 0.0052 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | *24* | *1050* |
| Endrin aldehyde | -- | -- | -- | -- | 0.032 | -- | -- | -- | -- | -- | -- | -- | -- | 0.0034 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | *24 [e]* | *1050 [e]* |
| Endrin ketone | -- | 0.021 | 0.0042 | 0.018 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.0045 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | *24 [e]* | *1050 [e]* |
| Fluoranthene | 1.1 | 5.9 | 1.7 | 2.4 | 0.33 | 0.46 | 0.049 | 0.13 | 2.3 | 0.44 | 0.17 | -- | 0.81 | 0.14 | 0.67 | 0.078 | 1.1 | 0.13 | 1.5 | 0.49 | 0.63 | 0.3 | -- | -- | 8 | 0.44 | -- | -- | *3200* | *140000* |
| Fluorene | 0.14 | 0.81 | 0.097 | 0.26 | -- | -- | -- | -- | 0.35 | -- | -- | -- | 0.49 | -- | -- | -- | -- | -- | 0.18 | -- | 0.09 | 0.044 | -- | -- | 0.82 | 0.13 | -- | -- | *3200* | *140000* |
| gamma-BHC | 0.043 | -- | -- | -- | -- | 0.002 | -- | -- | -- | -- | -- | -- | -- | -- | 0.00082 | -- | -- | -- | -- | 0.0018 | -- | -- | -- | -- | -- | -- | -- | -- | *0.769* | *100.962* |
| gamma-Chlordane | -- | -- | -- | -- | 0.0063 | -- | -- | -- | -- | -- | -- | -- | -- | 0.0018 | 0.00096 | 0.00098 | -- | -- | 0.0023 | 0.0021 | 0.01 | -- | 0.0027 | 0.009 | -- | 0.0063 | -- | -- | *2.86 [a]* | *375 [a]* |
| Heptachlor | 0.03 | -- | -- | 0.00054 | -- | -- | -- | 0.0077 | 0.0095 | 0.027 | -- | -- | -- | -- | -- | -- | 0.015 | -- | -- | -- | -- | -- | 0.00036 | -- | -- | -- | -- | -- | *0.222* | *29.167* |
| Heptachlor epoxide | -- | 0.0097 | 0.003 | -- | -- | 0.021 | 0.00078 | -- | 0.0048 | 0.037 | -- | -- | -- | 0.0026 | 0.0036 | 0.0011 | 0.015 | -- | -- | -- | 0.0087 | 0.0024 | -- | -- | -- | -- | -- | -- | *0.110* | *14.423* |
| Indeno(1,2,3-cd)pyrene | 0.21 | 0.35 | 0.11 | 0.12 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.29 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.37 | -- | -- | -- | *-- [g]* | *-- [g]* |
| Iron [f] | 36500 | 144000 | 123000 | 126000 | 14100 | 50400 | 25700 | 1390 | 6430 | 4440 | 52600 | 16500 | 18000 | 17000 | 69400 | 25600 | 61900 | 17300 | 16800 | 21000 | 36000 | 34300 | 37400 | 217000 | 14200 | 21700 | 31800 | 30600 | *--* | *--* |
| Isophorone | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | *1053* | *138158* |
| Lead | 323 | 283 | 7310 | 411 | 119 | 65.4 | 110 | 33.8 | 30.7 | 42.3 | 60.2 | 3.4 | 2.7 | 96.7 | 2060 | 83.1 | 296 | 21.9 | 178 | 123 | 365 | 22.4 | 13.6 | 48.1 | 43.2 | 92.2 | 7.4 | 4.1 | *400 [k]* | *750 [k]* |
| Magnesium [f] | 4330 | 6100 | 11600 | 7500 | 2780 | 5230 | 7090 | -- | -- | -- | 9550 | 5120 | 5660 | 470 | 12300 | 7450 | 5220 | 6710 | 7060 | 6280 | 6310 | 8450 | 8070 | 1560 | 4570 | 6970 | 10100 | 10200 | *--* | *--* |
| Manganese | 268 | 693 | 1200 | 929 | 135 | 303 | 216 | 13.7 | 93.6 | 41.8 | 553 | 277 | 289 | 102 | 446 | 273 | 539 | 187 | 183 | 182 | 241 | 338 | 290 | 1410 | 165 | 242 | 296 | 446 | *11200* | *490000* |
| Mercury | 0.26 | 0.14 | 0.07 | 0.09 | 0.11 | -- | 2.8 | -- | -- | -- | -- | -- | -- | 1 | 0.09 | 0.13 | 6.6 | 0.28 | 0.53 | 0.54 | 0.13 | 0.1 | -- | -- | 0.16 | -- | 0.23 | -- | *24* | *1050* |
| Methoxychlor | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | *400* | *17500* |
| Methylene Chloride | -- | -- | -- | -- | -- | -- | -- | -- | 1.5 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | *133* | *17500* |
| Naphthalene | 0.11 | 0.28 | -- | 0.097 | -- | 0.1 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.087 | 0.048 | 0.2 | -- | 0.2 | 0.081 | -- | -- | 2.4 | -- | -- | -- | *1600* | *70000* |
| Nickel | 39.2 | 61.5 | 87.3 | 93.1 | 44.1 | 106 | 34.4 | -- | -- | -- | 91.2 | 28 | 27.6 | 38.1 | 109 | 31.3 | 89.8 | 28.5 | 61.5 | 37.1 | 35.2 | 37.4 | 33.5 | 147 | 19.6 | 38.9 | 41.9 | 42.3 | *1600* | *70000* |
| Pentachlorophenol | 0.065 | 0.57 | 5.3 | 1.7 | -- | -- | -- | -- | 4.3 | -- | -- | -- | -- | -- | 0.46 | -- | 7.1 | -- | -- | 0.092 | 26 | 0.54 | -- | -- | -- | -- | -- | -- | *8.33* | *1093.75* |
| Phenanthrene | 0.96 | 7.5 | 1.2 | 2.5 | 0.24 | 0.51 | -- | 0.12 | 1.6 | 0.35 | 0.11 | -- | 1.3 | 0.13 | 0.47 | 0.092 | 1.3 | 0.12 | 1.3 | 0.43 | 0.76 | 0.38 | -- | -- | 7.2 | 0.58 | -- | -- | *--* | *--* |
| Phenol | -- | 0.4 | -- | 0.53 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | *48000* | *2100000* |
| Potassium [f] | 764 | 3070 | 2930 | 2380 | 650 | 406 | 440 | 321 | -- | -- | 1140 | 536 | 528 | 364 | 1120 | 773 | 910 | 550 | 541 | 599 | 551 | 813 | 738 | 411 | 534 | 1120 | 941 | 1100 | *--* | *--* |
| Pyrene | 1 | 8.6 | 2 | 2.9 | -- | -- | -- | 0.096 | 1.4 | 0.39 | 0.15 | -- | 0.54 | 0.13 | 0.58 | 0.058 | 0.78 | 0.087 | 0.94 | 0.4 | 960 | 0.12 | -- | -- | 9 | 0.49 | -- | -- | *2400* | *105000* |
| Selenium | 1.8 | 5.4 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1.8 | -- | -- | -- | -- | -- | 1.2 | 2 | -- | -- | -- | -- | -- | -- | -- | *400* | *17500* |
| Silver | 2.3 | 7.4 | 6.5 | 6.6 | 0.38 | 1.4 | 0.57 | 0.51 | -- | 1.1 | 2.2 | 0.44 | 0.55 | 1.2 | 4.7 | 0.6 | 2.1 | 1.9 | 0.45 | 1.4 | 2.3 | 0.8 | 0.64 | 0.86 | 0.38 | 0.66 | 0.58 | 0.65 | *400* | *17500* |
| Sodium [f] | 246 | 604 | 756 | 555 | 468 | 307 | 505 | 329 | -- | -- | 934 | 238 | 272 | 337 | 432 | 1040 | 717 | 1460 | 1080 | 203 | 569 | 1240 | 721 | 316 | 555 | 321 | 1050 | 1300 | *--* | *--* |
| Thallium | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 4.6 | -- | -- | -- | -- | *5.6* | *245* |
| Total Carcinogenic PAHs [g] | 0.5439 | 5.1 | 1.038 | 1.457 | 0.0184 | 0.0296 | -- | 0.00504 | 0.14 | -- | -- | -- | 0.0242 | 0.09375 | 0.4748 | 0.0039 | 0.0036 | -- | -- | 0.0122 | -- | 0.0521 | -- | -- | 1.744 | 0.0416 | -- | -- | *0.137* | *17.979* |
| Toluene | -- | -- | -- | -- | 0.001 | 0.008 | -- | -- | -- | 3.5 | -- | -- | -- | -- | -- | -- | -- | -- | 0.002 | -- | 0.003 | 0.009 | -- | -- | -- | 0.005 | -- | -- | *16000* | *700000* |
| Vanadium | 61.5 | 63.2 | 99.7 | 129 | 26.1 | 62 | 43.3 | 6.9 | 25.5 | 15.8 | 59.3 | 32.2 | 34.9 | 9.5 | 70.6 | 49.4 | 107 | 42.8 | 61.8 | 64.8 | 56.2 | 58.8 | 53.6 | 13.2 | 33.1 | 47.2 | 80 | 70.7 | *560* | *24500* |
| Xylene (total) | -- | -- | -- | -- | 0.003 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | *160000* | *7000000* |
| Zinc | 462 | 2940 | 2740 | 1590 | 245 | 112 | 250 | 9.3 | 105 | 89 | 616 | 59.7 | 40.6 | 142 | 1450 | 159 | 421 | 41.1 | 266 | 109 | 210 | 324 | 125 | 4310 | 71 | 237 | 72.3 | 111 | *24000* | *1050000* |

Table 2-6. Concentrations of Detected Chemicals (mg/kg) in Soils from the Main Process Area

Part 3 of 4

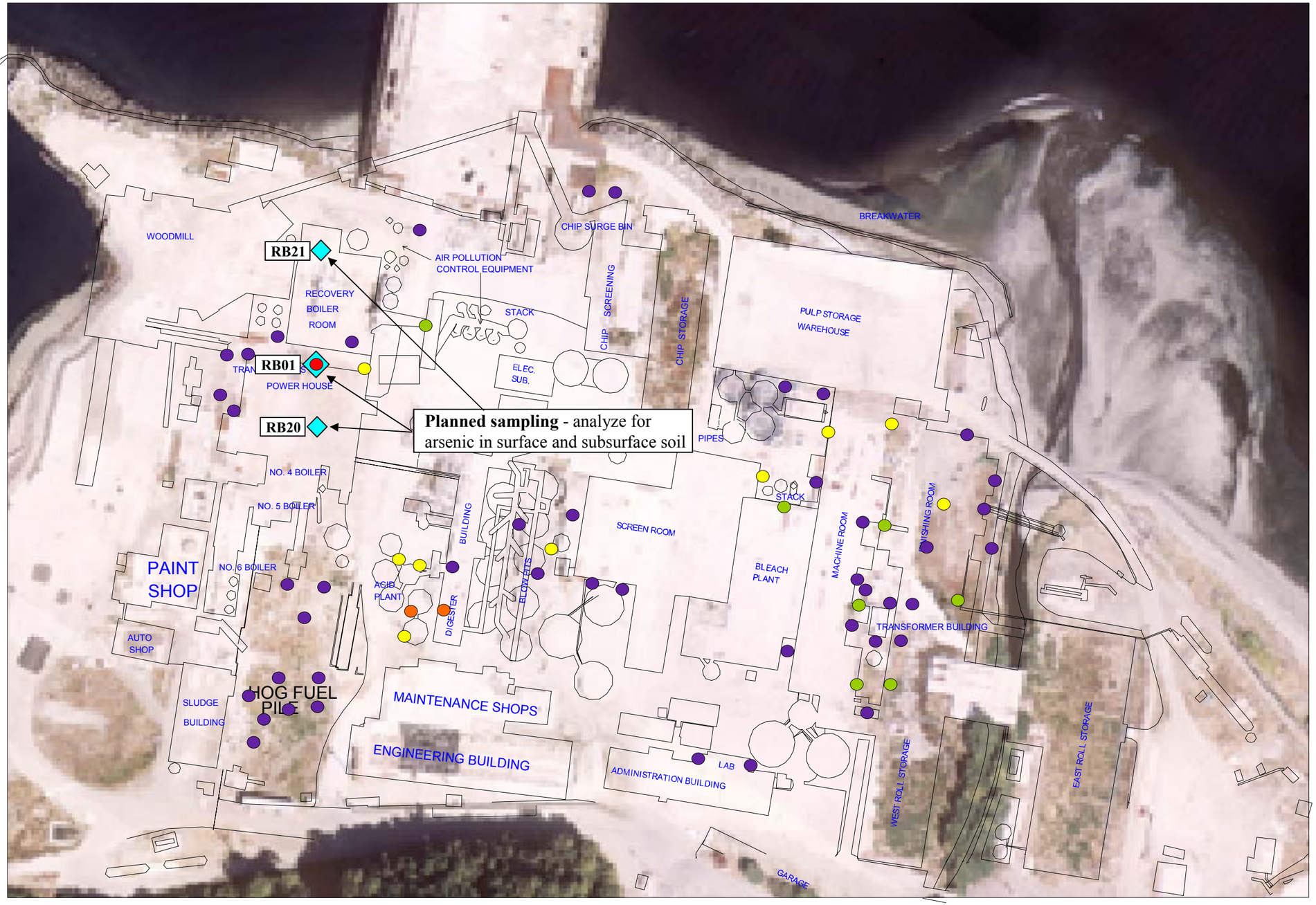
| Analyte | LYT01-SS | LYT02-SS | MR01SS | MR02SS | MR03SS | MR04SS | MR05SS | MR06SS | MR07SS | MR08SS | MR09SS | MR10SS | MR11SS | MR12SS | PC01SS | PC02SS | RB01SS | RB02SS | RB03-0SS | RB03-8SB | RB04-0SS | RB04-4SB | RB04-8SB | SR01-SS | SR02-SS | SR03-SS | SR04-SS | TB01SS | TB02SS | *Unrestricted Land Use* | *Industrial Land Use* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Dioxins/Furans** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1,2,3,4,6,7,8-HpCDD | -- | -- | -- | -- | -- | -- | -- | 1.90E-03 | -- | -- | 5.40E-03 | -- | 2.30E-03 | -- | -- | -- | 3.50E-03 | 5.90E-03 | -- | -- | 3.40E-04 | 9.40E-06 | -- | -- | -- | 7.40E-02 | -- | -- | -- | | |
| 1,2,3,4,6,7,8-HpCDF | -- | -- | -- | -- | -- | -- | -- | 2.10E-04 | -- | -- | 6.60E-04 | -- | 2.10E-03 | -- | -- | -- | 6.10E-04 | 9.40E-04 | -- | -- | 1.30E-04 | 2.90E-06 | -- | -- | -- | 6.90E-03 | -- | -- | -- | | |
| 1,2,3,4,7,8,9-HpCDF | -- | -- | -- | -- | -- | -- | -- | 2.00E-05 | -- | -- | 4.70E-05 | -- | 8.50E-05 | -- | -- | -- | 6.90E-05 | 9.00E-05 | -- | -- | 8.10E-06 | -- | -- | -- | -- | 9.00E-04 | -- | -- | -- | | |
| 1,2,3,4,7,8-HxCDD | -- | -- | -- | -- | -- | -- | -- | 1.80E-05 | -- | -- | 3.00E-05 | -- | 4.40E-05 | -- | -- | -- | 5.60E-05 | 8.60E-05 | -- | -- | 3.30E-06 | -- | -- | -- | -- | 4.10E-04 | -- | -- | -- | | |
| 1,2,3,4,7,8-HxCDF | -- | -- | -- | -- | -- | -- | -- | 2.40E-05 | -- | -- | 7.70E-05 | -- | 1.90E-04 | -- | -- | -- | 1.00E-04 | 1.40E-04 | -- | -- | 1.10E-05 | -- | -- | -- | -- | 3.40E-04 | -- | -- | -- | | |
| 1,2,3,6,7,8-HxCDD | -- | -- | -- | -- | -- | -- | -- | 6.10E-05 | -- | -- | 1.80E-04 | -- | 1.30E-04 | -- | -- | -- | 1.90E-04 | 3.00E-04 | -- | -- | 1.40E-05 | -- | -- | -- | -- | 2.60E-03 | -- | -- | -- | | |
| 1,2,3,6,7,8-HxCDF | -- | -- | -- | -- | -- | -- | -- | 1.20E-05 | -- | -- | 3.40E-05 | -- | 7.40E-05 | -- | -- | -- | 5.00E-05 | 5.00E-05 | -- | -- | 4.30E-06 | -- | -- | -- | -- | 1.30E-04 | -- | -- | -- | | |
| 1,2,3,7,8,9-HxCDD | -- | -- | -- | -- | -- | -- | -- | 3.40E-05 | -- | -- | 7.50E-05 | -- | 9.50E-05 | -- | -- | -- | 1.20E-04 | 2.10E-04 | -- | -- | 7.50E-06 | -- | -- | -- | -- | 8.30E-04 | -- | -- | -- | | |
| 1,2,3,7,8,9-HxCDF | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 3.90E-06 | -- | -- | -- | -- | -- | 5.80E-06 | 5.70E-06 | -- | -- | -- | -- | -- | -- | -- | 9.00E-06 | -- | -- | -- | | |
| 1,2,3,7,8-PeCDD | -- | -- | -- | -- | -- | -- | -- | 9.90E-06 | -- | -- | 1.10E-05 | -- | 2.40E-05 | -- | -- | -- | 4.40E-05 | 4.60E-05 | -- | -- | -- | -- | -- | -- | -- | 1.20E-04 | -- | -- | -- | | |
| 1,2,3,7,8-PeCDF | -- | -- | -- | -- | -- | -- | -- | 8.30E-06 | -- | -- | 2.30E-05 | -- | 1.20E-05 | -- | -- | -- | 4.00E-05 | -- | -- | -- | 3.20E-06 | -- | -- | -- | -- | 3.90E-05 | -- | -- | -- | | |
| 2,3,4,6,7,8-HxCDF | -- | -- | -- | -- | -- | -- | -- | 4.50E-06 | -- | -- | 1.70E-05 | -- | 3.00E-05 | -- | -- | -- | 3.10E-05 | 3.20E-05 | -- | -- | 3.30E-06 | -- | -- | -- | -- | 9.80E-05 | -- | -- | -- | | |
| 2,3,4,7,8-PeCDF | -- | -- | -- | -- | -- | -- | -- | 1.00E-05 | -- | -- | 2.70E-05 | -- | 2.00E-05 | -- | -- | -- | 6.80E-05 | 3.30E-05 | -- | -- | 4.80E-06 | -- | -- | -- | -- | 3.90E-05 | -- | -- | -- | | |
| 2,3,7,8-TCDD | -- | -- | -- | -- | -- | -- | -- | 1.90E-06 | -- | -- | 2.00E-06 | -- | 2.90E-06 | -- | -- | -- | 5.90E-06 | 5.30E-06 | -- | -- | -- | -- | -- | -- | -- | 1.20E-05 | -- | -- | -- | | |
| 2,3,7,8-TCDF | -- | -- | -- | -- | -- | -- | -- | 2.80E-05 | -- | -- | 1.70E-05 | -- | 1.10E-05 | -- | -- | -- | 3.00E-05 | 1.40E-05 | -- | -- | 3.90E-06 | -- | -- | -- | -- | 2.00E-05 | -- | -- | -- | | |
| OCDD | -- | -- | -- | -- | -- | -- | -- | 2.70E-02 | -- | -- | 5.40E-02 | -- | 2.00E-02 | -- | -- | -- | 2.60E-02 | 4.80E-02 | -- | -- | 4.10E-03 | 7.90E-05 | 1.00E-05 | -- | -- | 5.30E-01 | -- | -- | -- | | |
| OCDF | -- | -- | -- | -- | -- | -- | -- | 1.30E-03 | -- | -- | 1.90E-03 | -- | 2.30E-03 | -- | -- | -- | 1.70E-03 | 2.20E-03 | -- | -- | 8.60E-04 | 1.40E-05 | -- | -- | -- | 2.70E-02 | -- | -- | -- | | |
| 2,3,7,8-TCDD (TEQ) | -- | -- | -- | -- | -- | -- | -- | 8.00E-05 | -- | -- | 1.83E-04 | -- | 1.50E-04 | -- | -- | -- | 1.92E-04 | 2.48E-04 | -- | -- | 1.70E-05 | 2.16E-07 | 1.00E-08 | -- | -- | 1.91E-03 | -- | -- | -- | *6.67E-06* | *8.75E-04* |
| **Other Chemicals** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2,4-Dichlorophenol | -- | -- | 0.82 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | *240* | *10500* |
| 2-Butanone | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.004 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.009 | -- | 0.007 | -- | -- | *48000* | *2100000* |
| 2-Methylnaphthalene | -- | -- | 0.55 | -- | 0.11 | -- | -- | -- | 0.17 | -- | -- | -- | -- | -- | -- | -- | 0.78 | -- | -- | -- | -- | -- | -- | -- | -- | 0.099 | -- | -- | 0.16 | *16000* [h] | *70000* [h] |
| 4,4'-DDD | -- | -- | -- | -- | -- | -- | 0.00037 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | *4.167* | *546.875* |
| 4,4'-DDE | -- | -- | 0.008 | 0.0052 | 0.016 | 0.011 | -- | -- | 0.034 | -- | 0.0089 | 0.0016 | 0.0024 | 0.0052 | -- | 0.0021 | -- | -- | -- | -- | 0.00044 | 0.00044 | -- | 0.00084 | -- | 0.0085 | -- | 0.00097 | -- | *2.941* | *386.029* |
| 4,4'-DDT | -- | -- | -- | -- | -- | -- | 0.0011 | -- | -- | 0.016 | -- | -- | -- | -- | -- | -- | 0.014 | 0.003 | 0.0014 | -- | -- | 0.0028 | -- | 0.004 | -- | 0.033 | 0.0038 | -- | -- | *2.941* | *386.029* |
| 4-Methylphenol | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.08 | 0.07 | 0.15 | -- | 0.044 | *400* | *17500* |
| 4-Nitrophenol | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.11 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | *630* [i] | *16000* [i] |
| Acenaphthene | -- | -- | 1.3 | -- | 0.12 | -- | -- | 0.19 | 0.11 | -- | -- | -- | 0.063 | -- | -- | -- | 0.8 | -- | -- | -- | -- | -- | -- | -- | -- | 0.3 | -- | -- | 0.13 | *4800* | *210000* |
| Acenaphthylene | -- | -- | 0.19 | -- | 0.19 | -- | -- | -- | 0.064 | 0.11 | -- | -- | -- | -- | -- | -- | 0.27 | -- | -- | -- | -- | -- | -- | -- | -- | 0.11 | -- | -- | 0.3 | | |
| Acetone | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.074 | -- | *8000* | *350000* |
| Aldrin | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.00058 | 0.0029 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | *0.059* | *7.721* |
| alpha-BHC | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | *0.159* | *20.833* |
| alpha-Chlordane | -- | -- | -- | 0.013 | -- | 0.0034 | -- | -- | 0.0039 | -- | 0.0014 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.001 | -- | *2.86* [a] | *375* [a] |
| Aluminum | -- | -- | 11300 | 11900 | 10200 | 10300 | 16300 | 16400 | 13100 | 8670 | 9940 | 12500 | 9680 | 9240 | 3170 | 1310 | 4790 | 3340 | 18200 | 9250 | 12400 | 6720 | 11500 | 9960 | 7920 | 3810 | 9060 | 13700 | 18100 | *32581* [b] | |
| Anthracene | -- | -- | 1.6 | 0.097 | 0.4 | -- | -- | 0.23 | 1.2 | 0.083 | 0.048 | -- | 0.1 | -- | -- | -- | 1.2 | 0.046 | -- | -- | 0.042 | -- | -- | 0.028 | 0.065 | 0.48 | 0.16 | 0.078 | 6.1 | *24000* | *1050000* |
| Antimony | -- | -- | 94 | -- | -- | -- | -- | -- | -- | 9.6 | 1 | -- | 2.8 | -- | -- | -- | 46.5 | -- | -- | -- | 2.2 | -- | -- | -- | -- | 3.8 | -- | -- | -- | *32* | *1400* |
| Aroclor 1260 | -- | -- | 2.8 | 1.1 | 4.8 | 3.1 | -- | -- | 1.1 | -- | 0.88 | 0.075 | 0.36 | 0.81 | -- | -- | -- | -- | -- | -- | 0.39 | -- | -- | -- | -- | -- | -- | 0.43 | 0.19 | *0.5* [c] | *66* [c] |
| Arsenic | -- | -- | 6.5 | 3.9 | 13.8 | 7 | 2.7 | 5.1 | 23.9 | 34 | 5.5 | 5 | 10.8 | 3.1 | 10.1 | -- | 250 | 18.9 | 3.3 | 2.2 | 4.5 | 1.5 | -- | 2.8 | 1.7 | 21.2 | 1.5 | 4 | 3.3 | *0.67* | *87.5* |
| Barium | -- | -- | 431 | 36.8 | 115 | 91.4 | 48.5 | 138 | 168 | 90.8 | 56.2 | 54.5 | 153 | 35.4 | 273 | 20.4 | 169 | 65.8 | 107 | 14.2 | 77.3 | 28.4 | 21 | 29 | 26.7 | 56.3 | 24.7 | 40 | 45.9 | *5600* | *245000* |
| Benzo(a)anthracene | -- | -- | 2.2 | -- | 0.82 | -- | 0.093 | 0.27 | 0.39 | 0.41 | 0.16 | 0.057 | -- | -- | -- | -- | 3.5 | 0.23 | -- | -- | 0.057 | -- | -- | 0.076 | 0.18 | 1.1 | 0.25 | 0.16 | -- | -- [g] | -- [g] |
| Benzo(a)pyrene | -- | -- | 1.3 | -- | -- | -- | -- | -- | 0.31 | -- | 0.13 | 0.038 | -- | -- | -- | -- | 2.4 | 0.19 | -- | -- | -- | -- | -- | 0.064 | 0.11 | 0.75 | 0.19 | 0.097 | -- | -- [g] | -- [g] |
| Benzo(b)fluoranthene | -- | -- | 1.5 | -- | -- | -- | -- | -- | 0.32 | -- | 0.27 | 0.099 | -- | -- | -- | -- | 2.2 | 0.23 | -- | -- | 0.055 | -- | -- | 0.073 | 0.15 | 1.3 | 0.33 | -- | -- | -- [g] | -- [g] |
| Benzo(ghi)perylene | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.13 | -- | -- | -- | -- | -- | -- | 0.14 | -- | -- | -- | -- | -- | 0.056 | 0.062 | -- | -- | -- | -- | -- | -- |
| Benzo(k)fluoranthene | -- | -- | 1.7 | -- | -- | -- | -- | -- | 0.39 | -- | 0.1 | 0.046 | -- | -- | -- | -- | 3.8 | 0.24 | -- | -- | 0.022 | -- | -- | 0.055 | 0.082 | 0.56 | 0.16 | 0.23 | -- | -- [g] | -- [g] |
| Beryllium | -- | -- | 0.15 | 0.18 | 0.08 | 0.12 | 0.24 | 0.26 | 0.25 | 0.13 | 0.12 | 0.19 | 0.11 | 0.15 | -- | -- | -- | -- | 0.28 | 0.17 | 0.16 | 0.12 | 0.19 | 0.13 | 0.13 | -- | 0.15 | 0.18 | 0.24 | *160* | *7000* |
| beta-BHC | -- | 0.0096 | -- | 0.026 | -- | -- | 0.0065 | 0.015 | 0.051 | -- | -- | 0.0048 | 0.038 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.0048 | *0.556* | *72.917* |
| bis(2-Ethylhexyl) phthalate | -- | -- | 8.3 | -- | 2.6 | -- | -- | -- | 0.75 | 0.69 | 0.74 | 0.17 | -- | -- | 0.64 | -- | 0.64 | 0.081 | 0.078 | -- | 0.053 | -- | -- | 0.13 | -- | 0.71 | 0.67 | -- | -- | *71.43* | *9375* |
| Butyl benzyl phthalate | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | *16000* | *700000* |
| Cadmium | -- | -- | 140 | -- | 7.5 | -- | -- | -- | 3.5 | -- | 0.68 | -- | -- | 0.44 | -- | -- | -- | -- | -- | 0.63 | -- | 0.5 | 0.74 | 1.1 | 0.89 | -- | 0.75 | -- | -- | *80* | *3500* |
| Calcium [f] | -- | -- | 5970 | 3990 | 3910 | 15500 | 5180 | 5450 | 4690 | 4240 | 2800 | 4560 | 6630 | 4290 | 133000 | 768 | 4980 | 11600 | 22700 | 5330 | 13200 | 3160 | 4710 | 3040 | 4130 | 3780 | 2670 | 4590 | 6280 | -- | -- |
| Carbazole | -- | -- | 0.95 | -- | 0.18 | -- | -- | 0.064 | 0.5 | -- | -- | -- | -- | -- | -- | -- | 1.3 | -- | -- | -- | -- | -- | -- | -- | -- | 0.43 | 0.13 | -- | 1.2 | *50* | *6562.5* |
| Carbon disulfide | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.002 | -- | -- | -- | -- | -- | -- | *8000* | *350000* |

Table 2-6. Concentrations of Detected Chemicals (mg/kg) in Soils from the Main Process Area

Part 4 of 4

| Analyte | LYT01-SS | LYT02-SS | MR01SS | MR02SS | MR03SS | MR04SS | MR05SS | MR06SS | MR07SS | MR08SS | MR09SS | MR10SS | MR11SS | MR12SS | PC01SS | PC02SS | RB01SS | RB02SS | RB03-0SS | RB03-8SB | RB04-0SS | RB04-4SB | RB04-8SB | SR01-SS | SR02-SS | SR03-SS | SR04-SS | TB01SS | TB02SS | *Unrestricted Land Use* | *Industrial Land Use* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Other Chemicals** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Chloroform | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.007 | -- | *163.9* | *21516.4* |
| Chromium | -- | -- | 162 | 35.6 | 109 | 39.6 | 71.3 | 116 | 62.2 | 236 | 52.2 | 77.5 | 171 | 33.7 | 327 | 15.6 | 222 | 89.7 | 33 | 19.8 | 35 | 14.8 | 22.3 | 31.9 | 14.6 | 93.1 | 20.4 | 41.3 | 40.1 | *240* | *10500* |
| Chrysene | -- | -- | 2.3 | -- | 1.1 | -- | 0.17 | 0.53 | 0.82 | 0.51 | 0.28 | 0.1 | -- | -- | -- | -- | 4.7 | 0.41 | -- | -- | 0.093 | -- | -- | 0.11 | 0.2 | 1.6 | 0.57 | 0.21 | -- | *-- [g]* | *-- [g]* |
| Cobalt | -- | -- | 6.6 | 9.6 | 4.5 | 15.1 | 13.2 | 13 | 7.8 | 17.6 | 5.6 | 9.6 | 8.3 | 5.8 | 4.1 | 1.1 | 24.4 | 13.4 | 10.7 | 6.5 | 9.5 | 6.4 | 8.6 | 5.8 | 6.1 | 16 | 7 | 7.3 | 13.9 | *4700 [l]* | *--* |
| Copper | -- | -- | 182 | 65.1 | 335 | 139 | 43.2 | 71 | 498 | 517 | 197 | 64 | 136 | 107 | 265 | 20.3 | 744 | 220 | 60.3 | 16.1 | 119 | 18.4 | 22.9 | 143 | 38.7 | 613 | 48.6 | 106 | 71.1 | *2960* | *129500* |
| delta-BHC | -- | -- | -- | 0.0022 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | *--* | *--* |
| Dibenzo(a,h)anthracene | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | *-- [g]* | *-- [g]* |
| Dibenzofuran | -- | -- | 1.1 | -- | 0.095 | -- | -- | 0.079 | 0.23 | -- | -- | -- | 0.058 | -- | -- | -- | 0.98 | -- | -- | -- | -- | -- | -- | 0.051 | -- | 0.19 | -- | -- | 0.19 | *310 [l]* | *8200 [l]* |
| Dieldrin | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.0066 | 0.00068 | -- | -- | -- | -- | -- | -- | 0.00069 | -- | 0.015 | 0.00059 | -- | -- | -- | 0.0086 | 0.0022 | -- | 0.0047 | *0.063* | *8.203* |
| Diethyl phthalate | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.6 | 0.57 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | *64000* | *2800000* |
| Dimethyl phthalate | -- | -- | 0.28 | 0.055 | 0.5 | -- | -- | 0.098 | 0.12 | 0.084 | 0.093 | 0.056 | -- | 0.13 | 0.22 | -- | 0.27 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.6 | 0.16 | *80000* | *3500000* |
| Di-n-butyl phthalate | -- | -- | -- | -- | -- | -- | -- | 0.059 | -- | 0.37 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.14 | -- | 0.76 | -- | -- | -- | *8000* | *350000* |
| Di-n-octyl phthalate | -- | -- | 0.31 | -- | 22 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | *1600* | *70000* |
| Endosulfan sulfate | -- | -- | -- | -- | -- | -- | -- | 0.0043 | -- | -- | -- | -- | -- | -- | -- | -- | 0.0027 | 0.0018 | -- | -- | -- | -- | -- | 0.0021 | 0.0014 | 0.015 | -- | -- | -- | *480 [d]* | *21000 [d]* |
| Endosulfan-I | -- | -- | 0.0034 | -- | 0.0098 | -- | -- | 0.0014 | -- | -- | -- | -- | -- | -- | -- | 0.0087 | 0.00093 | 0.00059 | -- | -- | -- | -- | -- | -- | -- | 0.0081 | -- | -- | -- | *480 [d]* | *21000 [d]* |
| Endosulfan-II | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.00078 | -- | -- | -- | -- | -- | 0.00065 | -- | -- | -- | 0.02 | -- | -- | -- | *480 [d]* | *21000 [d]* |
| Endrin | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.021 | 0.0014 | -- | -- | *24* | *1050* |
| Endrin aldehyde | -- | -- | -- | -- | -- | -- | 0.002 | -- | -- | 0.0032 | -- | -- | -- | -- | -- | -- | -- | -- | 0.00046 | -- | -- | 0.0017 | -- | -- | -- | -- | -- | -- | -- | *24 [e]* | *1050 [e]* |
| Endrin ketone | -- | -- | -- | -- | -- | -- | 0.0035 | 0.028 | -- | -- | -- | -- | -- | -- | -- | -- | 0.057 | 0.0082 | -- | -- | -- | 0.0017 | -- | -- | 0.0014 | -- | 0.0046 | -- | -- | *24 [e]* | *1050 [e]* |
| Fluoranthene | -- | -- | 6.4 | -- | 1.5 | -- | 0.14 | 1.1 | 1.3 | 0.67 | 0.31 | 0.19 | 0.26 | -- | 0.063 | -- | 6.7 | 0.57 | -- | -- | 0.12 | -- | 0.043 | 0.27 | 0.45 | 2.6 | 1 | 0.36 | 6 | *3200* | *140000* |
| Fluorene | -- | -- | 1.3 | -- | 0.11 | -- | -- | 0.18 | 0.29 | -- | -- | -- | 0.094 | -- | -- | -- | 1.3 | -- | -- | -- | -- | -- | -- | 0.057 | 0.066 | 0.21 | -- | -- | 0.21 | *3200* | *140000* |
| gamma-BHC | -- | -- | -- | -- | -- | -- | -- | -- | 0.0048 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | *0.769* | *100.962* |
| gamma-Chlordane | -- | -- | -- | -- | -- | 0.0079 | -- | -- | 0.012 | -- | 0.0048 | 0.00087 | 0.0046 | 0.0038 | -- | -- | 0.011 | -- | -- | -- | -- | -- | -- | 0.0016 | 0.0015 | 0.016 | -- | 0.0029 | -- | *2.86 [a]* | *375 [a]* |
| Heptachlor | -- | -- | 0.0013 | -- | 0.0054 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.00063 | 0.0059 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | *0.222* | *29.167* |
| Heptachlor epoxide | -- | -- | 0.0067 | 0.0086 | 0.017 | 0.014 | 0.0013 | 0.01 | 0.016 | -- | -- | 0.0013 | -- | -- | -- | -- | 0.0074 | -- | -- | -- | -- | -- | -- | -- | 0.00051 | -- | -- | 0.0015 | -- | *0.110* | *14.423* |
| Indeno(1,2,3-cd)pyrene | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.12 | -- | -- | -- | -- | -- | -- | 0.12 | -- | -- | -- | -- | -- | -- | 0.055 | -- | -- | -- | -- | *-- [g]* | *-- [g]* |
| Iron [f] | -- | -- | 25100 | 29300 | 19400 | 62600 | 30400 | 36900 | 35000 | 150000 | 16200 | 25800 | 32000 | 15300 | 77100 | 7460 | 264000 | 108000 | 22400 | 14700 | 38700 | 11600 | 18600 | 18700 | 12100 | 109000 | 16700 | 20300 | 31000 | -- | -- |
| Isophorone | -- | -- | -- | -- | -- | -- | -- | 0.62 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | *1053* | *138158* |
| Lead | -- | -- | 334 | 113 | 813 | 205 | 19 | 87.6 | 318 | 481 | 159 | 31.1 | 220 | 86.2 | 120 | 4.9 | 336 | 159 | 35.2 | 2.6 | 77.9 | 3.6 | 2.58 | 139 | 14.1 | 53.9 | 71.8 | 73 | 38.9 | *400 [k]* | *750 [k]* |
| Magnesium [f] | -- | -- | 4760 | 6040 | 3960 | 5820 | 10400 | 9230 | 5080 | 5300 | 4250 | 6820 | 7660 | 4750 | 1040 | 402 | 1640 | 1920 | 7840 | 4990 | 7010 | 4090 | 6690 | 5980 | 3950 | 2090 | 4070 | 7120 | 10800 | -- | -- |
| Manganese | -- | -- | 189 | 318 | 150 | 407 | 511 | 613 | 267 | 963 | 133 | 290 | 227 | 146 | 806 | 53.7 | 1220 | 1720 | 1310 | 215 | 763 | 158 | 207 | 185 | 145 | 451 | 183 | 197 | 320 | *11200* | *490000* |
| Mercury | -- | -- | 0.29 | -- | 0.83 | 0.17 | -- | 1.3 | 1.3 | -- | 0.5 | 0.13 | 0.57 | 0.48 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.73 | 0.56 | *24* | *1050* |
| Methoxychlor | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.027 | -- | -- | -- | -- | -- | 0.0033 | -- | -- | -- | 0.048 | 0.0035 | -- | -- | *400* | *17500* |
| Methylene Chloride | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.008 | 0.006 | 0.01 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | *133* | *17500* |
| Naphthalene | -- | -- | 0.27 | -- | -- | 0.043 | -- | 0.046 | 0.16 | -- | -- | -- | 0.12 | -- | -- | -- | 1.8 | -- | -- | -- | -- | -- | -- | 0.088 | 0.067 | 0.4 | -- | -- | 0.12 | *1600* | *70000* |
| Nickel | -- | -- | 36.7 | 35.5 | 39.9 | 67.3 | 102 | 100 | 45.9 | 128 | 31 | 106 | 61.1 | 26.7 | 62.6 | -- | 149 | 77.3 | 84.2 | 19.5 | 42.9 | 30.4 | 24.4 | 25.7 | 22.7 | 74.3 | 18.3 | 31.9 | 45.6 | *1600* | *70000* |
| Pentachlorophenol | -- | -- | -- | -- | -- | -- | -- | -- | 0.15 | -- | 0.069 | -- | -- | -- | -- | -- | 0.46 | 0.1 | -- | -- | -- | -- | -- | 0.11 | -- | 15 | 0.53 | -- | 3.9 | *8.33* | *1093.75* |
| Phenanthrene | -- | -- | 8 | 0.12 | 1.3 | -- | 0.14 | 0.73 | 1.3 | 0.33 | 0.11 | 0.16 | 0.41 | -- | 0.06 | -- | 6.1 | 0.48 | -- | -- | 0.14 | -- | -- | 0.38 | 0.21 | 2.2 | 0.66 | 0.33 | 3.2 | -- | -- |
| Phenol | -- | -- | 0.22 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.35 | -- | -- | -- | -- | -- | -- | -- | -- | 0.089 | -- | -- | 0.059 | *48000* | *2100000* |
| Potassium [f] | -- | -- | 477 | 666 | 619 | 919 | 710 | 725 | 897 | 641 | 534 | 724 | 464 | 435 | 14600 | 812 | 1200 | 949 | 4050 | 843 | 2030 | 450 | 634 | 373 | 428 | 702 | 357 | 404 | 713 | -- | -- |
| Pyrene | -- | -- | 3.7 | -- | 1.4 | -- | 0.14 | 1.1 | -- | -- | 0.28 | 0.14 | 0.11 | -- | 0.059 | -- | 5 | 0.49 | -- | -- | 0.15 | -- | -- | 0.26 | 0.36 | 1.5 | 0.68 | 0.32 | 14000 | *2400* | *105000* |
| Selenium | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.53 | -- | -- | -- | -- | -- | -- | -- | -- | 0.55 | -- | -- | -- | -- | -- | 1.4 | *400* | *17500* |
| Silver | -- | -- | 0.67 | 0.7 | 1.1 | 1 | 0.72 | 0.88 | 1.3 | 0.34 | 0.63 | 1.2 | 0.78 | 3 | 0.6 | -- | 2.2 | 2.4 | 0.65 | 0.42 | 0.44 | 0.38 | 0.46 | 0.54 | 0.3 | 2.5 | 0.45 | 0.48 | 1.8 | *400* | *17500* |
| Sodium [f] | -- | -- | 666 | 539 | 616 | 944 | 650 | 1130 | 600 | 482 | 254 | 525 | 566 | 465 | 1760 | 438 | 622 | 768 | 4290 | 808 | 1510 | 242 | 767 | 181 | 345 | 471 | 1150 | 1430 | 1660 | -- | -- |
| Thallium | -- | -- | -- | -- | -- | -- | -- | -- | -- | 1.9 | -- | -- | -- | -- | 2.2 | -- | 7 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.82 | -- | *5.6* | *245* |
| Total Carcinogenic PAHs [g] | -- | -- | 1.863 | -- | 0.093 | -- | 0.011 | 0.0323 | 0.4282 | 0.0461 | 0.1978 | 0.0592 | -- | -- | -- | -- | 3.397 | 0.2761 | -- | -- | 0.01433 | -- | -- | 0.0855 | 0.1587 | 1.062 | 0.2697 | 0.1381 | -- | *0.137* | *17.979* |
| Toluene | -- | -- | -- | -- | 0.002 | -- | -- | -- | -- | -- | 0.002 | -- | -- | -- | -- | -- | -- | 0.008 | -- | -- | -- | -- | -- | 0.003 | -- | -- | -- | 0.002 | 0.001 | *16000* | *700000* |
| Vanadium | -- | -- | 48.1 | 47.4 | 88.6 | 50.5 | 49.4 | 51.5 | 59.1 | 45.7 | 58.8 | 54.3 | 39.1 | 35.2 | 13.9 | 6.2 | 88.8 | 30.2 | 154 | 55 | 38.8 | 28.1 | 49.2 | 38.4 | 25.9 | 25.6 | 42.1 | 49.2 | 70.3 | *560* | *24500* |
| Xylene (total) | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | *160000* | *7000000* |
| Zinc | -- | -- | 618 | 225 | 381 | 1240 | 81.1 | 382 | 447 | 1690 | 206 | 572 | 163 | 171 | 313 | 15.2 | 2300 | 672 | 79.3 | 35.9 | 152 | 49 | 46.2 | 79.6 | 193 | 95.4 | 53.8 | 73.2 | 79.8 | *24000* | *1050000* |

[a] Value is for chlordane
[b] Based on the upper 90th percentile of background as noted for Puget Sound by Ecology (1994)
[c] Value is for PCB mixtures using high risk and high persistence factors (Ecology 2001)
[d] Value is for endosulfan
[e] Value is for endrin
[f] Trace nutrients are not considered priority pollutants as organisms have wide ranges of tolerance (EPA 1989)
[g] Total Carcinogenic PAHs are presented as a sum of Benzo(a)pyrene toxicity equivalents (EPA 1993 )
[h] Value based on naphthalene
[i] 4-Nitrophenol is based on EPA (2002) risk-based criteria.
[j] Cobalt is based on EPA (2002) risk-based criteria.
[k] Lead is based on a preliminary remediation goal developed and promulgated by EPA Region 9 based on the IEUBK model
[l] Dibenzofuran is based on EPA (2002) risk-based criteria.




**Arsenic Concentrations at Past Sampling Locations**

- > 250 mg/kg
  - *Industrial Land Use Criteria = 219 mg/kg*
- 126 - 149 mg/kg
- 18 - 77 mg/kg
  - *State Maximum Background = 17 mg/kg*
- 7.9 - 16.4 mg/kg
  - *State 90th Percentile = 7.3 mg/kg*
- < 7.3 mg/kg

◆ Planned sampling location

Vicinity Map

**Scale in Feet**

0 — 270

N

**Figure 2-7**. Arsenic Results From Past Soil Sampling and Planned Soil Sampling Locations in the Main Process Area.


**Lead Concentrations at Past Sampling Locations**

- > 813 mg/kg
  *Industrial Land Use Criteria = 750 mg/kg*
- 283 - 410 mg/kg
  *Unrestricted Land Use Criteria = 250 mg/kg*
- < 220 mg/kg

◆ Planned sampling location

Vicinity Map

**Scale in Feet**

0 270

N

**Figure 2-8**. Lead Results From Past Soil Sampling and Planned Soil Sampling Locations in the Main Process Area.

2,3,7,8-TCDD (TEQ) was detected in the surface soil at three locations in the Main Process Area above the MTCA industrial criterion (Figure 2-9). Location FR06 was removed from the finishing room as part of the finishing room interim soil removal project in 1998. FR02 may also have been removed, but it is unclear. To confirm the dioxins/furans concentrations detected at FR02, a surface soil sample will be collected at this location and a subsurface soil sample (3 inches to groundwater) will be collected to delineate the vertical extent of contamination. To bound FR02, surface and subsurface soil will be collected from sample location MR20 to the south and FR20 to the north.

The other sample location that exceeded the MTCA industrial cleanup level was near the screen room (SR03). This location will be resampled to confirm the dioxins/furans concentrations, and to determine the vertical extent of dioxins/furans concentrations 6 inches to groundwater. Additionally, five stations surrounding this location will be sampled for dioxin in surface and subsurface soil to further delineate the area's concentrations. These sample locations are SR20, SR21, SR22, SR23, and SR24 (Figure 2-9).

Prior sampling for dioxins/furans was based on a subset of stations throughout the site. To further characterize the spatial extent of dioxins/furans concentrations at the Main Process Area, the previous sampling was considered along with the known and suspected sources to select additional sample locations for surface and subsurface soil sampling. One station, BL20 (Figure 2-9), is a process area likely to have dioxin in the waste stream and surface and subsurface samples will be collected to characterize this area. An on-site source of dioxins/furans was emissions from the stacks during combustion of the hog fuel. However, concentrations exceeding MTCA industrial criteria, based on samples collected by the EPA (E&E 1998), are not likely the result of aerial deposition of dioxin from stack emission onto the facility's concrete and soil. Nevertheless, eight additional locations (PC20, BP20, CS20, DK20, DB21, PS20, SR03, and RB21 in Figure 2-9) are identified for surface and subsurface soil sampling and dioxins/furans analyses to ensure adequate spatial coverage of the site.

### 2.3.8 TOTAL PETROLEUM HYDROCARBONS

Petroleum hydrocarbons were not evaluated during the EPA (E&E 1998) investigation and this is identified as a data gap. Areas where petroleum hydrocarbons were known to be used or stored on site were:

- Fuel Oil Day Tank—A 10,000-gallon fuel oil tank was present in the power house.
- Underground Storage Tanks (USTs)—Two USTs were present on site. Both were present at the northwest corner of the maintenance shop and removed in 1980.
- Fuel Oil Tanks—Two fuel oil tanks were present on site near the Log Yard. Both have been removed from the site.

- Fueling area—Three 550-gallon above ground storage tanks were used to store and fuel vehicles with leaded, unleaded, and diesel fuel.
- Fuel Oil Pipeline—An above-ground fuel oil pipeline extended from the dock to fuel oil tanks No. 1 and No. 2 for the transfer of fuel oil delivered by barge.

Additionally, a variety of greases and oils were used in the power house, Wood Mill, finishing room, and the mechanic shop. Figure 2-10 identifies areas to be sampled for petroleum hydrocarbons. At each sampling location, one surface and one subsurface soil sample will be collected. Each sample will be analyzed for petroleum hydrocarbons, using NWTPH-Dx and NWTPH-G, and VPH and EPH fractions if significant concentrations are found.

### 2.3.9 ECOLOGICAL SAMPLING

Sampling described thus far for on-site soil is primarily concerned with sampling the industrialized areas of the Rayonier site. Although these potential source areas probably contain the highest concentrations of chemicals and are suitable for evaluating potential human exposure and the nature and extent of contamination, many contain little or no habitat and would not provide an estimate of exposure in those areas where wildlife are most likely to occur. The riparian corridor along Ennis Creek, the forested areas along the east and west coastal bluffs, and forested areas along the entrance to the site contain habitat suitable for the species of the region. These four areas are the focus of the on-site ecological sampling.

Section 5.4.2.1 of the RI/FS Work Plan (Volume I), describes the approach for the on-site soil ecological risk assessment. Wildlife exposure models will be used to evaluate risks to wildlife (i.e., shrew, robin, and vole) from exposure to on-site soil contaminants. The exposure models will use concentrations of contaminants found in soil, earthworms, and plants to estimate exposure and risks. Soil to earthworm and soil to plant bioaccumulation factors (BAFs) will be calculated using the analytical chemical data from co-located soil, earthworm, and plant samples. Earthworm and plant samples need not be sampled from all locations because concentrations of chemicals in their tissues can be estimated from the soil concentrations in all areas using the site-specific BAFs. Soil, earthworm, and plant samples will be collected from selected locations within each contiguous suitable habitat area, and additional soil samples will be collected from within each area to enhance the spatial coverage.


**Dioxins/Furans (as 2,3,7,8-TCDD TEQs) Concentrations at Past Sampling Locations**

- 1.47 – 3.2 ug/kg
  - *Industrial Land Use Criteria = 0.87 ug/kg*
- 0.15 – 0.58 ug/kg
- 0.017 – 0.080 ug/kg
  - *Unrestricted land use criteria = 0.0007 ug/kg*

◆ Planned sampling location

Vicinity Map

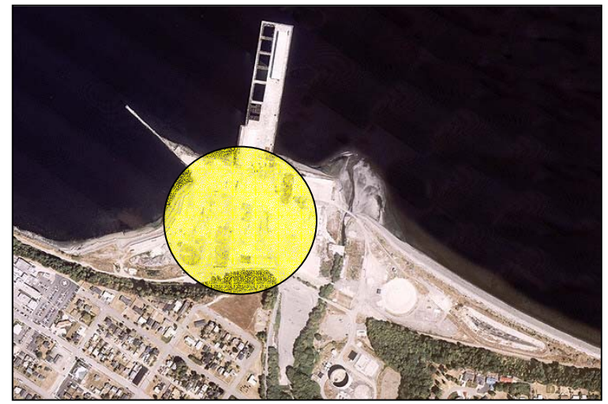
**Scale in Feet**

0 270

N

**Figure 2-9.** Dioxins/Furans Results from Past Soil Sampling and Planned Soil Sampling Locations in the Main Process Area.


◆ Planned sampling location



Vicinity Map

**Scale in Feet**

0 450

N

**Figure 2-10**. Planned Soil Sampling Locations for Characterizing Petroleum Hydrocarbons.

The sampling design will include focused sampling in areas containing suitable habitat and opportunistic sampling in industrialized areas. Sampling is stratified across areas that contain suitable habitat to ensure that wildlife exposure estimates are available for all areas of high potential wildlife usage. Four on-site areas with suitable habitat were identified from aerial photographs (Figure 2-11):

- East Coastal Bluff – upland forest habitat
- West Coastal Bluff – upland forest habitat
- Ennis Creek Corridor – riparian habitat
- Site Entrance Woodland – upland forest habitat

The source of potential contamination was also considered in the sampling design. The primary source for all four areas is aerial deposition from on-site stack and fugitive dust emissions. This potential may vary due to local wind patterns. However, the four areas are primarily located upgradient from the mill site and would not be subject to potential direct release of chemicals (e.g., spills) from past manufacturing processes.

The sampling requirements for the on-site soil ecological evaluation of areas where suitable habitat are summarized in Table 2-7. A single sample location from which soil, plants, and earthworms will be collected is located in the east coastal bluff, west coastal bluff, and site entrance woodland areas (Figure 2-11). Two additional soil samples will be located in each of these three areas to insure adequate spatial coverage. It is assumed that potential levels of contamination from stack and fugitive dust emissions may vary among the four habitat areas, but that levels within each area will be relatively homogeneous. Therefore, sample locations within the East Coastal Bluff, West Coastal Bluff, and Site Entrance Woodland areas will be evenly distributed across each area.

Table 2-7. Summary of Planned Sampling Requirements for the Terrestrial Ecological Evaluation

| Area | # Soil Samples | # Plant Samples | # Worm Samples |
|---|---|---|---|
| East Coastal Bluff | 3 | 1 | 1 |
| West Coastal Bluff | 3 | 1 | 1 |
| Ennis Creek Corridor | 3 | 2 | 2 |
| Site Entrance Woodland | 3 | 1 | 1 |
| Industrialized Area | 3 | 3 | 3 |
| **Totals** | **15** | **8** | **8** |

A systematic sampling design will be used for the lower portion of the Ennis Creek Corridor to characterize potential impacts from the finishing room release. An interim action was completed in the Ennis Creek-Finishing Room Area in 2002 that resulted in the removal of 1,248 tons of TPH and PCB-affected soil and sediment from the area (Integral and Foster Wheeler 2003). A soil sample will be located upstream from the

Interim Action area (Figure 2-11). Soil, plant, and earthworm samples will be collected from this location. Two additional samples will be evenly distributed across the upper portion of Ennis Creek. Soil, plant, and earthworm samples will be collected from one of these locations and only soil will be collected from the second location.

A survey was conducted in the spring of 2002 (see Appendix A of the Work Plan [Volume I]) to characterize the ground surface conditions and the presence of plants and earthworms on the industrialized portion of the mill site. Results of that survey were used to develop an ecological sampling design for the industrial portion of the site. Four areas were identified with potentially sufficient biomass of plants and earthworms for sampling purposes, the East Roll Storage, Chip Storage, and the southern portion of the Log Yard. Soil, plants, and earthworms will be collected from each of these areas (Figure 2-11). The potential contaminants associated with stack and fugitive dust emissions are inorganics, PAHs, and dioxins/furans. Therefore, chemical analyses for soil, earthworm, and plant samples from sampling locations in these areas will include dioxins/furans, inorganics, and PAHs. In addition, PCBs were also identified as an ecological COPC for the industrialized portion of the mill site (see Section 3.2.1 of the Work Plan [Volume I]). Therefore, ecological samples collected from the seven locations on the industrialized portion of the mill site will be analyzed for dioxins/furans, inorganics, PAHs, and PCBs.

Sample locations will be located in the field using a handheld Global Positioning System (GPS) unit with an accuracy of $\pm$ 6 feet. Earthworms and plants may not be present at the identified sample location. In those cases, the closest point to the sample location from which both earthworms and plants can be collected will be identified in the field, and the coordinates of that location recorded as the final sample location using the handheld GPS unit.

### 2.3.10 ADDITIONAL SOIL CHARACTERIZATION

In addition to delineating and further characterizing the specific locations where chemicals are known to exceed MTCA criteria, a goal of the RI soil sampling plan is to characterize the nature and extent of chemical concentrations in soils throughout the area of suspected releases. Samples collected by EPA (E&E, 1998) focused on sampling of surface soils from the mill site in areas where buildings and other structures did not hinder sample collection. Additional sampling needed to delineate the areas of concern based on past sampling are identified in the previous sections. Figure 2-12 shows the locations of past sampling of surface soils and the additional sampling locations. With the addition of the planned soil samples, sampling at the mill is judged to be adequate to determine the nature and extent of chemicals occurring in subsurface soil.


Planned sampling location - soil

Planed sampling location - soil and biota

N

**Scale in Feet**

0 1500

**Figure 2-11.** On Site Habitat Areas and Planned Soil and Terrestrial Biota Sampling Locations.

Existing data (E&E 1998) from subsurface soil sampling does not indicate the occurrence of any unique chemicals, nor do subsurface soils exhibit higher chemical concentrations than surface soils. Moreover, in each case where a chemical concentration was elevated in surface soil, the concentrations in an associated subsurface soil sample were substantially less than surface concentrations and not of any concern. Additionally, known releases of chemicals (petroleum and SSL) directly into the subsurface soil are a focused part of the soil sampling described in this SAP. Thus, the primary objective of subsurface soil sampling is to verify that subsurface contamination does not exist in areas showing signs of previous chemical contamination, and that an adequate number of samples are collected to eliminate concern of any substantial subsurface contamination. Figure 2-12 identifies the subsurface and surface soil sampling locations identified in previous sections of this SAP. In addition to the subsurface soil sampling and chemical analyses previously discussed, each of these locations will have a subsurface sample collected and evaluated for the priority pollutant list of inorganics and semivolatiles.

Table 2-8 summarizes the planned sampling to fully characterize chemicals occurring in soil at the Rayonier site. Table 2-9 summarizes the sampling needed to characterize chemicals occurring in earthworms and plants at the former Rayonier Mill Site.

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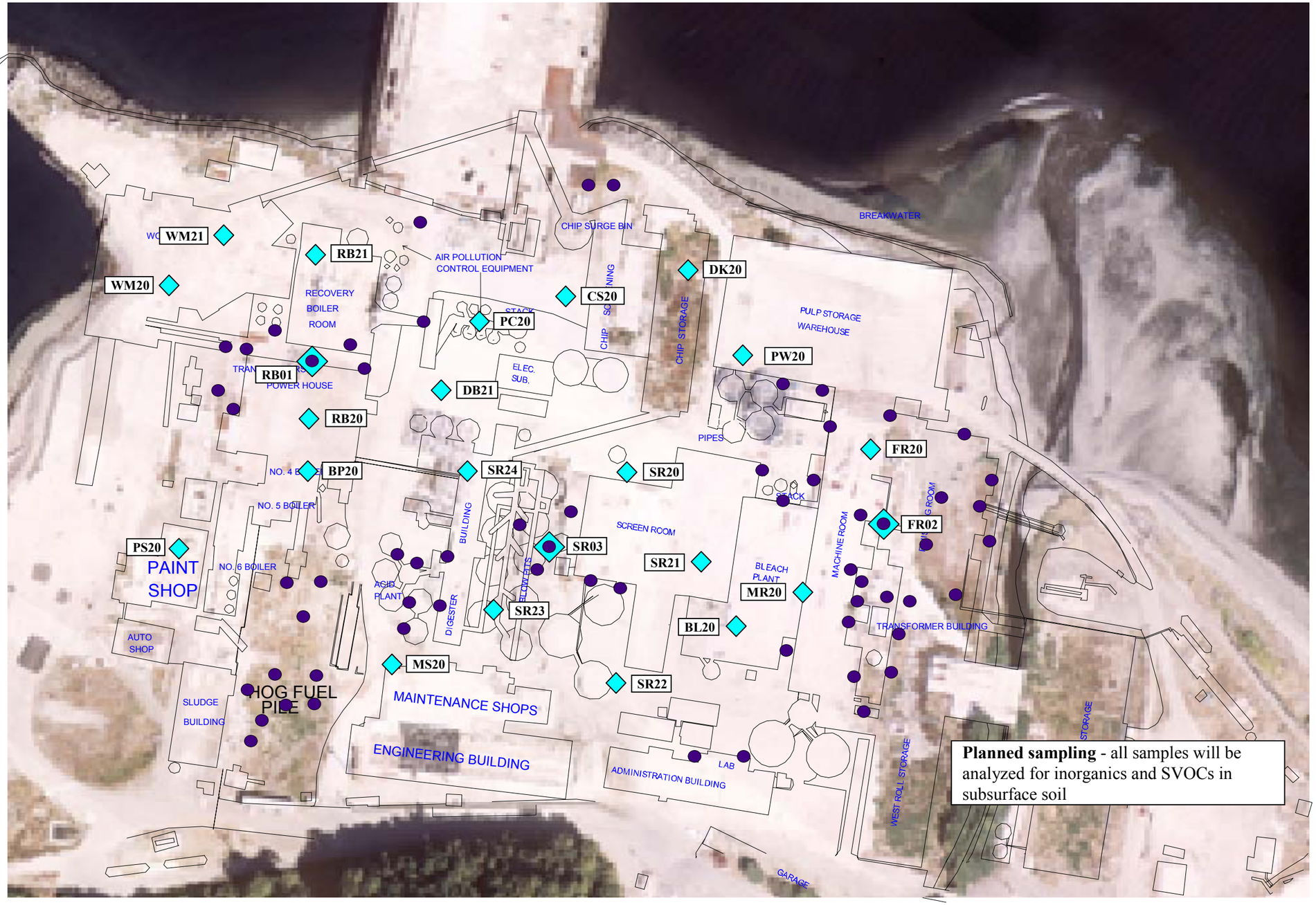


**Planned sampling** - all samples will be analyzed for inorganics and SVOCs in subsurface soil

Past sampling location

Planned sampling location

Vicinity Map

**Scale in Feet**

0 270

N

**Figure 2-12.** Past Soil Sampling Locations and Planned Subsurface Soil Sampling Locations for Additional Characterization Within the Main Process Area.

Table 2-8. Planned Sample Number and Analytical Test Methods for Soil (Part 1 of 3)

| Location | Depth | Inorganics (EPA Methods 6000/7000 Series) | Arsenic (EPA Methods 7060A/7421 or 6010B or 6020) | Copper (EPA Methods 6010B or 6020) | Lead (EPA Methods 6000/7000 Series) | SVOCs (EPA Method 8270C) | TPH-G (NWTPH-Gx) | TPH-D (NWTPH-Dx) | PCBs (EPA Method 8082) | Dioxins/Furans (1613B) | PAHs (EPA Method 8270C) | Pesticides (EPA Method 8081A) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AP03 | 0"-3" | | | | X | | | | | | | |
| AP03 | 3"-GW | | | | X | | | | | | | |
| AP20 | 0"-3" | | | | X | | | | | | | |
| AP20 | 3"-GW | | | | X | | | | | | | |
| BL20 | 0"-3" | | | | | | | | | X | | |
| BL20 | 3"-GW | X | | | | X | | | | X | | |
| BP20 | 0"-3" | | | | | | | | | X | | |
| BP20 | 3"-GW | X | | | | X | | | | X | | |
| BY02 | 0"-3" | | X[a] | | | | | | | | | |
| BY02 | 3"-GW | | X[a] | | | | | | | | | |
| BY20 | 0"-3" | | X[a] | | | | | | | | | |
| BY20 | 3"-GW | | X[a] | | | | | | | | | |
| CS20 | 0"-3" | | | | | | | | | X | | |
| CS20 | 3"-GW | X | | | | X | | | | X | | |
| DB02 | 0"-3" | | | | X | | | | | | | |
| DB02 | 3"-GW | | | | X | | | | | | | |
| DB21 | 0"-3" | | | | | | | | | X | | |
| DB21 | 3"-GW | X | | | | X | | | | X | | |
| DK20 | 0"-3" | | | | | | X | X | | X | | |
| DK20 | 3"-GW | X | | | | X | X | X | | X | | |
| FR02 | 0"-3" | | | | | | | | | X | | |
| FR02 | 3"-GW | X | | | | X | | | | X | | |
| FR20 | 0"-3" | | | | | | | | | X | | |
| FR20 | 3"-GW | X | | | | X | | | | X | | |
| GB08 | 0"-3" | | | | X | | | | | | | |
| GB08 | 3"-GW | | | | X | | | | | | | |
| LY20 | 0"-3" | | | | | | | | | X | | |
| LY20 | 3"-GW | | | | | | | | | X | | |
| LY21 | 0"-3" | X | | | | | X[c] | X[d] | | X | X | |
| LY21 | 3"-GW | X | | | | | X[c] | X[d] | | X | X | |
| LY22 | 0"-3" | | | | | | | | | X | | |
| LY22 | 3"-GW | | | | | | | | | X | | |
| LY23 | 0"-3" | | | | | | | | | X | | |
| LY23 | 3"-GW | | | | | | | | | X | | |
| LY24 | 0"-3" | X | | | | | | | | X | X | |
| LY24 | 3"-GW | X | | | | | | | | X | X | |
| LY25 | 0"-3" | X | | | | | | | | X | X | |
| LY25 | 3"-GW | X | | | | | | | | X | X | |
| MR03 | 0"-3" | | | | X | | | | | | | |
| MR03 | 3"-GW | | | | X | | | | | | | |
| MR20 | 0"-3" | | | | X | | | | | X | | |
| MR20 | 3"-GW | X | | | | X | | | | X | | |
| MS20 | 0"-3" | | | | | | X[c] | X[d] | | X | | |
| MS20 | 3"-GW | X | | | | X | X[c] | X[d] | | X | | |

Table 2-8. Planned Sample Number and Analytical Test Methods for Soil (Part 2 of 3)

| Location | Depth | Inorganics (EPA Methods 6000/7000 Series) | Arsenic (EPA Methods 7060A/7421 or 6010B or 6020) | Copper (EPA Methods 6010B or 6020) | Lead (EPA Method 6000/7000 Series) | SVOCs (EPA Method 8270C) | TPH-G (NWTPH-Gx) | TPH-D (NWTPH-Dx) | PCBs (EPA Method 8082) | Dioxins/Furans (1613B) | PAHs (EPA Method 8270C) | Pesticides (EPA Method 8081A) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PC20 | 0"-3" | | | | | | | | | X | | |
| PC20 | 3"-GW | X | | | | X | | | | X | | |
| PF02 | 0"-3" | | | X | | | | | | | | |
| PS20 | 0"-3" | | | | | | | | | X | | |
| PS20 | 3"-GW | X | | | | X | | | | X | | |
| PW20 | 0"-3" | | | | | | | | | | | |
| PW20 | 3"-GW | X | | | | X | | | | | | |
| RB01 | 0"-3" | | X[a] | | | | X[c] | X[d] | | | | |
| RB01 | 3"-GW | X | X[a] | | | X | X[c] | X[d] | | | | |
| RB20 | 0"-3" | | X[a] | | | | X[c] | X[d] | | | | |
| RB20 | 3"-GW | X | X[a] | | | X | X[c] | X[d] | | | | |
| RB21 | 0"-3" | | X[a] | | | | | | | X | | |
| RB21 | 3"-GW | X | X[a] | | | X | | | | X | | |
| RB22 | 0"-3" | | | | | | X[c] | X[d] | | | | |
| RB22 | 3"-GW | | | | | | X[c] | X[d] | | | | |
| RS20 | 0"-3" | X | | | | X | | | X | X | | X |
| RS20 | 3"-GW | X | | | | X | | | X | X | | X |
| RS21 | 0"-3" | X | | | | X | | | X | | | X |
| RS21 | 3"-GW | X | | | | X | | | X | | | X |
| SR03 | 0"-3" | | | | | | | | | X | | |
| SR03 | 3"-GW | X | | | | X | | | | X | | |
| SR20 | 0"-3" | | | | | | | | | X | | |
| SR20 | 3"-GW | X | | | | X | | | | X | | |
| SR21 | 0"-3" | | | | | | | | | X | | |
| SR21 | 3"-GW | X | | | | X | | | | X | | |
| SR22 | 0"-3" | | | | | | | | | X | | |
| SR22 | 3"-GW | X | | | | X | | | | X | | |
| SR23 | 0"-3" | | | | X | | | | | X | | |
| SR23 | 3"-GW | X | | | X | X | | | | X | | |
| SR24 | 0"-3" | | | | | | | | | X | | |
| SR24 | 3"-GW | X | | | | X | | | | X | | |
| SSL20 | 0"-3" | | | | | | | | | X | | |
| SSL20 | 3"-GW | X | | | | | | | | | X | |
| SSL21 | 0"-3" | | | | | | | | | X | | |
| SSL21 | 3"-GW | X | | | | | | | | | X | |
| SSL22 | 0"-3" | X | | | | | | | | X | X | |
| SSL22 | Just above groundwater | X | | | | | | | | X | X | |
| WM20 | 0"-3" | X | | | | | X[c] | X[d] | X | X | X | |
| WM20 | 3"-GW | X | | | | X | X[c] | X[d] | X | X | | |
| WM21 | 0"-3" | X | | | | | X[c] | X[d] | X | X | X | |
| WM21 | 3"-GW | X | | | | X | X[c] | X[d] | X | X | | |
| ECO20 | Biologically active layer[e] | X | | | | | | | | X | | |
| ECO21 | Biologically active layer[e] | X | | | | | | | | X | | |

Table 2-8. Planned Sample Number and Analytical Test Methods for Soil (Part 3 of 3)

| Location | Depth | Inorganics (EPA Methods 6000/7000 Series) | Arsenic (EPA Methods 7060A/7421 or 6010B or 6020) | Copper (EPA Methods 6010B or 6020) | Lead (EPA Method 6000/7000 Series) | SVOCs (EPA Method 8270C) | TPH-G (NWTPH-Gx) | TPH-D (NWTPH-Dx) | PCBs (EPA Method 8082) | Dioxins/Furans (1613B) | PAHs (EPA Method 8270C) | Pesticides (EPA Method 8081A) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ECO22 | Biologically active layer[e] | X | | | | | | | | X | | |
| ECO23 | Biologically active layer[e] | X | | | | | | | | X | | |
| ECO25 | Biologically active layer[e] | X | | | | | | | | X | | |
| ECO26 | Biologically active layer[e] | X | | | | | | | | X | | |
| ECO27 | Biologically active layer[e] | X | | | | | | | | X | | |
| ECO28 | Biologically active layer[e] | X | | | | | | | | X | | |
| ECO29 | Biologically active layer[e] | X | | | | | | | | X | | |
| ECO30 | Biologically active layer[e] | X | | | | | | | | X | | |
| ECO31 | Biologically active layer[e] | X | | | | | | | | X | | |
| ECO32 | Biologically active layer[e] | X | | | | | | | | X | | |
| ECO33 | Biologically active layer[e] | X | | | | | | | X | X | | |
| ECO34 | Biologically active layer[e] | X | | | | | | | X | X | | |
| ECO35 | Biologically active layer[e] | X | | | | | | | X | X | | |

[a] Depending on results of total arsenic analysis, may conduct analysis of arsenic to asses bioavailability (Ruby et al., 1996).

[b] Analysis may be required dependent upon analytical results for PF02.

[c] If TPH-G is detected above MTCA industrial land use criterion, may need to analyze for volatile chemicals using method NWVPH.

[d] If TPH-D is detected above MTCA industrial land use criterion, may need to analyze for petroleum hydrocarbon fractions method NWEPH.

[e] The biologically active soil layer will be determined in the field.

[f] These samples will be archived for possible future analysis.

Table 2-9. Planned Sample Number and Analytical Test Methods for Earthworms and Plants

| Location | Depth | Inorganics (EPA Methods 6000/7000 Series) | Arsenic (EPA Methods 7060A/7421 or 6010B or 6020) | Copper (EPA Methods 6010B or 6020) | Lead (EPA Method 6000/7000 Series) | SVOCs (EPA Method 8270C) | TPH-G (NWTPH-Gx) | TPH-D (NWTPH-Dx) | PCBs (EPA Method 8082) | Dioxins/Furans (1613B) | PAHs (EPA Method 8270C ) | Pesticides (EPA Method 8081A) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ECO21 | Biologically active layer[e] | X | | | | | | | | X | | |
| ECO23 | Biologically active layer[e] | X | | | | | | | | X | | |
| ECO26 | Biologically active layer[e] | X | | | | | | | | X | | |
| ECO28 | Biologically active layer[e] | X | | | | | | | | X | | |
| ECO31 | Biologically active layer[e] | X | | | | | | | | X | | |
| ECO33 | Biologically active layer[e] | X | | | | | | | X | X | | |
| ECO34 | Biologically active layer[e] | X | | | | | | | X | X | | |
| ECO35 | Biologically active layer[e] | X | | | | | | | X | X | | |

[a] The biologically active soil layer will be determined in the field for collection of earthworm samples.