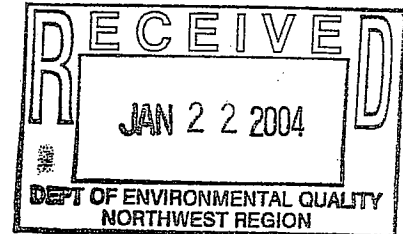




SECOR
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INCORPORATED

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7730 Southwest Mohawk Street
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503-691-2030 TEL
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January 19, 2004

Anna Coates
Oregon Department of Environmental Quality
2020 SW Fourth Ave., Suite 400
Portland, OR 97201

RE: Expanded Preliminary Assessment and Request for Site Closure Report
Former Schooner Creek Boat Works, North Pier 99/North Marine Drive, Portland, Oregon
SECOR Project No.: 15OT.09417.02.0002

Dear Anna:

At the request of the Oregon Department of Environmental Quality (DEQ), and on behalf of Mr. Milton Brown, SECOR International Incorporated (SECOR) has completed an Expanded Preliminary Assessment (XPA) and an analysis of site-specific risk-based contaminant levels (RBCs) for the Former Schooner Creek Boat Works site, located at North Pier 99/North Marine Drive in Portland, Oregon. The XPA and Request for Site Closure Report is included with this letter.

The report includes a description of the initial site investigation and surface soil sampling and analysis, a description of the soil excavation, and an analysis of the site-specific RBC levels generated for the request to close the site.

If you have any questions regarding the report, please feel free to contact me at (503) 691-2030.

Sincerely,
SECOR International Incorporated

Cell (503) 803-1913

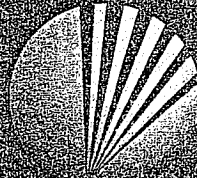
Aaron M. Kreitzer, E.I.T.
Staff Engineer

AMK:dkc

Attachment

cc: Steve Fortuna, Oregon Department of Environmental Quality

AC - called Aaron
1-22-04 Do not have a letter agreement w/ Milt Brown.
Cannot review.
Please call Milt Brown re letter agree.
AK - okay, will do



SECOR

Environmental Data Center

FINAL

**EXPANDED PRELIMINARY ASSESSMENT AND SITE CLOSURE
REPORT USING RISK BASED CONTAMINANT LEVELS FOR
MR. MILTON BROWN**

Former Schooner Creek Boat Wash

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FINAL

**EXPANDED PRELIMINARY ASSESSMENT AND SITE CLOSURE
REPORT USING RISK BASED CONTAMINANT LEVELS FOR
MR. MILTON BROWN**

Former Schooner Creek Boat Works

**North Pier 99/North Marine Drive
Portland, Oregon**

December 30, 2003
SECOR PN: 15OT.09417.02.0002

Prepared by:

Aaron M. Kreitzer, E.I.T.
Staff Engineer

Reviewed by:

Don Clabaugh
Principal Engineer

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EXECUTIVE SUMMARY

This document presents an Expanded Preliminary Assessment (XPA) for the site located at 1523 North Marine Drive in Portland Oregon (Site). The Site was listed by the Oregon Department of Environmental Quality (DEQ) as a high priority site based on its operational history and six complaints made to the DEQ from between 1991 and 2002.

During a meeting with Oregon DEQ representative Anna Coates on August 27, 2003, it became apparent that Oregon DEQ had been under the mistaken impression that work at the Site was done over the water. This impression is incorrect. Work at the Site has consisted of lifting vessels from the water onto an upland area approximately 50 feet above the water level. Once Ms. Coates came to understand the nature of the work at the Site, she suggested that this explanation be made an integral part of this report and a formal request to reclassify the Site from high priority to a more appropriate ranking.

Of the six complaints attributed to the Site, one is not specific to the Site (October 12, 1992), two are from a former disgruntled tenant (Mermaid Marine) in an effort to break their lease with Pier 99 (April 9, 2002 and April 12, 2002); and two do not pertain to the issues brought forth by the DEQ (September 11, 1991 and June 18, 1999). The remaining complaint (October 6, 1992) pertains to a single and unique complaint of pressure washing a marine vessel over the Columbia River (the River).

One specific complaint (April 9, 2002) alleged improper handling and disposal of potentially hazardous material and of disposal of engine oil onto the ground. This complaint has been investigated by SECOR, and the disposition and resolution of the complaint is described herein.

The Site is located on the Columbia River and has been operating as a marine vessel repair, manufacturer, painting and storage facility since the mid-1930s. The current building, crane and derrick were placed in approximately 1947. Schooner Creek Boat Works began operation at the Site in 1988 as a marine vessel repair and paint shop, and vacated the property in 2000.

To further delineate any potential threat(s) to the surrounding population and/or environment, a limited phase II was completed at the Site. Surface soil samples were collected from three potential source area listed by the DEQ (the embankment near the crane and engine housing, the eastern property gravel area, and the southern property gravel area), as well as a fourth area (the northwest corner of the property) disclosed by a former employee of Schooner Creek Boat Works. Sample depths ranged from between 6-12 inches below ground surface (bgs).

Based on historical activities at each locale, samples were selectively analyzed for volatile organic compounds (VOCs), total petroleum hydrocarbons (TPH) in the diesel and heavy oil ranges (TPH-DRO and TPH-ORO) and metals (specifically total lead). The results are outlined below:

- Total lead was present near the crane engine housing and eastern property gravel area at levels below EPA Region X Preliminary Remediation Goals (PRGs).

- Styrene was detected at a concentration of 157 micrograms per kilogram dry ($\mu\text{g/kg}$) near the eastern property gravel area. No other VOCs were detected at the Site above laboratory Method Reporting Limits (MRLs).
- TPH-DRO and TPH-ORO were detected at maximum concentrations of 7,540 milligrams per kilogram (mg/kg) dry and 42,400 mg/kg dry, respectively, at the crane engine housing.

A limited scope removal of contaminated soil was conducted during the week of October 13, 2003. Approximately 21.5 cubic yards of soil was removed near the crane engine housing and disposed of off site. Soils were removed to a total depth of approximately 7.0 feet bgs adjacent to the crane engine foundation. Further removal of soil would have created unstable slope conditions for the engine foundation. Three soil samples were collected; one from the excavation bottom (at a depth of 7.0 feet bgs); one from the northwest sidewall; and one from the southeast sidewall (at depths of 4.0 feet bgs each). TPH-DRO and TPH-ORO concentrations at the pit bottom were 376 mg/kg dry and 2,200 mg/kg dry, respectively.

Based on these results, a second soil sample was collected from the pit bottom and analyzed for extractable petroleum hydrocarbons (EPH) and selected VOCs per DEQ standards for establishing closure contaminant levels using site-specific risk-based calculations. Using the DEQ spreadsheet and laboratory analytical data, closure concentrations for diesel and heavy oil range hydrocarbons were calculated to be 20,000 mg/kg for leaching into groundwater for the residential scenario; and 7,400 mg/kg for soil ingestion, dermal contact, and inhalation for the residential scenario. Concentrations for volatilization to outdoor air and vapor intrusion into buildings were calculated to be greater than 100,000 mg/kg .

Discussions with the owner of the Former Schooner Creek Boat Works, the current land owner, and the DEQ have confirmed that work at the Site was conducted according to DEQ regulations and standards at the time each complaint was made. Based on the results of the limited Phase II investigation and soil removal, it is recommended that the Site be removed from the DEQ high priority listing and be considered for closure by the DEQ.

1.0 INTRODUCTION

SECOR International Incorporated (SECOR) has prepared this Expanded Preliminary Assessment (XPA) report for the Former Schooner Boat Works site (Site), located at North Pier 99/North Marine Drive in Portland, Oregon. The purpose of conducting the XPA and its associated sampling was to collect information beyond that gathered in the Preliminary Assessment (PA) or PA equivalent so that the DEQ could better evaluate any threat(s) the Site may pose to the surrounding population and environment.

An XPA typically consists of a field investigation with limited sampling; and may also include investigative work involving interviews with site owner/operators or file research. The XPA is limited in scope and is not intended as a full characterization of the Site. Field sampling was conducted under protocols accepted by the DEQ and the U. S. Environmental Protection Agency. Authority for conducting the XPA is provided in Oregon Revised Statute (ORS) 465.245.

2.0 SITE BACKGROUND

The Site is approximately 1 acre in size, located on the southern bank of the Columbia River, immediately west of the Interstate 5 Freeway (see Figure 1). From approximately 1937 to 1975, the Site operated as a marine vessel production, service and repair, and painting facility under the name Westerlund's Boat and Machine Shop. Marine transmissions were also manufactured at the Site. The current crane and buildings were placed at the Site in approximately 1947. Prior to that time, a barged crane was used, and the building was reportedly located at the current Interstate 5 Freeway overpass.

From approximately 1975 to approximately 1984, the Site operated as a machine shop under the name of Schrouder's Machine Shop. From approximately 1984 to approximately 1986, the Site was operated as an upholstery shop under the name of George's Upholstery. From approximately 1986 to 1988, the Site was operated as a marine vessel storage and repair facility under the name of Harbor 2 Boatyard.

Schooner Boat Works occupied the Site and began operation as a marine vessel repair and paint shop in 1988. Facility operations included marine vessel storage, painting, fiberglass and metalwork repair, and general repair of marine vessels. Boats were both brought in on dollies and picked from the River using the on-site crane, and brought up to the workshop for repairs. Operations ceased in July of 2000 and moved to another location.

2.1 LIST OF COMPLAINTS

The site was identified as a concern by the Oregon DEQ, based on six Pollution Complaints received by the DEQ between 1991 and 2002, alleging improper disposal or releases of hazardous substances at the Site. Based on these complaints, three areas of concern at the Site were identified; the riverbank area near the existing crane engine housing; the gravelly drainage area at the southern end of the property; and the solid waste storage and work area at the eastern end of the property. Specific complaints made to the DEQ are addressed below. Copies of the complaints are included in Appendix A.

2.1.1 Complaint No. 1

Complaint No. 1 (Complaint Number NWR-1991-2383) was received by the DEQ on September 11, 1991. The complaint alleges "improper disposal of chemicals" at the Site, then occupied by Schooner Creek Boat Works.

A DEQ representative conducted a site visit on October 15, 1991. The site visit included a conversation with the company owner regarding the improper disposal of chemicals, specifically paint thinner, into the dumpster. The owner detailed that some paint thinner waste was disposed of in the dumpster. DEQ advised the owner against disposing chemicals into the dumpster and requested that the owner submit an annual waste identification and quantity. The owner was then informed of his obligations for waste generation and disposal as a conditionally exempt generator.

No Potential Responsible Party (PRP) was identified by DEQ in the complaint. A No further action (NFA) was issued to the site regarding Complaint No. 1 after the site visit was conducted.

~~This complaint does not play a role in the listing of the Site as high Priority by the DEQ and should be dismissed as a cited reason for doing so.~~

2.1.2 Complaint No. 2

Complaint No. 2 (Complaint Number NWR-1992-2289) was received by the DEQ on October 6, 1992. The complaint alleges "Stripping of marine paint into Columbia River - pressure washing Cris Craft with black bottom and navigational hub - paint chips going into water - paint containing cuprous oxide" at the Site, then occupied by Schooner Creek Boat Works.

DEQ addressed the complaint by conveying to the owner that, per Water Quality Policy, epoxy or fiberglass bottom boats may be pressure washed over the water. However, marine paint (specifically ablative) may not be pressure washed over the water. An investigation revealed that Bristol Marine had applied paint containing cuprous oxide to the bottom of the boat.

A notice of non-compliance (NON) (NON WQ-92-451) was issued by the DEQ on October 28, 1992. No PRP was identified by DEQ in the complaint.

Upon discussion with the current property owner, Mr. Milton Brown, and the owner of Schooner Creek Boat Works, it was re-confirmed that all historical work involving the existing crane at the Site was done over the concrete pad next to, or inside, the workshop (up on the embankment), and that the complaint pertains to a single and unique event. Based on the complaints, DEQ assumed that all work on marine vessels was physically done over the River. However, during the Site visit on August 27, 2003, SECOR, the property owner, and the DEQ discussed the physical layout of the property, the crane, and its location in comparison to the River, and where and the type of work done on marine vessels. Boats picked from the River by the crane were lifted up onto the embankment where all work was done.

2.1.3 Complaint No. 3

Complaint No. 3 (Complaint Number NWR-1992-2325) was received by the DEQ on October 12, 1992. The complaint alleges that on October 8, 1992, "the source of the complaint, Mr. Bill Huff, was sanding a boat without containment; shavings going into the water of the Columbia Slough" at the Site, then occupied by Schooner Creek Boat Works.

A DEQ representative conducted a Site visit on October 8, 1992. The Site visit revealed that Mr. Huff was sanding the undercoat primer and putty off of the boat *Denali Balboa*, owned by Mr. Brad Anderson of Vancouver Washington. Upon inspection of the ingredients listed in the undercoat primer and putty, no toxic ingredients are present once the products dry.

A NON (NON WQ-92-442) was issued by the DEQ on October 20, 1992. No PRP was identified by the DEQ in the complaint.

This complaint does not pertain to the Former Schooner Creek Boat Works. The source of the complaint (Mr. Bill Huff) was a moorage customer of Pier 99 West conducting work on property other than Former Schooner Creek Boat Works.

2.1.4 Complaint No. 4

Complaint No. 4 (Complaint Number NWR-1999-0587) was received by the DEQ on June 18, 1999. The complaint alleges, "spraying the bottom of boats outside in boat yard; the smell is very strong" at the Site, then occupied by Schooner Creek Boat Works. The activities were observed on June 17 and 18, 1999.

The DEQ spoke with the company owner, Mr. Steve Rander, regarding complaints. Mr. Rander stated that they did paint a few boats outside in the yard due to an overload of work at the time; it was the first time that had been done that year; and that it will likely not need to occur again. Mr. Rander stated that the complainant is located in a local business area, and that there are boat work yards on either side of them. Painting is done for no more than an hour per day.

After the Site visit was completed, an NFA was issued on June 18, 1999, regarding the complaint. No PRP was identified by the DEQ in the complaint.

This complaint does not play a role in the listing of the Site as high priority by the DEQ and should be dismissed as a cited reason for doing so.

2.1.5 Complaint No. 5

Complaint No. 5 (Complaint Number NWR-2002-0294) was received by the DEQ on April 9, 2002. The complaint alleges "Oil slick to the river from crank case oil being drained on top of the dike. R(esponsible) P(arty) changes oil of the crane and lets it go directly into the river. Oil has soaked into the dirt and now seeps out of the embankment. This is an ongoing problem for several years" at the Site, then operated by Mermaid Marine.

A DEQ representative conducted a Site visit on April 17, 2002, and an NFA was issued for the complaint. The DEQ listed Mermaid Marine as the PRP in the complaint. Based on this

complaint, the Site was referred to Site Assessment by the DEQ's Northwest Region (NWR) Hazardous Waste program.

This complaint was made by a disgruntled tenant (Mermaid Marine) in an attempt to break his lease with Pier 99. The complainant inferred the allegations made and did not witness the alleged act of non-compliance. In fact, the complainant's own company was listed as a PRP. Therefore, this complaint should be dismissed as reason for listing the Site as high priority by the DEQ.

2.1.6 Complaint No. 6

Complaint No. 6 (Complaint Number NWR-2002-0274) was received by the DEQ on April 12, 2002. The complaint alleges "old problems at Site. Complainant has begun renting the Site, but has not started work there due to all kinds of fiberglass dust being all over, old painting debris, and old bottom paint all over the embankment; sewage and storm water went/goes to river. Can't work or clean around shop. 80 cubic yards of S(olid) W(aste) has been removed by the complainant, and there is still a lot more on Site. Pulled work equipment so no work is being conducted at this time by the complainant. Draining of crane crankcase and allowing the oil the drain onto the ground and embankment. Has been ongoing for several years, judged by the amount on the ground. Lots of oil has been deposited on the dike. Complainant has been working on cleaning up the Site for a month and a half and it still looks bad".

DEQ logged the complaint; however, no action was taken. Old Schooner Creek Boat Works Site was listed as the PRP in the complaint.

This complaint was made by a disgruntled employee (Mermaid Marine) for the reason cited under Complaint No. 5. The complainant inferred each of the allegations made and did not witness any of them directly. Therefore, this complaint should be dismissed as a reason for listing the Site as a high priority by the DEQ.

2.2 AREAS OF CONCERN

Based on the above-mentioned complaints, three areas of concern were identified by the DEQ: the crane engine and control cabin; the southern property gravel area; and the eastern property gravel area. Based on conversations with former employees, a fourth area was identified as a possible source.

2.2.1 Area 1. Embankment Near Crane

This area was identified as a possible source area based on the complaints submitted to the DEQ regarding improper dumping of oil from the crane engine onto the ground. The crane and engine housing sit at the top of the embankment, approximately 35 feet above the River surface.

2.2.2 Area 2. Southern Property Gravel Filter

This area was identified as a possible source area based on complaints submitted to the DEQ regarding storage of drums and solid waste and drainage of the concrete pad used to work on marine vessels outside of the workshop.

2.2.3 Area 3. Eastern Property Gravel Area

This area was identified as a possible source area based on complaints submitted to the DEQ regarding storage of solid waste material and drainage of the asphalt pad used to work on marine vessels outside of the workshop.

2.2.4 Area 4. Northwest Corner Drum Storage

This area was identified as a possible source area based on conversations with former employees of Schooner Creek Boat Works. The area was identified as a storage area for drums of fiberglass resin and catalyst materials for the fiberglass process.

3.0 SAMPLING OBJECTIVES

Surface soil sampling was conducted at the Site on July 3, 2003. The objectives of collecting these samples was to further characterize any potential source areas and eliminate those areas of concern that are not potential source areas. Areas 3 and 4 were tested for VOCs to identify potential organic compounds present in those areas. Areas 1 and 3 were tested for total lead to address the concern of solid waste storage and wash-down of material into the areas. Area 1 was tested for the presence of TPH-DRO and TPH-ORO.

4.0 SAMPLING ACTIVITIES PERFORMED

Eight soil samples were collected from depths ranging between 6 and 12 inches bgs (Figure 2). Sample locations were chosen based on cited issues by the DEQ as justification for listing the Site as high priority. Those areas include Area 1 (the engine and control cabin for the on-site crane and soils downslope of the cabin, SS-5 and SS-6), Area 2 (the graveled area at the southern property line, SS1 and SS-2), Area 3 (the eastern side of the property where solid waste was stored and equipment was worked on, SS-3 and SS-4), and Area 4 (the northwest corner of the storage shed where drums may have been stored, SS-7 and SS-8). All samples were collected using DEQ standards for sampling and analysis (OAR 340-122-0218).

All soil samples were collected into new, discretely labeled 8-ounce laboratory-prepared jars and stored in an ice chest pending transport to the project laboratory. A hand trowel and shovel were used to expose the soil for collection. Sampling equipment was decontaminated prior to each sample collection point using liquinox detergent and de-ionized water. Samples were transported under strict chain-of-custody protocol to North Creek Analytical (NCA) of Beaverton, Oregon.

5.0 SAMPLE RESULTS

Soil samples SS-3, SS-4, SS-7, and SS-8 were analyzed for the presence of VOCs per Environmental Protection Agency (EPA) Method 8260B. Samples SS-5 and SS-6 were analyzed for the presence of total petroleum hydrocarbons as diesel range organics (TPH-DRO) and heavy oil range organics (TPH-ORO) per NWTPH-Dx Method. Samples SS-3 through SS-6 were analyzed for the presence of leachable metals through EPA 1311/6000/7000 Series Methods. Samples SS-3 through SS-6 were also analyzed for total lead per EPA 6000/7000 Series Methods. Based on field observations, laboratory analyses were not performed on samples SS-1 and SS-2. The samples will be held by the laboratory, should additional site characterization be needed. Analytical results are summarized in Tables 1 and 2. A copy of the laboratory analytical report is included in Appendix B.

5.1 AREA 1. CRANE ENGINE AND CONTROL CABIN

To address complaints made regarding spillage of crane engine oil onto the riverbank, soil sample SS-5 was collected from the area approximately 10 feet downslope (north) of the existing crane engine bay. Soil sample SS-6 was collected from the area immediately beneath the crane engine bay. Figure 2 shows the locations of the samples SS-5 and SS-6. Soils beneath the crane engine bay exhibited petroleum staining. The land between the riverbank and the crane contained heavy vegetation and was not accessible during the Site investigation. Sheen was not visible on the River at the time of the soil sample collection.

Laboratory analysis indicates that TPH-DRO and TPH-ORO in sample SS-5 were 2,230 mg/kg dry and 2,550 mg/kg dry, respectively. Leachable barium was detected at a concentration of 0.800 milligrams per liter (mg/L). Total lead was detected at a concentration of 628 mg/kg dry.

TPH-DRO and TPH-ORO were detected in sample SS-6 at concentrations of 7,540 mg/kg dry and 42,400 mg/kg dry, respectively. Leachable barium was detected at a concentration of 0.663 mg/l. Total lead was detected at a concentration of 86.5 mg/kg dry.

5.2 AREA 2. SOUTHERN PROPERTY GRAVEL FILTER

To address complaints made regarding improper handling of hazardous substances and solid waste storage at the Site, surface soil samples SS-1 and SS-2 were collected from the southern property gravel filter area (Figure 2). Based on field observations during the Site investigation, these samples were submitted to the laboratory to hold pending further Site characterization.

5.3 AREA 3. EASTERN PROPERTY GRAVEL AREA

To address the complaint made regarding improper handling of hazardous substances, surface soil samples SS-3 and SS-4 were collected from the gravelly area at the east side of the property (Figure 2) at depths of 6 and 8 inches bgs, respectively.

Laboratory analysis indicates that styrene was detected in sample SS-3 at a concentration of 157 µg/kg dry; and 1,2,4-Trimethylbenzene was detected in sample SS-3 at a concentration of 101 µg/kg. However, quality control from the laboratory analysis indicates that 1,2,4-Trimethylbenzene was not detected above MRLs; rather, the results were raised based on

percent solids calculations. Leachable lead and barium were detected at concentrations of 0.576 and 0.806 mg/l, respectively. Total lead was detected at a concentration of 173 mg/kg dry.

Leachable lead and barium were detected in sample SS-4 at concentrations of 0.108 mg/l and 0.449 mg/l, respectively. Total lead was detected at a concentration of 36.0 mg/kg dry. Concentrations were below laboratory MRLs for VOC constituents.

5.4 AREA 4. NORTHWEST CORNER DRUM STORAGE

During the soil sampling event on July 3, 2003, information was disclosed to SECOR personnel from a former employee that the outside area at the northwest corner of the workshop was used to store drums of a fiberglass resin catalyst, Methyl Ethyl Ketone. The former employee stated that the drums were stored in that area and moved to the workshop when used for mixing. Based on this information, surface soil samples were collected at the outside northwest corner of the workshop and analyzed for VOCs.

This area was sampled based on a former employee's description of operational activities in the area during the sampling event. It was disclosed that drums of a fiberglass resin catalyst (Methyl Ethyl Ketone) were stored and used there.

Soil samples SS-7 and SS-8 were collected from the northwest corner of the former storage shed and work shop (Figure 2). Soil samples at a depth of 12 inches bgs exhibited no visual signs of contamination, based on field observations. Laboratory analysis indicates that concentrations were below MRLs for all VOC constituents, including Methyl Ethyl Ketone, in samples SS-7 and SS-8.

6.0 REMEDIATION

6.1 SOIL EXCAVATION

On October 15, 2003, approximately 21.5 cubic yards of soil contaminated with diesel and heavy oil range hydrocarbons was removed from the east, northeast, and southeast sides of the existing crane housing concrete foundation. Soil was removed to a total depth of approximately 7 feet bgs using a backhoe, and placed into lined containers for disposal. The total depth of the concrete foundation, approximately 4 feet, was exposed during the excavation. Soil at depths greater than 7 feet was left in place due to the potential unstable slope conditions that would have been created. The extent and location of the excavation is shown on Figure 3.

Three confirmation soil samples were collected on October 23, 2003 - one from the excavation bottom and one from each sidewall - and analyzed for hydrocarbon identification by NW-TPH HCID methodology and total lead. Sample locations are shown on Figure 3. All soil samples were taken to NCA. Diesel and heavy oil range hydrocarbons were detected in the pit bottom sample at concentrations of 376 and 2,200 mg/kg dry, respectively, and in sidewall #1 sample at concentrations of less than 125 and 1,700 mg/kg dry, respectively. Total lead was detected in the pit bottom, sidewall #1, and sidewall #2 at 51.6, 95.8, and 8.25 mg/kg dry, respectively. Analytical results are summarized on Table 3. A copy of the laboratory analytical report is included in Appendix B.

Soil sample concentrations were compared to DEQ Soil Matrix Cleanup levels. Based on site-specific conditions used to generate a matrix score, cleanup levels for diesel and heavy oil range hydrocarbons falls into Level 1, 100 mg/kg. Because concentrations of diesel and heavy oil range hydrocarbons were significantly greater than this for the pit bottom sample, site closure soil concentrations were generated using risk-based analysis. The process is described below.

7.0 CALCULATION OF RISK BASED CONCENTRATIONS

On October 29, 2003, a second soil sample was collected from the pit bottom and analyzed for EPH per Washington Department of Ecology (WDOE) Policy Method and selected VOCs per EPA Method 8260B. The sample was collected at a depth of approximately 7.0 feet bgs from native soil (silt) lying beneath the existing rock bedding used as foundation for the crane housing foundation, into a new laboratory-prepared, 8-ounce glass jar, labeled, and placed on ice pending transport to the project laboratory. The sample location is shown on Figure 3.

7.1 LABORATORY ANALYSIS

A second soil sample, Bottom-102903, was collected on October 29, 2003, and analyzed for Benzene, toluene, ethylbenzene and total xylenes (BTEX), 1,2-dibromoethane, 1,2-dichloroethane, methyl tert-butyl ether (MTBE), naphthalene, 1,2,4-trimethylbenzene (1,2,4-TMB), 1,3,5-trimethylbenzene (1,3,5-TMB), isopropylbenzene, n-propylbenzene, and extractable aliphatic and aromatic TPH fractions.

Laboratory analysis indicates that the concentrations of BTEX were less than the laboratory MRLs of 0.05 mg/kg dry (0.1 mg/kg dry for total xylenes). 1,2,4-TMB and 1,3,5-TMB were not detected above laboratory MRLs of 0.1 mg/kg dry and 0.05 mg/kg dry, respectively. MTBE and naphthalene were not detected above laboratory MRLs of 0.2 mg/kg dry. 1,2-dibromoethane, 1,2-dichloroethane and n-propylbenzene were not detected above laboratory MRLs of 0.05 mg/kg dry. Isopropylbenzene was not detected above the laboratory MRL of 0.2 mg/kg dry. Laboratory analytical data is summarized on Tables 4 and 5.

Laboratory analysis indicates that aliphatic hydrocarbon fractions C8-C10 and C10-C12 were not detected above laboratory MRLs of 5.0 mg/kg dry. Aliphatic fractions C12-C16, C16-C21, and C21-C34 were detected at concentrations of 8.19, 17.0, and 52.0 mg/kg dry, respectively.

Aromatic hydrocarbon fractions C8-C10, C10-C12, and C12-C16 were not detected above laboratory MRLs of 5.0 mg/kg dry. Aromatic fractions C16-C21 and C21-C34 were detected at concentrations of 6.92 and 7.24 mg/kg dry, respectively. Based on the concentrations above, the total extractable petroleum hydrocarbons were calculated by the laboratory to be 91.4 mg/kg dry by weight.

7.2 RISK-BASED SITE-SPECIFIC CONCENTRATIONS

Risk-based concentrations were determined specifically for the Site using DEQ guidelines presented in *Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites*, revised September 22, 2003. The specific concentrations were determined using the

spreadsheet *Calculating RBCs for Total Petroleum Hydrocarbons* provided by the DEQ, revised September 22, 2003.

TPH aliphatic and aromatic fractions and specific constituent (BTEX, 1,2,4-TMB, 1,3,5-TMB and naphthalene) concentrations were entered into the spreadsheet, and site-specific risk-based concentrations (RBCs) were calculated. Based on the TPH fraction and constituent data, a site-specific RBC for diesel and heavy oil range hydrocarbons was calculated to be 20,000 mg/kg for leaching into groundwater for the residential scenario, and 7,400 mg/kg for soil ingestion, dermal contact and inhalation for the residential scenario. Concentrations for volatilization to outdoor air and vapor intrusion into buildings were calculated to be greater than 100,000 mg/kg, the maximum amount that would be present if all of the initial air space is filled with petroleum product. Residential scenario concentrations are cited because they represent the most conservative RBCs of the exposure pathways (residential, urban residential, occupational, construction worker, and excavation worker).

Laboratory analysis from three soil samples collected on October 23, 2003 (one from the pit bottom and two from the side walls), indicate that the concentration of combined diesel and heavy oil range hydrocarbons remaining is 2,576 mg/kg at the pit bottom and 1,700 mg/kg for the northwest sidewall. These are well below the site-specific RBCs that were calculated using DEQ documents.

7.3 DEPTH TO WATER COMPARED TO PROJECTED DEPTH OF CONTAMINATION

The site is located on the southern bank of the Columbia River, immediately west of the Interstate-5 Freeway. Soils that were found to contain diesel and heavy oil range hydrocarbon contamination were located approximately 50 vertical feet above the shoreline and approximately 35 horizontal feet south of the shoreline.

The vertical extent of contamination has been delineated from 0 feet to 7.0 feet bgs directly from laboratory analyses of soil samples collected at depths of 0.5 feet and 7.0 feet bgs. At 0.5 feet bgs directly beneath the crane engine oil sump, the combined concentration of diesel and heavy oil range hydrocarbons was 47,940 mg/kg dry. At a depth of 7.0 feet bgs, the combined concentration was 2,576 mg/kg dry. This indicates a 94.6% decrease in concentration over a depth of 7.0 vertical feet. Using a conservative estimate of a 75% decrease over the next 7.0 vertical feet, at a depth of 14.0 feet bgs, the combined concentration is estimated to be 644 mg/kg dry. At 20 feet bgs, the combined concentration is conservatively estimated to be less than 161 mg/kg.

Given that the Site is at a relative elevation gain of approximately 50 feet above the shoreline of the River and the horizontal proximity of the site to the shoreline, the concentration of combined diesel and heavy oil range hydrocarbons is estimated to be negligible at depths greater than 20 feet bgs. This provides for at least 30 feet of isolation between the water table and any soil contamination remaining at the Site.

8.0 CONCLUSIONS

An Expanded Preliminary Assessment was completed by SECOR International, Incorporated to help determine any potential threats posed to the surrounding population and/or environment.

The Site was listed as a high priority site by the DEQ, citing six complaints (from 1991 to 2002). The complaints range from improper handling and disposal of hazardous material to draining of the crane crankcase oil onto the embankment.

Surface soil samples were collected by SECOR personnel on July 3, 2003. Eight samples were collected from three locations deemed possible source areas by the DEQ and a fourth location based on information gathered during a Site visit from a former employee. The three source areas were determined based on six complaints made to the DEQ since 1991, alleging improper handling and storage of potentially hazardous materials and conducting work over the River, resulting in potentially toxic or hazardous materials to enter the River. The source areas include: 1) Crane Engine and Control Housing, 2) Southern Property Gravel Filter, 3) Eastern Property Gravel Area, and 4) Northwest Corner Drum Storage.

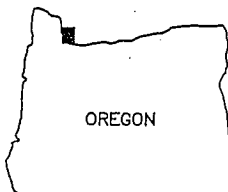
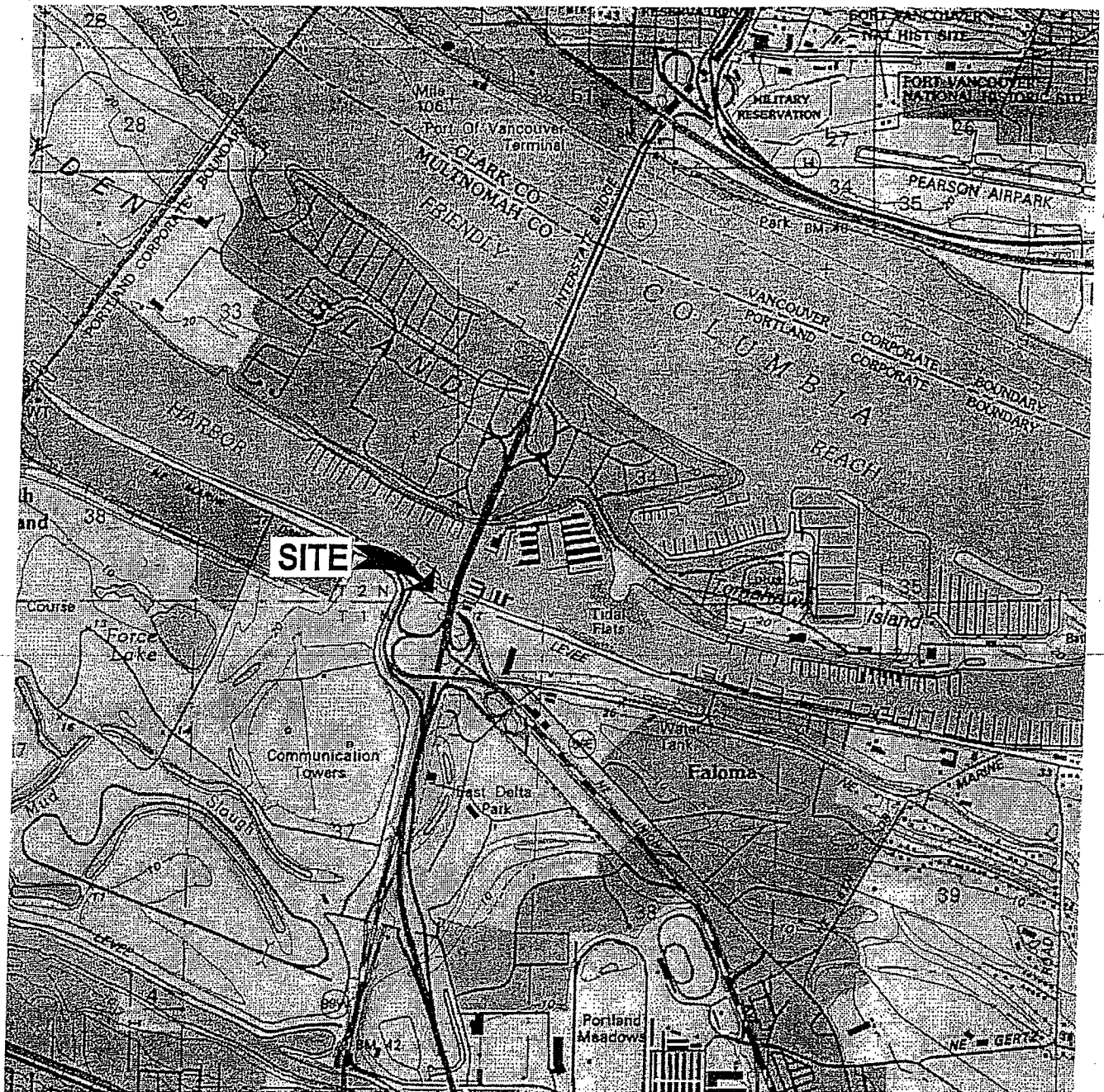
All samples were collected from between 6-12 inches bgs. Based on the nature of the complaints and Site history, samples were selectively analyzed for VOCs, metals, and TPH-DRO and TPH-ORO: Area 1 was analyzed for TPH-DRO and TPH-ORO and metals; Area 3 for VOCs and metals; and Area 4 for VOCs. Samples collected from Area 2 were submitted to the laboratory to hold for possible future characterization.

Soil samples from Areas 3 and 4 were below laboratory MRLs for all constituents, with the exception of total lead in Area 3. Area 1 samples contained elevated levels of diesel and heavy oil range hydrocarbons. On October 15, 2003, approximately 21.2 cubic yards of contaminated soil was removed from Area 1 near the crane engine housing and taken to the Hillsboro Landfill for disposal.

Closure samples were collected from the excavation pit bottom and two of the sidewalls. Combined diesel and heavy oil range hydrocarbon concentrations remained above Soil Matrix cleanup levels at 2,576 mg/kg dry. A second soil sample was collected from the pit bottom and analyzed for EPH constituents and BTEX, 1,2,4-TMB, 1,3,5-TMB, and naphthalene. Based on the analytical results, site-specific risk-based contaminant levels for the residential scenario for total petroleum hydrocarbons in the diesel and heavy oil range were calculated to be 7,400 mg/kg for soil ingestion, dermal contact and inhalation, and 20,000 mg/kg for leaching to groundwater. Residential scenario concentrations are cited because they represent the most conservative RBCs of the exposure pathways.

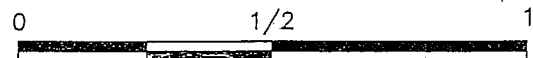
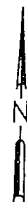
Based on the calculated RBCs above, combined diesel and heavy oil range hydrocarbon laboratory analytical concentrations from the pit bottom (at a depth of 7.0 feet bgs) of 2,576 mg/kg, and the conservative estimated depth of contaminant as compared to the depth to water (less than 161 mg/kg at a depth of 20 feet bgs), SECOR recommends that the Site be considered for closure by the DEQ.

FIGURES



OREGON

QUADRANGLE LOCATION



SCALE (MILES)

REFERENCE: USGS 7.5 MINUTE QUADRANGLE; PORTLAND, OREGON-WASHINGTON; 1990



SECOR

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SITE VICINITY MAP

**FORMER SCHOONER CREEK BOAT WORKS
NORTH PIER 99 / MARINE DRIVE
PORTLAND, OREGON**

FIGURE:

1

JOB #: 150T.09147.02.0002

APPR: *Hmt*

DWN: AMK

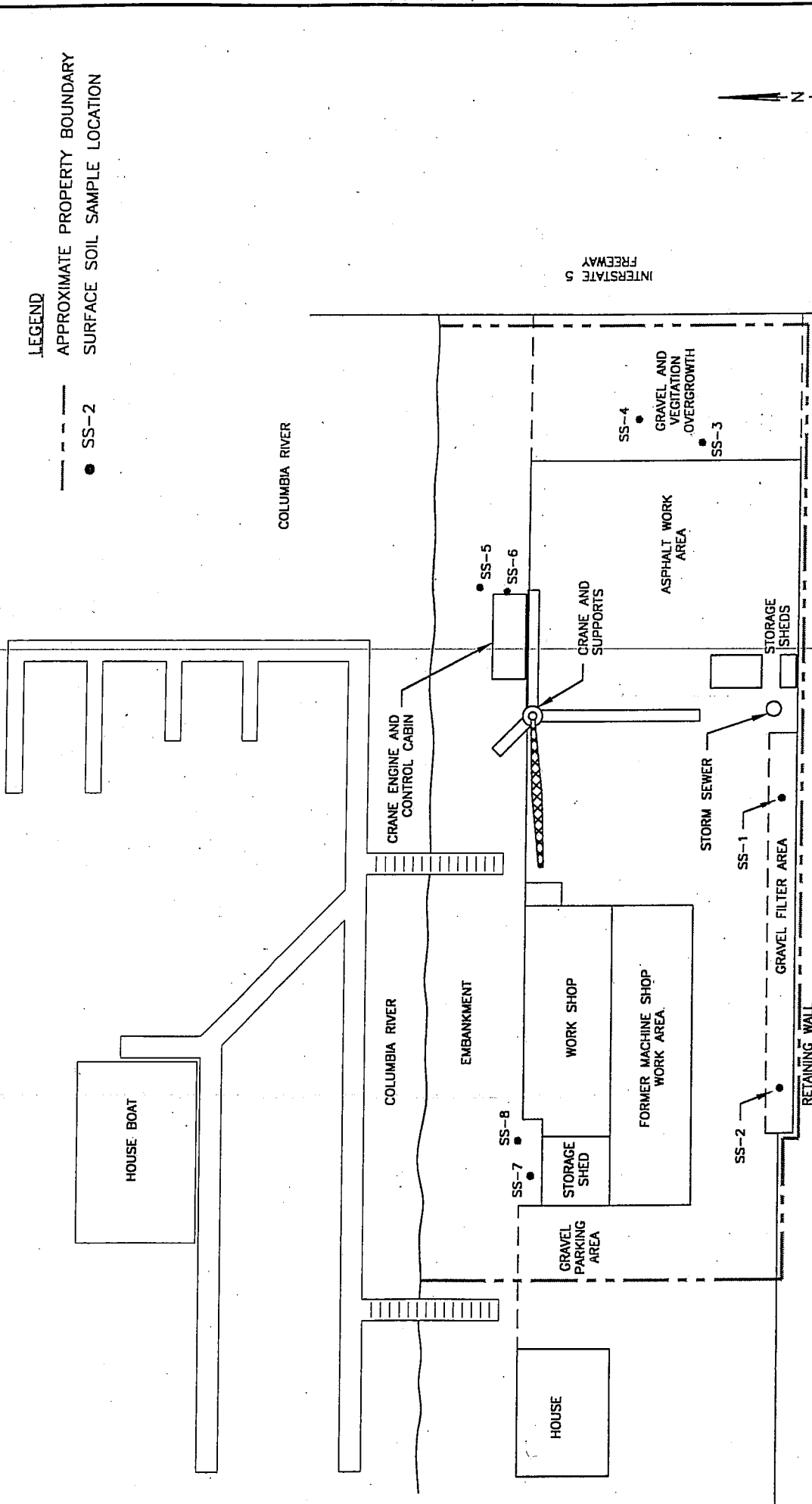
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N./SCHOONER BOAT WORKS

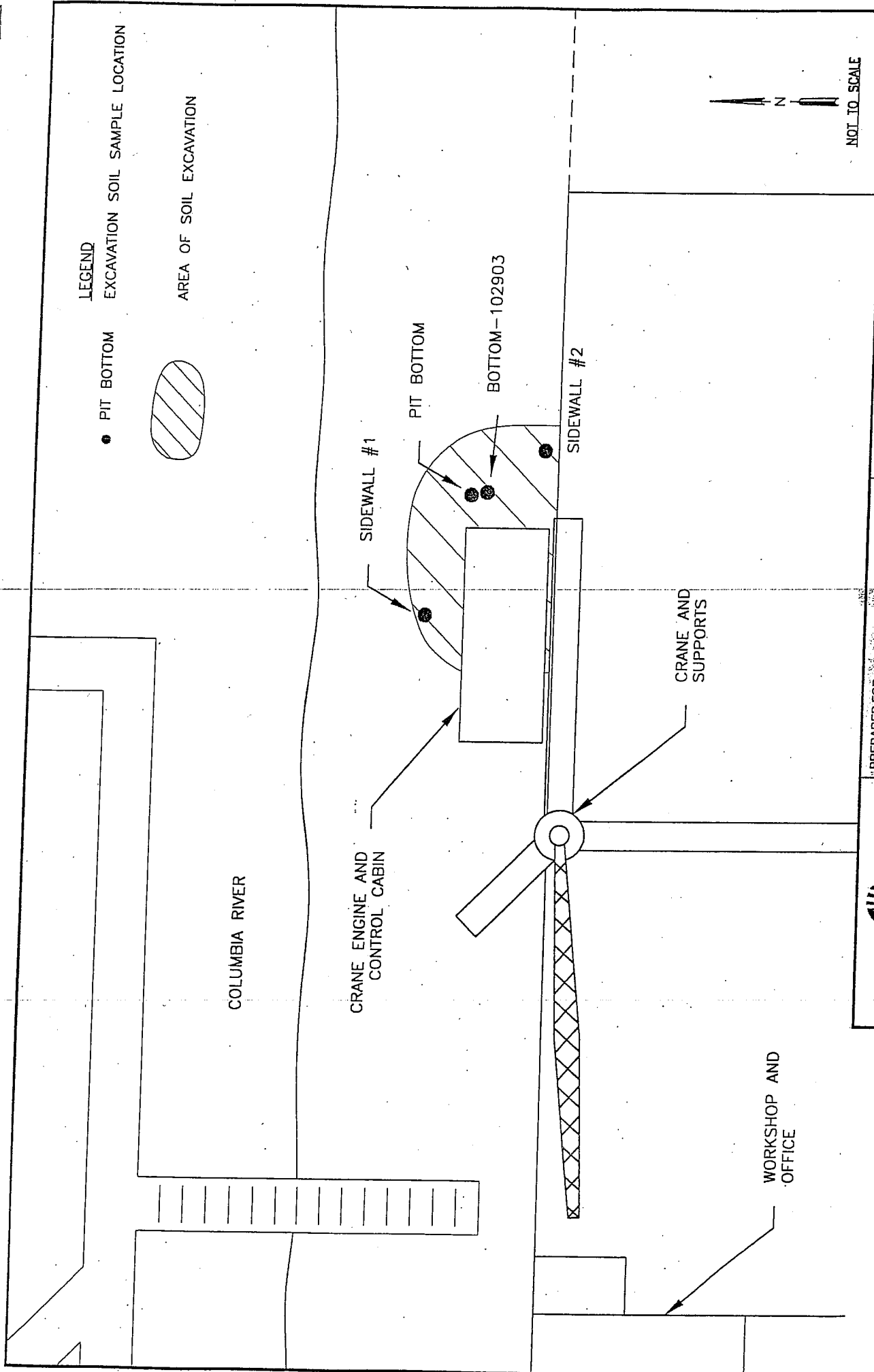
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LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- SS-2 SURFACE SOIL SAMPLE LOCATION



 <p>SECOR 7730 SW MOHAWK TUALATIN, OREGON (503) 691-2030 / (503) 692-7074 fax</p>	<p>PREPARED FOR: FORMER SCHOONER CREEK BOAT WORKS NORTH PIER 99 / MARINE DRIVE PORTLAND, OREGON</p>	<p>FIGURE: 2</p>	<p>SITE PLAN AND SURFACE SOIL SAMPLE LOCATIONS</p>
<p>DATE: 10/28/03</p>	<p>APPROVED BY: <i>AMK</i></p>	<p>CHECKED BY: <i>AMK</i></p>	<p>JOB NUMBER: 150T-09417.02.0002 DRAWN BY: AMK</p>



 SECOR 7730 SW MOHAWK TUALATIN, OREGON (503) 691-2030 / (503) 692-7074 fax		PREPARED FOR: FORMER SCHOONER CREEK BOAT WORKS NORTH PIER 99 / MARINE DRIVE PORTLAND, OREGON		JOB NUMBER: 150T.09417.02.0002		DRAWN BY: AMK		CHECKED BY: <i>Amk</i>		APPROVED BY: <i>JLC</i>		DATE: 10/28/03	
EXCAVATION AND SOIL SAMPLE LOCATIONS				FIGURE: 3									

TABLES

Table 1
SUMMARY OF SURFACE SOIL CHEMICAL RESULTS
Volatile Organic Compounds and Total Petroleum Hydrocarbons
Former Schooner Boat Works
N. Pier 99 / N. Marine Drive, Portland, Oregon

Sample Identification	Sample Depth (inches)	Sampling Date	VOCs (µg/kg dry)															TPH-DRO (mg/kg dry)	TPH-CRO (mg/kg dry)	
			2-Butanone (Methyl Ethyl Ketone)	Chloro-ethane	1,2-Dibromo-ethane	Dibromo-chloro-methane	1,1-Dichloro-ethane	1,2-Dichloro-ethane	1,1-Dichloro-ethene	Cis-1,2-Dichloro-ethene	Trans-1,2-Dichloro-ethene	Styrene	Tetra-chloro-ethane	1,1,1-Trichloro-ethane	Trichloro-ethene	1,2,4-Trinitrolyl-benzene	Trichloro-fluoro-methane			Vinyl Chloride
SS-1	12	7/3/03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SS-2	12	7/3/03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SS-3	6	7/3/03	<1,000	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	-
SS-4	8	7/3/03	<100	<1,000	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	-
SS-5	12	7/3/03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SS-6	12	7/3/03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SS-7	12	7/3/03	<100	<1,000	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	-
SS-8	12	7/3/03	<100	<1,000	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	-

Shaded Cell= Detectable Concentration
- = Not Analyzed
VOC = Volatile Organic Compound
TPH = Total Petroleum Hydrocarbons
mg/kg = milligrams per kilogram (parts per million)

µg/kg = micrograms per kilogram (parts per billion)
DRO = Diesel Range Organics (C10 - C22)
ORO = Oil Range Organics (C22 - C32)
TPH Analysis by NMTPH-Dx Method
VOC Analysis by EPA Method 8260B

* Analyte detected below laboratory method reporting limit (MRL) in sample extract. Percent solids calculation raised result above MRL.