

Early Action Report for the Bulk Fuel Tank Area Ketchikan Pulp Company Site

As part of redevelopment efforts at the mill site, Ketchikan Pulp Company (KPC) is removing soils from several areas that have been contaminated with petroleum hydrocarbons (Figure 1). As discussed in the remedial investigation report (Exponent 1998), areas that were contaminated with petroleum were removed from the remedial investigation during the project scoping process and investigated separately under an early action program. Soil sampling from these areas is described in detail in *Preliminary Site Characterization for Early Action for Petroleum-Contaminated Soils* (Appendix C in Exponent 1998). As part of the program, surface and subsurface soil samples were collected from 2 stations in the compressor area, 22 stations in the railroad tracks area, 2 stations in the former underground storage tank area, and 8 stations in the bulk fuel tank area. An additional 8 samples were collected from residual bulk fuel tank foundation sand after removal of the tank and the majority of the foundation sand.

Depending on past activities in each of the areas, samples were analyzed for gasoline-, diesel-, or residual-range organics; aliphatic and aromatic hydrocarbon fractions (C₆-C₁₀, C₁₀-C₂₅, or C₂₅-C₃₆); benzene, toluene, ethylbenzene, and xylenes (BTEX); and/or polycyclic aromatic hydrocarbons (PAHs). Alaska Department of Environmental Conservation (ADEC) soil cleanup standards for one or more petroleum-related compounds were exceeded in the compressor area, at two stations in the railroad tracks area, and at two stations in the bulk fuel tank area (Appendix C in Exponent 1998).

This report summarizes soil removal at the bulk fuel tank area, which was conducted in accordance with the *Early Action Plan for the Bulk Fuel Tank Area* (Exponent 1999a). Soil removal activities at the compressor and railroad tracks areas were conducted separately from soil removal at the bulk fuel tank and are discussed in *Early Action*

Report for the Railroad Tracks and Compressor Areas (Exponent 1999b). The quality assurance review summary for the chemical analyses is provided in Attachment A.

Removal Activities

On May 16–17, 1999, soil was removed from the contaminated area between the foundation ring of the bulk fuel tank and the containment berm (Figure 2). The excavation began at the south wall of the diesel tank retention wall and proceeded south along the side of the bulk fuel tank foundation ring to the sump foundation. During the course of excavation, the former pump house foundation was removed. Some visibly contaminated soil could not be removed because of the presence of column footings supporting fuel and steam pipes. Soil was excavated either to a depth where visible staining was not observed or to bedrock. Excavation depth varied between 2 and 8 ft. Coarse material (>2 in.) was separated from the “fine soil” (<2 in.) using a mechanical shaker. After separation, the fine soil was loaded into lined roll-off containers for transport to an out-of-state solid waste landfill. Five grab samples of soil were collected from the excavation area and analyzed for diesel- and residual-range organics and PAHs. Sample descriptions are provided in Table 1, and analytical results are provided in Table 2. The coarse material that was retained by the mechanical shaker was used to partially backfill the excavation. D1 crushed rock was used to complete the back filling (Photograph 1).

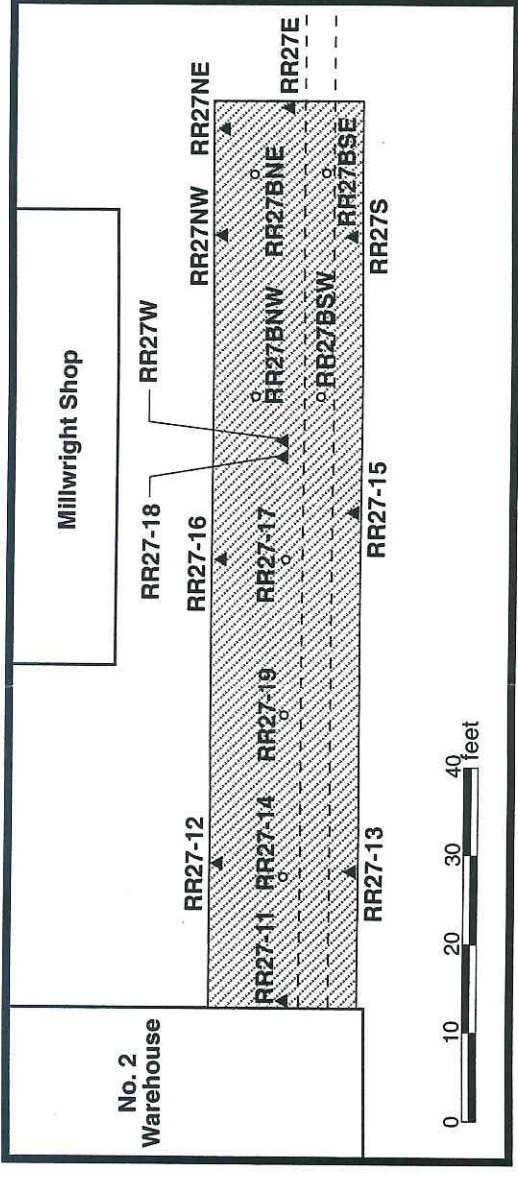
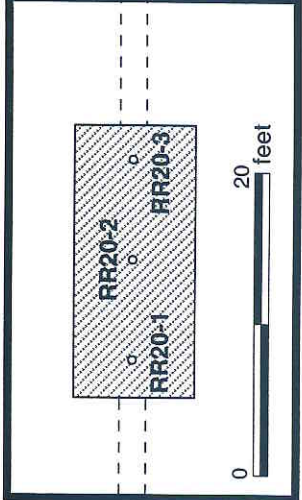
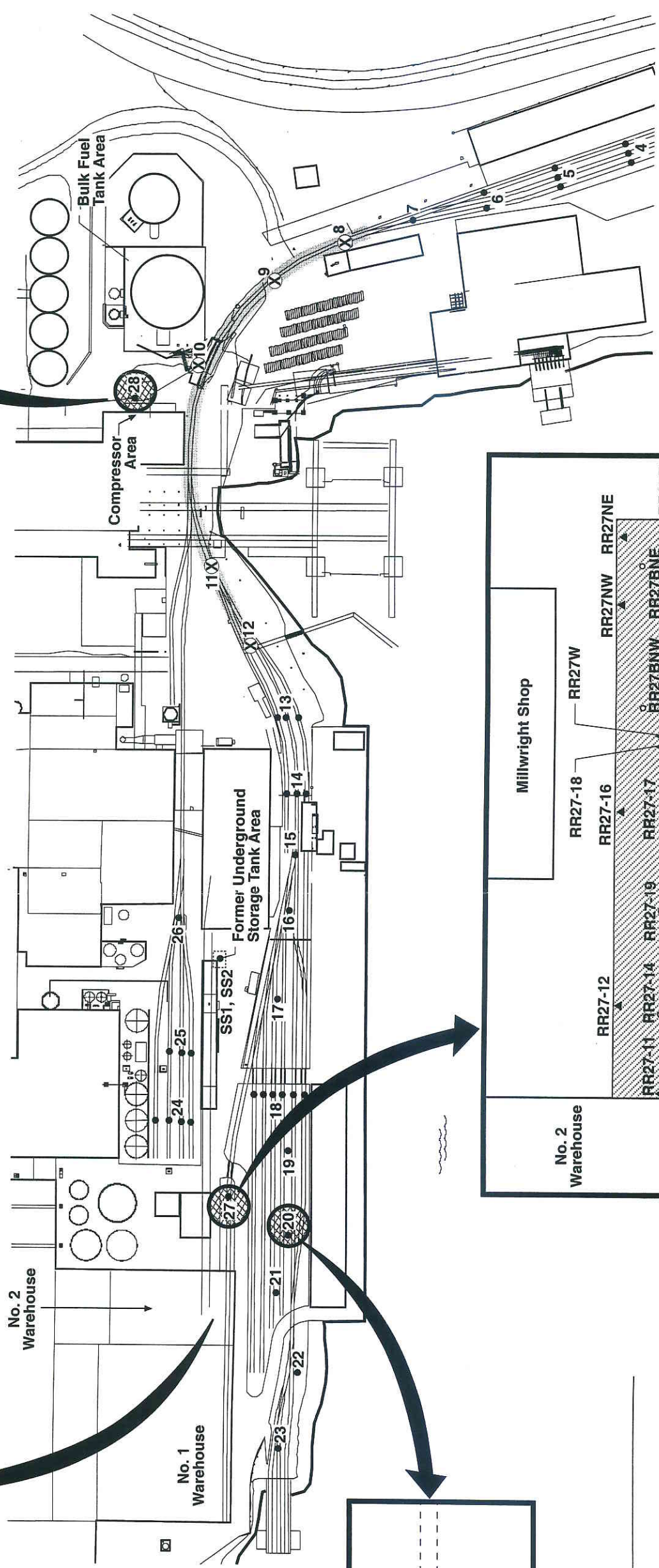
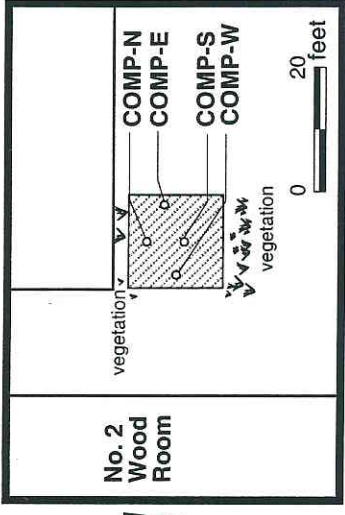
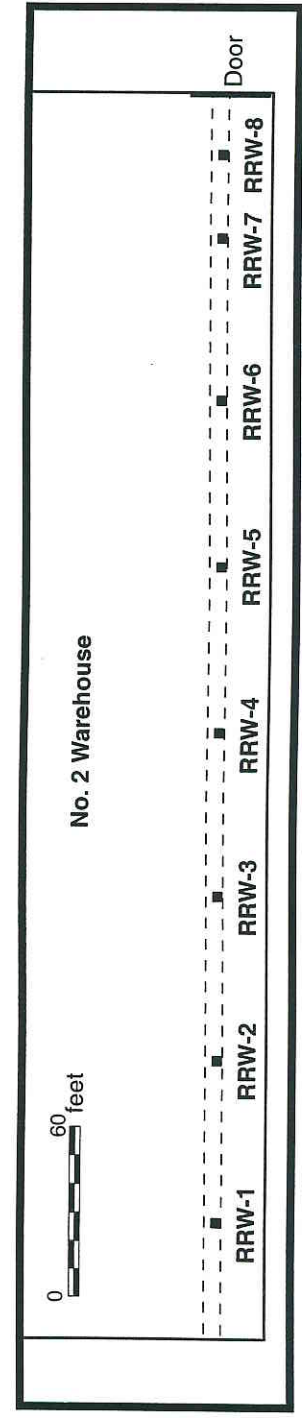
On June 16, 1999, soil was removed from the contaminated area south of the sump foundation and the 12-in. pipeline (Figure 2). The excavation began at the south wall of the sump foundation and continued approximately 50 ft east along the fill line, and it included removal of a section of the containment berm (Photograph 2). Soil was excavated to bedrock, which ranged from 2.5 to 6 ft deep. Small quantities of visibly contaminated soil could not be removed from the bedrock surface and from under the sump foundation and fill pipe support footings. Coarse material (>2 in.) was separated from the fine soil (<2 in.) using a mechanical shaker. After separation, the fine soil was

loaded into lined roll-off containers for transport to an out-of-state solid waste landfill. Ten grab samples of soil were collected from the excavation area and analyzed for diesel- and residual-range organics and PAHs. Sample descriptions are provided in Table 1, and analytical results and the applicable ADEC standards are provided in Table 2. Four samples, BFT-S2, BFT-S3, BFT-S4, and BFT-S14, had results for one or more analytes above ADEC limits; however, additional soil could not be removed because of the presence of concrete structures. Approximately 80–90 yd³ of contaminated soil remain in place. The coarse material that was retained by the mechanical shaker was used to partially backfill the excavation. D1 crushed rock was used to complete the backfilling. The containment berm was built up to its original height with D1 rock.

Twenty-six containers (approximately 416 yd³) of soil were removed from the two excavations and transported to an out-of-state landfill.

References

- Exponent. 1998. Remedial investigation, Ketchikan Pulp Company site. Volumes I–IV. Prepared for Ketchikan Pulp Company, Ketchikan, AK. Exponent, Bellevue, WA.
- Exponent. 1999a. Technical memorandum no. 18, early action plan for the bulk fuel tank area. Prepared for Ketchikan Pulp Company, Ketchikan, AK. Exponent, Bellevue, WA.
- Exponent. 1999b. Technical memorandum no. 20, early action report for the railroad tracks and compressor areas. Prepared for Ketchikan Pulp Company, Ketchikan, AK. Exponent, Bellevue, WA.



LEGEND

- Test pit
- ⊗ Test pit samples not collected because surface is paved (Stations 8-12)
- ▨ Railroad tracks are paved
- 23 Station number
- Soil sample where one or more constituents exceed ADEC standards
- Confirmation soil sampling station (approximate) (surface/bottom)
- ▲ Confirmation soil sampling station (approximate) (sidewall)
- Surface soil sampling stations
- ▨ Excavated area

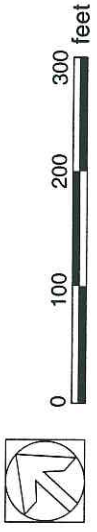


Figure 1. Petroleum-contaminated soils locations

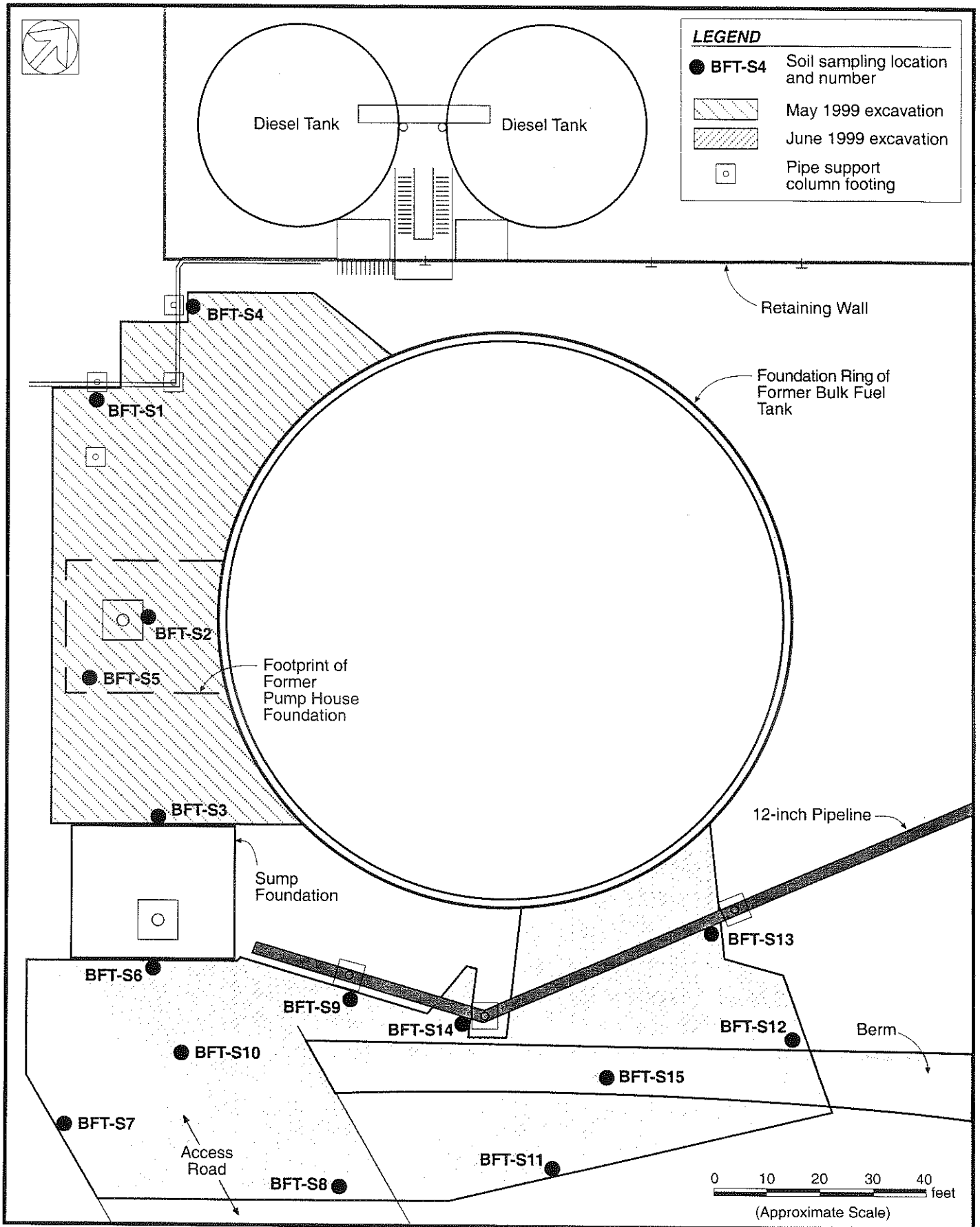


Figure 2. Excavations and confirmation soil sampling locations at the bulk fuel tank area.

Table 1. Confirmation Sample Descriptions

Sample	Type of Sample	Notes
May 1999 samples		
BFT-S1	Sidewall	Collected at 2 ft depth on side of pipe support column footing. Visible contamination present.
BFT-S2	Floor	Collected at 4.5 ft depth from bedrock underneath former pump house foundation.
BFT-S3	Floor/sidewall	Side/base of sump foundation. Visible contamination present.
BFT-S4	Sidewall	Collected from 2 ft depth on side of pipe support column footing. Visible contamination present.
BFT-S5	Floor	Collected from 2 ft depth.
June 1999 samples		
BFT-S6	Sidewall	Side of sump foundation. Visible contamination present.
BFT-S7	Sidewall	Side of retaining wall. Visible contamination present.
BFT-S8	Floor/sidewall	Base of access ramp/berm.
BFT-S9	Sidewall	Next to pipe support column footing. Visible contamination present.
BFT-S10	Floor	Collected from 6 ft depth on top of bedrock. Visible contamination present.
BFT-S11	Sidewall	Collected from 4 ft depth.
BFT-S12	Sidewall	Collected from 5 ft depth.
BFT-S13	Sidewall	Collected from 2.5 ft depth on side of pipe support column footing. Visible contamination present.
BFT-S14	Sidewall	Collected from 3.5 ft depth on side of pipe support column footing. Visible contamination present.
BFT-S15	Floor	Collected from 5.5 ft depth on top of bedrock. Visible contamination present.

Table 2. Analytical results for petroleum-contaminated soils from the bulk fuel tank area

Analyte	Units	Ingestion Standard	ADEC									
			May 1999 Samples					June 1999 Samples				
			BFT-S1	BFT-S2	BFT-S3	BFT-S4	BFT-S5	BFT-S6	BFT-S7	BFT-S8		
DRO	mg/kg	8,250	647	5,380	9,500	14,500	164	25 U	25 U	190		
RRO	mg/kg	8,300	967	6,500	11,200	14,200	213	50 U	50 U	458		
Acenaphthene	µg/kg	5,000,000	3,350 U	33,500 U	8,380 U	168,000 U	335 U	335 U	67.0 U	335 U		
Acenaphthylene	µg/kg	NE	6,500 U	65,000 U	16,300 U	325,000 U	650 U	650 U	130 U	650 U		
Anthracene	µg/kg	24,900,000	335 U	11,700 U	1,260 U	16,800 U	33.5 U	33.5 U	6.70 U	50.3 U		
Benz[a]anthracene	µg/kg	9,000	335 U	3,350 U	838 U	16,800 U	33.5 U	33.5 U	9.78	181.0 U		
Benzo[a]pyrene	µg/kg	900	364	15,100	2,710	22,700	44.9	33.5 U	13.20	96.9		
Benzo[b]fluoranthene	µg/kg	9,000	780	25,000 U	5,000 U	75,000 U	150 U	75.0 U	15.0 U	75.0 U		
Benzo[ghi]perylene	µg/kg	NE	1,500 U	26,300 U	4,690 U	93,800 U	188 U	75.0 U	15.0 U	113 U		
Benzo[k]fluoranthene	µg/kg	93,000	335 U	15,100 U	2,510 U	25,100 U	33.5 U	33.5 U	7.80	134 U		
Chrysene	µg/kg	930,000	2,680 U	134,000 U	16,800 U	184,000 U	335 U	33.5 U	16.2	1110 U		
Dibenz[a,h]anthracene	µg/kg	900	1,500 U	105,000 U	9,380 U	113,000 U	338 U	75.0 U	15.0 U	263 U		
Fluoranthene	µg/kg	3,300,000	750 U	18,800 U	2,810 U	37,500 U	75.0 U	75.0 U	27.8	150 U		
Fluorene	µg/kg	3,300,000	750 U	19,600	3,900	37,500 U	75.0 U	75.0 U	15.0 U	75.1		
Indeno[1,2,3-cd]pyrene	µg/kg	9,000	750 U	22,500 U	3,750 U	56,300 U	75.0 U	75.0 U	15.0 U	450 U		
Naphthalene	µg/kg	3,300,000	3,350 U	33,500 U	8,380 U	168,000 U	335 U	335 U	67.0 U	335 U		
Phenanthrene	µg/kg	NE	1,570	65,700	12,300	84,100	45.3	33.5 U	16.80	299		
Pyrene	µg/kg	2,500,000	787	40,700	6,300	57,900	93.6	33.5 U	34.50	478		

Table 2. (cont.)

		June 1999 Samples									
Analyte	Units	ADEC Ingestion Standard	BFT-S9	BFT-S10	BFT-S11	BFT-S12	BFT-S13	BFT-S14	BFT-S15		
DRO	mg/kg	8,250	967	474	101	25 U	5,790	9,030	1,400		
RRO	mg/kg	8,300	2,440	771	300	50 U	5,540	7,370	3,300		
Acenaphthene	µg/kg	5,000,000	1,680 U	3,350 U	670 U	134 U	1,680 U	8,380 U	1,680 U		
Acenaphthylene	µg/kg	NE	3,250 U	6,500 U	1,300 U	260 U	3,250 U	16,300 U	3,250 U		
Anthracene	µg/kg	24,900,000	168 U	670 U	67.0 U	13.4 U	586 U	2,510 U	335 U		
Benzo[a]anthracene	µg/kg	9,000	5,360 U	9,050 U	1,010 U	13.4 U	15,600 U	50,300 U	9,380 U		
Benzo[a]pyrene	µg/kg	900	302	376	67.0 U	13.4 U	734	2,170	481		
Benzo[b]fluoranthene	µg/kg	9,000	375 U	750 U	150 U	30 U	375 U	1,880 U	375 U		
Benzo[ghi]perylene	µg/kg	NE	750 U	1,500 U	150 U	30 U	938 U	6,560 U	938 U		
Benzo[k]fluoranthene	µg/kg	93,000	503 U	670 U	134 U	13.4 U	1,010 U	3,350 U	670 U		
Chrysene	µg/kg	930,000	3,350 U	6,030 U	603 U	13.4 U	10,100 U	31,800 U	5,860 U		
Dibenz[a,h]anthracene	µg/kg	900	1,130 U	1,500 U	225 U	30 U	1,880 U	6,560 U	1,500 U		
Fluoranthene	µg/kg	3,300,000	563 U	1,500 U	150 U	30 U	1,310 U	5,630 U	750 U		
Fluorene	µg/kg	3,300,000	468	1,450	150 U	30 U	1,510	6,620	942		
Indeno[1,2,3-cd]pyrene	µg/kg	9,000	2,250 U	3,750 U	900 U	30 U	3,000 U	13,100 U	3,000 U		
Naphthalene	µg/kg	3,300,000	1,680 U	3,350 U	670 U	134 U	1,680 U	8,380 U	1,680 U		
Phenanthrene	µg/kg	NE	1,710	5,260	211	13.4 U	4,700	26,000	3,080		
Pyrene	µg/kg	2,500,000	1,220	2,190	241	13.4 U	4,310	13,000	2,230		

Note: ADEC - Alaska Department of Environmental Conservation

DRO - diesel-range organics

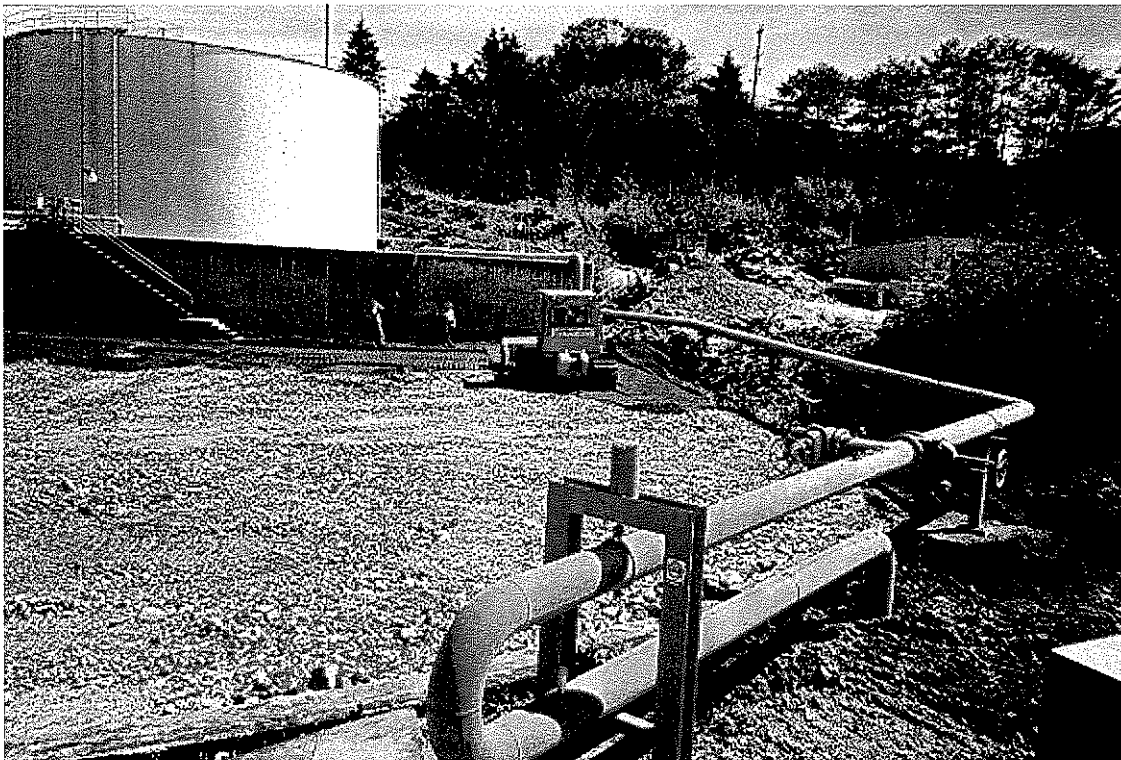
NE - none established

RRO - residual-range organics

U - undetected at detection limit shown

**Soil Removal Activities at the Bulk Fuel Tank Area
Ketchikan Pulp Company Site**

May and June 1999



Photograph 2. Excavation along 12-inch pipeline prior to backfilling, June 1999.

**Soil Removal Activities at the Bulk Fuel Tank Area
Ketchikan Pulp Company Site**

May and June 1999



Photograph 1. Backfilling of excavation area between foundation ring and containment berm, May 1999.

Attachment A

Quality Assurance Review Summary— Chemical Analyses of Soils from the Bulk Fuel Tank Area

Introduction

Exponent performed a quality assurance review of data for chemical analyses of diesel- and residual-range organics and polycyclic aromatic hydrocarbons (PAHs). The quality assurance review was conducted to verify that the laboratory quality assurance and quality control (QA/QC) procedures were completed and documented as specified in the quality assurance project plan (QAPP) (Appendix B in PTI 1997) and that the quality of the data is sufficient to meet the project data quality objectives (DQOs) and support the use of the data for its intended purposes. The results of the quality assurance review are presented in this report.

Chemical analyses were completed on soil samples collected as part of an early action program for the bulk fuel tank area. The early action program was developed in support of the remedial investigation and feasibility study (RI/FS) conducted for the Uplands Operable Unit at the Ketchikan Pulp Company site located approximately 5 miles north of Ketchikan, Alaska (PTI 1997). Fifteen soil samples were collected in May and June 1999 during this investigation. Details of the sampling procedures are provided in the field sampling plan (Appendix A in PTI 1997) and Technical Memorandum No. 18 (Exponent 1999). Descriptions of the procedures used for chemical analyses, data validation, and data processing are provided in the QAPP (Appendix B in PTI 1997).

Data Validation Procedures

A modified U.S. Environmental Protection Agency (EPA) Level 3 data validation was completed. During the quality assurance review, selected results were qualified, but no results were rejected.

Data validation procedures are based on EPA Contract Laboratory Program national functional guidelines for inorganic data review (U.S. EPA 1994a) and national functional guidelines for organic data review (U.S. EPA 1994b). Data validation procedures were modified, as appropriate, to accommodate project-specific DQOs and quality control requirements that are not specifically addressed by the national functional guidelines.

The following laboratory deliverables were reviewed during the data validation process:

- Chain-of-custody documentation to verify completeness of the data
- Case narratives discussing analytical problems (if any) and procedures
- Data summary sheets to verify analytical holding times
- Method blanks associated with each sample delivery group (SDG) to check for laboratory contamination
- Results for all laboratory quality control samples used to check analytical accuracy, including matrix spikes, laboratory control samples (LCSs), and surrogates
- Results for all quality control samples used to check analytical precision, including duplicate sample analyses.

Sample Set and Analytical Methods

The sample set consisted of 15 soil samples. Analyses for diesel- and residual-range organics were completed in accordance with Alaska Department of Environmental

Conservation methods AK102 and AK103, respectively. Analyses for PAHs were completed in accordance with EPA SW-846 Method 8310 (U.S. EPA 1997). All analyses were completed by North Creek Analytical (Portland, Oregon).

Sample Delivery Groups

The soil samples were analyzed in two SDGs. The data packages contained all documentation and data necessary to conduct a complete quality assurance review.

Data Quality Assessment

The results of the quality control procedures used during sample analysis are discussed below. The laboratory data were evaluated in terms of completeness, holding times, instrument performance, method blanks, accuracy, precision, and method reporting limits.

Completeness

The results reported by the laboratory were 100 percent complete.

Holding Times

The analytical holding time constraints specified in the QAPP (Appendix B in PTI 1997) were met for all samples and analyses with one exception. The method-required holding time limit of 14 days from collection to extraction for PAH analyses was exceeded by 2 days for one sample. Consequently, all PAH results for the one sample were qualified as estimated (assigned a *J* qualifier).

Instrument Performance

The performance of the analytical instruments, as documented by the laboratory, was acceptable. Initial and continuing calibration data and calibration blank data were not provided by the laboratory. However, no calibration or calibration blank exceedances were addressed in the data package.

Method Blank Analyses

No target analytes were detected in any method blank.

Accuracy

The accuracy of the analytical results is evaluated in terms of matrix spike, LCS, and surrogate recoveries. The recoveries reported by the laboratory for matrix spike and LCS analyses met the criteria for acceptable performance and frequency of analysis. The recoveries reported by the laboratory for all surrogates met the criteria for acceptable performance and frequency of analysis, with the following exceptions:

- The recovery of one of two surrogate compounds added to samples analyzed for diesel- and residual-range organics exceeded the laboratory's control limit in two samples. The recovery of the other surrogate in both samples was within control limits, and no data were qualified.
- Surrogate recoveries in several samples analyzed for diesel- and residual-range organics and PAHs could not be calculated because of sample dilution necessitated by high target compound concentrations. This did not result in any data qualification.

Precision

The results reported by the laboratory for laboratory duplicate analyses met the criteria for acceptable performance and frequency of analysis.

Method Reporting Limits

The method detection limits and method reporting limits provided by the laboratory met project DQOs (PTI 1997).

References

Exponent. 1999. Technical memorandum no. 18, early action plan for the bulk fuel tank area. Prepared for Ketchikan Pulp Company, Ketchikan, AK. Exponent, Bellevue, WA.

PTI. 1997. Work plan for the remedial investigation and feasibility study at the Ketchikan Pulp Company site. Prepared for Ketchikan Pulp Company, Ketchikan, AK. PTI Environmental Services, Bellevue, WA.

U.S. EPA. 1994a. USEPA Contract Laboratory Program national functional guidelines for inorganic data review. EPA 540/R-94/013. February 1994. Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, DC.

U.S. EPA. 1994b. USEPA Contract Laboratory Program national functional guidelines for organic data review. EPA 540/R-94/012. February 1994. Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington, DC.

U.S. EPA. 1997. Test methods for evaluating solid waste – physical/chemical methods, SW-846. Version 2. Integrated Manual/Update III. U.S. Environmental Protection Agency, Washington, DC.