Final Soils ✓ ✓

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CH2M HILL
Engineers
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Complete report in
LUST file: Snohomish County PUD #1 ~~0002~~
UST#008874
Halls Lake Yard
6120 - 212th St. SW
98043

December 11, 1990

SEA28742.A0

Mr. Joe Hickey
Washington Department of Ecology
4350 150th Avenue NE
Redmond, WA 98052

Dear Mr. Hickey:

In accordance with our telephone conversation, of November 6, 1990, I am providing you with a copy of the Snohomish County Public Utility technical memorandum which describes the soil investigation for underground storage tanks at Everett and Mountlake Terrace.

We appreciate your review of this document in an expeditious manner. If you have any questions, please call me at (206) 453-5000.

Sincerely,

CH2M HILL

Libby Goldstein

Libby Goldstein

je/hickey.let

Enclosure

Christi, 12-17-90
It looks like we only have one PUD file, but this report addresses two sites, both completed.
JS

MEMORANDUM CH2MHILL

TO: Garth Williams, Supervisor of Facilities
Snohomish County PUD No. 1

FROM: Lynn Laszewski/CH2M HILL
Libby Goldstein/CH2M HILL

DATE: October 24, 1990

SUBJECT: Summary of Soil Investigation for Underground Storage Tanks at Everett and Mountlake Terrace

PROJECT: SEA28472.A0

BACKGROUND

Snohomish County Public Utility District No. 1 retained CH2M HILL to observe the removal of four underground storage tanks (UST) and the excavation of contaminated soils associated with the tanks. Three of the UST systems were located at the District's downtown Everett facility and consisted of a 10,000 gallon gasoline tank (D-1), a 300-gallon waste oil tank (D-2), and a 300-gallon used transformer oil tank (D-3). The fourth tank (H-1) was a 2,000-gallon gasoline tank located at the Mountlake Terrace facility. Figures 1 and 2 show the location of tanks at each site. All tanks were constructed of single wall steel and were estimated to be approximately 30 years old.

A preliminary investigation was conducted by Hart Crowser Earth and Environmental Technologies in March 1988 to determine if soil may be contaminated in the vicinity of the four UST systems. Soil borings completed near the tanks indicated that soil in the vicinity of D-1 and H-1 contained petroleum hydrocarbons. Borings completed near D-2 did not exhibit detectible contamination. Soil borings were not completed near D-3. In the case of D-1, elevated petroleum hydrocarbons levels appeared to be limited to areas near the tank. The total petroleum hydrocarbons (TPH) detected in this area ranged from less than the detection limit to 2,500 ppm. The soil contamination detected near H-1 was at a depth of 2.5 to 4.0 feet from the surface, which may indicate surface spills. TPH levels ranged from less than 20 ppm (detection limit) to 2,300 ppm.

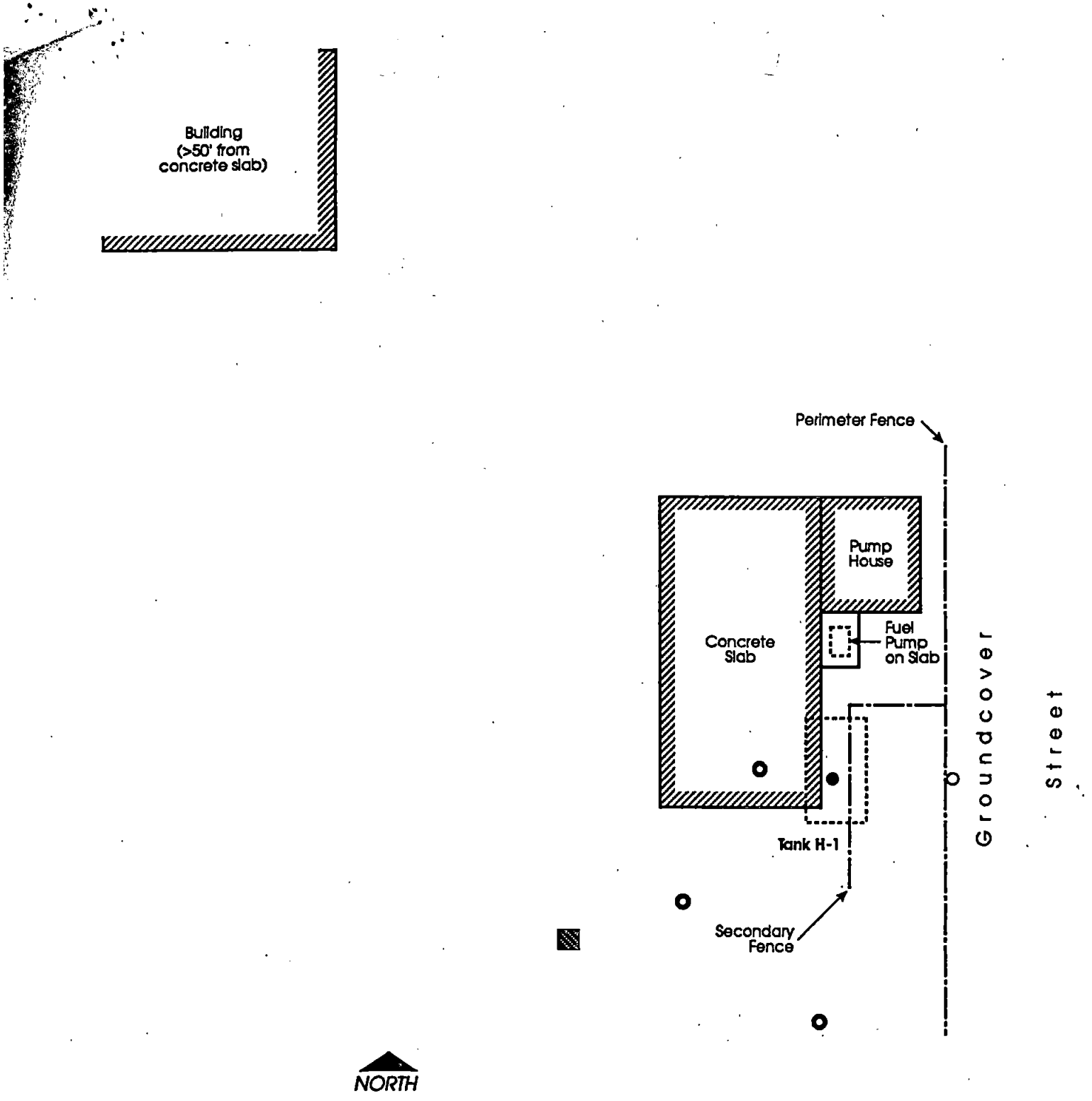

Figure 2
SNOHOMISH PUD
HALLS LAKE FACILITY

The District retained CH2M HILL to oversee the removal of the tanks and contaminated soil and verify (by sampling) the levels of TPH and volatile organic chemicals remaining in the excavation soil. The Verification Sampling Plan was designed to indicate whether or not petroleum contaminated soils were removed to the Washington Department of Ecology (Ecology) guideline levels. This would be accomplished by collecting soil samples from the four walls and floor of each tank excavation pit. The Verification Sampling Plan is included in Attachment A.

This memorandum summarizes the site observations and excavation sampling. Analytical data evaluation and recommendations for additional site remediation are also presented.

SITE INVESTIGATION METHODS

The removal of the UST systems and subsequent soil investigation was conducted from August 16, 1990 through September 5, 1990. The UST systems were removed and the soil in the vicinity of the four USTs were excavated by Lige and William B. Dickson Company. All soil samples collected by CH2M HILL were submitted to Friedman and Bruya, Inc., environmental chemists for total petroleum hydrocarbons (TPH) and benzene, toluene, ethyl benzene, and xylene (BTEX) analysis. EPA Methods 418.1 and 8020 were used for analysis of TPH and BTEX respectively.

The following criteria were used to determine the extent of excavation:

- soils that were stained, had visible contamination, or were otherwise discolored
- soils that had a strong petroleum odor
- soils that had readings greater than three to five ppm above background on the HNu photo-ionization detector

In general, soil was excavated past the point that contaminated soil was visually observed. Soil samples were then collected from the excavation pit walls and bottom to verify that sufficient contaminated soil was removed. If the analytical results from the pits indicated that the remaining soil exceeded the proposed Ecology clean-up levels, additional soil was excavated. This process was repeated until the analytical results indicated that soils were below the Ecology clean-up levels proposed June 20, 1990. The proposed Ecology cleanup levels are listed in Table 1.

Prior to sampling, the backhoe operator was instructed to retrieve soil from the desired location and depth in the excavation pit. Soil samples were collected by scooping soil from the backhoe bucket with a decontaminated stainless steel spoon. To obtain a representative sample, grab samples were collected from several locations within the backhoe bucket.

Soil that was removed from the excavation pits was stockpiled and stored in a predesignated bermed area lined with Visqueen. At the end of each day the stockpiles were covered with an additional Visqueen sheet. These stockpiles remained onsite until analytical results indicated the appropriate method of disposal for the soil. Sampling and removal of the excavated soil was the responsibility of Lige and William B. Dickson Company.

Tank H-1, Halls Lake Gasoline Tank

Tank H-1 was removed on August 16, 1990. The bottom of the tank was approximately six feet below grade. After removal, the tank was visually inspected. No holes or pits were observed on the outer surface of the tank. Tank H-1 excavation was completed on August 17, 1990. After excavation, elevated HNu readings were detected from the floor and the west wall of the pit. An additional three to five feet of soil was removed from these areas prior to verification sampling. The final dimensions of the excavated pit were 32' x 25' x 9'. Eleven soil samples, five floor samples, five wall samples, and one field

duplicate sample, were submitted to the laboratory. The floor samples were composited by the laboratory prior to analysis. Soil samples were analyzed for TPH and BTEX.

Tank D-1, Everett Gasoline Tank

Tank D-1 was removed on August 24, 1990 and pit excavation was completed on August 27, 1990. The bottom of this tank was approximately eight feet below grade. Holes or pits were not observed on the outer tank surface. The size of the excavation pit was 21' x 43' x 11'. When Hnu readings indicated that contaminated soil was removed, verification soil samples were collected from the walls and floor of the excavation pit. The five samples collected from the excavation floor were composited by the laboratory prior to analysis. Six soil samples (four wall samples, one floor composite sample, and one field duplicate sample) were analyzed for TPH and BTEX.

The results from the initial verification sample analysis (August 27, 1990) indicated that TPH levels in soil from the west portion of the pit floor exceeded Ecology proposed cleanup levels for gasoline UST systems. As a result, additional soil (two to three feet) was excavated from the west portion of the pit bottom and additional verification soil samples were collected on August 31, 1990.

Tank D-2, Waste Oil Tank

Tank D-2 was removed on August 24, 1990 and pit excavation was completed on September 5, 1990. The bottom of the 300-gallon tank was approximately seven feet below grade. The tank appeared to be in good condition; no holes or pits were observed on the outer surface. The size of the excavation pit was 22' x 42' x 10'. Initial verification soil samples were collected from the walls and floor of the excavation pit on August 27, 1990. Due to the size of the excavation pit, two samples were collected from the floor of the pit. These two samples were composited into one sample by the laboratory prior to analysis.

additional soil from the north wall was not feasible without jeopardizing the structural integrity of the building. Therefore, to determine the horizontal extent of the elevated TPH levels, additional samples were taken by digging with a shovel one to two feet into the excavation north wall beneath the building at the approximate depth of the tank bottom (five feet).

INVESTIGATION RESULTS

Analytical results the verification soil samples are presented in Tables 2, 3, 4, and 5. Laboratory analytical data is included in Attachment B. Quality Control/Quality Assurance measures employed for this sampling included chain-of-custody, maintenance of sample preservation and holding time requirements, and final data validation for conformance to applicable protocols. Data validation revealed that the precision, accuracy, and detection limits were acceptable for EPA analytical methods 8020 and 418.1.

Tank H-1, Halls Lake Gasoline Tank

Eleven soil samples were collected from the Tank H-1 excavation. The initial sample results indicated TPH concentrations were less than 25,000 ppb (detection limit) for all sample locations except the west wall. BTEX concentrations range from less than 1 ppb (detection limit) to 3,800 ppb for xylenes. Verification sample analysis after continued excavation of the west wall indicated that TPH concentrations from the west wall are also less than 25,000 ppm. Table 2 presents the analytical results for samples collected from Tank H-1 excavation.

w/ cleanup standard of .5 ppm

? typo ?

Tank D-1, Everett Gasoline Tank

Thirteen soil samples from the Tank D-1 excavation were analyzed for TPH and BTEX. Initial verification sample analysis indicated that TPH and BTEX concentrations in

north wall. These samples were collected at the approximate depth of the tank bottom (five feet). One sample was collected from the west, center and east portions of the north wall. Analytical results from these samples indicated TPH concentrations did not exceed 200,000 ppb.

SUMMARY AND CONCLUSIONS

Tank H-1, Tank D-1, and Tank D-2 final excavation floor and wall samples did not exceed the proposed Ecology cleanup guidelines of 100,000 ppb for gasoline and 200,000 ppb for diesel and fuel oils. Because Tank D-2 contained waste oil, the sample with the highest TPH levels was further characterized. Analysis of the Tank D-2 excavation north wall sample did not indicate total arsenic, lead, cadmium, or chromium at levels that exceed the ranges that naturally occur in soils. Gas chromatography indicated that the constituents present in the sample are similar to diesel fuel, hydraulic fluid, and motor oil. Therefore, it appears that these former tank locations do not require further remediation and do meet the Ecology guidelines for UST system closure.

Tank D-3 excavation walls and east portion of the floor exceeded the Ecology proposed TPH cleanup levels for diesel and fuel oil UST closure prior to final excavation. These areas were further excavated on August 31, 1990. Verification sample analysis from the north wall of the excavation still exceeded 200,000 ppb TPH, however, continued excavation was not possible without jeopardizing the structural integrity of the adjacent building. To further characterize the horizontal extent of elevated TPH levels, samples were collected from the north wall at the approximate depth of the tank bottom by digging with a shovel one to two feet into the excavation wall. Sample analysis indicated that TPH levels were less than 50,000 ppb. These analytical results indicate that the horizontal extent of elevated TPH levels (400,000 ppb) do not extend beyond one to two feet beneath the building foundation. Therefore, it appears that removal of soil containing elevated TPH

levels under the building would not be essential to protect human health and the environment for the following reasons:

1) TPH levels remaining in the soil are low (400,000 ppb).
2) Analytical results appear to indicate that the area containing elevated TPH levels is limited to approximately four cubic yards of soil.
3) The soil is located below the concrete foundation of a building that will continue to be used by the Snohomish County PUD No. 1 for industrial purposes.
4) Groundwater levels are approximately 72 feet below the surface and do not approach the estimated depth of contamination (approximately 9 feet below ground surface).

Table 2

Snohomish County Public Utility District No. 1
Mountlake Terrace, Washington

EXCAVATION SAMPLE RESULTS

TANK H-1 HALLS LAKE GASOLINE TANK

	Parameters	Benzene	Toulene	Ethylbenzene	Total Xylenes	TPH
	WDOE Proposed Cleanup Levels[a]	Soil 500 ppb	Soil 40,000 ppb	Soil 20,000 ppb	Soil 20,000 ppb	Soil 100,000 ppb
Sample Number	Sample Location					
PUD-HL-NWL-8171	North Wall	<1	<1	<1	<1	<25,000
PUD-HL-WWL-8172	West Wall	<200[c]	700	540	3,800	500,000
PUD-HL-SWL-81710[b]	West Wall	<1	<1	<1	<1	<25,000
PUD-HL-XWL-81712[b]	West Wall (dup)	<1	<1	<1	<1	<25,000
PUD-HL-SWL-8173	South Wall	<10[c]	<1	<1	<1	<25,000
PUD-HL-EWL-8174	East Wall	<1	<1	1	13	<25,000
PUD-HL-CFL-81711 PUD-HL-NEFL-8177 PUD-HL-NWFL-8175 PUD-HL-SEFL-8178 PUD-HL-SWFL-8179	Center, Northeast, Northwest, Southeast, and Southwest floor samples composited	<2[c]	<1	1	4	<25,000

WAC 173-340-450 June 20, 1990 Draft.
Resample of west wall of excavation after removal of approximately 3 to 4 feet of soil.
nterferences were present which interfered with the identification and quantification of the analyte indicated.