

CUST 1556

DEPARTMENT OF ECOLOGY  
 NWRQ/TCP TANKS UNIT

INTERIM CLEANUP REPORT  *SR*  
 SITE CHARACTERIZATION   
 FINAL CLEANUP REPORT   
 OTHER   
 AFFECTED MEDIA: SOIL   
 OTHER \_\_\_\_\_ GW   
 INSPECTOR (INT.) \_\_\_\_\_ DATE \_\_\_\_\_

*3/16/94  
(soil, gw)*

REPORT OF REMEDIAL ACTION  
 AND GEOTECHNICAL SERVICES  
 HYDRAULIC FLUID REMEDIAL PROGRAM  
 STORES BUILDING, RENTON SERVICE CENTER  
 RENTON, WASHINGTON  
 FOR  
 PUGET SOUND POWER & LIGHT COMPANY  
 VOLUME 1

Independent Action Report Update

Site Name: PUGET SOUND POWER  
 Inc. #: 1556 Date of Report: 10-4-91  
 County: King Date Report Rec'd: 1-6-94  
 Reviewed by: JOHN BAITS  
 Comments (please include: free prod., tank info., media, contaminant migration, GW conc. trends, PCS treated/fate?):

NFA -  
 DURING RELATED TANK REMOVAL DISCOVERED  
 HYDRAULIC FLUID CONTAMINATED SOIL.  
 HYDRAULIC LIFTS OUT-OF-SERVICE IN 5/88  
 APPROXIMATELY 6000 FT<sup>2</sup> AREA DEFINED  
 AS CONTAMINATED, REMOVED 3100 YLTS  
 PCS OFF-SITE FOR DISPOSAL, GEO-  
 ENGINEERS CONCLUDES SOIL HAVE BEEN  
 SUCCESSFULLY REMOVED AND GW HAS  
 NOT BEEN IMPACTED. GEO ENGINEERS  
 RECOMMENDS NO FURTHER REMEDIATION

Hydraulic Fluid Tank -

October 4, 1991

Geotechnical,  
Geoenvironmental and  
Geologic Services

Puget Sound Power & Light Company  
P.O. Box 97034  
Bellevue, Washington 98009-9734

Attention: Mr. Gary R. Reid

We are submitting eight copies of our report of remedial action related to a hydraulic fluid leak in the vicinity of the Stores Building at the Renton Service Center in Renton, Washington. Our services described in this report are part of our ongoing services for this project and were initially authorized verbally by Mr. Gary Reid of Puget Sound Power & Light Company on June 28, 1989. Our services were performed in accordance with Blanket Contract No. 89-BX01074A and under Purchase Order No. ZZ-02147-W-LS.

We appreciate the opportunity to be of continued service to Puget Sound Power & Light Company. Please call if you have any questions regarding this report or our services.

Yours very truly,

GeoEngineers, Inc.



Stephen C. Perrigo  
Associate

CAH:KSK:SCP:cs

File No. 0186-106-R69

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REPORT OF REMEDIAL ACTION AND GEOTECHNICAL SERVICES

HYDRAULIC FLUID REMEDIAL PROGRAM

STORES BUILDING, RENTON SERVICE CENTER

RENTON, WASHINGTON

FOR

PUGET SOUND POWER & LIGHT COMPANY

INTRODUCTION

This report summarizes the results of our observations during the remedial activities related to hydraulic fluid-contaminated soil in the vicinity of the Stores Building at the PSP&L (Puget Sound Power & Light Company) Renton Service Center in Renton, Washington. The site is located at 620 South Grady Way as shown on the Vicinity Map, Figure 1.

The Stores Building and its associated access/parking areas are bounded by South Grady Way to the north, Talbot Road to the west, and by other PSP&L facilities to the east and south. The general layout of the site is shown on Figures 2 and 3. The project area is located within and north of the garage area of the Stores Building. Hydraulic fluid had been used to operate three hydraulic lifts in the garage area since 1974. The hydraulic lifts have been out of service since May 1988. During the removal of two waste oil tanks located immediately north of the garage in August 1989, hydraulic fluid-contaminated soil was encountered. Subsequently, GeoEngineers' completed subsurface contamination studies at the site and defined an area of approximately 6,000 square feet in the vicinity of the garage which had been affected by the leakage of hydraulic fluid.

GeoEngineers' subsurface contamination studies of the site are summarized in the following reports: "*Report of Geotechnical Services, Underground Storage Tank Removal and Subsurface Contamination Study, Stores Building, Renton Service Center, Renton, Washington, for Puget Sound Power & Light Company,*" dated January 17, 1990; "*Supplemental Report, Geoenvironmental Services, Off-site Subsurface Contamination Study, General Stores Building, Renton Service Center, Renton, Washington, for Puget Sound Power & Light Company,*" dated November 29, 1990; and "*Supplemental Report, Geoenvironmental Services, Subsurface Contamination Study and Ground Water*

IN-File ✓

Monitoring Program, General Stores Building, Renton Service Center, Renton, Washington, for Puget Sound Power & Light Company," dated December 18, 1990.

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These subsurface contamination studies describe the field activities, observations, testing results and conclusions which form the basis for our recommendations for remediation of the hydraulic fluid contamination. GeoEngineers' recommended remedial action is described in the first report cited. We recommended that the contaminated soil be removed by excavation. We evaluated other alternative remediation technologies including in-situ bioremediation and steam stripping. These alternative methods were not appropriate because of the type of hydrocarbon contamination involved.

Remediation activities were completed between the dates of September 27 and December 17, 1990. Two USTs (underground fuel storage tanks) and associated residual contaminated soil were removed concurrently with the hydraulic fluid remedial program. These USTs were located near the northeast corner of the Stores Building and outside of the hydraulic fluid-contaminated area at the site. The UST removal activities are described in a separate report titled "Report of Remedial Action, Underground Storage Tank Removal, Stores Building, Renton Service Center, Renton, Washington, for Puget Sound Power & Light Company," dated February 7, 1991.

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#### SCOPE OF SERVICES

The purpose of our services was (1) to provide preconstruction support to PSP&L (development of remedial specifications, obtaining permits and coordinating off-site soil disposal), (2) to provide geoenvironmental and geotechnical services during the remedial activities (observation and documentation of cleanup activities), and (3) to observe and maintain documentation of the contractor's activities as requested by PSP&L. GeoEngineers subcontracted Sargent Engineers Inc. to provide structural engineering consultation services for the project. Chempro (Chempro Environmental Services, Inc.) provided general contracting services to PSP&L during the remediation.

The specific scope of services completed for this project included:

##### Preconstruction Support

1. Assist PSP&L in the development of specifications for the remedial activities and in the contractor selection process.
2. Assist PSP&L in obtaining permits from various regulatory agencies.

3. Assist PSP&L in coordinating off-site disposal of contaminated soil.
4. Subcontract Sargent Engineers Inc. to develop demolition plans for the remedial activities.

Monitoring Remedial Activities

5. Subcontract Sargent Engineers Inc. to provide ongoing structural engineering consultation services during the remedial operations.
6. Bail product from MW-7 and MW-25 during the initial phase of remediation, then abandon these wells prior to excavating in these areas.
7. Observe the relocation of the sanitary sewer line.
8. Provide technical guidance on the dewatering system, and monitor the installation of ground water pumps and water table depression wells designed to dewater the excavations and lower the static water table.
9. Collect wastewater samples for chemical analysis in accordance with Metro's discharge permit requirements.
10. Monitor the combustible vapor levels in the excavations on a regular basis in accordance with PSP&L's construction permit with the City of Renton.
11. Provide on-site consultation services during remedial operations to (a) assist with the identification of contaminated materials through field screening techniques supported by analytical testing, (b) sample potentially contaminated soils for chemical analysis to determine their disposition, (c) coordinate the segregation of contaminated and noncontaminated soils, and (d) sample soils remaining at the limits of the remedial excavation for chemical analysis to evaluate the effectiveness of the remedial activities.
12. Monitor the placement and compaction of backfill in the excavated areas.
13. Observe site cleanup activities and obtain surface soil samples for chemical analysis from the driveway area north of the Stores Building and from beneath the asphaltic concrete pavement in the contaminated soil stockpile area.

14. Obtain ground water samples from selected monitor wells at the completion of remedial activities for chemical analysis.

#### Monitoring Contractor Activities

15. Monitor the cutting, demolition, and removal of specific sections of the concrete floor slab inside the Stores Building.
16. Observe the removal of the hydraulic lifts and the related below grade piping inside the Stores Building.
17. Monitor the cleaning and backfilling of the hydraulic lift vaults that were left in place.
18. Monitor the transportation of both contaminated and noncontaminated soils to their respective stockpile areas.
19. Observe and record the weights of trucks loaded with contaminated soil prior to transport to the Kitsap County Sanitary Landfill.

#### REGULATORY CONSIDERATIONS

Releases of petroleum hydrocarbons to the environment are regulated through several environmental regulations. The regulation that relates to the reporting and mitigation of the release of hydraulic fluid at this site is the MTCA (Model Toxics Control Act) Regulation (WAC 173-340). The MTCA Regulation includes specific cleanup levels for releases of petroleum hydrocarbons that are heavier than diesel. The cleanup levels in the MTCA Regulation were finalized by Ecology (the Washington Department of Ecology) in February 1991. During the period of the planning and implementation of cleanup efforts at this site the MTCA Regulation cleanup levels went through several drafts.

The final MTCA Regulation compliance cleanup level for hydrocarbons in soil is 200 mg/kg. The analytical method to achieve this cleanup level is not specified in the regulation and, no such guidance has been developed to date.

Recently enacted UST (Underground Storage Tank) Regulations (WAC 173-360) and their associated guidance address the issue of appropriate analytical methods for characterizing contamination and releases of petroleum hydrocarbons. It is our experience that Ecology is applying this guidance to MTCA regulated releases as well. The guidance for the UST Regulations which was released in February 1991 specifies that petroleum hydrocarbons heavier than diesel (which would include hydraulic fluid) in soil should be quantified using EPA Method 418.1, total petroleum hydrocarbons.

GeoEngineers prior experience at the PSP&L Renton site demonstrated interferences in the EPA Method 418.1 analysis that appeared to be related to the presence of coal in the fill which is common across the site. As an alternate, we have used another testing method to characterize the hydraulic fluid contamination in soil at this site. The analytical testing of soil for hydraulic fluid contamination was performed using modified EPA Method 8015 with all analyses quantified relative to a hydraulic fluid standard. We believe that this method, in conjunction with the contaminant specific quantitation, provides an accurate representation of the residual soil contamination at the site. We believe that this method is appropriate for the purpose of site evaluation relative to MTCA regulation compliance cleanup levels for petroleum hydrocarbons.

#### REMEDIAL PROGRAM

##### OVERVIEW

Preconstruction support activities began in April 1990 after PSP&L selected the cleanup approach for this project. Preconstruction support included: (1) assistance in the development of specifications for the remedial activities, (2) meeting with Ecology and the City of Renton to discuss cleanup plans, (3) preparation of documentation for appropriate construction permit applications, (4) assistance with PSP&L's contractor selection process, and (5) assistance with arranging landfill disposal of contaminated soil. Actual construction activities could not begin until the appropriate preconstruction activities could be arranged.

Messrs. Gary Reid and/or Dave Kramer of PSP&L were on-site during the remedial operations. GeoEngineers provided technical guidance to PSP&L and their general contractor during the remedial program. We subcontracted Sargent Engineers Inc. to provide structural consultation services to PSP&L and their contractors prior to and during the remedial operations.

Chempro began on-site remedial activities at the site on September 27, 1990. Chempro subcontracted out some of the tasks involved in the remedial operations, including concrete cutting and removal, sanitary sewer line relocation, the transportation of contaminated soil to the Olympic View Landfill in Kitsap County, and the concrete slab replacement. The remedial program was completed on December 17, 1990, with the exception of the

replacement of the concrete floor slab inside the Stores Building and asphaltic concrete pavement north of the Stores Building. The floor slab was replaced in January 1991.

A representative of GeoEngineers was present during the remedial operations to observe and document the site cleanup, backfill and restoration activities. Analytical data are summarized in Tables 1 through 8. The field screening methods are described in Appendix A. The laboratory reports are included in Appendix B.

#### PRECONSTRUCTION SUPPORT

GeoEngineers assisted PSP&L in the development of specifications for the remedial activities. The document is titled "Specification for Renton Service Center Garage Area, Remediation of Hydraulic Fluid Leak, Removal of Underground Fuel Storage Tanks and Surface Restoration". GeoEngineers subcontracted the services of Sargent Engineers, Inc. to prepare demolition plans (three sheets) to include in the specification package.

PSP&L and GeoEngineers' representatives met with Mr. Joe Hickey and Ms. Annette Petrie of the Northwest Regional Office of Ecology on April 4, 1990. The purpose of the meeting was to inform Ecology of the findings of GeoEngineers' prior studies and to discuss the planned remedial action. Ecology's representatives indicated that they could not provide specific comment on the planned cleanup since the action was being completed as an independent action as described in the MTCA Regulation. Mr. Hickey prepared a letter acknowledging that: (1) PSP&L had satisfied reporting requirements for the site, (2) Ecology felt that the site characterization followed proper procedures, and (3) Ecology felt that the proposed remediation plan for the site was adequate. A copy of Ecology's letter, dated May 1, 1990 is included in Appendix C.

PSP&L and GeoEngineers' representatives met with the City of Renton on March 28, 1990. The proposed cleanup action potentially affected several departments within the City's bureaucracy. The purpose of the meeting was to discuss the planned remedial action with the city and to coordinate permitting activities. The City's efforts were coordinated by Mr. Ron Nelson of the City of Renton Building Department. Other departments represented in that meeting included the Renton Fire Department and the Department of Public Works.

GeoEngineers provided supporting documentation for PSP&L's submittals to the City of Renton which included the specifications previously described, an environmental checklist, a building permit application and a grading license application. In addition, GeoEngineers developed a document titled "Excavation and Temporary Erosion/Sedimentation Control Plan, Soils Remediation, Stores Building, Renton Service Center, Puget Sound Power & Light Company, Renton, Washington." This document was also supplied to the City of Renton during the permit application process. A copy of the plan is included in Appendix C.

GeoEngineers assisted PSP&L in the contractor selection process. PSP&L submitted the project bid package to two firms. The specifications previously described were submitted as part of the bid package. GeoEngineers attended a prebid meeting to assist PSP&L in describing the scope of the project and to answer questions.

GeoEngineers assisted PSP&L with securing permission for disposal of petroleum contaminated soil from the site at the Olympic View Landfill in Kitsap County, Washington. This included profiling the waste stream and obtaining clearance for its disposal. On September 20, 1990 we submitted documentation to characterize the waste soil to the landfill operator's consultant, Parametrix, Inc. A copy of the soil disposal clearance request letter is included in Appendix D. On October 9, 1990, PSP&L received verbal notification that the soil would be accepted at the landfill for disposal.

#### SITE PREPARATION

Chempro constructed two stockpile areas on the site during site preparation activities on September 28, 1990. The contaminated soil stockpile area was constructed to the southwest of the Stores Building. The noncontaminated soil stockpile area was constructed along the eastern edge of the PSP&L property. The contaminated soil stockpile area was lined with plastic sheeting and surrounded with ecology blocks. The noncontaminated soil stockpile area was lined with plastic sheeting and surrounded by straw bales. Contaminated and noncontaminated soil placed in the respective stockpile areas during the remedial activities was covered with plastic sheeting and secured at the end of each working day in accordance with the Excavation and Temporary Erosion/Sedimentation Control Plan. The stockpile areas were maintained by Chempro throughout the remedial operations.

During site preparation activities from September 28 through October 5, 1990, Chempro hung a curtain barrier from the ceiling of the Stores Building which effectively separated the remediation work area and the rest of the building. This barrier, working in conjunction with fans hung from the ceiling, prevented dust and exhaust fumes from migrating from the work area to the other active areas of the Stores Building. The curtain required adjustment several times during the remedial activities in order to efficiently control dust and exhaust fumes. The curtain barrier remained in place until the completion of the project.

As part of the site preparation, Chempro lined the catch basins in the vicinity of the remedial activities and stockpiles with filter fabric to prevent sediment from entering the basins. Bales of hay and sorbent pillows were placed around the perimeter of the catch basins to further prevent sediment and contaminated water from entering the catch basins. Chempro also installed an inflatable plug in the catch basin system drain line on November 19, 1990. This plug was left in place until the remedial activities were complete.

#### ANCILLARY CONSTRUCTION ACTIVITIES

**Concrete Demolition and Hydraulic Lift Removal:** The concrete demolition was performed in accordance with the Demolition Plan prepared by Sargent Engineers, dated July 26, 1990. Sargent Engineers also provided ongoing structural engineering consulting services during the concrete floor slab demolition.

Chempro subcontracted the concrete floor slab cutting inside the Stores Building to Cascade Sawing and Drilling, Inc. The concrete slab was cut into rectangular sections between October 1 and October 5, 1990. These sections were later broken and removed by Chempro during the remedial excavation activities. Chempro hauled the concrete debris to Stoneway Concrete Company in Renton for recycling.

Chempro removed portions of the hydraulic lift system in the Stores Building during the remediation activities. The locations of the three hydraulic lift vaults (V-1, V-3 and V-4) and the wash sump (V-2) are shown in Figures 3 and 4. Vaults V-1 and V-3 and the wash sump V-2 were in good condition with no apparent structural damage in the concrete walls or base. Vault V-4 was in poor condition with large sections of the eastern concrete wall missing and the other walls slightly fractured. A concrete lube rack

foundation, which predated the installation of Vault V-1, traversed beneath Vault V-1 and the grade beam. The concrete lube rack foundation was partially demolished and removed during the excavation.

The hydraulic lift cylinders in Vaults V-1, V-3 and V-4 were removed, drained of hydraulic fluid, and disposed of as scrap metal by Chempro. Most of the below-grade piping within the hydraulic system was also removed. The below-grade piping that was not removed was drained of hydraulic fluid and cleaned along with the concrete vaults. Concrete vaults V-1, V-3 and V-4 were left in place. Chempro pressure washed the inside of the concrete vaults with water and then removed all of the liquid from the vaults with a vacuum truck. This cycle of washing and removing of liquid was repeated several times until the vaults were thoroughly cleansed. Wash sump V-2 was demolished and removed from the excavation by Chempro. Chempro hauled the concrete debris from the partial demolition of the lube rack foundation and the wash sump to Stoneway Concrete Company in Renton for recycling.

**Sanitary Sewer Relocation:** MAM Construction Company, subcontracted by Chempro, relocated the sanitary sewer line between November 8 and November 11, 1990. Two new manholes were installed and the sewer line was rerouted to the northeast of the original sewer line as shown in Figure 5, and outside of the limits of the hydraulic fluid contamination. GeoEngineers' field representative collected confirmatory soil samples from the base of the new sewer line trench. The sampling and testing procedures are discussed in the SOIL EXCAVATION section of this report. GeoEngineers' representative also observed and evaluated the placement and compaction of backfill in the relocated sanitary sewer line trench. The details of backfill operations are discussed in the SITE RESTORATION section of this report.

**Dewatering:** Ground water was observed in the remedial excavations at a depth ranging from 6 to 9 feet below ground surface. Significant dewatering of the site was necessary to remove the hydraulic fluid-contaminated soil which extended as deep as 14 feet below the ground surface. Dewatering operations began on October 4, 1990 and continued until the completion of the remedial excavations on December 8, 1990. Dewatering was generally accomplished by placing pumps directly in the excavations and/or by installing ground water depression wells at various locations. The pumps and depression wells remained in place and operating until

chemical analysis confirmed that contaminated soil exceeding cleanup criteria had been removed in each section of the remedial excavations.

The dewatering method that proved to be most effective in removing water and lowering the static ground water table inside the Stores Building was using a combination of contractor's pumps and a ground water depression well. The ground water depression well used consisted of a slotted 55-gallon drum which was placed in the base of the excavation at a depth of approximately 13 feet. Pea gravel was placed around the outside of the slotted drum and an electric water table depression pump was placed inside the slotted drum with an actuator set at the desired water table elevation. The depression well worked in conjunction with one or two contractor's pumps that were placed in the excavation. The contractor's pumps were used until the surface water level had fallen to the desired elevation. After this was achieved, the ground water depression well, working alone, was able to maintain the desired water level in the immediate area.

The depression wells were used to dewater approximately 400 square feet of the excavation at a time and effectively lowered the water table in those areas to 12 to 13 feet below ground surface. The remedial excavation inside the Stores Building was generally accomplished one section (as shown in Figure 4) at a time. The pumps and depression wells were moved from section to section as the excavation progressed.

In the remedial excavation north of the Stores Building, a similar dewatering method was used except it was not necessary to move the ground water depression well from section to section. A slotted 55-gallon drum was placed inside a slotted, 30-inch-diameter corrugated metal pipe at a depth of approximately 14 feet below ground surface. Pea gravel filled the annular space between the drum and the pipe and medium sand was used as a filter pack around the outside of the pipe. The ground water depression well was placed in a central location within the excavation north of the Stores Building. Several contractor's pumps were used in conjunction with the depression well. These pumps were moved to different areas of the excavation as needed.

Wastewater from the excavations was pumped to on-site storage tanks. The storage tanks included three 6,500-gallon Baker Tanks and one 21,000-gallon Baker Tank. The wastewater was subsequently discharged to the

sanitary sewer in accordance with Metro Discharge Permit #253 which was secured by Chempro on behalf of PSP&L. A copy of the discharge permit is presented in Appendix E.

The initial wastewater samples were required by Metro to characterize the water. These samples were collected from a sump inside the Stores Building and from the Baker Tanks. Subsequent wastewater samples were collected from the Baker Tank system outlet by our representative on a weekly basis for compliance with the discharge permit. The samples were submitted to the laboratory for TPH (total petroleum hydrocarbons) analysis by EPA Method 418.1, volatile aromatic hydrocarbon analysis for BETX (benzene, ethylbenzene, toluene and xylenes) by EPA Method 8020, and total lead by EPA Method 7421. All compounds were either not detected above the laboratory detection limits or were detected at concentrations that were less than the Metro discharge criteria. The results of the wastewater analyses are summarized in Table 1. Laboratory reports are included in Appendix B.

The storage tanks acted as settling tanks and product collection tanks for the wastewater pumped from the excavations. Chempro placed sorbent pads on the water surface in the tanks and changed the pads several times per week. The sorbent pads effectively controlled and removed free product that accumulated in the tanks during the remediation.

**Materials Handling:** The soil excavation was accomplished by Chempro using track-mounted excavators and rubber-tire mounted backhoes. The excavators and backhoes removed the soil which was segregated into noncontaminated and contaminated soil according to the results of field screening conducted by GeoEngineers' representative. The soil was transferred from the excavators and backhoes to a dump truck, and was then transported to the appropriate stockpile area. Dump trucks hauling contaminated soil were cleaned prior to hauling noncontaminated soil.

The maximum and average accumulation of soil in the noncontaminated stockpile area was estimated to be 400 cubic yards and 250 cubic yards, respectively. The maximum and average accumulation of soil in the contaminated stockpile area was estimated to be 250 cubic yards and 125 cubic yards, respectively. Contaminated soil was hauled to the Olympic View Sanitary Landfill on 22 days during the remedial operations. The maximum and average quantity of contaminated soil transported to the landfill was

250 cubic yards and 140 cubic yards, respectively. The transportation of contaminated soil was restricted during periods of heavy precipitation.

#### SOIL EXCAVATION

**Procedures:** The removal of hydraulic fluid-contaminated soil from the remedial excavations began on October 2, 1990 and continued through December 8, 1990. The limits of the remedial excavation inside the Stores Building and north of the Stores Building are shown in Figure 2. Enlarged views of the excavation inside the building and north of the building are shown in Figures 4 and 5, respectively. At times, excavation inside and outside the building occurred concurrently. This minimized work delays resulting from waiting for chemical test results.

Timber piles, grade beams and pile caps provide foundation support to the Stores Building. Excavation activities inside the Stores Building were restricted by the presence of these below-grade obstructions and by the portions of concrete slab which remained in place. Care was taken during the excavation activities to not damage the building foundation support elements and concrete slab.

**Subsurface Conditions:** Soil encountered in the excavations included approximately 1 to 2 feet of fill beneath the concrete slab inside the Stores Building and the asphaltic concrete pavement north of the Stores Building. This upper fill material consists of sand with variable amounts of silt and gravel that had been used to raise the site elevation to its current grade. Beneath the upper fill is a thick layer of coal mine spoils which consist of a mixture of fragmented coal and rock spoils, with silt, sand and gravel. The coal spoils extend to depths ranging from 7 to 12 feet below grade and are underlain by interlayered sand, silty sand, and silt which extended to the base of the remedial excavation.

Visual recognition of contaminated soil in the coal spoils was difficult because of the natural dark coloration of the soil. Field evaluation of the contaminated soil was accomplished by visual observation of sheen on the soil or by sheen testing. In those areas with the greatest degree of contamination, a sheen was readily apparent on the ground water surface after soil in the ground water zone had been disturbed. This sheen was controlled by the placement of sorbent pads on the ground water surface in the excavations. The pads were removed prior to backfilling each

excavation. The use of sorbent pads as described effectively controlled and removed the majority of the free product that was present on the ground water surface in the open excavations.

**Soil Characterization:** GeoEngineers' field representative was on-site to sample and field screen soil as it was removed from each section of the excavation to evaluate areas of potential contamination. Screening results were used to separate contaminated from noncontaminated soils and to provide a basis for selecting soil samples for chemical analysis. The field screening methods used are described in Appendix A. Field screening indicated that the zone of hydraulic fluid-contaminated soil was present from 5 to 14 feet below the ground surface.

When field screening indicated that the contaminated soil had been removed in a given section in the excavation, confirmatory soil samples were collected along the walls and the base of the excavation. Sampling locations in the remedial excavation inside the Stores Building are shown in Figure 4. Sampling locations in the remedial excavation north of the Stores Building are shown in Figure 5. Sampling locations as described in the tables are referenced to section numbers as shown in Figures 4 and 5. Sample numbers as shown in the tables include a prefix which represents the date the sample was collected followed by a suffix which represents a unique, sequential sample number for each sample collected during this site remediation. The sample numbers shown in Figures 3 and 4 only show the unique suffix of the sample number.

All samples were analyzed for fuel hydrocarbons by modified EPA Method 8015, quantified as hydraulic fluid. The field screening results and chemical analytical results for the samples analyzed for fuel hydrocarbons as hydraulic fluid are summarized in Table 3 (inside the Stores Building) and Table 4 (north of the Stores Building). The laboratory reports are presented in Appendix B.

When chemical test results indicated that the contamination levels exceeded the MTCA compliance cleanup level of 200 mg/kg, excavation continued until field screening and additional sampling and analysis demonstrated that the contaminated soil had been successfully removed from that location.

Additional chemical analyses were performed on selected soil samples obtained in the vicinity of the former locations of two underground waste

oil tanks (Tank Nos. 224 and 225). These tanks were removed in August 1989 and are discussed in our report dated January 17, 1990. The additional analyses include PCBs (polychlorinated biphenyls) by EPA Method 8080; volatile organic compounds by EPA Method 8010/8020; and fuel hydrocarbons quantified as gasoline and diesel by modified EPA Method 8015. Selected samples in other areas of the remedial excavation were also analyzed for PCBs by EPA Method 8080. The results of the additional chemical analyses are presented in Table 5. The laboratory reports are presented in Appendix B.

**Noncontaminated Soil:** Our previous subsurface studies indicated that the upper 4 to 5 feet of soil at the site did not contain petroleum hydrocarbons at concentrations exceeding the MTCA cleanup level of 200 mg/kg. Field screening was used during the remediation project to identify the limits of noncontaminated overburden soil. Where practical, the noncontaminated overburden soil was excavated and stockpiled in the noncontaminated soil stockpile area. In some instances, because of logistical constraints, some noncontaminated overburden soil was removed with the contaminated soil.

Approximately 230 cubic yards of noncontaminated soil were removed from the excavation inside the Stores Building, and approximately 400 cubic yards were removed from the excavation north of the building. The contents of barrels containing noncontaminated cuttings from 12 exploratory borings completed during our previous subsurface contamination studies were also placed in the noncontaminated soil stockpile. Approximately 115 cubic yards of noncontaminated soil removed during the concurrent UST removal and remediation activities was also placed in the noncontaminated soil stockpile. The UST remedial activities are described in a separate report. The noncontaminated soil stockpile contained a total of approximately 750 cubic yards of soil.

Composite samples were collected from the noncontaminated stockpile periodically throughout the project for chemical analysis to confirm that the soil was noncontaminated. The samples were analyzed for fuel hydrocarbons quantified as hydraulic fluid by modified EPA Method 8015. Selected soil samples were also analyzed for volatile aromatic hydrocarbons (BETX) by EPA Method 8020, and for fuel hydrocarbons quantified as gasoline and diesel by modified EPA Method 8015. Sample 901016-30 had a fuel hydrocarbon

concentration that was slightly greater than the MTCA cleanup level of 200 mg/kg. The soil in the area from which this sample was collected was transferred to the contaminated stockpile area. The remaining soil in this part of the noncontaminated soil stockpile was sampled and analyzed and found to not meet the criteria of contaminated soil. The analytical results for the noncontaminated stockpile samples are summarized in Table 2, and the laboratory reports are presented in Appendix B.

Soil from the noncontaminated soil stockpile was subsequently used as fill in the completed remedial excavations during backfilling procedures.

**Excavation Inside of the Stores Building:** The remedial excavation inside the Stores Building was completed in sections, as shown in Figure 4. Excavation staging and methods were planned to work within the significant logistical constraints posed by obstructions in and beneath the building. These obstructions included strips of concrete slab, grade beams, pile caps, timber piles and hydraulic vaults which were left in place in accordance with Sargent Engineers' demolition plans. A vacuum truck was utilized to remove contaminated soil from several areas that were difficult to access with conventional excavation equipment.

Approximately 1,600 cubic yards of hydraulic fluid-contaminated soil were removed from the remedial excavation inside the Stores Building. Test results from samples obtained from the final limits of the inside excavation indicated that fuel hydrocarbon, PCB, and volatile organic compound concentrations did not exceed MTCA compliance cleanup levels at any of the locations tested.

**Excavation North of the Stores Building:** A test pit was excavated to a depth of 7 feet in the paved driveway north of the fence outside of the Stores Building. This test pit was dug to evaluate the northern limit of the contamination and to locate the sanitary sewer line. The 6-inch-diameter steel sanitary sewer pipe was encountered at a depth of 7 feet below ground surface in the test pit. The test pit was temporarily backfilled after soil samples were obtained. The remedial excavation north of the Stores Building subsequently merged with the test pit, and the temporary backfill was removed and replaced.

During the remedial excavation activities, the 6-inch diameter sanitary sewer line was exposed in the outside excavation approximately 8 feet below

the ground surface. The pipe was broken twice (November 8 and 9, 1990) during excavation operations. The broken sections of the pipe were immediately repaired with PVC pipe.

Approximately 1,500 cubic yards of hydraulic fluid-contaminated soil were removed from the remedial excavation north of the Stores Building. Test results from samples obtained from the final limits of the remedial excavation north of the Stores Building indicated that fuel hydrocarbon, PCB, and volatile organic compound concentrations did not exceed MTCA compliance cleanup levels at any of the locations tested.

**Contaminated Soil Stockpile and Disposal:** GeoEngineers assisted PSP&L in obtaining clearance for disposal of the contaminated soil at the Kitsap County Sanitary Landfill. In addition to the 3,100 cubic yards of hydraulic fluid-contaminated soil removed from the remedial excavations, the contents of barrels containing contaminated soil cuttings from two exploratory borings completed during our previous subsurface study were emptied onto the contaminated soil stockpile.

Contaminated soil removed from the remedial excavations was hauled from the excavations to the contaminated soil stockpile and subsequently transported to the Kitsap County Sanitary Landfill between October 10 and December 11, 1991. Chempro subcontracted the transport of the contaminated soil to CW Trucking. Some contaminated soil was excavated and loaded directly into trucks belonging to CW Trucking for transport to the landfill. All trucks loaded with contaminated soil were weighed by Chempro using portable on-site scales prior to leaving the site. The contaminated soil was generally stabilized with bentonite or fly ash to reduce moisture content prior to transport to the landfill. A GeoEngineers' representative was on-site to monitor and record the weight of each loaded truck.

#### OTHER SITE ACTIVITIES

**Vapor Monitoring:** The City of Renton's building permit required that the methane levels be monitored in the excavations throughout the remedial program. GeoEngineers' field representative monitored the combustible vapor concentrations in the excavations on a regular basis. Vapor levels were measured at various locations in the excavations using a Bacharach TLV Sniffer calibrated to hexane at 500 ppm (parts per million). All readings

were less than 100 ppm, which is the lower quantification level for this instrument. A reading of 100 ppm on this instrument is approximately equivalent to 0.3 percent of the lower explosive limit for methane.

**Free Product Recovery:** A GeoEngineers' representative bailed free (floating) product from monitor wells MW-7 and MW-25 during the remedial program from September 27 through November 12, 1990. Bailing continued in an effort to reduce the amount of free product present on the ground water table prior to beginning the remedial excavation in the vicinity of these wells.

Product recovered from MW-6, MW-7 and MW-25 during our bailing activities described in our prior reports had been stored on site in 5-gallon buckets. Product that was removed from the monitor wells during the current remedial program was also stored on-site in 5-gallon buckets. All product was disposed of by Chempro at United Drain Oil at the completion of the remedial program. A total of approximately 12 gallons of mixed product and water were disposed of.

**Monitor Well Abandonment:** Twenty of the monitor wells were abandoned by representatives of GeoEngineers prior to the beginning of the remedial operations. Wells MW-1, MW-2, MW-3, MW-5, MW-6, MW-9, MW-11, MW-13 through MW-18, MW-21 through MW-24, MW-26, MW-30 and MW-31 were abandoned in accordance with current state law in September 26, 1990. Details of the well removal were provided to you in a letter sent to Ecology (Washington State Department of Ecology) on October 18, 1990. A copy of the well removal letter is presented in Appendix F.

Monitor wells MW-7 and MW-25 were abandoned by GeoEngineers' representatives during the remedial operations on November 12, 1990 in accordance with current state laws. Details of the well abandonment procedures were provided to you in a letter sent to Ecology on November 29, 1990. A copy of the well abandonment letter is presented in Appendix F. ✓

Monitor well MW-12 was removed during the remedial excavation activities. Details of the well removal were provided in a letter sent to Ecology on September 27, 1991. A copy of the well removal letter is presented in Appendix F.

Monitor wells located outside of the remedial excavation area were left in place for use as ground water monitor wells after completion of the remedial program. The locations of existing and abandoned monitor wells at the site are shown in Figure 6. ✓

#### SITE RESTORATION

Backfill: A GeoEngineers' representative was on site to monitor the placement and compaction of backfill in the remedial excavations and the relocated sanitary sewer line trench. Messrs. Gary Reid and/or Dave Kramer of PSP&L were also on site during backfilling activities. Chempro conducted the backfilling operations throughout the remedial program. Backfill was placed and compacted in each section after we received the results of confirmatory sampling and analysis demonstrating that remaining soils did not exceed MTCA compliance cleanup levels. Backfilling activities began on October 3, 1990 and continued through December 12, 1990 and were performed in general accordance with the document titled: "Specification for Renton Service Center Garage Area, Remediation of Hydraulic Fluid Leak, Removal of Underground Fuel Storage Tanks and Surface Restoration".

Prior to backfilling, loose soil in the excavations was removed and placed in the contaminated soil stockpile. About 1 to 3 feet of water was present in all excavations prior to the placement of backfill. Crushed rock was placed as backfill from the base of the excavation to above the water table. Subsequent fill was generally placed above the water table in 1-foot lifts and compacted with an excavator-mounted vibratory plate. GeoEngineers' representative conducted in-place compaction tests using a nuclear density gauge to evaluate the compaction of the backfill in several areas within the excavation north of the Stores Building.

Four different types of fill were used to backfill the excavations inside and north of the Stores Building. The four types of fill were used in various combinations in different areas within the remedial excavations. A list of the different types of fill, along with a brief description of each type, is given below.

1. Noncontaminated Soil Stockpile Fill - This fill is soil that had previously been removed from the excavation, stockpiled in the noncontaminated soil stockpile. This soil had been sampled and analyzed and found to be noncontaminated through chemical

analytical testing. This fill generally consisted of coal mine spoils (a mixture of fragmented coal and rock spoils, with silt, sand and gravel).

2. PSP&L Pit Run - This fill was previously stockpiled on another PSP&L site for use as structural fill. The pit run was transported to the project site and stockpiled near the noncontaminated soil stockpile for use as structural fill in the remedial excavations. The fill consisted of brown silty sand with gravel. The maximum dry density for this material as determined on two separate samples by GeoEngineers in accordance with the ASTM D-1557 test procedure was calculated to be 138 pounds per cubic foot and 140 pounds per cubic foot.
3. Six-Inch Minus Crushed Rock - This fill consisted of 1- to 6-inch crushed rock with less than 5 percent fines (material passing U.S. Standard No. 200 sieve).
4. Two and one-half Minus Crushed Rock - This fill consisted of 1/2- to 2-1/2-inch crushed rock with less than 5 percent fines (material passing U.S. Standard No. 200 sieve).

Sections 1 through 4 inside the Stores Building were backfilled with 6-inch minus crushed rock from the base of the excavation to approximately 7 feet below grade. From 7 feet below grade to the ground surface, a mixture of noncontaminated soil stockpile fill, PSP&L pit run, and 6-inch minus crushed rock was placed and compacted. Based on our observations, the fill appeared to be in a firm and unyielding condition.

Sections 5 and 6 inside the Stores Building were backfilled with 2-1/2-inch minus crushed rock from the base of the excavation to approximately 7 feet below grade. From 7 feet below grade to the ground surface, a mixture of noncontaminated soil stockpile fill and PSP&L pit run was placed and compacted. Based on our observations, the fill appeared to be in a firm and unyielding condition.

Vaults V-3 and V-4 were filled with noncontaminated soil stockpile fill. The fill placed in these vaults was not compacted. Vault V-1 was filled with pea gravel.

The excavation north of the Stores Building and north of the fence was backfilled with 2-1/2-inch minus crushed rock from the base of the excavation to approximately 7 feet below grade. Near the sanitary sewer line, which was exposed in the excavation north of the fence, a layer of

Mirafi 140N filter fabric was placed in the base of the excavation. At the recommendation of PSP&L, about 1-1/2 feet of medium sand was placed over the filter fabric from the base of the excavation to the base of the sewer line. PSP&L pit run fill was placed and compacted from 7 feet below grade up to the ground surface. Our observations and the results of in-place compaction tests indicate that backfill placed greater than 2 feet below ground surface was compacted in accordance with the specifications to at least 90 percent of the maximum dry density as determined by the ASTM D-1557 test procedure. The backfill placed from 2 feet below grade to the ground surface was compacted in accordance with the specifications to at least 95 percent of the maximum dry density. A summary of the compaction test results are included in Table 6. The upper 2 feet of the backfill was observed to be yielding under the weight of the equipment. GeoEngineers recommended that the pumping backfill be removed and replaced, however Mr. Dave Kramer of PSP&L indicated that the pumping backfill was acceptable.

The excavation north of the Stores Building and south of the fence was backfilled with 6-inch minus crushed rock from the base of the excavation to ground surface. Based on our observations, the fill appeared to be in a firm and unyielding condition.

The new sanitary sewer line located in this area was bedded in and covered with pea gravel. From the top of the pea gravel to about 4 feet below ground surface PSP&L pit run was placed as backfill. The results of in-place compaction tests taken in the new sewer line trench indicate that PSP&L pit run backfill was compacted to at least 90 percent of the maximum dry density as determined using the ASTM D-1557 test procedure. The results of the compaction tests are presented in Table 6. At a depth of about 4 feet, the backfill was observed to be yielding under the weight of the equipment. GeoEngineers recommended that the pumping backfill be removed and replaced, however Mr. Dave Kramer of PSP&L indicated that the pumping backfill was acceptable. From 4 feet below grade to the ground surface 6-inch minus crushed rock was placed as backfill. Based on our observations, the upper 4 feet of fill appeared to be in a firm and unyielding condition.

Daily field reports were maintained by our field representative during the excavation backfill procedures to document our observations and test results. These reports are maintained in our files and are available for review.

**Other Restoration Activities:** Other site restoration activities continued through December 17, 1990. Chempro used water to wash down the catch basins and the connective underground piping and removed all residue from the catch basins with a vacuum truck. The inflatable plug was removed from the discharge line on December 12, 1990 following the cleaning of the catch basins.

The Baker Tanks were thoroughly cleansed by Chempro before they were transported off site. The accumulated sludge in the bottom of the tanks was removed with a vacuum truck and disposed of by Chempro.

Sections of the asphaltic concrete pavement in the contaminated soil stockpile area were damaged during the course of the remedial program. During site cleanup activities, Chempro removed the damaged asphaltic concrete pavement and the upper 1 foot of soil from these areas. This soil was disposed of at the Olympic View Landfill. After the soil was removed, GeoEngineers' representative collected three soil samples in the base of these shallow excavations. The samples were analyzed for fuel hydrocarbons quantified as hydraulic fluid by modified EPA Method 8015. The fuel hydrocarbon concentrations did not exceed the MTCA compliance cleanup level of 200 mg/kg. The analytical results for the samples are included in Table 7. The laboratory reports are presented in Appendix B. ✓

During the course of the remedial operations, PSP&L and GeoEngineers observed that some spillage of contaminated soil occurred as the trucks were loaded in the driveway area north of the Stores Building and as the trucks were driving across the yard to the contaminated soil stockpile area. During site cleanup activities, a GeoEngineers' representative collected three composite soil samples from the surface soil in the driveway area north of the Stores Building. The samples were analyzed for fuel hydrocarbons quantified as hydraulic fluid by modified EPA Method 8015. The two samples collected in the driveway in Sections 1,2,5 and 6 had fuel hydrocarbon concentrations that did not exceed the MTCA cleanup level for soil. The composite soil sample collected in the driveway in Sections 3 and 4 had a fuel hydrocarbon concentrations of 220 mg/kg. Chempro subsequently subcontracted a vacuum truck to remove the surficial soil in the driveway area. The material removed was disposed of by Chempro at their Kent facility. GeoEngineers resampled the soil in Sections 3 and 4 for chemical analysis. The fuel hydrocarbon concentration in this sample did

not exceed the MTCA cleanup level. The analytical results for the samples obtained in the driveway area are included in Table 7. The laboratory reports are presented in Appendix B.

#### ADDITIONAL MONITORING ACTIVITIES

##### GROUND WATER MONITORING

A representative of GeoEngineers obtained ground water samples from MW-8, MW-10, MW-19 and MW-20 on February 1, 1991, after the completion of the remedial activities. Ground water sampling procedures are described in Appendix A. These wells are located downgradient from the remedial area, as shown in our report dated January 17, 1990. The samples were analyzed for TPH (total petroleum hydrocarbons) by EPA Method 418.1. TPH was not present above the laboratory detection limit of 1 mg/l (milligram per liter). The MTCA compliance cleanup criteria for TPH in ground water is 1 mg/l. The results of the ground water analyses are presented in Table 8. The laboratory reports are included in Appendix B.

#### CONCLUSIONS

The results of the remediation monitoring activities performed by GeoEngineers indicate that subsurface hydrocarbon contamination by hydraulic fluid in the vicinity of the Renton General Stores Building has been successfully removed. The remaining soils sampled and analyzed have hydrocarbon concentrations that do not exceed MTCA compliance cleanup levels, based on our sampling and testing. Based on the results of our ground water monitoring program, no detectable hydrocarbon contamination is present in the ground water directly downgradient of the area affected by the hydraulic fluid leak. We do not recommend any further remedial actions related to residual hydraulic fluid contamination in the vicinity of the Stores Building. ✓

It is our opinion that the backfill in the remedial excavations and the new sewer line trench was placed and compacted in general accordance with the plans and specifications as described in the document titled "Specification for Renton Service Center Garage Area, Remediation of Hydraulic Fluid Leak, Removal of Underground Fuel Storage Tanks and Surface Restoration".

We recommend that all remaining monitor wells as shown in Figure 6 be abandoned after they are no longer of use as ground water monitoring wells. Two of these wells (MW-36 and MW-38) have been paved over and can be located using a metal detector. Proper abandonment of these wells is required by current state laws.

#### LIMITATIONS

We have prepared this report for use by Puget Sound Power & Light Company. This report may be made available to regulatory agencies. This report is not intended for use by others and the information contained herein is not applicable to other sites. Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted practices in this area at the time the report was prepared. No other conditions, express or implied, should be understood.

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Please contact us if you have any questions regarding this report.

Respectfully submitted,

GeoEngineers, Inc.

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**TABLE 1**  
**SUMMARY OF ANALYTICAL DATA**  
**WASTE WATER DISCHARGED TO METRO**

Sample Number	Date Sampled	Sampling Location	Volatile Aromatic Hydrocarbons <sup>1</sup> ( $\mu\text{g/l}$ )				Fuel Hydrocarbons <sup>2</sup> ( $\text{mg/l}$ )	Total Petroleum Hydrocarbons <sup>3</sup> ( $\text{mg/l}$ )	Total Lead <sup>4</sup> ( $\text{mg/l}$ )
			B	E	T	X			
901010-19	10/10/90	Sump, inside Stores Building, Section 5	--	--	--	--	<1.0	<1.0	--
901023-41	10/23/90	21,000-gallon Baker tank	--	--	--	--	<1.0	--	
901023-42	10/23/90	6,500-gallon Baker tank, east	--	--	--	--	4.0	--	
901023-43	10/23/90	6,500-gallon Baker tank, middle	--	--	--	--	6.0	--	
901023-44	10/23/90	6,500-gallon Baker tank, west	--	--	--	--	<1.0	--	
901024-52	10/24/90	21,000-gallon Baker tank	<0.5	1.8	2.4	11.0	--	--	
901024-53	10/24/90	6,500-gallon Baker tank, east	<0.5	<0.5	<0.5	<0.5	--	--	
901024-54	10/24/90	6,500-gallon Baker tank, middle	<0.5	<0.5	<0.5	1.7	--	--	
901024-55	10/24/90	6,500-gallon Baker tank, west	<0.5	0.6	<0.5	6.7	--	--	
901025-58	10/25/90	Middle and west 6,500-gallon Baker tanks	--	--	--	--	--	<0.005	
901025-59	10/25/90	East 6,500-gallon and 21,000-gallon Baker tanks	--	--	--	--	--	<0.005	
901031-77	10/31/90	Baker tank system outlet	0.7	2.1	7.6	13.0	--	<1.0	0.005
901107-84	11/07/90	Baker tank system outlet	<0.5	<0.5	0.9	2.3	--	2.0	0.008
901114-99	11/14/90	Baker tank system outlet	8.4	2.3	18.0	13.0	--	<1.0	0.007
901121-120	11/21/90	Baker tank system outlet	<0.5	<0.5	0.6	<0.5	--	5.0	0.025
901128-136	11/28/90	Baker tank system outlet	<0.5	<0.5	<0.5	0.5	--	<1.0	0.017

Metro Discharge Criteria	130	1,400	1,500	--	--	100	3.0
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**Notes:**

<sup>1</sup>Volatile aromatic hydrocarbons analyzed by EPA method 8020 for BETX only. B = benzene; E = ethylbenzene; T = toluene; X = xylenes.

<sup>2</sup>Fuel hydrocarbons analyzed by modified EPA Method 8015.

<sup>3</sup>Total petroleum hydrocarbons analyzed by EPA Method 418.1.

<sup>4</sup>Total lead analyzed by EPA Method 7421.

Chemical analyses conducted by Analytical Technologies, Inc.

\*< = less than

\*-- = not tested

$\mu\text{g/l}$  = micrograms per liter

$\text{mg/l}$  = milligrams per liter

**TABLE 2**  
**SUMMARY OF SOIL ANALYTICAL DATA**  
**NONCONTAMINATED SOIL STOCKPILE**

Sample Number	Date Sampled	General Sampling Location	Field Screening <sup>1</sup>	Volatile Aromatic Hydrocarbons <sup>2</sup>				Fuel Hydrocarbons <sup>3</sup>		
			Sheen	mg/kg				Quantified as Gasoline	Quantified as Diesel	Quantified as Hydraulic Fluid
				B	E	T	X			
901016-29	10/16/90	North half of stockpile	NS	0.15	0.38	0.71	2.5	<5	<5	<5
901016-30	10/16/90	South half of stockpile	SS	<0.025	0.035	0.045	0.71	<5	<5	290
901022-33	10/22/90	South half of stockpile	NS	--	--	--	--	--	--	88
901030-74	10/30/90	Stockpile	NS	--	--	--	--	--	--	<50
901101-83	11/01/90	South half of stockpile	NS	--	--	--	--	--	--	<50
901112-97	11/12/90	North half of stockpile	NS	--	--	--	--	<5	<5	<50
901112-98	11/12/90	South half of stockpile	NS	--	--	--	--	<5	<5	<50
901120-114	11/20/90	North half of stockpile	NS	<0.025	<0.025	<0.025	<0.025	<5	<5	<50
901120-115	11/20/90	South half of stockpile	NS	<0.025	<0.025	<0.025	<0.025	<5	<5	<50
901207-194	12/07/90	South half of stockpile	--	--	--	--	--	--	--	120
901208-207	12/08/90	South half of stockpile	--	--	--	--	--	--	--	120
901208-208	12/08/90	North half of stockpile	--	--	--	--	--	--	--	120

**Notes:**

<sup>1</sup>Field screening methods described in Appendix A. Sheen Test: NS = no sheen, SS = slight sheen.

<sup>2</sup>Volatile aromatic hydrocarbons analyzed by EPA Method 8020 for: BETX only. B = benzene, E = ethylbenzene, T = toluene, X = xylenes.

<sup>3</sup>Fuel hydrocarbons analyzed by modified EPA Method 8015 and quantified relative to gasoline, diesel and hydraulic fluid standards.

Chemical analyses conducted by Analytical Technologies, Inc.

\*<\* = less than

mg/kg = milligrams per kilogram

\*--\* = not tested

TABLE 3 (Page 1 of 4)  
SUMMARY OF SOIL ANALYTICAL DATA  
FIELD SCREENING AND FUEL HYDROCARBON ANALYSIS  
REMEDIAL EXCAVATION - INSIDE STORES BUILDING

Sample Number	Date Sampled	Sample Depth (feet)	General Sampling Location	Field Screening <sup>1</sup>	Fuel Hydrocarbons <sup>2</sup> (mg/kg)	Comments
				Sheen	Quantified As Hydraulic Fluid	
901015-26	10/15/90	8.5	East wall of excavation, Section 6	NS	<5	
901015-27	10/15/90	8.5	East wall of excavation, Section 6	NS	<5	
901022-31	10/22/90	8.5	Under eastern edge of lube rack near V-1, Section 6	NS	97	
901022-32	10/22/90	8.5	Under eastern edge of lube rack near V-1, Section 6	NS	22	
901023-34	10/23/90	9.5	South wall of excavation, Section 6	NS	49	
901023-35	10/23/90	11.0	Base of excavation, Section 6	NS	<5	
901023-36	10/23/90	10.0	North wall of excavation, Section 6	NS	<5	
901023-37	10/23/90	10.0	Base of V-1, Section 6	NS	<5	
901023-38	10/23/90	9.5	Near base of V-1, Section 6	NS	40	
901023-39	10/23/90	9.5	Under northern edge of V-1, Section 6	NS	1,100	Footnote <sup>3</sup>
901023-40	10/23/90	9.5	Under western edge of V-1, Section 6	SS	46	
901023-45	10/23/90	9.5	Under western edge of V-1, Section 6	MS	560	Footnote <sup>3</sup>
901023-46	10/23/90	10.0	South wall of excavation, Section 6	NS	<5	
901023-47	10/23/90	11.0	Base of excavation, Section 6	NS	<5	
901023-48	10/23/90	11.0	Base of excavation, Section 6	NS	<5	
901023-49	10/23/90	11.0	Base of excavation, Section 6	NS	<5	
901023-50	10/23/90	9.5	Base of excavation, Section 6	NS	<5	
901023-51	10/23/90	9.5	North wall of excavation, Section 6	NS	22	
901024-56	10/24/90	9.5	West wall of excavation, Section 5	NS	<5	
901024-57	10/24/90	11.0	Base of excavation, Section 5	NS	<5	
901025-60	10/25/90	11.0	Base of excavation, Section 5	NS	<5	
901025-61	10/25/90	11.0	Base of excavation, Section 5	NS	<5	
901025-62	10/25/90	9.0	Under V-1, base, Section 6	NS	<5	
901025-63	10/25/90	9.0	Under V-1, base, Section 6	NS	<5	
901025-64	10/25/90	9.0	Under V-1, East wall, Section 6	SS	<5	
901025-65	10/25/90	9.0	Under V-1, East wall, Section 6	SS	<5	
901025-66	10/26/90	10.0	South wall of excavation, Section 5	NS	580	Footnote <sup>3</sup>
901025-67	10/26/90	13.0	Base of excavation, Section 5	SS	66	

See Notes on Page 4

TABLE 3 (Page 2 of 4)

Sample Number	Date Sampled	Sample Depth (feet)	General Sampling Location	Field Screening <sup>1</sup>	Fuel Hydrocarbons <sup>2</sup> (mg/kg)	Comments
				Sheen	Quantified As Hydraulic Fluid	
901029-68	10/29/90	12.0	Base of excavation, Section 5	NS	<50	
901029-69	10/29/90	12.0	Base of excavation, Section 5	NS	<50	
901029-70	10/29/90	11.0	Base of excavation, Section 5	NS	<50	
901029-71	10/29/90	10.0	North wall of excavation, Section 5	MS	10,000	Footnote <sup>3</sup>
901029-72	10/29/90	10.0	North wall of excavation, Section 5	NS	<50	
901030-73	10/30/90	10.0	South wall of excavation, Section 5	SS	<50	
901119-109	11/19/90	9.5	East wall of excavation, Section 4	SS	<50	
901119-110	11/19/90	9.5	East wall of excavation, Section 4	NS	<50	
901121-127	11/21/90	9.5	East wall of excavation, Section 4	MS	3,500	Footnote <sup>3</sup>
901128-132	11/28/90	9.0	South wall of excavation, Section 4	NS	<50	
901128-133	11/28/90	11.0	Base of excavation, Section 4	NS	<50	
901128-134	11/28/90	11.0	Base of excavation, Section 4	NS	<50	
901129-143	11/29/90	11.0	Base of excavation, Section 4	NS	<50	
901129-144	11/29/90	11.0	Base of excavation, Section 4	NS	<50	
901129-145	11/29/90	11.0	Base of excavation, Section 4	NS	<50	
901201-146	12/01/90	11.0	East wall of excavation, Section 4	NS	<50	
901201-147	12/01/90	10.0	Base of excavation, Section 4	SS	<50	Footnote <sup>4</sup>
901201-148	12/01/90	11.0	Base of excavation, Section 4	NS	<50	
901201-149	12/01/90	12.0	Base of excavation, Section 4	NS	<50	
901201-150	12/01/90	12.0	Base of excavation, Section 4	NS	<50	
901201-151	12/01/90	11.0	Base of excavation, Section 4	NS	<50	
901203-152	12/03/90	9.0	South wall of excavation, Section 4	NS	<50	
901203-153	12/03/90	11.0	Base of excavation, Section 4	NS	<50	
901203-154	12/03/90	11.0	Base of excavation, under V-3, Section 4	NS	<50	
901203-155	12/03/90	11.0	Base of excavation, Section 4	NS	54	
901204-156	12/04/90	11.0	Base of excavation, Section 4	NS	<50	
901204-157	12/04/90	11.0	Base of excavation, Section 4	NS	<50	
901204-158	12/04/90	11.0	Base of excavation, Section 4	NS	<50	Footnote <sup>4</sup>
901204-159	12/04/90	10.0	South wall of excavation, Section 3	NS	<50	
901204-160	12/04/90	11.0	Base of excavation, Section 3	NS	<50	

See Notes on Page 4

TABLE 3 (Page 3 of 4)

Sample Number	Date Sampled	Sample Depth (feet)	General Sampling Location	Field Screening <sup>1</sup>	Fuel Hydrocarbons <sup>2</sup> (mg/kg)	Comments
				Sheen	Quantified As Hydraulic Fluid	
901204-161	12/04/90	12.0	Base of excavation, Section 3	NS	<50	
901204-162	12/04/90	12.0	Base of excavation, Section 3	NS	<50	
901204-163	12/04/90	12.0	Base of excavation, under V-4, Section 3	NS	<50	
901205-164	12/05/90	10.0	South wall of excavation, Section 3	NS	<50	
901205-165	12/05/90	12.0	Base of excavation, Section 3	NS	<50	
901205-166	12/05/90	10.00	West wall of excavation, Section 3	NS	<50	
901205-167	12/05/90	12.0	Base of excavation, Section 3	NS	<50	
901205-168	12/05/90	10.0	West wall of excavation, Section 3	NS	<50	
901205-169	12/05/90	12.0	Base of excavation, Section 3	NS	<50	
901205-170	12/05/90	10.0	West wall of excavation, Section 3	NS	<50	
901205-171	12/05/90	12.0	Base of excavation, Section 3	NS	<50	
901205-172	12/05/90	12.0	Base of excavation, Section 3	NS	<50	
901205-173	12/05/90	12.0	Base of excavation, Section 3	NS	<50	
901205-174	12/05/90	12.0	Base of excavation, under V-4, Section 3	NS	<50	Footnote <sup>4</sup>
901205-175	12/05/90	11.0	Base of excavation, Section 3	NS	<50	
901205-176	12/05/90	10.0	West wall of excavation, Section 3	NS	74	
901205-177	12/05/90	12.0	Base of excavation, Section 3	NS	<50	
901205-178	12/05/90	10.0	West wall of excavation, Section 3	SS	<50	
901205-179	12/05/90	12.0	Base of excavation, Section 3	NS	<50	
901205-180	12/05/90	10.0	West wall of excavation, Section 3	SS	<50	
901206-181	12/06/90	12.0	Base of excavation, Section 3	NS	<50	
901206-182	12/06/90	12.0	Base of excavation, Section 3	NS	440	Footnote <sup>3</sup>
901206-183	12/06/90	12.0	Base of excavation, Section 3	NS	67	
901206-184	12/06/90	12.0	Base of excavation, Section 3	NS	<50	
901206-185	12/06/90	10.0	Under V-4, Section 3	HS	36,000	Footnote <sup>3</sup>
901206-186	12/06/90	12.0	Base of excavation, Section 3	NS	<50	
901206-187	12/06/90	10.0	Under V-4, Section 3	HS	5,600	Footnote <sup>3</sup>
901206-188	12/06/90	14.0	Base of excavation, Section 3	NS	<50	
901206-189	12/06/90	14.0	Base of excavation, Section 3	NS	<50	
901207-190	12/07/90	10.0	South wall of excavation, Section 2	NS	<50	

See Notes on Page 4

TABLE 3 (Page 4 of 4)

Sample Number	Date Sampled	Sample Depth (feet)	General Sampling Location	Field Screening <sup>1</sup>	Fuel Hydrocarbons <sup>2</sup> (mg/kg)	Comments
				Sheen	Quantified As Hydraulic Fluid	
901207-191	12/07/90	13.0	Base of excavation, Section 2	NS	<50	
901207-192	12/07/90	13.0	Base of excavation, Section 2	NS	<50	
901207-193	12/07/90	13.0	Base of excavation, Section 2	NS	<50	
901207-195	12/07/90	12.0	Base of excavation, Section 2	NS	230	Footnote <sup>3</sup>
901207-196	12/07/90	12.0	Base of excavation, Section 3	NS	<50	
901208-197	12/08/90	10.0	South wall of excavation, Section 2	NS	<50	
901208-198	12/08/90	13.0	Base of excavation, Section 2	NS	<50	
901208-199	12/08/90	13.0	Base of excavation, Section 2	NS	<50	
901208-200	12/08/90	13.0	Base of excavation, Section 2	NS	<50	
901208-201	12/08/90	10.0	South wall of excavation, Section 1	NS	<50	
901208-202	12/08/90	13.0	Base of excavation, Section 1	NS	<50	
901208-203	12/08/90	13.0	Base of excavation, Section 1	NS	<50	Footnote <sup>4</sup>
901208-204	12/08/90	10.0	South wall of excavation, Section 1	NS	<50	
901208-205	12/08/90	13.0	Base of excavation, Section 1	NS	<50	
901208-206	12/08/90	10.0	West wall of excavation, Section 1	NS	<50	

Notes:

<sup>1</sup>Field screening methods described in Appendix A. NS = no sheen, SS = slight sheen, MS = moderate sheen, HS = heavy sheen

<sup>2</sup>Fuel hydrocarbons analyzed by modified EPA Method 8015 and quantified relative to hydraulic fluid standards.

<sup>3</sup>Soil in this area was subsequently excavated and removed.

<sup>4</sup>Additional analytical data for sample is shown in Table 5.

Chemical analyses conducted by Analytical Technologies, Inc.

\*< = less than; mg/kg = milligrams per kilogram

TABLE 4 (Page 1 of 3)  
SUMMARY OF SOIL ANALYTICAL DATA  
FIELD SCREENING AND FUEL HYDROCARBON ANALYSIS  
REMEDIAL EXCAVATION - NORTH OF STORES BUILDING

Sample Number	Date Sampled	Sample Depth (feet)	General Sampling Location	Field Screening <sup>1</sup>	Fuel Hydrocarbons <sup>2</sup> (mg/kg)	Comments
				Sheen	Quantified as Hydraulic Fluid	
901002-8	10/02/90	7.0	North wall of excavation, Section 3	SS	<5	
901003-9	10/03/90	6.5	Base of excavation, under sewer line, Section 2	NS	<5	
901003-10	10/03/90	6.5	Base of excavation, Section 2	NS	<5	
901030-75	10/30/90	7.0	Base of excavation, Section 2	NS	<50	
901030-76	10/30/90	6.5	East wall of excavation, Section 3	NS	<50	
901031-78	10/31/90	7.0	West wall of excavation, Section 1	NS	<50	
901101-79	11/01/90	10.0	Base of excavation, Section 2	NS	<50	
901101-80	11/01/90	8.0	Base of excavation, below sewer line, Section 2	NS	<50	
901101-81	11/01/90	8.0	Base of excavation, below sewer line, Section 3	NS	<50	
901101-82	11/01/90	10.0	Base of excavation, Section 3	NS	<50	
901107-85	11/07/90	9.0	Base of excavation, Section 3	NS	<50	
901107-86	11/07/90	8.0	East wall of excavation, Section 3	NS	<50	
901108-87	11/08/90	10.0	Base of excavation, Section 2	NS	<50	
901108-88	11/08/90	9.0	Base of new sewer line trench, Section 4	NS	<50	
901109-89	11/09/90	9.0	Base of new sewer line trench, Section 4	NS	<50	
901109-90	11/09/90	9.0	Base of new sewer line trench, Section 5	NS	<50	Footnote <sup>3</sup>
901109-91	11/09/90	8.0	Base of new sewer line trench, Section 6	NS	<50	Footnote <sup>3</sup>
901112-92	11/12/90	9.0	West wall of excavation, Section 1	NS	<50	
901112-93	11/12/90	10.0	Base of excavation, Section 2	NS	<50	
901112-94	11/12/90	8.0	West wall of excavation, Section 1	NS	<50	
901112-95	11/12/90	10.0	Base of excavation, Section 1	NS	<50	
901112-96	11/12/90	10.0	Base of excavation, Section 2	NS	<50	
901114-100	11/14/90	10.0	Base of excavation, Section 4	NS	<50	Footnote <sup>3</sup>

See Notes on Page 3

TABLE 4 (Page 2 of 3)

Sample Number	Date Sampled	Sample Depth (feet)	General Sampling Location	Field Screening <sup>1</sup>	Fuel Hydrocarbons <sup>2</sup> (mg/kg)	Comments
				Sheen	Quantified as Hydraulic Fluid	
901115-101	11/15/90	9.0	East wall of excavation, Section 6	NS	<50	Footnote <sup>3</sup>
901115-102	11/15/90	9.0	North wall of excavation, Section 6	NS	<50	Footnote <sup>3</sup>
901115-103	11/15/90	11.0	Base of excavation, Section 6	NS	<50	Footnote <sup>3</sup>
901115-104	11/15/90	11.0	Base of excavation, Section 5	NS	<50	Footnote <sup>3</sup>
901115-105	11/15/90	8.0	North wall of excavation, Section 5	NS	<50	Footnote <sup>3</sup>
901116-106	11/16/90	11.0	Base of excavation, Section 5	NS	<50	
901116-107	11/16/90	9.0	North wall of excavation, Section 5	NS	<50	
901119-111	11/19/90	11.0	Base of excavation, Section 4	NS	<50	Footnote <sup>3</sup>
901119-112	11/19/90	9.5	North wall of excavation, Section 4	NS	3,000	Footnote <sup>3,4</sup>
901116-117	11/28/90	11.0	Base of excavation, Section 4	NS	<50	Footnote <sup>3</sup>
901120-118	11/20/90	11.0	Base of excavation, Section 4	NS	<50	Footnote <sup>3</sup>
901120-119	11/20/90	11.0	Base of excavation, Section 3	NS	<50	Footnote <sup>3</sup>
901121-121	11/21/90	13.0	Base of excavation, Section 3	SS	<50	Footnote <sup>3</sup>
901121-122	11/21/90	11.0	Base of excavation, Section 4	NS	<50	
901121-123	11/21/90	9.5	East wall of excavation, Section 4	NS	<50	
901121-124	11/21/90	9.0	North wall of excavation, Section 4	NS	<50	
901121-125	11/21/90	9.0	East wall of excavation, Section 4	SS	<50	
901121-126	11/21/90	11.0	Base of excavation, Section 3	NS	<50	
901127-128	11/27/90	13.0	Base of excavation, Section 2	NS	<50	
901127-129	11/27/90	13.0	Base of excavation, Section 2	NS	<50	
901127-130	11/27/90	13.0	Base of excavation, Section 2	NS	<50	
901127-131	11/27/90	13.0	Base of excavation, Section 2	NS	<50	
901128-135	11/28/90	14.0	Base of excavation, Section 1	NS	<50	
901129-137	11/29/90	14.0	Base of excavation, Section 1	NS	<50	
901129-138	11/29/90	9.0	West wall of excavation, Section 1	NS	<50	
901129-139	11/29/90	9.0	West wall of excavation, Section 1	NS	100	Footnote <sup>3</sup>

See Notes on Page 3

TABLE 4 (Page 3 of 3)

Sample Number	Date Sampled	Sample Depth (feet)	General Sampling Location	Field Screening <sup>1</sup>	Fuel Hydrocarbons <sup>2</sup> (mg/kg)	Comments
				Sheen	Quantified as Hydraulic Fluid	
901129-140	11/29/90	14.0	Base of excavation, Section 1	NS	<50	
901129-141	11/29/90	10.0	West wall of excavation, Section 1	NS	<50	
901129-142	11/29/90	14.0	Base of excavation, Section 1	NS	<50	

Notes:

<sup>1</sup>Field screening methods described in Appendix A. Sheen Test: NS = no sheen, SS = slight sheen.

<sup>2</sup>Fuel hydrocarbons analyzed by modified EPA Method 8015.

<sup>3</sup>Additional analytical data for sample is shown in Table 5.

<sup>4</sup>Soil in this area was subsequently excavated and removed.

Chemical analyses conducted by Analytical Technologies, Inc.

\*<\* = less than

mg/kg = milligrams per kilogram

TABLE 5  
SUMMARY OF ADDITIONAL SOIL ANALYTICAL DATA  
REMEDIAL EXCAVATIONS

Sample Number	Date Sampled	Sample Depth (feet)	General Sampling Location	Field Screening <sup>1</sup>	Fuel Hydrocarbons <sup>2</sup> (mg/kg)		VOCs <sup>3</sup> (mg/kg)	PCBs <sup>4</sup> (mg/kg)
				Sheen	Quantified As Gasoline	Quantified As Diesel		
901109-90	11/09/90	9.0	Base of new sewer line trench, Section 5	NS	<5	<5	ND	-
901109-91	11/09/90	8.0	Base of new sewer line trench, Section 6	NS	<5	<5	Footnote <sup>5</sup>	-
901114-100	11/14/90	10.0	Base of excavation, Section 4	NS	-	-	-	ND
901115-101	11/15/90	9.0	East wall of excavation, Section 6	NS	<5	<5	ND	-
901115-102	11/15/90	9.0	North wall of excavation, Section 6	NS	<5	<5	ND	-
901115-103	11/15/90	11.0	Base of excavation, Section 6	NS	<5	<5	ND	-
901115-104	11/15/90	11.0	Base of excavation, Section 5	NS	<5	<5	ND	-
901115-105	11/15/90	8.0	North wall of excavation, Section 5	NS	<5	<5	Footnote <sup>6</sup>	-
901119-111	11/19/90	11.0	Base of excavation, Section 4	NS	<5	<5	ND	-
901119-112	11/19/90	9.5	Base of excavation, Section 4	NS	<5	<5	ND	-
901119-113	11/19/90	11.0	Base of excavation, Section 6	NS	-	-	-	ND
901120-117	11/20/90	11.0	Base of excavation, Section 4	NS	<10	<10	ND	ND
901120-118	11/20/90	11.0	Base of excavation, Section 4	NS	<10	<10	ND	-
901120-119	11/20/90	11.0	Base of excavation, Section 3	NS	<10	<10	ND	-
901121-121	11/21/90	13.0	Base of excavation, Section 3	SS	<10	<10	ND	-
901129-139	11/29/90	9.0	West wall of excavation, Section 1	NS	-	-	-	ND
901201-147	12/01/90	10.0	Base of excavation, Section 4	SS	-	-	-	Footnote <sup>7</sup>
901204-158	12/04/90	11.0	Base of excavation, Section 4	NS	-	-	-	ND
901205-174	12/05/90	12.0	Base of excavation under V-4, Section 3	NS	-	-	-	ND
901208-203	12/08/90	13.0	Base of excavation, Section 1	NS	-	-	-	ND

**Notes:**

<sup>1</sup>Field screening methods described in Appendix A. Sheen Test: NS = no sheen, SS = slight sheen.

<sup>2</sup>Fuel hydrocarbons analyzed by modified EPA Method 8015 and quantified relative to gasoline and diesel standards.

<sup>3</sup>VOCs (volatile organic compounds) analyzed by 8010/8020.

<sup>4</sup>PCBs (polychlorinated biphenyls) analyzed by EPA Method 8080.

<sup>5</sup>Tetrachloroethene detected at concentration of 0.038 mg/kg. No other analytes present above laboratory detection limits.

<sup>6</sup>Methylene chloride detected at concentration of 0.17 mg/kg. No other analytes present above laboratory detection limits.

<sup>7</sup>PCB 1260 detected at concentration of 0.040 mg/kg.

Chemical analysis conducted by Sound Analytical and Analytical Technologies, Inc.

\*< = less than; mg/kg = milligrams per kilogram; "-" = not tested; ND = not detected

**TABLE 6**  
**SUMMARY OF IN-PLACE COMPACTION TESTS**  
**REMEDIAL EXCAVATION BACKFILL**

Test Date	General Location	Feet Below Grade	Field Moisture (%)	Dry Density <sup>1</sup> (pounds/cubic foot)		% Compaction	
				Field	Maximum	Field	Specification
11/05/90	North of the fence	3.0	8	135	138	98	90
11/05/90	North of the fence	3.0	7	126	138	91	90
11/05/90	North of the fence	2.0	9	135	138	98	95
11/05/90	North of the fence	2.0	10	128	138	93*	95
11/05/90	North of the fence	2.0	8	132	138	96	95
11/05/90	North of the fence	2.0	10	134	138	97	95
11/06/90	North of the fence	1.5	7	132	138	96	95
11/06/90	North of the fence	1.5	9	131	138	96	95
11/06/90	North of the fence	1.5	9	133	138	97	95
11/06/90	North of the fence	1.0	8	132	138	96	95
11/06/90	North of the fence	1.0	10	134	138	97	95
11/13/90	New sewer line trench	5.0	9	130	140	93	90
11/13/90	New sewer line trench	5.0	10	134	140	96	90
11/13/90	New sewer line trench	4.0	12	127	140	91	90
11/13/90	New sewer line trench	4.0	8	133	140	95	90

**Notes:**

<sup>1</sup>Maximum dry density determined by GeoEngineers in accordance with ASTM D-1557 test procedure.

\* Retested after additional compactive effort.

Tests were performed by a GeoEngineers' representative using a nuclear density gauge.

**TABLE 7**  
**SUMMARY OF SOIL ANALYTICAL DATA**  
**SAMPLES COLLECTED AS PART OF SITE RESTORATION ACTIVITIES**

Sample Number	Date Sampled	Sample Depth (feet)	General Sampling Location	Field Screening <sup>1</sup>	Fuel Hydrocarbons <sup>2</sup> (mg/kg)			Comments
				Sheen	Quantified As Gasoline	Quantified As Diesel	Quantified As Hydraulic Fluid	
901210-209	12/10/90	Composite	Driveway area north of building, Sections 1 & 2	SS	<5	<5	130	Footnote <sup>3</sup>
901210-210	12/10/90	Composite	Driveway area north of building, Sections 3 & 4	SS	<5	<5	220	
901210-211	12/10/90	Composite	Driveway area north of building, Sections 5 & 6	SS	<5	<5	150	
901213-212	12/13/90	1.0	Contaminated stockpile area, beneath hole in asphalt	NS	-	-	<50	
901213-213	12/13/90	1.0	Contaminated stockpile area, beneath hole in asphalt	NS	-	-	120	
901213-214	12/13/90	1.0	Contaminated stockpile area, beneath hole in asphalt	NS	-	-	51	
901213-215	12/13/90	Composite	Driveway area north of building, Sections 3 & 4	NS	-	-	55	

**Notes:**

<sup>1</sup>Field screening methods described in Appendix A. Sheen Test: NS = no sheen, SS = slight sheen.

<sup>2</sup>Fuel hydrocarbons analyzed by modified EPA Method 8015.

<sup>3</sup>Soil in this area was subsequently excavated and removed. Composite sample number 901213-215 was then obtained.

Chemical analyses conducted by Analytical Technologies, Inc.

\*<\* = less than

mg/kg = milligrams per kilogram

\*--\* = not tested

TABLE 8  
SUMMARY OF GROUND WATER ANALYTICAL DATA

Well Number	Date Sampled	Total Petroleum Hydrocarbons <sup>1</sup> (mg/l)
MW-8	02/01/91	<1
MW-10	02/01/91	<1
MW-19	02/01/91	<1
MW-20	02/01/91	<1

Notes:

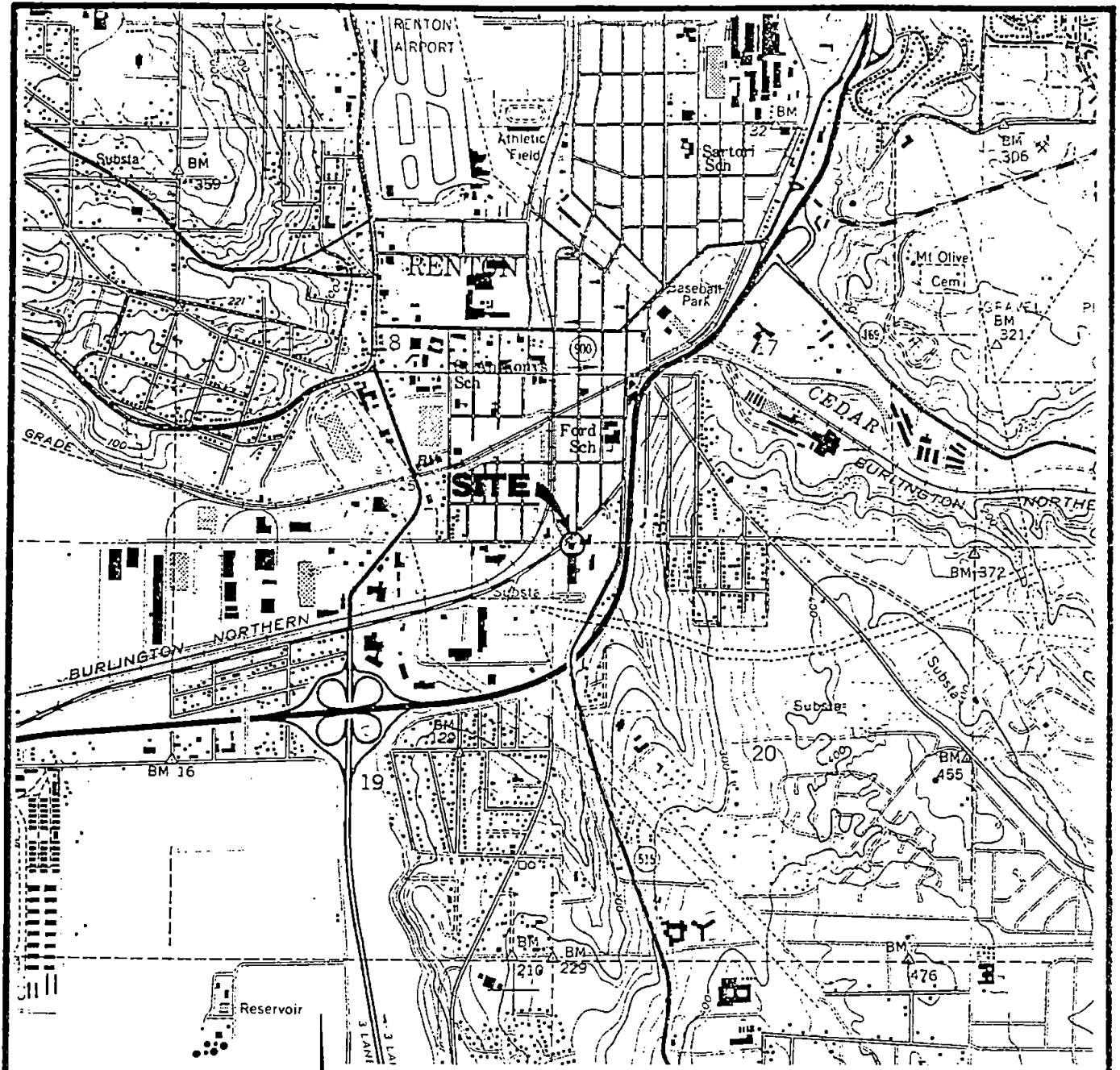
<sup>1</sup>Total petroleum hydrocarbons analyzed by EPA Method 418.1

Chemical analyses conducted by Analytical Technologies, Inc.

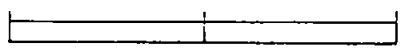
mg/l = milligrams per liter

\*< = less than

0186-101-804 KSK:KKT 11-16-89



0 2000 4000



SCALE IN FEET

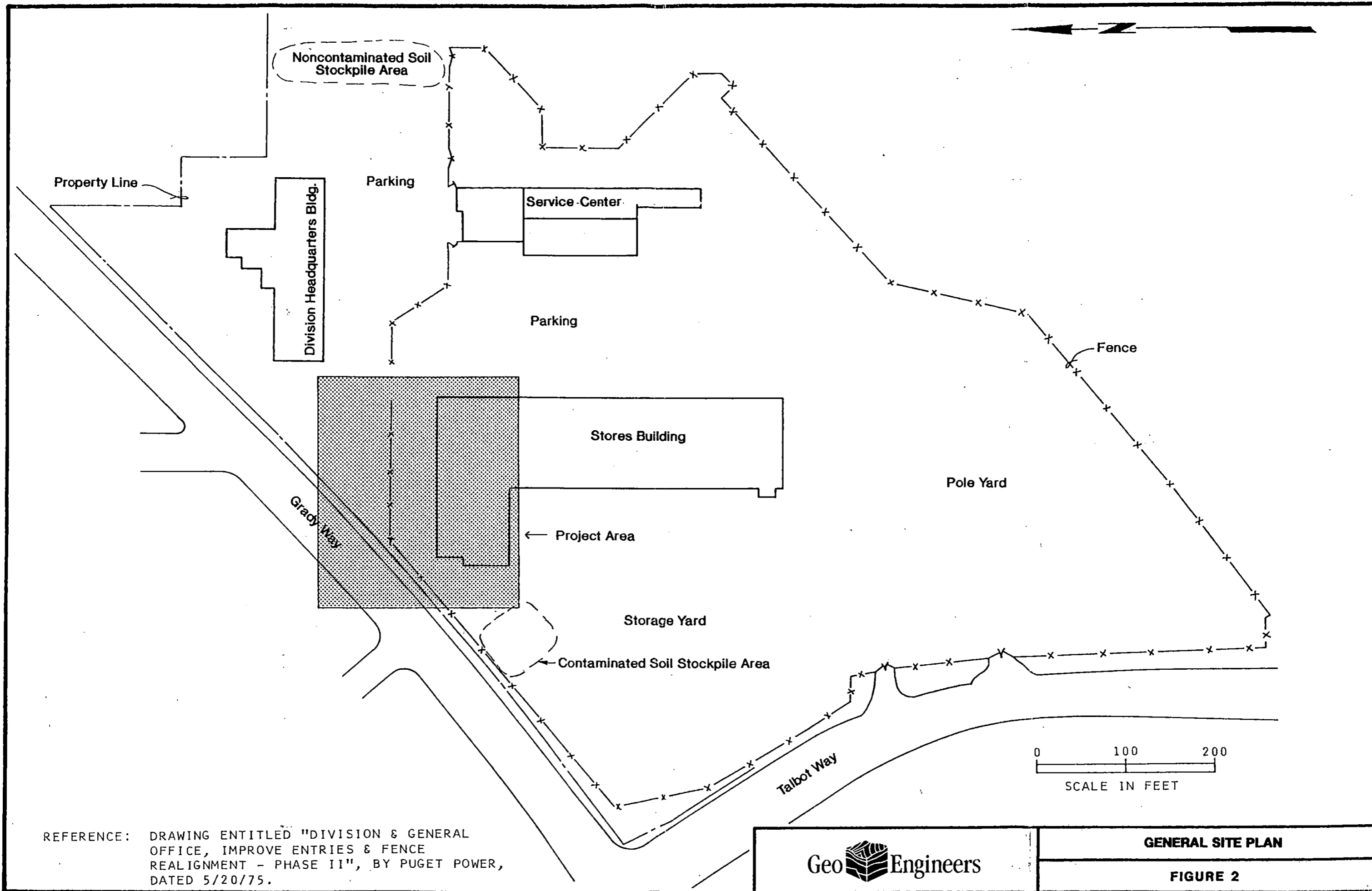
REFERENCE: USGS 7.5' TOPOGRAPHIC QUADRANGLE MAP "RENTON, WASH."



VICINITY MAP

FIGURE 1

186-106-804 KSK:DDH 4-17-90



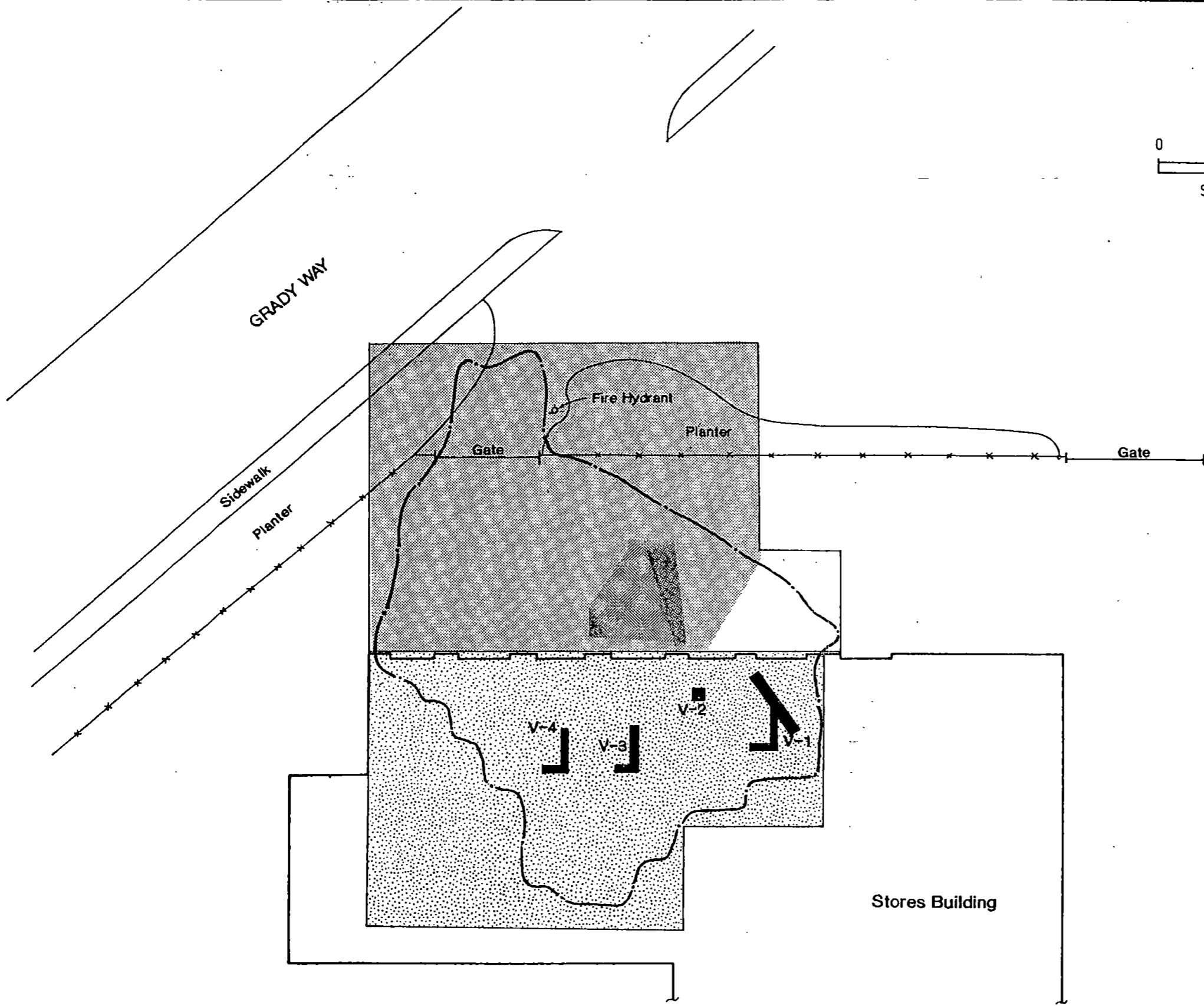
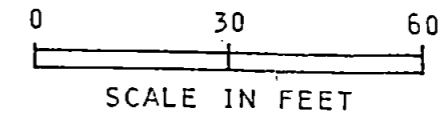
REFERENCE: DRAWING ENTITLED "DIVISION & GENERAL OFFICE, IMPROVE ENTRIES & FENCE REALIGNMENT - PHASE II", BY PUGET POWER, DATED 5/20/75.



GENERAL SITE PLAN

FIGURE 2

0186-106-B04 KSK:KLT 6-20-90



EXPLANATION:

- LIMIT OF EXCAVATION
- AREA ENLARGED IN FIGURE 4
- AREA ENLARGED IN FIGURE 5
- VAULT LOCATION AND NUMBER (V-2 REMOVED)

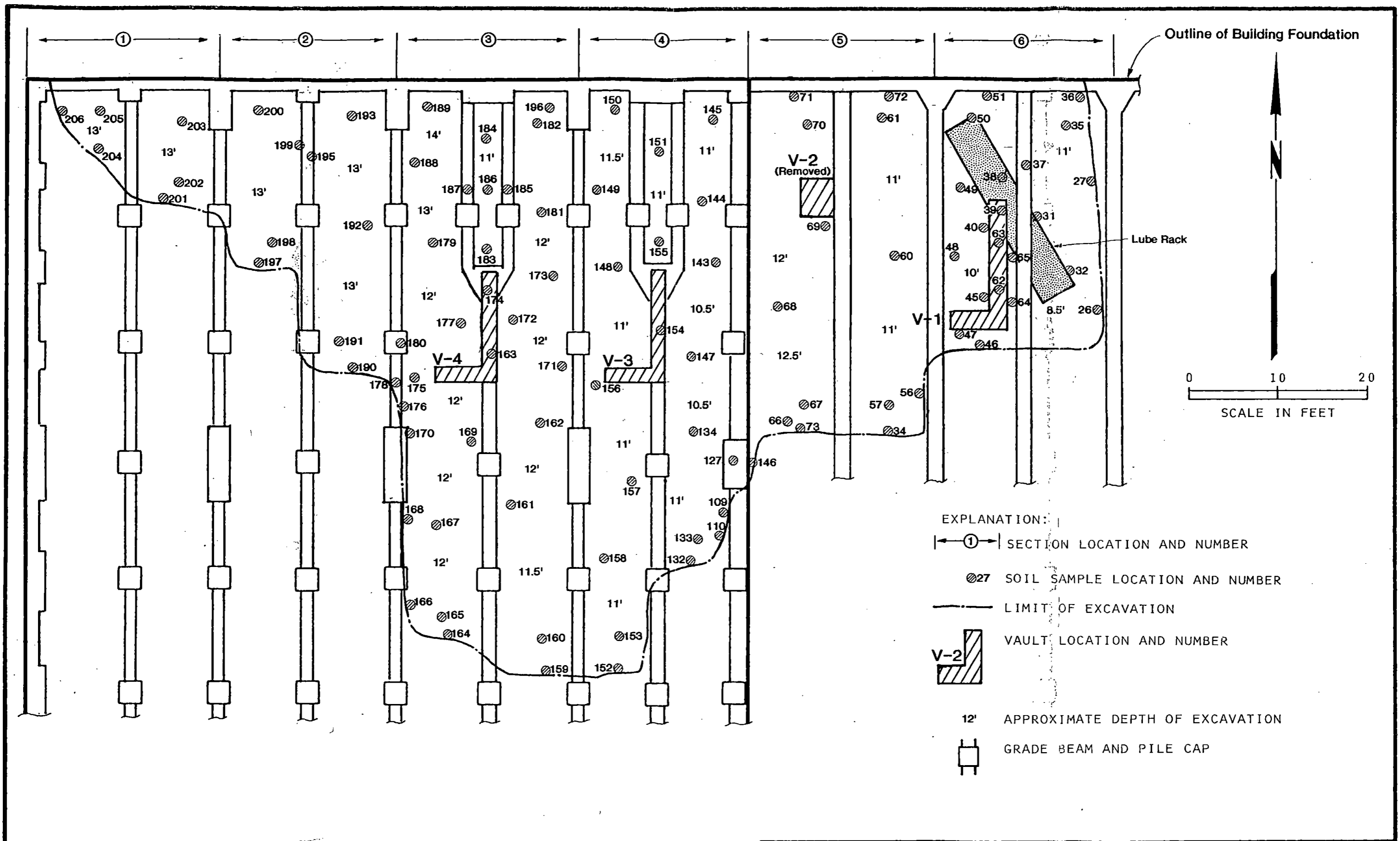
REFERENCE: DRAWING ENTITLED "RENTON TRANSPORTATION CENTER REMODEL", DATED 3/4/74, BY PUGET POWER AND SITE MEASUREMENTS MADE BY GEOENGINEERS, INC



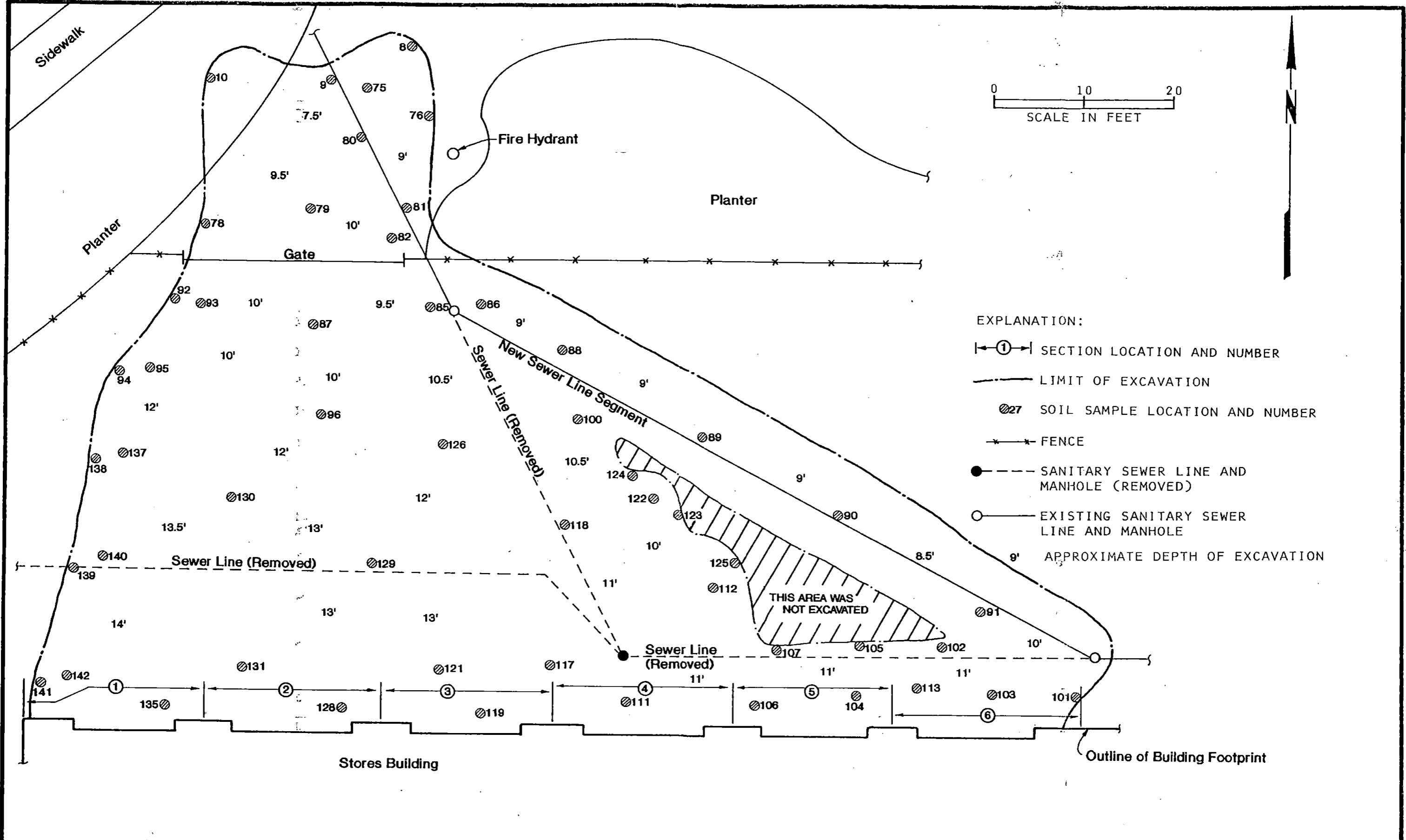
SITE PLAN

FIGURE 3

0186-106-BOA CAH:BOH 12.28.90



0186-106-B69 CAH:BDH 12.2890

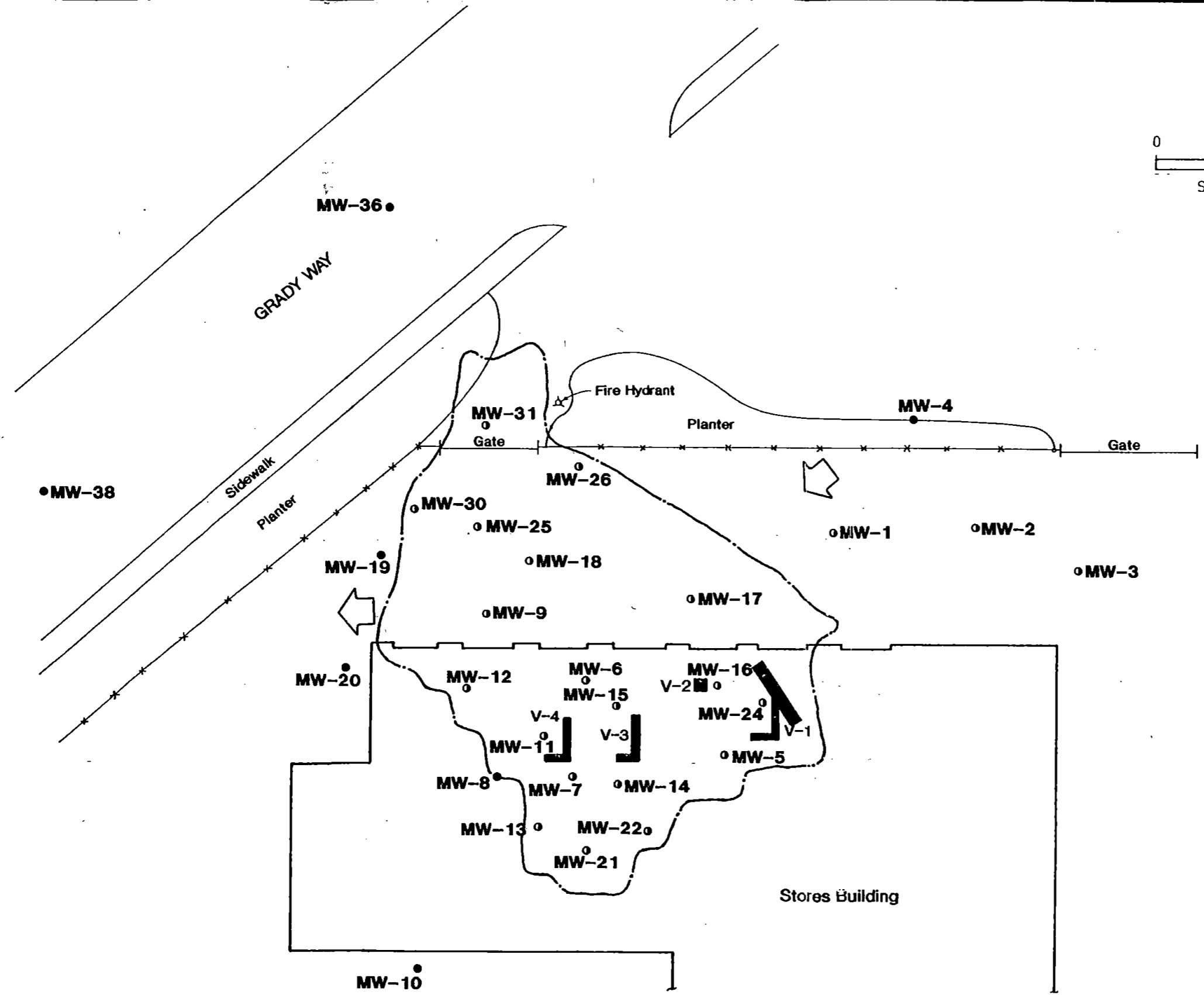
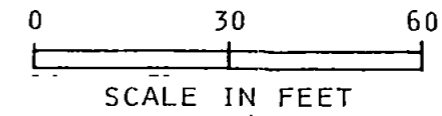


REFERENCE: DRAWING ENTITLED "RENTON TRANSPORTATION CENTER REMODEL", DATED 3/4/74, BY PUGET POWER AND SITE MEASUREMENTS MADE BY GEOENGINEERS, INC.



**SAMPLING PLAN NORTH OF STORES BUILDING**  
**FIGURE 5**

0186-106-B04 KSK:KKT 6:20:90



- EXPLANATION:
- LIMIT OF EXCAVATION
  - MW-1 MONITOR WELL LOCATION AND NUMBER (ABANDONED)
  - MW-4 MONITOR WELL LOCATION AND NUMBER
  - V-1 VAULT LOCATION AND NUMBER (V-2 REMOVED)
  - FENCE
  - GENERAL DIRECTION OF GROUND WATER FLOW

REFERENCE: DRAWING ENTITLED "RENTON TRANSPORTATION CENTER REMODEL", DATED 3/4/74, BY PUGET POWER AND SITE MEASUREMENTS MADE BY GEOENGINEERS, INC



SITE PLAN WITH MONITOR WELL LOCATIONS  
FIGURE 6

APPENDIX A

## A P P E N D I X    A

### FIELD METHODS

#### SOIL SAMPLING PROGRAM

A geologist from our staff selected the soil sample locations and examined the soils encountered.

Discrete soil samples were collected from the excavation with the aid of the contractor's excavating equipment. Soil samples were obtained from the center of the excavator bucket and placed directly in a plastic sample bag. A portion of the soil was transferred to sample jars. The sample jars were filled completely to eliminate headspace, then sealed and placed in a cooler with ice. Field screening was performed on the remaining soil.

Composite soil samples were collected from the noncontaminated soil stockpiles. Each sample is a composite of samples from four to six discrete locations. The discrete samples were placed in a sample bag and mixed. The resulting composite sample was then transferred to a sample jar and placed in a cooler with ice.

#### FIELD SCREENING OF SOIL SAMPLES

A GeoEngineers representative conducted field screening on soil samples obtained from the remedial excavation. Field screening results are used as a general guideline to delineate areas of potential petroleum-related contamination in soils. In addition, screening results are used to aid in the selection of soil samples for chemical analysis. The field screening methods employed included visual examination and sheen testing. The results of sheen screening are included in Tables 2 through 5, and 7 in the text of this report.

Visual screening consists of inspecting the soil for the presence of stains indicative of residual hydrocarbons. Visual screening is generally more effective in detecting the presence of heavier petroleum hydrocarbons such as motor oil, or when hydrocarbon concentrations are high. Sheen screening is a more sensitive method which has been effective in detecting residual petroleum hydrocarbons at concentrations lower than current regulatory criteria.

Sheen testing involves placing soil in water and observing the water surface for signs of sheen. Because of its sensitivity, the sheen method was first tested on soils obtained from a portion of the site believed to

be clean and unaffected by residual petroleum hydrocarbons. The results of the sheen tests on these soils were established as the background level of sheen for the site.

Sheens are classified as follows:

NS - No Sheen	No visible sheen on water surface. Note: background soil samples at the site were classified NS.
SS - Slight Sheen	Light colorless film, spotty to globular; spread is irregular, not rapid; areas of no sheen remain; film dissipates rapidly.
MS - Moderate Sheen	Light to heavy film, may have some color or iridescence, globular to stringy; spread is irregular to flowing.
HS - Heavy Sheen	Heavy colorful film with iridescence; stringy, spread is rapid, sheen flows off the sample; most of water surface is covered.

Field screening results are site specific. The results vary with temperature, soil type, type of contaminant, and soil moisture content.

#### GROUND WATER SAMPLING PROCEDURES

Ground water samples were collected from MW-8, MW-10, MW-19 and MW-20 on February 1, 1991. The water samples were collected with a stainless steel bailer after at least three well volumes of water were removed from each well casing. The water samples were transferred to liter jars in the field and kept cool during transport to the testing laboratory. Chain-of-custody procedures were observed during transport of the water samples.

The bailer was cleaned prior to each sampling attempt with a fresh water rinse, a trisodium phosphate detergent wash and a second fresh water rinse which was followed by a distilled water rinse.

#### CHEMICAL ANALYTICAL PROGRAM

Soil samples obtained during the hydraulic fluid remedial program were analyzed by Analytical Technologies, Inc. and Sound Analytical Services, Inc. The soil samples were analyzed for one or more of the following compounds: TPH using infrared spectrophotometry methods in accordance with

EPA Method 418.1; purgeable halocarbons using gas chromatography/electrolytic/electron capture detection in accordance with EPA Method 8010; fuel hydrocarbons using gas chromatography/flame ionization detection in accordance with modified EPA Method 8015; purgeable halocarbons using gas chromatography/photoionization detection in accordance with EPA Methods 8020; and PCBs using gas chromatography/electron capture detection in accordance with EPA Method 8080.

Water samples obtained during the hydraulic fluid remedial program were analyzed by Analytical Technologies, Inc. The water samples were analyzed for one or more of the following compounds: TPH using infrared spectrophotometry methods in accordance with EPA Method 418.1; fuel hydrocarbons using gas chromatography/flame ionization detection in accordance with modified EPA Method 8015; total lead concentration using atomic absorption/graphite furnace detection in accordance with EPA Method 7421; and BETX using gas chromatography/photoionization detection in accordance with EPA Methods 8020.

Chain-of-custody procedures were observed in transporting the soil and water samples to the analytical laboratory. The analytical data for the soil samples are summarized in Tables 2 through 5 and 7 in the text of this report. The analytical data for the water samples are summarized in Tables 1 and 8 in the text of this report. The laboratory reports for the soil and water samples are presented in Appendix B. The laboratory reports contain the analytical results, quality control data, chromatograms (for modified EPA Method 8015 analysis), and the chain-of-custody form.

**APPENDIX B**

**(SEE VOLUME 2)**

APPENDIX C



STATE OF WASHINGTON  
DEPARTMENT OF ECOLOGY

4350-150th Ave. NE • Redmond, Washington 98052-5301 • (206) 881-1111

May 1, 1990

Mr. Gary Reed, Senior Staff Engineer  
Engineering Services  
Puget Sound Power & Light Company  
PO Box 97034  
Bellevue, WA 98009-9734

RE: Stores Building at 620 South Grady Way, Renton

Dear Mr. Reed:

Thank you for the report detailing the tank removal and contamination found at the above referenced location. State and federal notification requirements for 70.105D RCW and 40 CFR Part 280 respectively, have been met. It is possible, if water quality violations occur, additional notification may be necessary based on state law 90.48 RCW. The Department of Ecology (Ecology) will retain these reports in a file at the regional office. Extensive review of submitted reports is not possible for independent clean-ups; however, a quick review is possible when underground storage tank closures are involved.

Based on the information submitted to me in the form of the Geo Engineers subsurface contamination study and tank removal report, proper procedures were followed, and the proposed remediation plan appears to be adequate. The City of Renton may have additional comments or requirements which would need to be followed. A final clean-up report should be submitted to Ecology based on requirements in 173-340 WAC.

Please contact me if you have questions or I can be of further assistance.

Sincerely,

*Joseph M. Hickey*  
Joseph M. Hickey  
Site Inspector

JH:cd

**Excavation and Temporary Erosion/Sedimentation Control Plan  
Soils Remediation  
Stores Building, Renton Service Center  
Puget Sound Power and Light Company  
Renton, Washington**

**INTRODUCTION**

Puget Sound Power and Light Company (Puget) is planning the cleanup of contaminated soil resulting from a historic leak of hydraulic fluid beneath the General Stores Building at the Renton Service Center on Grady Way in Renton, Washington. The cleanup activities are planned for the September-October period of 1990. The site characterization was performed by GeoEngineers, Inc. Puget has provided site characterization documents, an environmental checklist, and permit applications to the City of Renton for review. This plan is prepared as a supplement to those documents already provided to the City. Puget is currently involved in its contractor selection process. Depending upon the outcome of that process there may be minor modifications to the procedures and plans outlined in this document. Puget will advise the City of any changes which result from the contractor selection process.

**EXCAVATION PLAN**

In all areas of planned soil excavation the ground surface is presently covered by structures, concrete pavement or asphaltic pavement. Demolition of structures and removal of pavements is not addressed in this plan.

The petroleum hydrocarbon contaminated soils are generally present at a depth of about 5 to 12 feet below present site grade. It is anticipated that during the late summer/early fall period, the ground water level will be approximately 10 feet below present site grade. The area of soils with petroleum hydrocarbon contamination encompasses approximately 2,500 square feet beneath the building and 2,500 square feet in the paved parking area in the front of the building. To allow for sloped sidewalls for the excavations, the limit of excavation encompasses approximately 4,200 square feet within the building and 4,500 square feet in the paved parking area in the front of the building. We anticipate that total volumes of uncontaminated and contaminated soils will each be approximately 1,500 cubic yards.

Soil excavation will be accomplished using track-mounted and/or rubber tire-mounted backhoes. For the excavation work within the building, the size of the excavation equipment will be limited by the physical restraints posed by piles, pilecaps, grade beams, and floor slab segments that will remain in-place during the cleanup activities. Outside of the building a larger track hoe will be used for soil excavation. Excavated soils will be placed directly into dump trucks for immediate transport to on-site stockpile areas or for off-site transport for disposal.

Excavation and Temporary Erosion/Sedimentation Control Plan  
Soils Remediation - Stores Building, Renton Service Center  
August 16, 1990  
Page 2

In all areas where excavation is required, the actual excavation work will be performed in segments so that only a portion of the petroleum hydrocarbon contaminated zone is exposed at any one time. Inside of the building, this is necessary because of the limited space for moving and staging the excavation equipment.

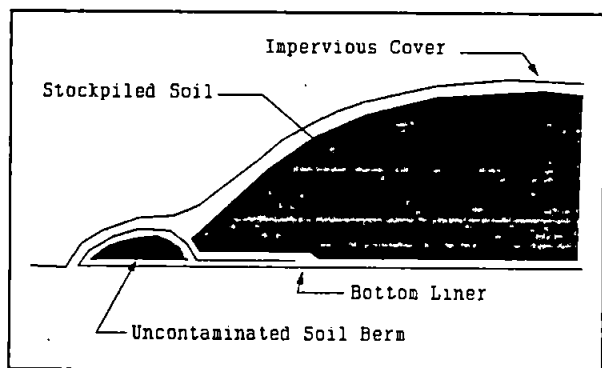
In each segment to be excavated, the soil excavation will begin with the removal of uncontaminated overburden. This uncontaminated soil will be stockpiled separately in accordance with methods discussed later in this plan. A representative of GeoEngineers will be present during excavation activities to evaluate soil for the presence of petroleum hydrocarbon contamination. If the transition zone between contaminated soil and uncontaminated soil is gradual, the transition soils may be stockpiled separately so that their actual status can be determined later by representative sampling and chemical analysis.

Excavation of contaminated soil will proceed with soil removal down to the base of the contaminated zone or the top to the aquifer. Further excavation of contaminated soil in the upper one to two feet of the aquifer zone may be done on a discretionary basis if such excavation can be completed without generating excessive contaminated water and if the soils removed do not contain excessive water. This will depend upon the character of the soil. Soil with free water drainage will not be placed in the soil stockpiles.

If excessive water in excavated soil cannot be avoided then dewatering will become necessary. If needed, dewatering will be accomplished by excavating a deeper pit in the excavation, placing a temporary casing surrounded by gravel in the pit and withdrawing water from the casing to locally lower the ground water table. Waste water collected by dewatering will be placed in a temporary, totally enclosed storage tank.

#### SOIL STOCKPILE PLANS

Soil excavated during cleanup operations will be classified as either uncontaminated soil, potentially contaminated soil, or contaminated soil. Each classification of soil will be handled and stockpiled separately. Soils will be stockpiled in predesignated areas. The soil stockpile areas will be within parts of the facility with controlled access. Soil stockpile areas will not be located within 100 feet of any surface water course. Stockpiled soil will be placed on an impervious barrier such as visqueen. The edges of the lower impervious barrier (bottom liner) will be bermed to prevent fluids and soil from moving off of the liner as shown on the figure.



Typical Soil Stockpile

Soil will be placed on the bottom liner by end dumping from a dump truck and/or placement with a front-end loader. Soil stockpiles may be up to 10 feet high. Soil stockpiles will be covered with an impervious barrier such as visqueen.

When the soil stockpiles are being accessed for placement or removal of fill, only the working face of the stockpile will be exposed. At the end of each working day, each soil stockpile will be completely covered and the cover secured with weights (such

as tires) to prevent the cover from being blown off.

Uncontaminated soil will be used as backfill as each excavated segment is completed. Because of this, it is not expected that there will be significant volume of stockpiled uncontaminated soil present at the site at any one time.

Potentially contaminated soil will be stockpiled until the soil's status can be determined by chemical analysis. If chemical testing shows the soil to be uncontaminated, it will be used as backfill. If the soil is found to be contaminated soil, it will be managed along with the other contaminated soil.

Ideally, contaminated soil will be transported directly to the landfill as it is being excavated, thus eliminating the need for stockpiling of contaminated soil. If this is not possible, then the contaminated soil will be stockpiled until it is accepted for disposal at the Kitsap County Landfill. Puget will strive to arrange and complete soil disposal promptly, but conditions beyond Puget's control may require that contaminated soil remain stockpiled at the site for more than 10 days.

#### EROSION CONTROL

Stockpiled soils will be covered with visqueen and will not be subject to normal erosional processes. The stockpiling plans described above will effectively prevent erosion problems from occurring with stockpiled soils.

The staged soil excavations will essentially be open pits in the ground. Since the site is relatively flat, none of the excavation work planned would result in an excavation from which soil materials could escape by natural processes. The relatively small size of each segment of the excavation will result in each part of the excavation remaining open for a relatively short period of time (2-3 days). We have not identified any erosion related issues resulting from the planned cleanup operation.

#### SEDIMENTATION CONTROL

Minor losses of small amounts of excavated soil are inevitable during the excavation and loading process. To prevent the accumulation of sediment in storm drains on the site, they will be lined with filter fabric beneath the drain grate prior to initiating on-site activities. Puget's contractor will place straw bales or other adequate sediment barrier devices or materials at locations where the movement of surface water could potential transport soils away from the project site. On a daily basis and upon completion of cleanup activities the remaining surficial soils will be collected and handled appropriately (as contaminated or uncontaminated soil).

APPENDIX D



September 20, 1990

Consulting Geotechnical  
Engineers and Geologists

Mr. Rich Mullen  
Parametrix  
13020 Northrup Way  
Bellevue, Washington 98005

Dear Mr. Mullen:

GeoEngineers, Inc. is providing consulting services to Puget Sound Power & Light Company (PSP&L) regarding the excavation and removal of hydraulic fluid-contaminated soil in the vicinity of the General Stores Building at the Renton Service Center located in Renton, Washington. On behalf of PSP&L, GeoEngineers is requesting pre-approval for disposal of the hydraulic fluid-contaminated soil which will be excavated during the planned remedial activities.

We anticipate approximately 1,500 cubic yards of soil will require disposal. At this time, a contractor has not been chosen for the job of soil excavation. We would expect to begin disposal around the first week in October of 1990. The contaminated soil will be transported to Kitsap County Landfill by a trucking company approved of by the Kitsap County Landfill authorities.

We understand that the following criteria have been established at the Kitsap County Landfill for the acceptance of petroleum-contaminated soils:

1. Soil will not meet WAC 173-303 Dangerous Waste designation.
- \* 2. Not to exceed 30,000 ppm (3 percent) total petroleum hydrocarbons.
- \* 3. Not to exceed 100 ppm benzene.

\* Per truckload on a composite basis.

We expect that the soils to be removed will be similar in character to those sampled and analyzed during our initial site characterization. Attached are the results of chemical analysis performed on representative soil samples obtained from soil borings completed within the area to be excavated. Analysis performed on the soil samples includes total petroleum hydrocarbons (EPA Method 418.1) and fuel fingerprint (EPA Method 8015). Based upon chemical analysis of these representative samples of hydraulic fluid contaminated soil, we feel the criteria will be met for the disposal of hydraulic fluid-contaminated soil at the Kitsap County Sanitary Landfill.

GeoEngineers, Inc.  
2405 140th Ave. NE, Suite 105  
Bellevue, WA 98005  
Telephone (206) 746-5200  
Fax, (206) 746-5068

Representative soil sample numbers of hydraulic-fluid contaminated soil include the following:

MW-6-3  
MW-7-3  
MW9 (8')  
MW-14, sample #3  
MW-15, sample #3  
MW-16, sample #3  
MW-21, sample #3  
MW-23  
MW-24, sample #3  
MW-25, sample #2  
MW-31

For your information, also attached is the results of chemical analysis performed on the hydraulic fluid product removed from the on-site reservoir. Analysis performed on the product includes semi-volatile organics (EPA Method 8270) and total metals. Please note this data is not representative of the hydraulic-fluid contaminated soil, but is representative of the product which contaminated the soil.

The product sample number of the hydraulic fluid analyzed is listed below.

#### Hydraulic Fluid Tank

We also expect that a minor amount of waste oil contaminated soil will be removed during the remedial excavation. Attached is the results of chemical analysis performed on a soil sample obtained from the limits of the waste oil tank excavation, which will be included within the area of the hydraulic-fluid remedial excavation. Analysis performed on the soil sample from the waste oil tank excavation includes total petroleum hydrocarbons and volatile organic compounds (EPA Method 8010/8020).

The soil sample number of the sample obtained from the waste oil tank excavation is listed below.

225-SW

Chemical analytical laboratory reports for all samples listed above are attached for your review. The sample numbers and analytical results listed above are highlighted on the attached reports.

Parametrix  
September 20, 1990  
Page 3

The following contacts are included for your convenience;

Generator: Puget Sound Power & Light Company  
P.O. Box 97034  
Bellevue, WA 98009-9734  
Contact: Mr. Gary Reid (206) 462-3077

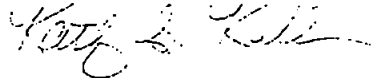
Environmental and Geotechnical Consultation Services:  
GeoEngineers, Inc.  
2405 - 140th Avenue Northeast, Suite 105  
Bellevue, Washington 98005  
Contact: Ms. Kathy Killman (206) 746-5200

- o o o -

Thank you for your assistance in expediting this matter. If you require any additional information regarding the disposal of this contaminated soil or our schedule, please call.

Yours very truly,

GeoEngineers, Inc.



Kathy S. Killman  
Project Geologist

KSK:SCP:  
Attachments

cc: (without attachments)  
Mr. Dick Arnold  
Kitsap County Sanitary Landfill, Inc.  
1005 Southwest Barney-White Rd  
Port Orchard, WA 98366

Mr. Gary Reid  
Puget Sound Power & Light Company  
P.O. Box 97034  
Bellevue, WA 98009-9734

File No. 0186-106-B69

SAMPLE CROSS REFERENCE SHEET

CLIENT : GEOENGINEERS, INC.  
PROJECT # : 186-101-B04  
PROJECT NAME : -

ATI #	CLIENT DESCRIPTION	MATRIX	DATE SAMPLED
8909-013-1	MW-6-3	SOIL	09/05/89
8909-013-2	MW-6-5	SOIL	09/05/89
8909-013-3	MW-8-3	SOIL	09/05/89
8909-013-4	MW-8-5	SOIL	09/05/89
8909-013-5	MW-7-3	SOIL	09/05/89
8909-013-6	MW-7-5	SOIL	09/05/89

----- TOTALS -----

MATRIX	# SAMPLES
SOIL	6

ATI STANDARD DISPOSAL PRACTICE

The samples from this project will be disposed of in thirty (30) days from the date of this report. If an extended storage period is required, please contact our sample control department before the scheduled disposal date.

GENERAL CHEMISTRY RESULTS

CLIENT : GEOENGINEERS, INC. SAMPLE MATRIX : SOIL  
PROJECT # : 186-101-B04  
PROJECT NAME : -

PARAMETER	UNITS	-1	-2	-3	-4	-5	-6
PETROLEUM HYDROCARBONS	mg/Kg	34,000	2.8	22	<1.0	13,000	12

GENERAL CHEMISTRY RESULTS

CLIENT : GEOENGINEERS, INC.  
PROJECT # : 186-101-B4  
PROJECT NAME : PSP&L, RENTON

SAMPLE MATRIX : SOIL  
UNITS : mg/Kg

ATI I.D.	CLIENT I.D.	PETROLEUM HYDROCARBONS
8909-025-1	MW5 (8')	<1.0
8909-025-2	MW5 (13')	<1.0
8909-025-3	MW9 (8')	11,000
8909-025-4	MW9 (13')	<1.0
8909-025-5	MW10 (5.5')	<1.0
8909-025-6	MW10 (13')	<1.0

SAMPLE CROSS REFERENCE SHEET

CLIENT : GEOENGINEERS, INC.  
 PROJECT # : 186-101  
 PROJECT NAME : -

ATI #	CLIENT DESCRIPTION	MATRIX	DATE SAMPLED
8910-059-1	MW-11, SAMPLE #3	SOIL	10/09/89
8910-059-2	MW-11, SAMPLE #5	SOIL	10/09/89
8910-059-3	MW-12, SAMPLE #3	SOIL	10/09/89
8910-059-4	MW-12, SAMPLE #5	SOIL	10/09/89
8910-059-5	MW-14, SAMPLE #3	SOIL	10/09/89
8910-059-6	MW-14, SAMPLE #5	SOIL	10/09/89

----- TOTALS -----

MATRIX	# SAMPLES
SOIL	6

ATI STANDARD DISPOSAL PRACTICE

The samples from this project will be disposed of in thirty (30) days from the date of this report. If an extended storage period is required, please contact our sample control department before the scheduled disposal date.

GENERAL CHEMISTRY RESULTS

CLIENT : GEOENGINEERS, INC.  
PROJECT # : 186-101  
PROJECT NAME : -

SAMPLE MATRIX : SOIL

PARAMETER	UNITS	-1	-3	-5	-6
PETROLEUM HYDROCARBONS	mg/Kg	<1.0	13	7,100	<1.0

SAMPLE CROSS REFERENCE SHEET

CLIENT : GEOENGINEERS, INC.  
 PROJECT # : 186-101-BO4  
 PROJECT NAME : -

ATI #	CLIENT DESCRIPTION	MATRIX	DATE SAMPLED
8910-066-1	MW-15, SAMPLE #3	SOIL	10/10/89
8910-066-2	MW-15, SAMPLE #5	SOIL	10/10/89
8910-066-3	MW-16, SAMPLE #3	SOIL	10/10/89
8910-066-4	MW-16, SAMPLE #5	SOIL	10/10/89
8910-066-5	MW-20, SAMPLE #3	SOIL	10/10/89
8910-066-6	MW-20, SAMPLE #5	SOIL	10/10/89

----- TOTALS -----

MATRIX	# SAMPLES
SOIL	6

ATI STANDARD DISPOSAL PRACTICE

The samples from this project will be disposed of in thirty (30) days from the date of this report. If an extended storage period is required, please contact our sample control department before the scheduled disposal date.



GENERAL CHEMISTRY RESULTS

CLIENT : GEOENGINEERS, INC.  
PROJECT # : 186-101-BO4  
PROJECT NAME : -

SAMPLE MATRIX : SOIL

PARAMETER	UNITS	-1	-2	-3	-4	-5
PETROLEUM HYDROCARBONS	mg/Kg	13,000	<1.0	9,300	<1.0	<1.0

FUEL HYDROCARBONS ANALYSIS  
DATA SUMMARY

CLIENT	: GEOENGINEERS, INC.	DATE SAMPLED	: 10/10/89
PROJECT #	: 186-101-BO4	DATE RECEIVED	: 10/10/89
PROJECT NAME	: -	DATE EXTRACTED	: 10/13/89
CLIENT I.D.	: MW-16, SAMPLE #3	DATE ANALYZED	: 10/16/89
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8015 MODIFIED	DILUTION FACTOR	: 5

-----  
COMPOUND

RESULT  
-----

FUEL HYDROCARBONS	<25
HYDROCARBON RANGE	-
HYDROCARBONS QUANTITATED USING	GASOLINE
FUEL HYDROCARBONS	2,200'
HYDROCARBON RANGE	C14 - C26
HYDROCARBONS QUANTITATED USING	DIESEL

SAMPLE CROSS REFERENCE SHEET

CLIENT : GEOENGINEERS, INC.  
 PROJECT # : 186-101  
 PROJECT NAME : -

ATI #	CLIENT DESCRIPTION	MATRIX	DATE SAMPLED
8910-088-1	MW-13, SAMPLE #3	SOIL	10/12/89
8910-088-2	MW-13, SAMPLE #5	SOIL	10/12/89
8910-088-3	MW-21, SAMPLE #3	SOIL	10/12/89
8910-088-4	MW-21, SAMPLE #5	SOIL	10/12/89
8910-088-5	MW-22, SAMPLE #3	SOIL	10/12/89
8910-088-6	MW-22, SAMPLE #5	SOIL	10/12/89
8910-088-7	MW-24, SAMPLE #3	SOIL	10/12/89
8910-088-8	MW-24, SAMPLE #5	SOIL	10/12/89

----- TOTALS -----

MATRIX	# SAMPLES
SOIL	8

ATI STANDARD DISPOSAL PRACTICE

The samples from this project will be disposed of in thirty (30) days from the date of this report. If an extended storage period is required, please contact our sample control department before the scheduled disposal date.

FUEL HYDROCARBONS ANALYSIS  
DATA SUMMARY

CLIENT	: GEOENGINEERS, INC.	DATE SAMPLED	: 10/12/89
PROJECT #	: 186-101	DATE RECEIVED	: 10/12/89
PROJECT NAME	: -	DATE EXTRACTED	: 10/13/89
CLIENT I.D.	: MW-24, SAMPLE #3	DATE ANALYZED	: 10/16/89
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8015 MODIFIED	DILUTION FACTOR	: 5

-----  
COMPOUND

RESULT  
-----

FUEL HYDROCARBONS  
HYDROCARBON RANGE  
HYDROCARBONS QUANTITATED USING

<25  
-  
GASOLINE

FUEL HYDROCARBONS  
HYDROCARBON RANGE  
HYDROCARBONS QUANTITATED USING

1,800.  
C14 - C26  
DIESEL

## GENERAL CHEMISTRY RESULTS

CLIENT : GEOENGINEERS, INC.  
 PROJECT # : 186-101  
 PROJECT NAME : -

SAMPLE MATRIX : SOIL

PARAMETER	UNITS	-1	-3	-5	-7	-8
PETROLEUM HYDROCARBONS	mg/Kg	3	370	73	6,000	7

SAMPLE CROSS REFERENCE SHEET

CLIENT : GEOENGINEERS, INC.  
 PROJECT # : 186-106-BO4  
 PROJECT NAME : PUGET POWER

ATI #	CLIENT DESCRIPTION	DATE SAMPLED	MATRIX
8911-108-1	MW-23	11/27/89	SOIL
8911-108-2	B-27	11/27/89	SOIL
8911-108-3	B-28	11/27/89	SOIL

----- TOTALS -----

MATRIX	# SAMPLES
SOIL	3

ATI STANDARD DISPOSAL PRACTICE

The samples from this project will be disposed of in thirty (30) days from the date of this report. If an extended storage period is required, please contact our sample control department before the scheduled disposal date.

GENERAL CHEMISTRY RESULTS

CLIENT : GEOENGINEERS, INC.  
PROJECT # : 186-106-BO4  
PROJECT NAME : PUGET POWER

SAMPLE MATRIX : SOIL

PARAMETER	UNITS	-1	-2	-3
PETROLEUM HYDROCARBONS	mg/Kg	5,900	19	25

## GENERAL CHEMISTRY RESULTS

CLIENT : GEOENGINEERS, INC.  
PROJECT # : 186-101  
PROJECT NAME : -

SAMPLE MATRIX : SOIL  
UNITS : mg/Kg

ATI I.D. #	CLIENT I.D.	PETROLEUM HYDROCARBONS
8910-077-1	MW-17, SAMPLE #3	<1.0
8910-077-3	MW-18, SAMPLE #3	7.7
8910-077-4	MW-18, SAMPLE #5	<1.0
8910-077-5	MW-19, SAMPLE #3	<1.0
8910-077-7	MW-25, SAMPLE #2	14,000
8910-077-8	MW-25, SAMPLE #3	<1.0
8910-077-9	MW-26, SAMPLE #3	<1.0

FUEL HYDROCARBONS ANALYSIS  
 DATA SUMMARY

CLIENT	: GEOENGINEERS, INC.	DATE SAMPLED	: 10/11/89
PROJECT #	: 186-101	DATE RECEIVED	: 10/11/89
PROJECT NAME	: -	DATE EXTRACTED	: 10/13/89
CLIENT I.D.	: MW-25, SAMPLE #2	DATE ANALYZED	: 10/16/89
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8015 MODIFIED	DILUTION FACTOR	: 10

 -----  
 COMPOUND

 RESULT  
 -----

 FUEL HYDROCARBONS  
 HYDROCARBON RANGE  
 HYDROCARBONS QUANTITATED USING

 <50  
 -  
 GASOLINE

 FUEL HYDROCARBONS  
 HYDROCARBON RANGE  
 HYDROCARBONS QUANTITATED USING

 4,500.  
 C16 - C26  
 DIESEL

SAMPLE CROSS REFERENCE SHEET

CLIENT : GEOENGINEERS, INC.  
 PROJECT # : 186-106-B04  
 PROJECT NAME : PUGET POWER

ATI #	CLIENT DESCRIPTION	DATE SAMPLED	MATRIX
8911-115-1	B-29	11/28/89	SOIL
8911-115-2	MW-30	11/28/89	SOIL
8911-115-3	MW-31	11/28/89	SOIL

----- TOTALS -----

MATRIX	# SAMPLES
SOIL	3

ATI STANDARD DISPOSAL PRACTICE

The samples from this project will be disposed of in thirty (30) days from the date of this report. If an extended storage period is required, please contact our sample control department before the scheduled disposal date.

GENERAL CHEMISTRY RESULTS

CLIENT : GEOENGINEERS, INC.  
PROJECT # : 186-106-BO4  
PROJECT NAME : PUGET POWER

SAMPLE MATRIX : SOIL

PARAMETER	UNITS	-1	-2	-3
PETROLEUM HYDROCARBONS	mg/Kg	6.9	8.4	2,000

FUEL HYDROCARBONS ANALYSIS  
DATA SUMMARY

CLIENT	: GEOENGINEERS, INC.	DATE SAMPLED	: 11/28/89
PROJECT #	: 186-106-B04	DATE RECEIVED	: 11/28/89
PROJECT NAME	: PUGET POWER	DATE EXTRACTED	: 11/30/89
CLIENT I.D.	: MW-31	DATE ANALYZED	: 12/02/89
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8015 MODIFIED	DILUTION FACTOR	: 1

COMPOUND	RESULT
FUEL HYDROCARBONS HYDROCARBON RANGE HYDROCARBONS QUANTITATED USING	<5 - GASOLINE
FUEL HYDROCARBONS HYDROCARBON RANGE HYDROCARBONS QUANTITATED USING	840 C8 - C28 DIESEL



Analytical **Technologies, Inc.**

560 Naches Avenue, S.W., Suite 101, Renton, WA 98055. (206) 228-8335

83-103-1367  
**Product Sample**

ATI I.D. # 9001-078

GeoEngineers

FEB 16 1990

February 15, 1990

Routing	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
File	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

GeoEngineers, Inc.  
2405 140th Avenue N.E.  
Suite 105  
Bellevue, WA 98005

Attention : Kathy Killman

Project Number : 186-101-B4

Project Name : Puget Power Renton

On August 29, 1989 Analytical Technologies, Inc. received two soil samples and one product sample for analyses. The samples were analyzed with EPA methodology or equivalent methods as specified in the analytical schedule. The results, sample cross reference, and the quality control data were sent to you on September 11, 1989 under ATI accession #8908-130.

The samples were reaccessioned for additional tests on January 25, 1990. Enclosed is the report for the additional analyses.

*Frederick W. Grothkopp*  
for Mary C. Silva  
Senior Project Manager  
FWG/pes

*Frederick W. Grothkopp*  
Frederick W. Grothkopp  
Technical Manager



SAMPLE CROSS REFERENCE SHEET

CLIENT : GEOENGINEERS, INC.
PROJECT # : 186-101-B4
PROJECT NAME : PUGET POWER RENTON

Table with 4 columns: ATI #, CLIENT DESCRIPTION, DATE SAMPLED, MATRIX. Row 1: 9001-078-1, HYDRAULIC FLUID TANK, 08/28/89, PRODUCT

----- TOTALS -----

Summary table with 2 columns: MATRIX, # SAMPLES. Row 1: PRODUCT, 1

ATI STANDARD DISPOSAL PRACTICE

The samples from this project will be disposed of in thirty (30) days from the date of this report. If an extended storage period is required, please contact our sample control department before the scheduled disposal date.



## ANALYTICAL SCHEDULE

CLIENT : GEOENGINEERS, INC.  
PROJECT # : 186-101-B4  
PROJECT NAME : PUGET POWER RENTON

ANALYSIS	TECHNIQUE	REFERENCE	LAB
SEMI-VOLATILE COMPOUNDS	GCMS	EPA 8270	R
ARSENIC	AA/GF	EPA 7060	R
BARIUM	AA/F	EPA 7080	R
CADMIUM	AA/F	EPA 7130	R
CHROMIUM	AA/F	EPA 7190	R
LEAD	AA/F	EPA 7420	R
MERCURY	AA/COLD VAPOR	EPA 7470	R
SELENIUM	AA/GF	EPA 7740	R
SILVER	AA/F	EPA 7760	R

SD = ATI - San Diego  
R = ATI - Renton  
T = ATI - Tempe  
PNR = ATI - Pensacola

SEMI-VOLATILE ORGANICS ANALYSIS  
DATA SUMMARY

CLIENT	: GEOENGINEERS, INC.	DATE SAMPLED	: N/A
PROJECT #	: 186-101-B4	DATE RECEIVED	: N/A
PROJECT NAME	: PUGET POWER RENTON	DATE EXTRACTED	: 01/26/90
CLIENT I.D.	: REAGENT BLANK	DATE ANALYZED	: 01/29/90
SAMPLE MATRIX	: PRODUCT	UNITS	: mg/Kg
EPA METHOD	: 8270	DILUTION FACTOR	: 300

RESULTS BASED ON "AS IS" BASIS

COMPOUND	RESULT
N-NITROSODIMETHYLAMINE	<51
PHENOL	<51
ANILINE	<51
BIS (2-CHLOROETHYL) ETHER	<51
2-CHLOROPHENOL	<51
1,3-DICHLOROBENZENE	<51
1,4-DICHLOROBENZENE	<51
BENZYL ALCOHOL	<51
1,2-DICHLOROBENZENE	<51
2-METHYLPHENOL	<51
BIS (2-CHLOROISOPROPYL) ETHER	<51
4-METHYLPHENOL	<51
N-NITROSO-DI-N-PROPYLAMINE	<51
HEXACHLOROETHANE	<51
NITROBENZENE	<51
ISOPHORONE	<51
2-NITROPHENOL	<51
2,4-DIMETHYLPHENOL	<51
BENZOIC ACID	<51
BIS (2-CHLOROETHOXY) METHANE	<51
2,4-DICHLOROPHENOL	<51
1,2,4-TRICHLOROBENZENE	<51
NAPHTHALENE	<51
4-CHLOROANILINE	<51
HEXACHLOROBUTADIENE	<51
4-CHLORO-3-METHYLPHENOL	<51
2-METHYLNAPHTHALENE	<51
HEXACHLOROCYCLOPENTADIENE	<51
2,4,6-TRICHLOROPHENOL	<51
2,4,5-TRICHLOROPHENOL	<51
2-CHLORONAPHTHALENE	<51
2-NITROANILINE	<51
DIMETHYLPHTHALATE	<51
ACENAPHTHYLENE	<51
3-NITROANILINE	<51
ACENAPHTHENE	<51
2,4-DINITROPHENOL	<51
4-NITROPHENOL	<51

CONTINUED NEXT PAGE

SEMI-VOLATILE ORGANICS ANALYSIS  
DATA SUMMARY (CONTINUED)

CLIENT	: GEOENGINEERS, INC.	DATE SAMPLED	: N/A
PROJECT #	: 186-101-B4	DATE RECEIVED	: N/A
PROJECT NAME	: PUGET POWER RENTON	DATE EXTRACTED	: 01/26/90
CLIENT I.D.	: REAGENT BLANK	DATE ANALYZED	: 01/29/90
SAMPLE MATRIX	: PRODUCT	UNITS	: mg/Kg
EPA METHOD	: 8270	DILUTION FACTOR	: 300

RESULTS BASED ON "AS IS" BASIS

COMPOUND	RESULT
DIBENZOFURAN	<51
2,4-DINITROTOLUENE	<51
2,6-DINITROTOLUENE	<51
DIETHYLPHthalate	<51
4-CHLOROPHENYL-PHENYLETHER	<51
FLUORENE	<51
4-NITROANILINE	<51
4,6-DINITRO-2-METHYLPHENOL	<51
N-NITROSODIPHENYLAMINE	<51
4-BROMOPHENYL-PHENYLETHER	<51
HEXACHLOROBENZENE	<51
PENTACHLOROPHENOL	<51
PHENANTHRENE	<51
ANTHRACENE	<51
DI-N-BUTYLPHthalate	<51
FLUORANTHENE	<51
BENZIDINE	<51
PYRENE	<51
BUTYLBENZYLPHthalate	<51
3,3-DICHLOROBENZIDINE	<51
BENZO(a)ANTHRACENE	<51
BIS(2-ETHYLHEXYL)PHthalate	<51
CHRYSENE	<51
DI-N-OCTYLPHthalate	<51
BENZO(b)FLUORANTHENE	<51
BENZO(k)FLUORANTHENE	<51
BENZO(a)PYRENE	<51
INDENO(1,2,3-cd)PYRENE	<51
DIBENZ(a,h,)ANTHRACENE	<51
BENZO(g,h,i)PERYLENE	<51

## SURROGATE PERCENT RECOVERIES

NITROBENZENE-d5	87
2-FLUOROBIPHENYL	94
TERPHENYL-d14	100
PHENOL-d6	90
2-FLUOROPHENOL	103
2,4,6-TRIBROMOPHENOL	77



SEMI-VOLATILE ORGANICS ANALYSIS  
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT	: GEOENGINEERS, INC.	DATE SAMPLED	: N/A
PROJECT #	: 186-101-B4	DATE RECEIVED	: N/A
PROJECT NAME	: PUGET POWER RENTON	DATE EXTRACTED	: 01/26/90
CLIENT I.D.	: REAGENT BLANK	DATE ANALYZED	: 01/29/90
SAMPLE MATRIX	: PRODUCT	UNITS	: mg/Kg
EPA METHOD	: 8270	DILUTION FACTOR	: 300
RESULTS BASED ON "AS IS" BASIS			

COMPOUND	SCAN NUMBER	ESTIMATED CONCENTRATION
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NO NON-HSL COMPOUNDS FOUND > 10% OF NEAREST INTERNAL STANDARD.

SEMI-VOLATILE ORGANICS ANALYSIS  
DATA SUMMARY

CLIENT	: GEOENGINEERS, INC.	DATE SAMPLED	: 08/28/89
PROJECT #	: 186-101-B4	DATE RECEIVED	: 08/29/89
PROJECT NAME	: PUGET POWER RENTON	DATE EXTRACTED	: 01/26/90
CLIENT I.D.	: HYDRAULIC FLUID TANK	DATE ANALYZED	: 01/29/90
SAMPLE MATRIX	: PRODUCT	UNITS	: mg/Kg
EPA METHOD	: 8270	DILUTION FACTOR	: 300

RESULTS BASED ON "AS IS" BASIS

COMPOUND	RESULT
N-NITROSODIMETHYLAMINE	<51
PHENOL	<51
ANILINE	<51
BIS (2-CHLOROETHYL) ETHER	<51
2-CHLOROPHENOL	<51
1,3-DICHLOROBENZENE	<51
1,4-DICHLOROBENZENE	<51
BENZYL ALCOHOL	<51
1,2-DICHLOROBENZENE	<51
2-METHYLPHENOL	<51
BIS (2-CHLOROISOPROPYL) ETHER	<51
4-METHYLPHENOL	<51
N-NITROSO-DI-N-PROPYLAMINE	<51
HEXACHLOROETHANE	<51
NITROBENZENE	<51
ISOPHORONE	<51
2-NITROPHENOL	<51
2,4-DIMETHYLPHENOL	<51
BENZOIC ACID	<51
BIS (2-CHLOROETHOXY) METHANE	<51
2,4-DICHLOROPHENOL	<51
1,2,4-TRICHLOROBENZENE	<51
NAPHTHALENE	<51
4-CHLOROANILINE	<51
HEXACHLOROBUTADIENE	<51
4-CHLORO-3-METHYLPHENOL	<51
2-METHYLNAPHTHALENE	<51
HEXACHLOROCYCLOPENTADIENE	<51
2,4,6-TRICHLOROPHENOL	<51
2,4,5-TRICHLOROPHENOL	<51
2-CHLORONAPHTHALENE	<51
2-NITROANILINE	<51
DIMETHYLPHTHALATE	<51
ACENAPHTHYLENE	<51
3-NITROANILINE	<51
ACENAPHTHENE	<51
2,4-DINITROPHENOL	<51
4-NITROPHENOL	<255

CONTINUED NEXT PAGE

SEMI-VOLATILE ORGANICS ANALYSIS  
DATA SUMMARY (CONTINUED)

CLIENT	: GEOENGINEERS, INC.	DATE SAMPLED	: 08/28/89
PROJECT #	: 186-101-B4	DATE RECEIVED	: 08/29/89
PROJECT NAME	: PUGET POWER RENTON	DATE EXTRACTED	: 01/26/90
CLIENT I.D.	: HYDRAULIC FLUID TANK	DATE ANALYZED	: 01/29/90
SAMPLE MATRIX	: PRODUCT	UNITS	: mg/Kg
EPA METHOD	: 8270	DILUTION FACTOR	: 300

RESULTS BASED ON "AS IS" BASIS

COMPOUND	RESULT
DIBENZOFURAN	<51
2,4-DINITROTOLUENE	<51
2,6-DINITROTOLUENE	<51
DIETHYLPHTHALATE	<51
4-CHLOROPHENYL-PHENYLETHER	<51
FLUORENE	<51
4-NITROANILINE	<51
4,6-DINITRO-2-METHYLPHENOL	<51
N-NITROSODIPHENYLAMINE	<51
4-BROMOPHENYL-PHENYLETHER	<51
HEXACHLOROBENZENE	<51
PENTACHLOROPHENOL	<255
PHENANTHRENE	<51
ANTHRACENE	<51
DI-N-BUTYLPHTHALATE	<51
FLUORANTHENE	<51
BENZIDINE	<51
PYRENE	<51
BUTYLBENZYLPHTHALATE	<51
3,3-DICHLOROBENZIDINE	<51
BENZO (a) ANTHRACENE	<51
BIS (2-ETHYLHEXYL) PHTHALATE	<51
CHRYSENE	<51
DI-N-OCTYLPHTHALATE	<51
BENZO (b) FLUORANTHENE	<51
BENZO (k) FLUORANTHENE	<51
BENZO (a) PYRENE	<51
INDENO (1,2,3-cd) PYRENE	<51
DIBENZ (a,h,) ANTHRACENE	<51
BENZO (g,h,i) PERYLENE	<51

## SURROGATE PERCENT RECOVERIES

NITROBENZENE-d5	80
2-FLUOROBIPHENYL	88
TERPHENYL-d14	43
PHENOL-d6	84
2-FLUOROPHENOL	96
2,4,6-TRIBROMOPHENOL	70



SEMI-VOLATILE ORGANICS ANALYSIS  
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT	: GEOENGINEERS, INC.	DATE SAMPLED	: 08/28/89
PROJECT #	: 186-101-B4	DATE RECEIVED	: 08/29/89
PROJECT NAME	: PUGET POWER RENTON	DATE EXTRACTED	: 01/26/90
CLIENT I.D.	: HYDRAULIC FLUID TANK	DATE ANALYZED	: 01/29/90
SAMPLE MATRIX	: PRODUCT	UNITS	: mg/Kg
EPA METHOD	: 8270	DILUTION FACTOR	: 300

RESULTS BASED ON "AS IS" BASIS

COMPOUND	SCAN NUMBER	ESTIMATED CONCENTRATION
BRANCHED ALKANE	1148	2,100
HYDROCARBON	1285	7,500
HYDROCARBON	1300	12,000
HYDROCARBON	1382	24,000
HYDROCARBON	2173	6,000

SEMI-VOLATILE ORGANIC  
QUALITY CONTROL DATA

CLIENT : GEOENGINEERS, INC.  
 PROJECT # : 186-101-B4  
 PROJECT NAME : PUGET POWER RENTON  
 EPA METHOD : 8270

SAMPLE I.D. : 9001-078-1  
 DATE EXTRACTED : 01/26/90  
 DATE ANALYZED : 01/29/90  
 MATRIX : PRODUCT  
 UNITS : mg/Kg

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED SAMPLE	% REC	DUP SPIKED SAMPLE	DUP % REC	RPD
1,2,4-TRICHLOROBENZENE	<51	100	79	79	83	83	5
ACENAPHTHENE	<51	100	74	74	74	74	0
2,4-DINITROTOLUENE	<51	100	47	47	54	54	14
PYRENE	<51	100	76	76	89	89	16
N-NITROSO-DI-N-PROPYLAMINE	<51	100	75	75	75	75	0
1,4-DICHLOROBENZENE	<51	100	86	86	86	86	0
PENTACHLOROPHENOL	<51	200	117	58	127	63	8
PHENOL	<51	200	144	72	149	74	3
2-CHLOROPHENOL	<51	200	148	74	153	76	3
4-CHLORO-3-METHYLPHENOL	<51	200	145	72	143	72	1
4-NITROPHENOL	<51	200	39	20	54	27	32

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{(\text{Spiked Sample Result} - \text{Duplicate Spike Sample Result})}{\text{Average of Spiked Sample}} \times 100$$



METALS RESULTS

CLIENT : GEOENGINEERS, INC.  
PROJECT # : 186-101-B4  
PROJECT NAME : PUGET POWER RENTON

MATRIX : PRODUCT

UNITS : mg/Kg

ATI I.D. #	CLIENT I.D.	ARSENIC	BARIUM	CADMIUM	CHROMIUM
9001-078-1	HYDRAULIC FLUID TANK	<1	10	3.3	<3



METALS RESULTS

CLIENT : GEOENGINEERS, INC.  
PROJECT # : 186-101-B4  
PROJECT NAME : PUGET POWER RENTON

MATRIX : PRODUCT

UNITS : mg/Kg

ATI I.D. #	CLIENT I.D.	LEAD	MERCURY	SELENIUM	SILVER
9001-078-1	HYDRAULIC FLUID TANK	<15	<0.15	<1	<3



## METALS QUALITY CONTROL

CLIENT : GEOENGINEERS, INC.  
 PROJECT # : 186-101-B4  
 PROJECT NAME : PUGET POWER RENTON

MATRIX : PRODUCT

UNITS : mg/Kg

PARAMETER	ATI I.D.	SAMPLE RESULT	DUP RESULT	RPD	SPIKED SAMPLE	SPIKE CONC	% REC
ARSENIC	9001-078-1	<1	<1	0	3.0	4.1	73
BARIUM	9001-078-1	10	10	0	2870	3280	87
CADMIUM	9001-078-1	3.3	3.3	0	84	82	98
CHROMIUM	9001-078-1	<3	<3	0	318	328	97
LEAD	9001-078-1	<15	<15	0	1510	1640	92
MERCURY	9001-067-9	<0.15	<0.15	0	0.53	0.72	74
SELENIUM	9001-078-1	<1	<1	0	2.1	2.4	88
SILVER	9001-078-1	<3	<3	0	159	164	97

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

# Chain of Custody

9001-078

PROJECT MANAGER: Kathy Killman  
 COMPANY: CEI  
 ADDRESS: \_\_\_\_\_  
 PHONE: 246-5200 SAMPLED BY: JER

LABORATORY NUMBER: 8908-130

SAMPLE DISPOSAL INSTRUCTIONS					ANALYSIS REQUEST															NUMBER OF CONTAINERS				
<input type="checkbox"/> ATI Disposal @ \$5.00 each <input type="checkbox"/> Return <input type="checkbox"/> Pickup (will call)					8010	8020	8040	8270	8310	8080	8140	8150	WDOE	418.1	413.2	8015	TOC	TOX	%		TCLP	Priority	EP TOX	EP TOX
SAMPLE ID	DATE	TIME	MATRIX	LAB ID	Halogenated Volatiles	Aromatic Volatiles	GCMS ONLY	GCMS Volatiles	GCMS DMA	IPLC PNA	Pesticides & PCB's	PCB's ONLY	Phosphate Pesticides	Herbicides	PAH's (WAC 173)	(PII)	Grease & Oil	(Modified)	9060	9020	Moisture			
12245W1	8/24/89		Soil	-1	X	X											X	X						
1224 WW1	↓		↓	-2													X	X						
Hydraulic Fluid Tank	8/15/89	3:15	Fluid	-3				X										X					X	

REACCESSION FROM  
 8908-130  
 NEW ACCESSION IS 9001-078

PROJECT INFORMATION		SAMPLE RECEIPT		RELINQUISHED BY: 1		RELINQUISHED BY: 2		RELINQUISHED BY: 3	
PROJECT NUMBER: <u>186-101-P4</u>	TOTAL NUMBER OF CONTAINERS: <u>2</u>	CHAIN OF CUSTODY SEALS Y/N/V/A: <u>N</u>	INTACT? Y/N/V/A: <u>Y</u>	Signature: <u>James Kirk</u>	Time:	Signature:	Time:	Signature:	Time:
PROJECT NAME: <u>Puget Power Rental</u>	RECEIVED GOOD COND./COLD: <u>Y</u>	Company: <u>CEI</u>		Printed Name: <u>James Kirk</u>	Date:	Printed Name:	Date:	Printed Name:	Date:
PURCHASE ORDER NUMBER:				Company:		Company:		Company:	
VIA:				RECEIVED BY: 1	RECEIVED BY: 2	RECEIVED BY: (LAB) 3			
TAT: <input checked="" type="checkbox"/> 24HR <input type="checkbox"/> 48 HRS <input type="checkbox"/> 72 HRS <input type="checkbox"/> 1 WK <input type="checkbox"/> 2 WKS (Normal)				Signature:	Time:	Signature:	Time:	Signature:	Time:
PRIOR AUTHORIZATION IS REQUIRED FOR RUSH DATA				Printed Name:	Date:	Printed Name:	Date:	Printed Name:	Date:
SPECIAL INSTRUCTIONS:				Company:		Company:		Company:	
<u>Return soil for 30 days</u>									
<u>RUSH</u>									
<u>PLEASE FAX ORDERS</u>									

D - 35



# Waste Oil Contaminated Soil Sample

ATI I.D. # 8908-067

## SAMPLE CROSS REFERENCE SHEET

CLIENT : GEOENGINEERS, INC.  
PROJECT # : 186-101-B4  
PROJECT NAME : PUGET POWER

ATI #	CLIENT DESCRIPTION	MATRIX	DATE SAMPLED
8908-067-1	225-B	SOIL	08/14/89
8908-067-2	225-NW	SOIL	08/14/89
8908-067-3	225-WW	SOIL	08/14/89
8908-067-4	225-EW	SOIL	08/14/89
8908-067-5	225-SW	SOIL	08/14/89

----- TOTALS -----

MATRIX	# SAMPLES
SOIL	5

### ATI STANDARD DISPOSAL PRACTICE

The samples from this project will be disposed of in thirty (30) days from the date of this report. If an extended storage period is required, please contact our sample control department before the scheduled disposal date.

VOLATILE ORGANIC ANALYSIS  
DATA SUMMARY

CLIENT	: GEOENGINEERS, INC.	DATE SAMPLED	: 08/14/89
PROJECT #	: 186-101-B4	DATE RECEIVED	: 08/14/89
PROJECT NAME	: PUGET POWER	DATE EXTRACTED	: 08/15/89
CLIENT I.D.	: 225-SW	DATE ANALYZED	: 08/17/89
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8010/8020	DILUTION FACTOR	: 1
RESULTS BASED ON DRY WEIGHT			

COMPOUND	RESULT
BENZENE	<0.025
BROMODICHLOROMETHANE	<0.010
BROMOFORM	<0.010
BROMOMETHANE	<0.025
CARBON TETRACHLORIDE	<0.010
CHLOROBENZENE	<0.025
CHLOROETHANE	<0.025
CHLOROFORM	<0.010
CHLOROMETHANE	<0.100
DIBROMOCHLOROMETHANE	<0.010
1,2-DICHLOROBENZENE	<0.025
1,3-DICHLOROBENZENE	<0.025
1,4-DICHLOROBENZENE	<0.025
1,1-DICHLOROETHANE	<0.010
1,2-DICHLOROETHANE	<0.010
1,1-DICHLOROETHENE	<0.010
CIS-1,2,-DICHLOROETHENE	<0.010
TRANS-1,2-DICHLOROETHENE	<0.010
1,2-DICHLOROPROPANE	<0.010
CIS-1,3-DICHLOROPROPENE	<0.010
TRANS-1,3-DICHLOROPROPENE	<0.010
ETHYLBENZENE	0.12
METHYLENE CHLORIDE	<0.10
1,1,2,2-TETRACHLOROETHANE	<0.010
TETRACHLOROETHENE	0.095
TOLUENE	0.044
1,1,1-TRICHLOROETHANE	0.091
1,1,2-TRICHLOROETHANE	<0.010
TRICHLOROETHENE	<0.010
TRICHLOROFLUOROMETHANE	<0.025
VINYL CHLORIDE	<0.025
META & PARA XYLENE	0.46
ORTHO XYLENE	0.19

## SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE	73
BROMOFLUOROBENZENE	72

GENERAL CHEMISTRY RESULTS

CLIENT : GEOENGINEERS, INC. SAMPLE MATRIX : SOIL  
PROJECT # : 186-101-B4  
PROJECT NAME : PUGET POWER

PARAMETER	UNITS	-1	-2	-3	-4	-5
PETROLEUM HYDROCARBONS	mg/Kg	1,900	11,000	28	200	22
MOISTURE	%	27	26	26	19	26

APPENDIX E

METRO DISCHARGE AUTHORIZATION  
FOR  
SPECIAL/MINOR DISCHARGER  
NUMBER 253

FOR

Puget Power c/o Chemical Processors, Inc.  
3400 E. Marginal Way South  
620 S. Grady Wy., Renton  
Seattle, WA 98134

CONTACT: Peter Vandervelde

PHONE: 682-4898

TYPE: General Maintenance & Repair Facility

SIC: 4911

EPA I.D.:

DISCHARGE TO: METRO SEWER

\*NOTE: This authorization is valid only for the  
specific process and dates shown below:

DISCHARGE PROCESS: Groundwater Remediation

MAXIMUM VOLUME: 9000 GPD

DOCUMENT EFFECTIVE DATE: 10/25/90

EXPIRATION DATE: 10/25/91

For information concerning this Metro Discharge Authorization  
please contact Jim Sifford, Industrial Waste Investigator at  
684-2335.

24-HOUR  
EMERGENCY NOTIFICATION

RENTON TREATMENT PLANT: 684-2400

DEPARTMENT OF ECOLOGY: 867-7000

-----  
(For Your Use)

LOCAL FIRE DEPARTMENT: \_\_\_\_\_

24-HR. CORPORATE CONTACTS:  
\_\_\_\_\_

METRO DISCHARGE AUTHORIZATION  
 NUMBER 253  
 PAGE 2

GENERAL DISCHARGE LIMITATIONS

Corrosive Substances

The lower pH limit is 5.5; the discharge of any substance which can cause corrosive damage to the metro sewerage system either by itself or through interaction with other substances, is not allowed.

High Temperature

The industrial user shall not discharge material with a temperature in excess of 65 C (150 F).

Fats, Oils and Greases

The industrial user shall not discharge wastes that contain in excess of 100 milligrams per liter (mg/l) of polar fats, oils and greases (FOG) or 100 mg/l of non-polar FOG. *Replace with 418 1*

Flammable or Explosive Materials

Materials which can cause two successive readings on an explosion hazard meter, at the point of discharge into the system (or at any point in the system), be more than five percent (5%) nor any single reading over ten percent (10%) of the Lower Explosive Limit (LEL) on the meter are not allowed. Prohibited materials include, but are not limited to, gasoline, kerosene, naphtha, benzene, toluene, xylene, ethers, alcohols, ketones, aldehydes, peroxides, chlorates, perchlorates, bromates, carbides, hydrides and sulfides and any other substances which the City and the State or EPA have notified the user are a fire hazard or a hazard to the system.

Restricted Substances

The industrial user shall not discharge wastes which exceed the following limitations:\*

Arsenic	1.0	Mercury	0.1
Cadmium	1.2	Nickel	6.0
Chromium	6.0	Silver	1.0
Copper	3.0	Zinc	5.0
Lead	3.0	Cyanide	2.0

*ONLY*

\* Expressed as milligrams per liter

GENERAL CONDITIONS

1. All requirements and ordinances of Metro Resolution No. 3374 pertaining to the discharge of wastes into the municipal sewer system are hereby made a condition of this Discharge Authorization.
2. Any facility changes which will result in a change in the character or volume of the pollutants discharged to the municipal sewer system must be reported to your Metro representative. Any facility changes that will cause the violation of the effluent limitations specified herein will not be allowed.
3. In the event the industrial user is unable to comply with any of the conditions of this Discharge Authorization because of a breakdown of equipment or facilities, an accident caused by human error, negligence, or any other cause, such as an act of nature, the company shall:
  - (a) take immediate action to stop, contain and clean up the unauthorized discharges and correct the problem.
  - (b) immediately notify the Municipality of Metropolitan Seattle so steps can be taken to prevent damage to the sewerage system.
  - (c) submit a written report describing the breakdown, the actual quantity and quality of resulting waste discharged, corrective action taken, and the steps taken to prevent a recurrence.

Compliance with these requirements does not relieve the industrial user from responsibility to maintain continuous compliance with the conditions of the Discharge Authorization or the resulting liability for failure to comply.

4. The industrial user shall, at all reasonable times, allow authorized representatives of the Municipality of Metropolitan Seattle to enter that portion of the premises where an effluent source or disposal system is located or in which any records are required to be kept under the terms and conditions of this Discharge Authorization.

METRO DISCHARGE AUTHORIZATION  
NUMBER 253  
PAGE 4

5. Nothing in the Discharge Authorization shall be construed as excusing the industrial user from compliance with any applicable federal, state, or local statutes, ordinances, or regulations.
6. This Discharge Authorization does not constitute authority for discharge into waters of the state. Any such discharge is subject to regulation and enforcement action by the Department of Ecology.
7. All requirements and ordinances of the Environmental Protection Agency and Department of Ecology pertaining to hazardous and toxic wastes, disposal facilities, and discharge of wastes into the municipal sewer system, are hereby made a condition of this Discharge Authorization.

THE SPECIAL CONDITIONS FOR THIS DISCHARGE AUTHORIZATION ARE ON THE FOLLOWING PAGE. FOR THIS DISCHARGE AUTHORIZATION TO BE VALID, THESE SPECIAL CONDITIONS MUST BE MET.

Investigator: *Jim Safford*

Date: *10-25-1990*

METRO DISCHARGE AUTHORIZATION  
NUMBER 253  
PAGE 5

SPECIAL CONDITIONS

Discharge Limitations

<u>Constituent</u>	<u>Maximum Concentration, ppm</u>
Benzene	0.13
Toluene	1.5
Ethylbenzene	1.4
Non-polar Fats, Oil & Grease (non-polar FOG) - T.P.M.	100

The concentrations for benzene, toluene and ethylbenzene are the proposed Metro local limits for these parameters (limits are subject to public review and comment and SEPA review, with a tentative adoption date of August 6, 1990). For the purposes of this discharge authorization, the proposed limits are your discharge limits.

Operating Procedures

Common Sense Criteria

- a) There shall be no pronounced odor of solvent or gasoline.
- b) There shall be no pronounced oil sheen or unusual color.
- c) There shall be no pronounced hydrogen sulfide (rotten egg) odor.
- d) There shall be no visibly pronounced turbidity, the discharge must remain translucent.

Metro will expect operators on site to pay close attention to these common sense criteria whenever discharge to the sanitary sewer is occurring. If any of the discharge limits or common sense criteria are exceeded, you must stop discharging and notify the Metro Industrial Waste Section at 684-2325.

METRO DISCHARGE AUTHORIZATION  
NUMBER 253  
PAGE 6

Monitoring Requirements

The following monitoring requirements shall be met for this discharge authorization:

<u>Parameter</u>	<u>Frequency</u>	<u>Sample Type/Method</u>
Flow	Monthly Average (expressed as gallons/day)	Meter or pump rate (gallons/day)
Explosivity	Weekly for first month; monthly thereafter	Meter
Common Sense Criteria	Continuous	Observation
Hydrogen Sulfide	Only if common sense criteria are exceeded	Meter
Settleable Solids	Only if common sense criteria are exceeded	Grab/Imhoff Cone or Turbidity Meter
Metals (lead)	Weekly for first month of discharge; monthly thereafter	Grab
Benzene, toluene, ethylbenzene	Weekly for first month; monthly thereafter	Grab/EPA Method 602
Non-polar FOG T.P.H.	Weekly for first month; monthly thereafter	Grab/Standard Method 5520F

A monthly self monitoring report shall be filed with Metro by the 15th day of the month following sample collection. This report must include the total monthly volume of water discharged to the sewer as well as the analytical results.

The suggested analytical method for the contaminant indicators benzene, ethylbenzene and toluene is EPA Method 602 in Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater (EPA-600/4-82-057, July 1982). The required analytical method for the contaminant indicator of non-polar FOG is Method 5520F (with a partition-gravimetric extraction procedure) in the 1989 Standard Methods for the Examination of Water and Wastes (17th edition).

City of Renton Requirements

The following conditions are a requirement of City of Renton Public Works Department and are hereby incorporated as special conditions to this authorization.

1. Upon receipt of the Discharge Authorization, the applicant shall make application for a side sewer permit to insure proper connection to the City system.
2. A meter shall be installed on the discharge connection for the purpose of determining City of Renton sewer billing charges.
3. Applicant shall sign an "Authorization for Special Billing" form for billing purposes.
4. All analytical test reports required by Metro shall be copied to City of Renton Public Works Department, Attention: David M. Christensen.

*26  
10/24/40  
METRO AS OF*

CHEMPRO Environmental Services

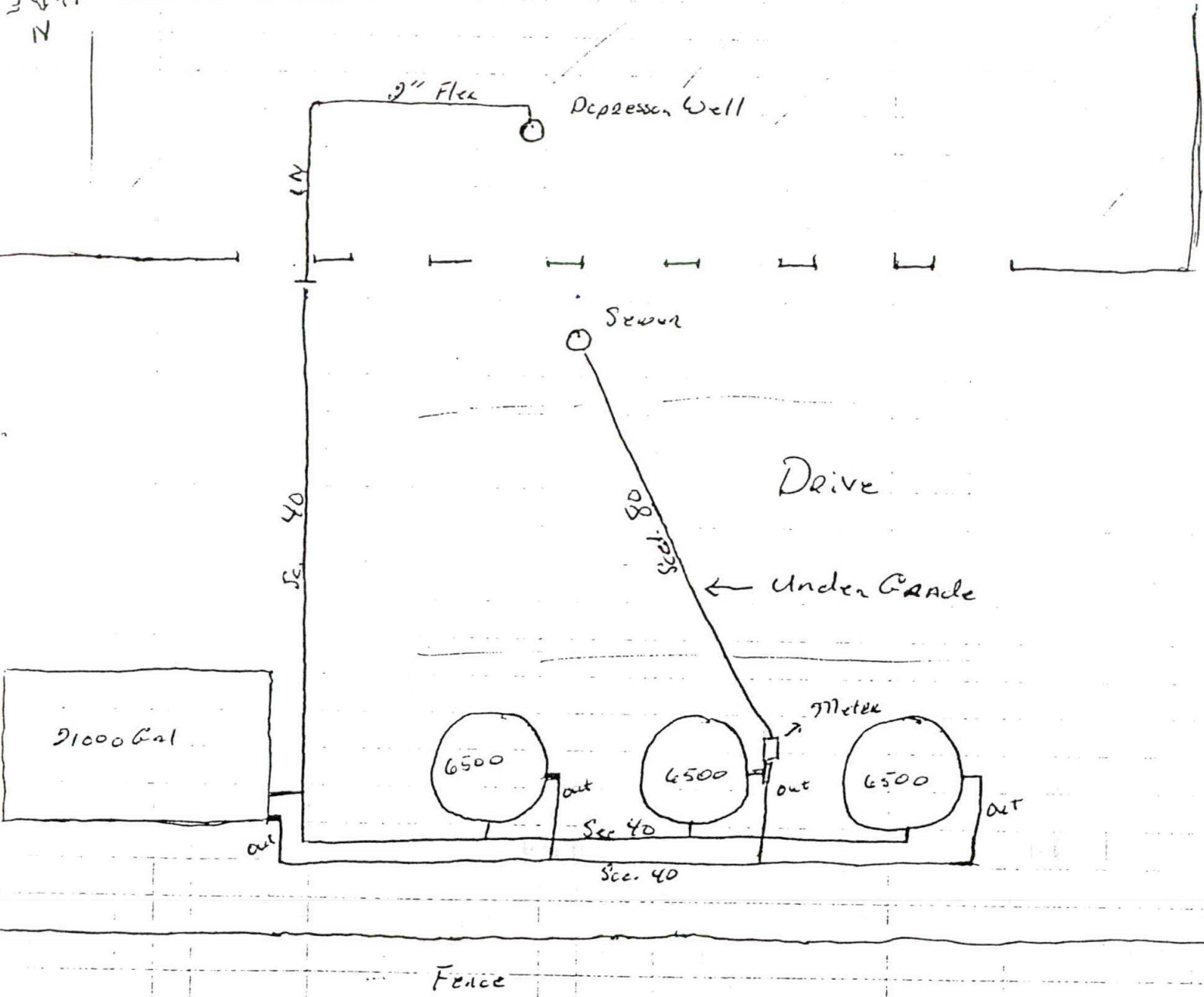
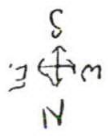
Permit # 253

Puget Power

620 S. Grady Way

Renton Wash.

Garage Complex C



Sarah Grady W.

0301  
Kerry #

APPLICATION ONLY - UNTIL VALIDATED

PERMIT NUMBER 4-704

Owner <b>PUGET POWER</b>		Location of Work <b>6020 S. GRADY WAY</b>	
Address <b>6020 S. GRADY WAY</b>			
<b>RENTON WA. 98055</b>			
INSPECTIONS	<b>CONSTRUCTION PERMIT</b> (Public Right-of-Way)  <b>10-24-90</b> Date Issued  <b>12-31-90</b> Expiration Date	FEES	
		Sanitary Sewer/Storm Water Permits	<b>10000</b>
		Right-of-Way Construction	
		Right-of-Way Inspection Fees	
		Water Inspection/Approval Fee	
		Special Utility Connection Fee, Water	
		Water Latecomer Fee	
		Special Assessment District, Water	
		Sewer Inspection/Approval Fees	
		Special Utility Connection Fee, Sewer	
		Sewer Latecomer Fee	
		Special Assessment District, Sewer	
Source Data		Special Deposit, Private Latecomer	
		Special Deposit, Cash Bond	
		TOTAL FEE	<b>10000</b>

Description of Work  
Number of Feet **INSTALLATION OF METER READING 55010.8 TEMPORARY SEWER FROM TEMPORARY STORAGE TANKS TO EXIST. CURB SIDE WHOLE PER APPROVED SKETCH ATTACHED**

Contractor **HEMERD**

Business License **8639**

Bond **NOT RECD**

Address **3400 EAST MARSHALL WAY SOUTH SEATTLE WA. 98134**

Telephone **622-4078 371-1320**

IT IS UNDERSTOOD THAT THE CITY OF RENTON SHALL BE HELD HARMLESS OF ANY AND ALL LIABILITY, DAMAGE OR INJURY ARISING FROM THE PERFORMANCE OF SAID WORK.

ANY WORK PERFORMED WITHIN THE RIGHT-OF-WAY OR ON SEWER MAIN MUST BE DONE BY A LICENSED, BONDED CONTRACTOR. LOCATE UTILITIES BEFORE EXCAVATING.

235-2631 FOR INSPECTION.  
Between 8 AM and 9 AM for location in afternoon; call before 12 Noon the day before inspection in morning.  
SPECIFY TIME FOR INSPECTION.

APPLICANT *[Signature]*

PUBLIC WORKS DIRECTOR

E - 9

CALL BEFORE YOU DIG 48-HOUR LOCATORS

BY *[Signature]*

235-2620 for street signs

**APPENDIX F**

October 18, 1990

Washington Department of Ecology  
Northwest Regional Office  
4550 - 150th Avenue Northeast  
Redmond, Washington 98052-5301

Attention: Mr. Rod Thompson


Monitor Well Abandonment Services  
Puget Sound Power & Light  
Renton Service Center  
Renton, Washington  
File No. 0186-106-B04

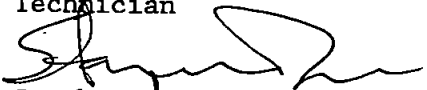
This letter summarizes our recent monitor well abandonment activities at the site of the Renton Service Center in Renton, Washington. The monitor wells were sealed and abandoned on September 26, 1990 by our staff technician who is a licensed well driller in the State of Washington.

There were 20 monitor wells on this site which were abandoned. The wells varied from 12 to 15 feet in depth. The monitor wells were abandoned in accordance with Washington State Administrative Code (Chapter 173-160). The wells were sealed and abandoned by filling well casings with a slurry of Portland cement.

A data sheet summarizing the well abandonment details has been included with the attached water well reports. Please contact us if you have any questions regarding this report.

Yours very truly,  
GeoEngineers, Inc.

  
Jon C. Koloski  
Technician

  
Stephen C. Perrigo  
Associate

JCK:SCP:ira

Attachments

Two copies submitted

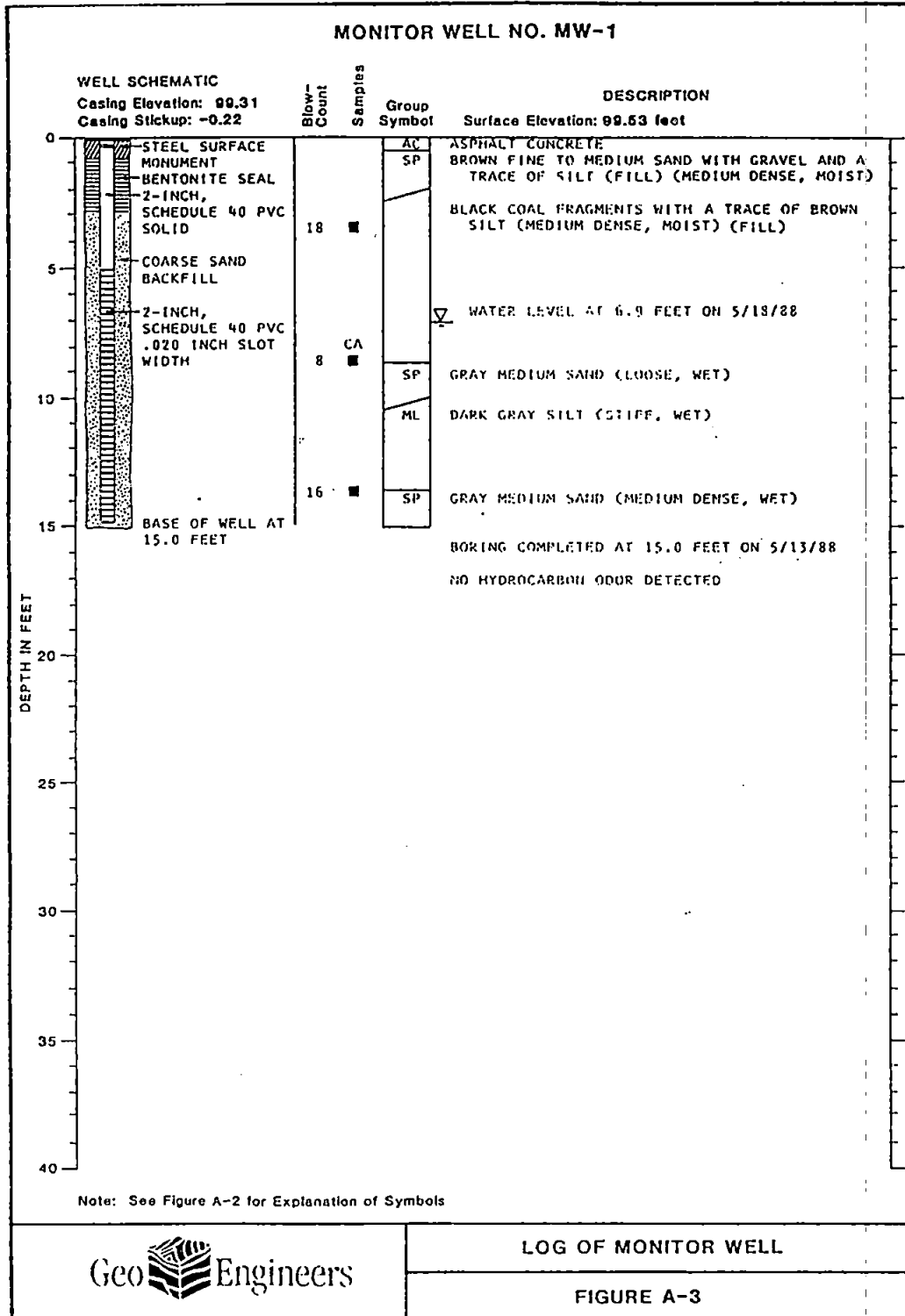
cc: Mr. Gary R. Reid  
Puget Sound Power & Light Co.

RESOURCE PROTECTION WELL REPORT

START CARD NO. 027964

PROJECT NAME: Puget Sound Power and Light  
 WELL IDENTIFICATION NO. MW-1  
 DRILLING METHOD: Well Abandonment  
 DRILLER: Jon C. Koloski  
 FIRM: GeoEngineers Inc.  
 SIGNATURE: Jon C. Koloski  
 CONSULTING FIRM: Same  
 REPRESENTATIVE: Same

LOCATION: T 23N, R 5E, SEC. 19  
 DISTANCE: 150 FT. FROM N/S SECTION LINE  
200 FT. FROM E/W SECTION LINE  
 DATUM: \_\_\_\_\_  
 WATER LEVEL ELEVATION: \_\_\_\_\_  
 INSTALLED: Abandoned on 9-26-90  
 DEVELOPED: \_\_\_\_\_





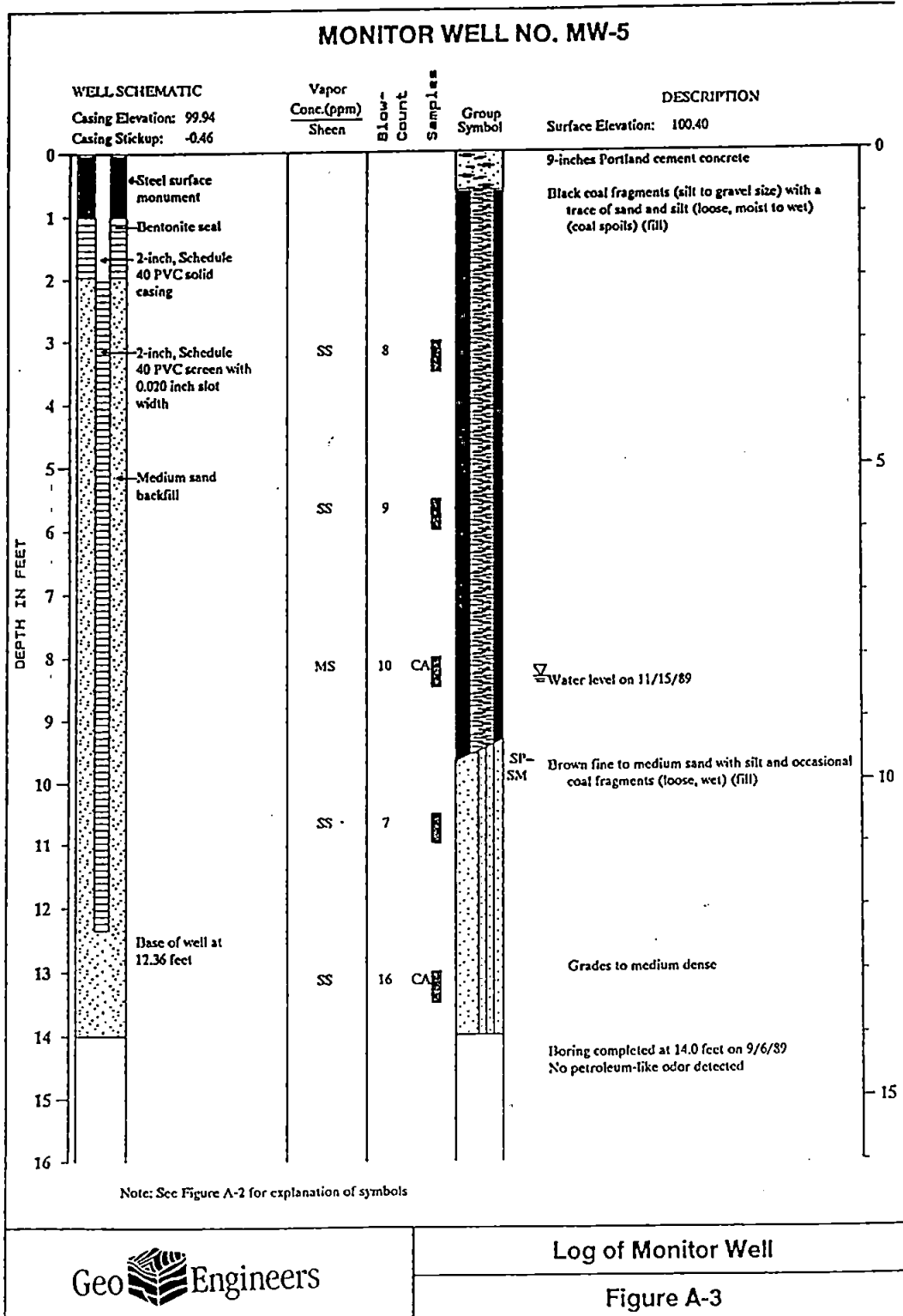


# RESOURCE PROTECTION WELL REPORT

START CARD NO. 027964

PROJECT NAME: Puget Sound Power and Light  
 WELL IDENTIFICATION NO. MW-5  
 DRILLING METHOD: Well Abandonment  
 DRILLER: Jon C. Koloski  
 FIRM: GeoEngineers Inc.  
 SIGNATURE: Jon C. Koloski  
 CONSULTING FIRM: Same  
 REPRESENTATIVE: Same

LOCATION: T 23N, R 5E, SEC. 19  
 DISTANCE: 150 FT. FROM N/S SECTION LINE  
200 FT. FROM E/W SECTION LINE  
 DATUM: \_\_\_\_\_  
 WATER LEVEL ELEVATION: \_\_\_\_\_  
 INSTALLED: Abandoned on 9-26-90  
 DEVELOPED: \_\_\_\_\_

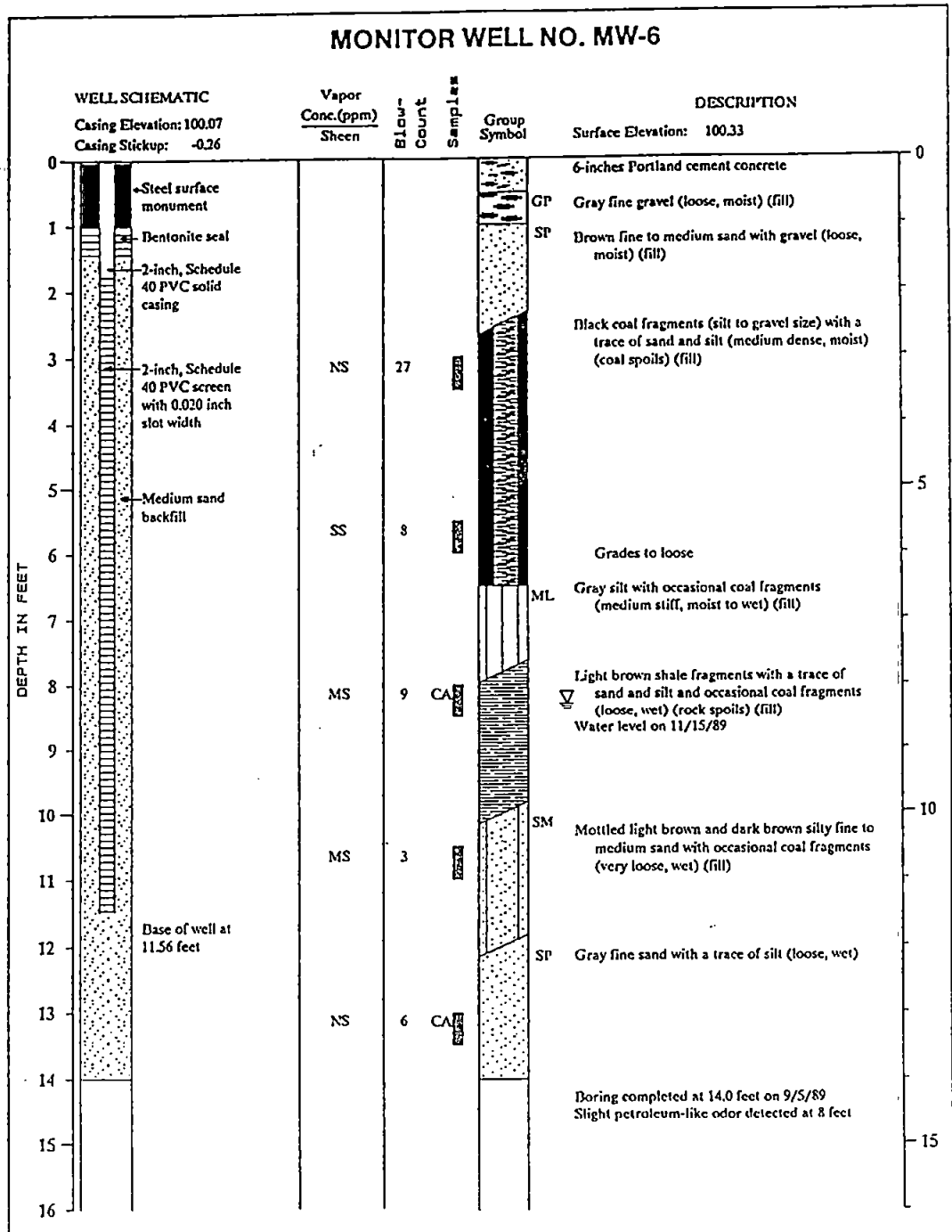


# RESOURCE PROTECTION WELL REPORT

START CARD NO. 027964

PROJECT NAME: Puget Sound Power and Light  
 WELL IDENTIFICATION NO. MW-6  
 DRILLING METHOD: Well Abandonment  
 DRILLER: Jon C. Koloski  
 FIRM: GeoEngineers Inc.  
 SIGNATURE: Jon C. Koloski  
 CONSULTING FIRM: Same  
 REPRESENTATIVE: Same

LOCATION: T 23N, R 5E, SEC. 19  
 DISTANCE: 150 FT. FROM N/S SECTION LINE  
200 FT. FROM E/W SECTION LINE  
 DATUM: \_\_\_\_\_  
 WATER LEVEL ELEVATION: \_\_\_\_\_  
 INSTALLED: Abandoned on 9-26-90  
 DEVELOPED: \_\_\_\_\_



Note: See Figure A-2 for explanation of symbols



Log of Monitor Well

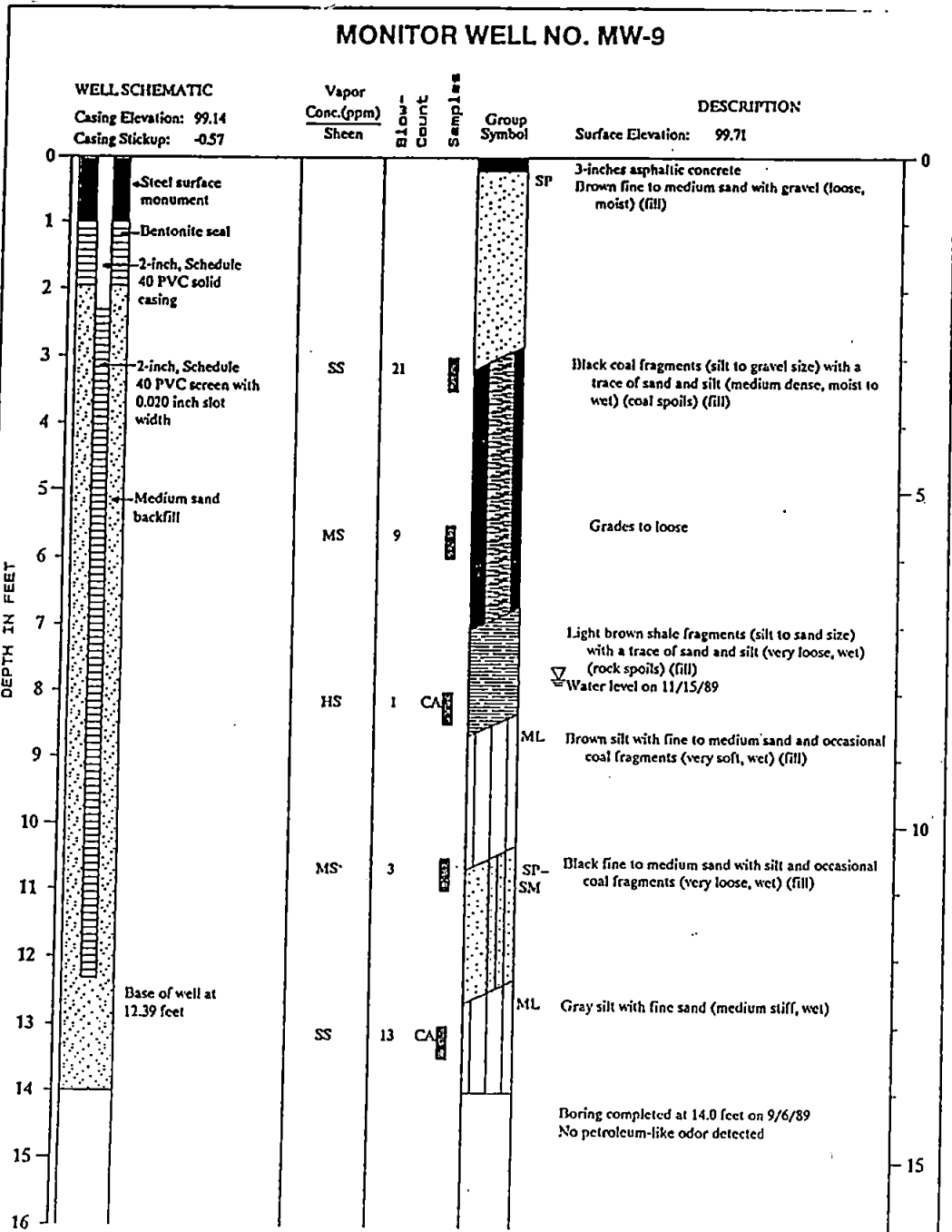
Figure A-4

# RESOURCE PROTECTION WELL REPORT

START CARD NO. 027964

PROJECT NAME: Puget Sound Power and Light  
 WELL IDENTIFICATION NO. MW-9  
 DRILLING METHOD: Well Abandonment  
 DRILLER: Jon C. Koloski  
 FIRM: GeoEngineers Inc.  
 SIGNATURE: Jon C. Koloski  
 CONSULTING FIRM: Same  
 REPRESENTATIVE: Same

LOCATION: T 23N, R 5E, SEC. 19  
 DISTANCE: 150 FT. FROM N/S SECTION LINE  
200 FT. FROM E/W SECTION LINE  
 DATUM: \_\_\_\_\_  
 WATER LEVEL ELEVATION: \_\_\_\_\_  
 INSTALLED: Abandoned on 9-26-90  
 DEVELOPED: \_\_\_\_\_



Note: See Figure A-2 for explanation of symbols

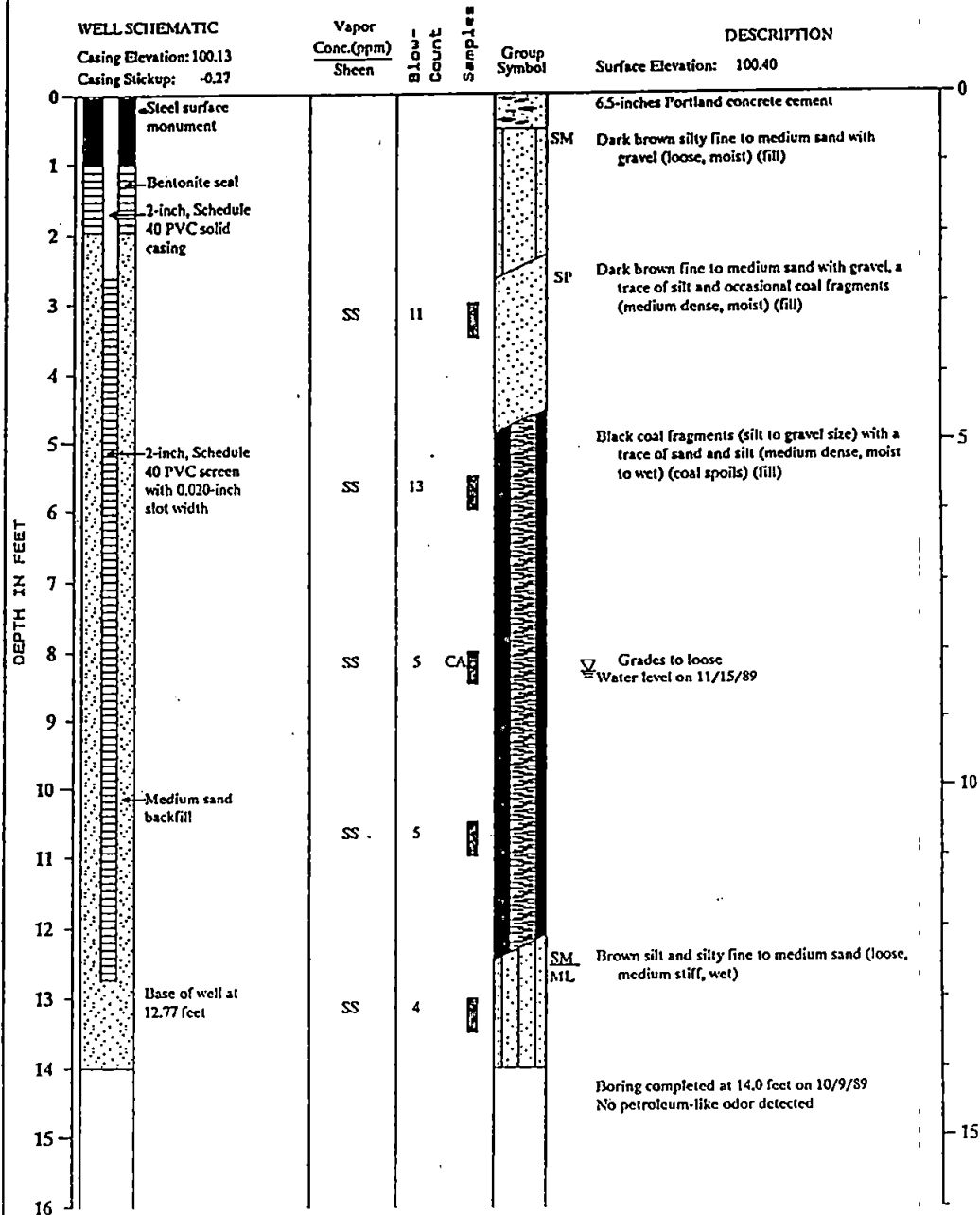
# RESOURCE PROTECTION WELL REPORT

START CARD NO. 027964

PROJECT NAME: Puget Sound Power and Light  
 WELL IDENTIFICATION NO. MW-11  
 DRILLING METHOD: Well Abandonment  
 DRILLER: Jon C. Koloski  
 FIRM: GeoEngineers Inc.  
 SIGNATURE: Jon C. Koloski  
 CONSULTING FIRM: Same  
 REPRESENTATIVE: Same

LOCATION: T 23N, R 5E, SEC. 19  
 DISTANCE: 150 FT. FROM N/S SECTION LINE  
200 FT. FROM E/W SECTION LINE  
 DATUM: \_\_\_\_\_  
 WATER LEVEL ELEVATION: \_\_\_\_\_  
 INSTALLED: Abandoned on 9-26-90  
 DEVELOPED: \_\_\_\_\_

## MONITOR WELL NO. MW-11



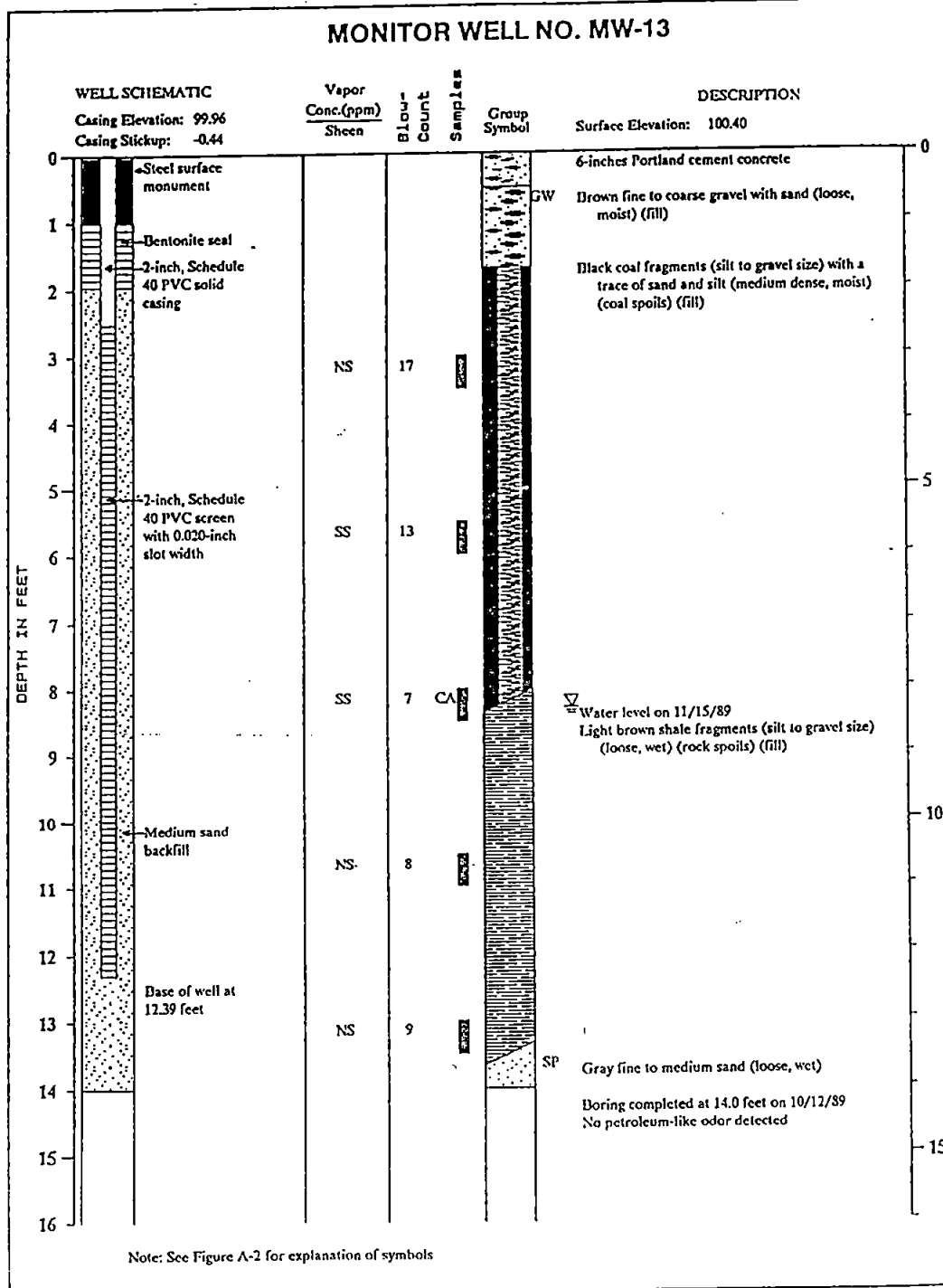
Note: See Figure A-2 for explanation of symbols

# RESOURCE PROTECTION WELL REPORT

START CARD NO. 027964

PROJECT NAME: Puget Sound Power and Light  
 WELL IDENTIFICATION NO. MW-13  
 DRILLING METHOD: Well Abandonment  
 DRILLER: Jon C. Koloski  
 FIRM: GeoEngineers Inc.  
 SIGNATURE: Jon C. Koloski  
 CONSULTING FIRM: Same  
 REPRESENTATIVE: Same

LOCATION: T 23N, R 5E, SEC. 19  
 DISTANCE: 150 FT. FROM N/S SECTION LINE  
200 FT. FROM E/W SECTION LINE  
 DATUM: \_\_\_\_\_  
 WATER LEVEL ELEVATION: \_\_\_\_\_  
 INSTALLED: Abandoned on 9-26-90  
 DEVELOPED: \_\_\_\_\_

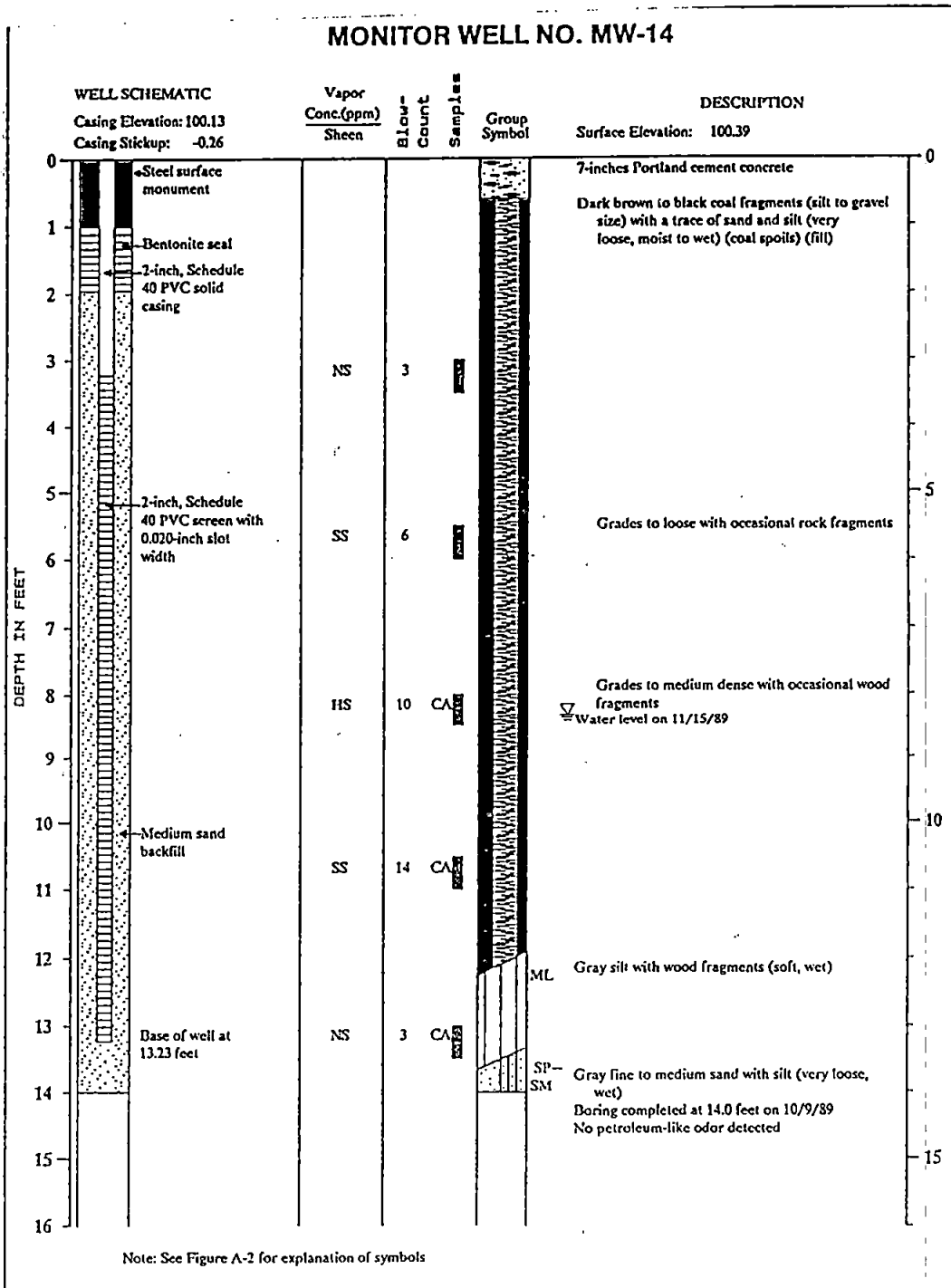


# RESOURCE PROTECTION WELL REPORT

START CARD NO. 027964

PROJECT NAME: Puget Sound Power and Light  
 WELL IDENTIFICATION NO. MW-14  
 DRILLING METHOD: Well Abandonment  
 DRILLER: Jon C. Koloski  
 FIRM: GeoEngineers Inc.  
 SIGNATURE: Jon C. Koloski  
 CONSULTING FIRM: Same  
 REPRESENTATIVE: Same

LOCATION: T 23N, R 5E, SEC. 19  
 DISTANCE: 150 FT. FROM N/S SECTION LINE  
200 FT. FROM E/W SECTION LINE  
 DATUM: \_\_\_\_\_  
 WATER LEVEL ELEVATION: \_\_\_\_\_  
 INSTALLED: Abandoned on 9-26-90  
 DEVELOPED: \_\_\_\_\_

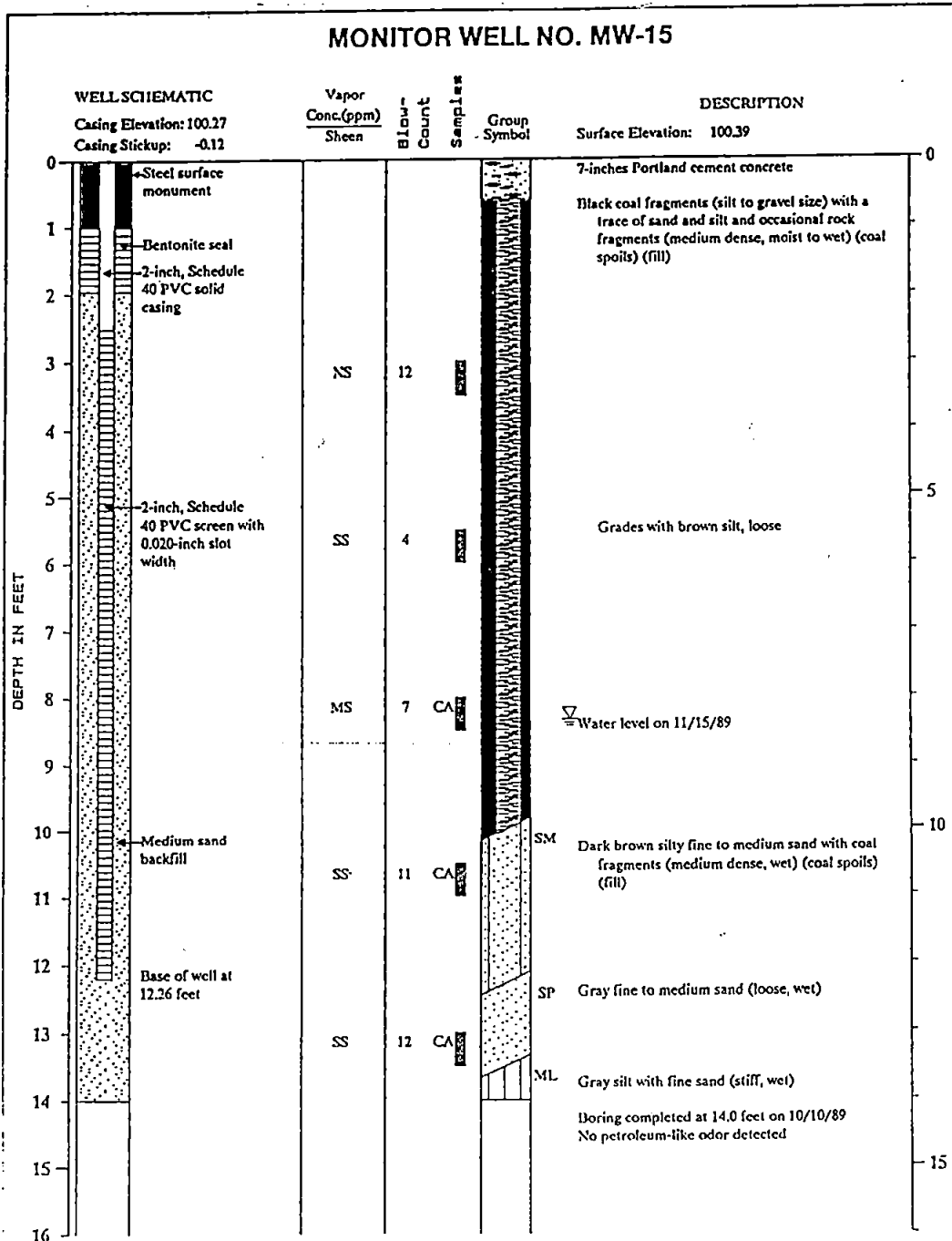


# RESOURCE PROTECTION WELL REPORT

START CARD NO. 027964

PROJECT NAME: Puget Sound Power and Light  
 WELL IDENTIFICATION NO. MW-15  
 DRILLING METHOD: Well Abandonment  
 DRILLER: Jon C Koloski  
 FIRM: GeoEngineers Inc.  
 SIGNATURE: Jon C Koloski  
 CONSULTING FIRM: Same  
 REPRESENTATIVE: Same

LOCATION: T 23N, R 5E, SEC. 19  
 DISTANCE: 150 FT. FROM N/S SECTION LINE  
200 FT. FROM E/W SECTION LINE  
 DATUM: \_\_\_\_\_  
 WATER LEVEL ELEVATION: \_\_\_\_\_  
 INSTALLED: Abandoned on 9-26-90  
 DEVELOPED: \_\_\_\_\_

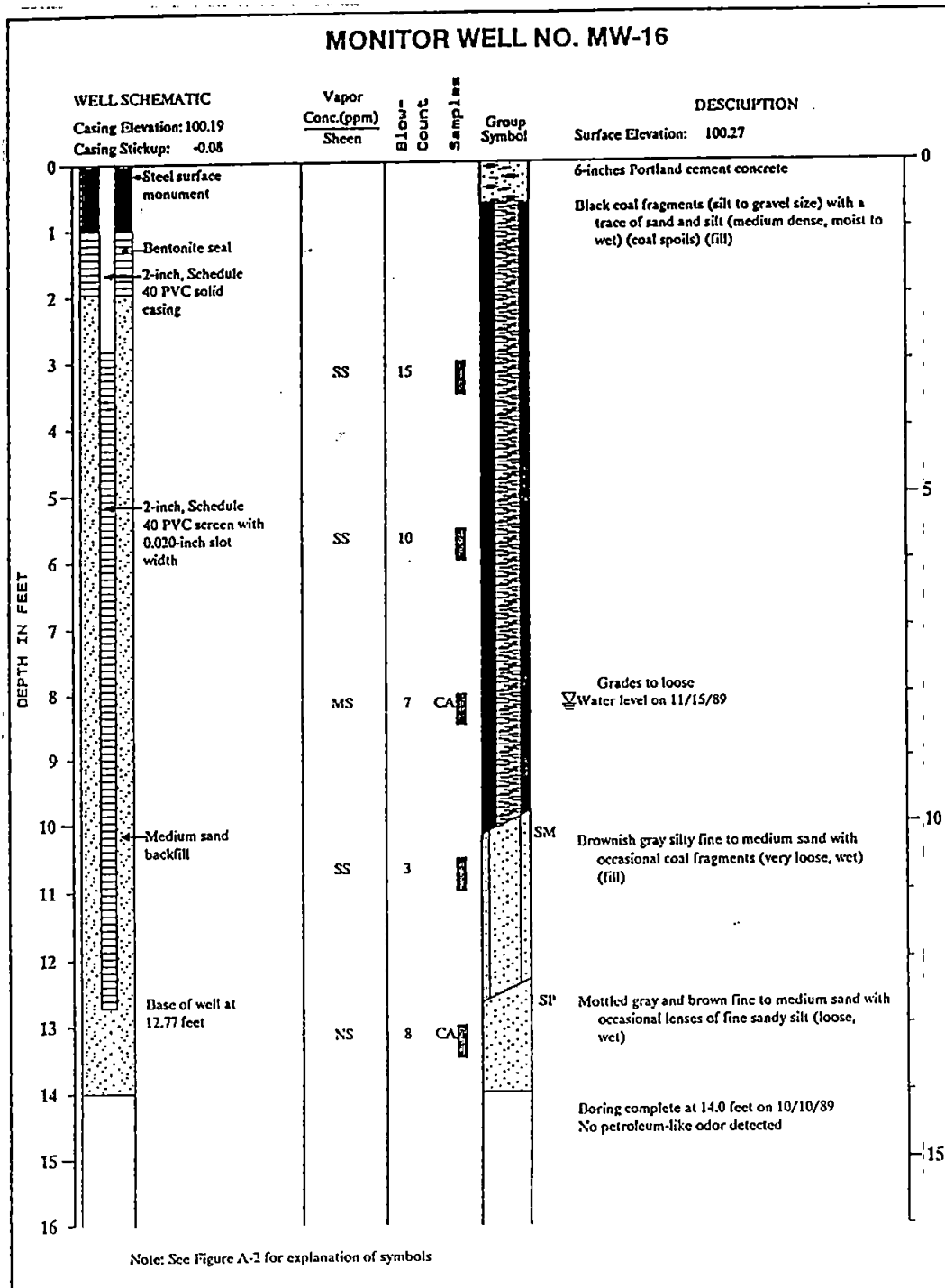


# RESOURCE PROTECTION WELL REPORT

START CARD NO. 027964

PROJECT NAME: Puget Sound Power and Light  
 WELL IDENTIFICATION NO. MW-16  
 DRILLING METHOD: Well Abandonment  
 DRILLER: Jon C. Koloski  
 FIRM: GeoEngineers Inc.  
 SIGNATURE: Jon C. Koloski  
 CONSULTING FIRM: Same  
 REPRESENTATIVE: Same

LOCATION: T 23N, R 5E, SEC. 19  
 DISTANCE: 150 FT. FROM N/S SECTION LINE  
200 FT. FROM E/W SECTION LINE  
 DATUM: \_\_\_\_\_  
 WATER LEVEL ELEVATION: \_\_\_\_\_  
 INSTALLED: Abandoned on 9-26-90  
 DEVELOPED: \_\_\_\_\_

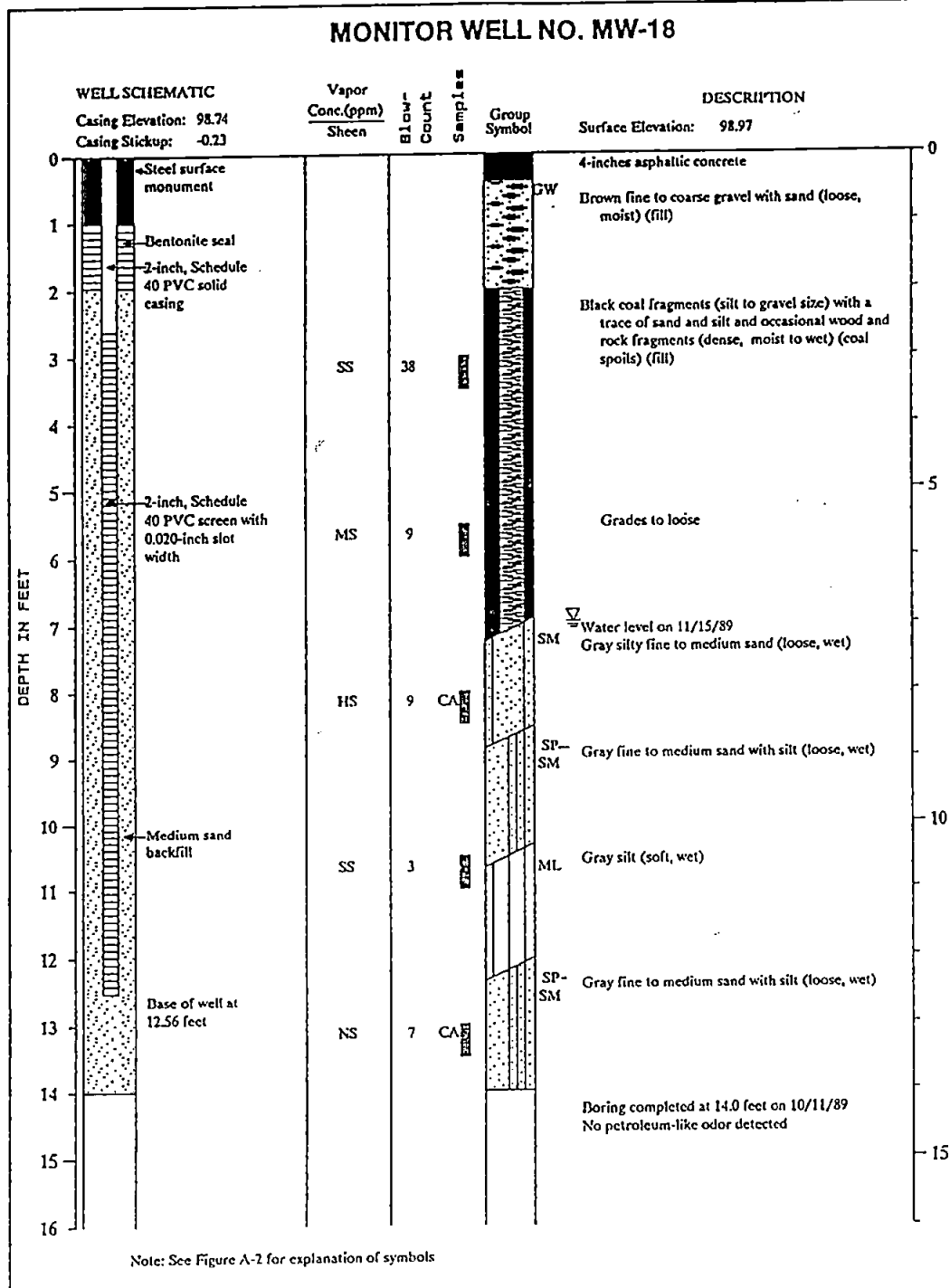


# RESOURCE PROTECTION WELL REPORT

START CARD NO. 027964

PROJECT NAME: Puget Sound Power and Light  
 WELL IDENTIFICATION NO. MW-18  
 DRILLING METHOD: Well Abandonment  
 DRILLER: Jon C. Koloski  
 FIRM: GeoEngineers Inc.  
 SIGNATURE: Jon C. Koloski  
 CONSULTING FIRM: Same  
 REPRESENTATIVE: Same

LOCATION: T 23N, R 5E, SEC. 19  
 DISTANCE: 150 FT. FROM N/S SECTION LINE  
200 FT. FROM E/W SECTION LINE  
 DATUM: \_\_\_\_\_  
 WATER LEVEL ELEVATION: \_\_\_\_\_  
 INSTALLED: Abandoned on 9-26-90  
 DEVELOPED: \_\_\_\_\_



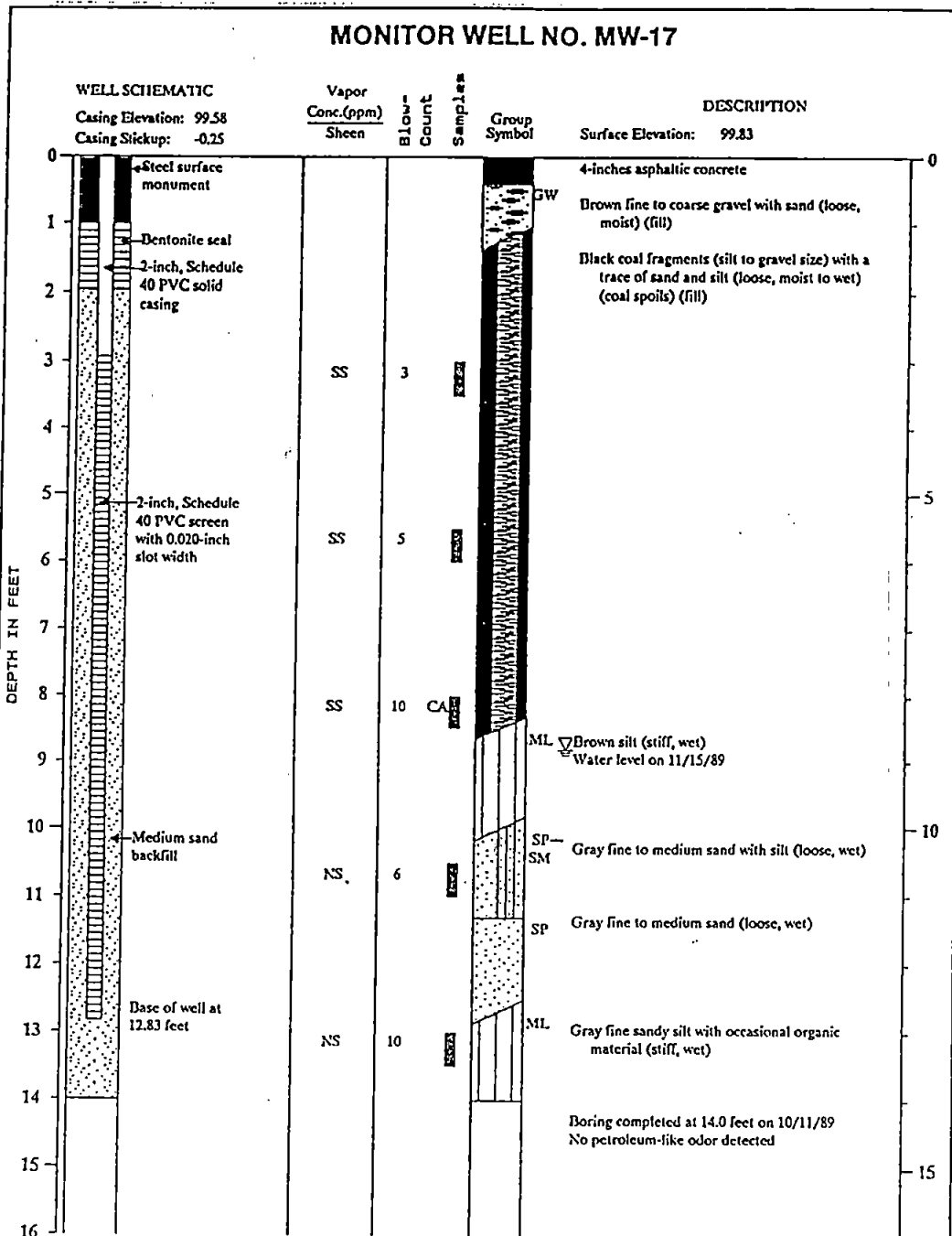
Log of Monitor Well

# RESOURCE PROTECTION WELL REPORT

START CARD NO. 027964

PROJECT NAME: Puget Sound Power and Light  
 WELL IDENTIFICATION NO. MW-17  
 DRILLING METHOD: Well Abandonment  
 DRILLER: Jon C. Koloski  
 FIRM: GeoEngineers Inc.  
 SIGNATURE: Jon C. Koloski  
 CONSULTING FIRM: Same  
 REPRESENTATIVE: Same

LOCATION: T 23N, R 5E, SEC. 19  
 DISTANCE: 150 FT. FROM N/S SECTION LINE  
200 FT. FROM E/W SECTION LINE  
 DATUM: \_\_\_\_\_  
 WATER LEVEL ELEVATION: \_\_\_\_\_  
 INSTALLED: Abandoned on 9-26-90  
 DEVELOPED: \_\_\_\_\_



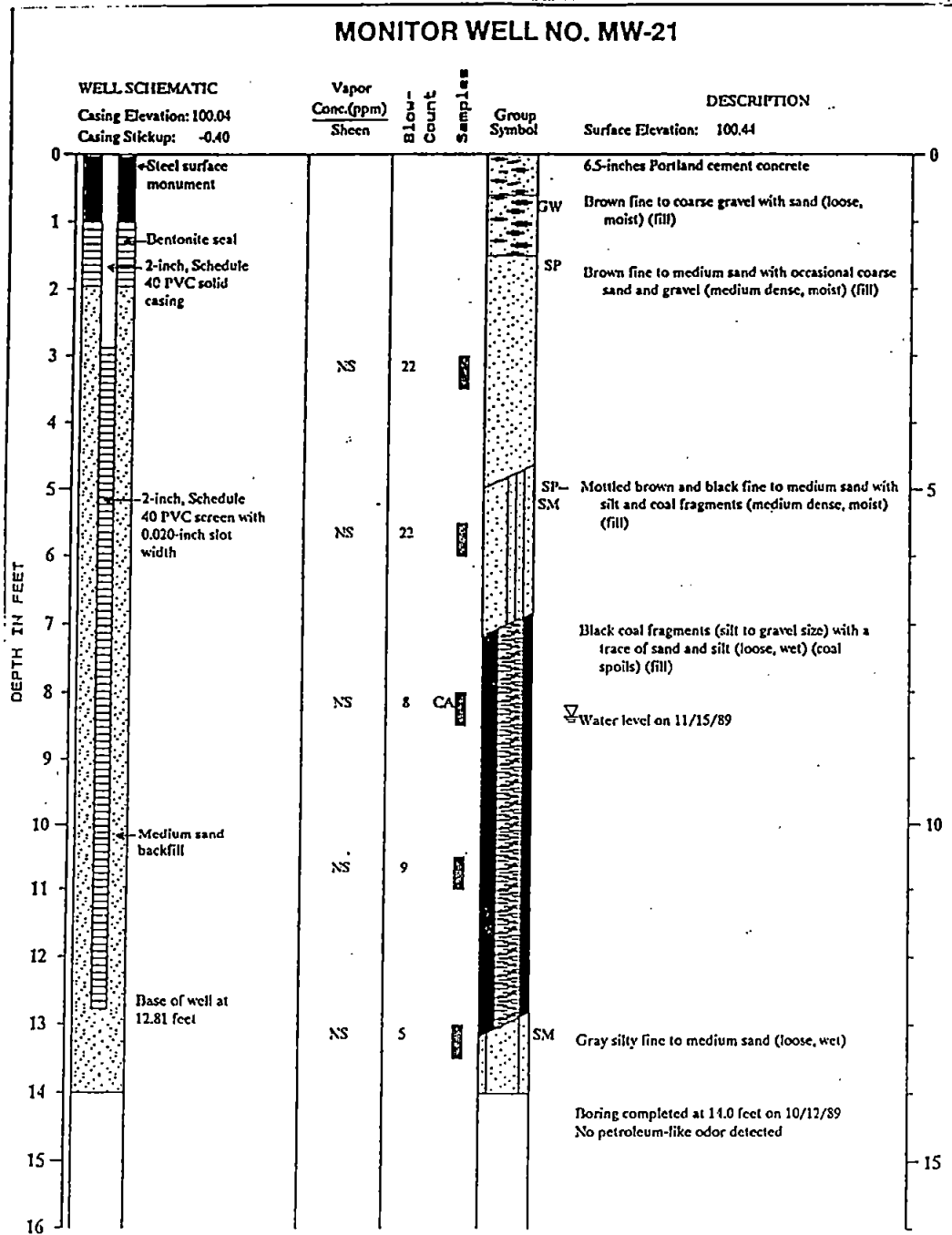
Note: See Figure A-2 for explanation of symbols

# RESOURCE PROTECTION WELL REPORT

START CARD NO. 027964

PROJECT NAME: Puget Sound Power and Light  
 WELL IDENTIFICATION NO. MW-21  
 DRILLING METHOD: Well Abandonment  
 DRILLER: Jon C. Koloski  
 FIRM: GeoEngineers Inc.  
 SIGNATURE: Jon C. Koloski  
 CONSULTING FIRM: Same  
 REPRESENTATIVE: Same

LOCATION: T 23N, R 5E, SEC. 19  
 DISTANCE: 150 FT. FROM N/S SECTION LINE  
200 FT. FROM E/W SECTION LINE  
 DATUM: \_\_\_\_\_  
 WATER LEVEL ELEVATION: \_\_\_\_\_  
 INSTALLED: Abandoned on 9-26-90  
 DEVELOPED: \_\_\_\_\_

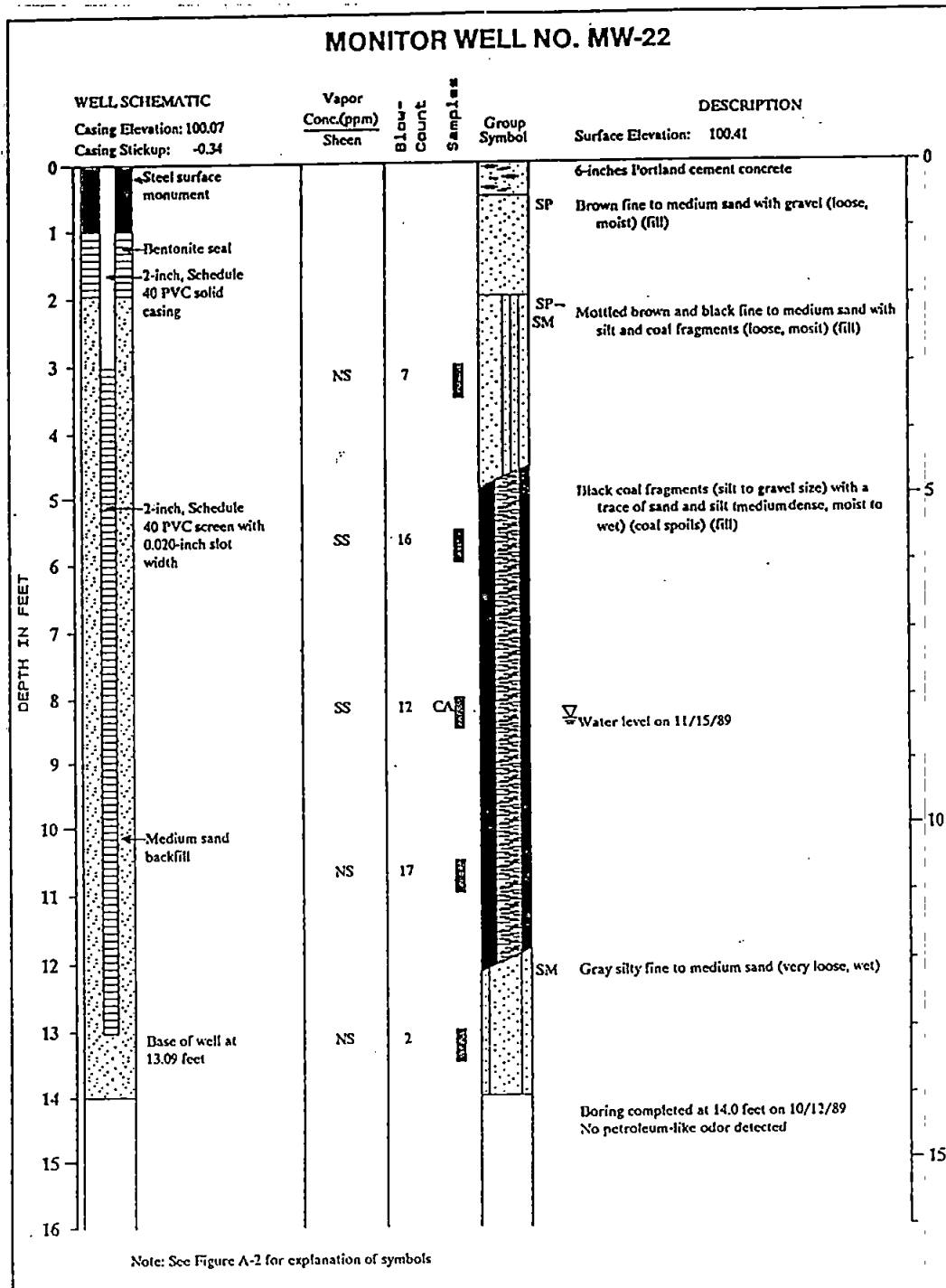


# RESOURCE PROTECTION WELL REPORT

START CARD NO. 027964

PROJECT NAME: Puget Sound Power and Light  
 WELL IDENTIFICATION NO. MW-22  
 DRILLING METHOD: Well Abandonment  
 DRILLER: Jon C. Koloski  
 FIRM: GeoEngineers Inc.  
 SIGNATURE: Jon C. Koloski  
 CONSULTING FIRM: Same  
 REPRESENTATIVE: Same

LOCATION: T 23N, R 5E, SEC. 19  
 DISTANCE: 150 FT. FROM N/S SECTION LINE  
200 FT. FROM E/W SECTION LINE  
 DATUM: \_\_\_\_\_  
 WATER LEVEL ELEVATION: \_\_\_\_\_  
 INSTALLED: Abandoned on 9-26-90  
 DEVELOPED: \_\_\_\_\_





# RESOURCE PROTECTION WELL REPORT

START CARD NO. 027964

PROJECT NAME: Puget Sound Power and Light

WELL IDENTIFICATION NO. MW-24

DRILLING METHOD: Well Abandonment

DRILLER: Jon C. Koloski

FIRM: GeoEngineers Inc.

SIGNATURE: Jon C. Koloski

CONSULTING FIRM: Same

REPRESENTATIVE: Same

LOCATION: T 23N, R 5E, SEC. 19

DISTANCE: 150 FT. FROM N/S SECTION LINE

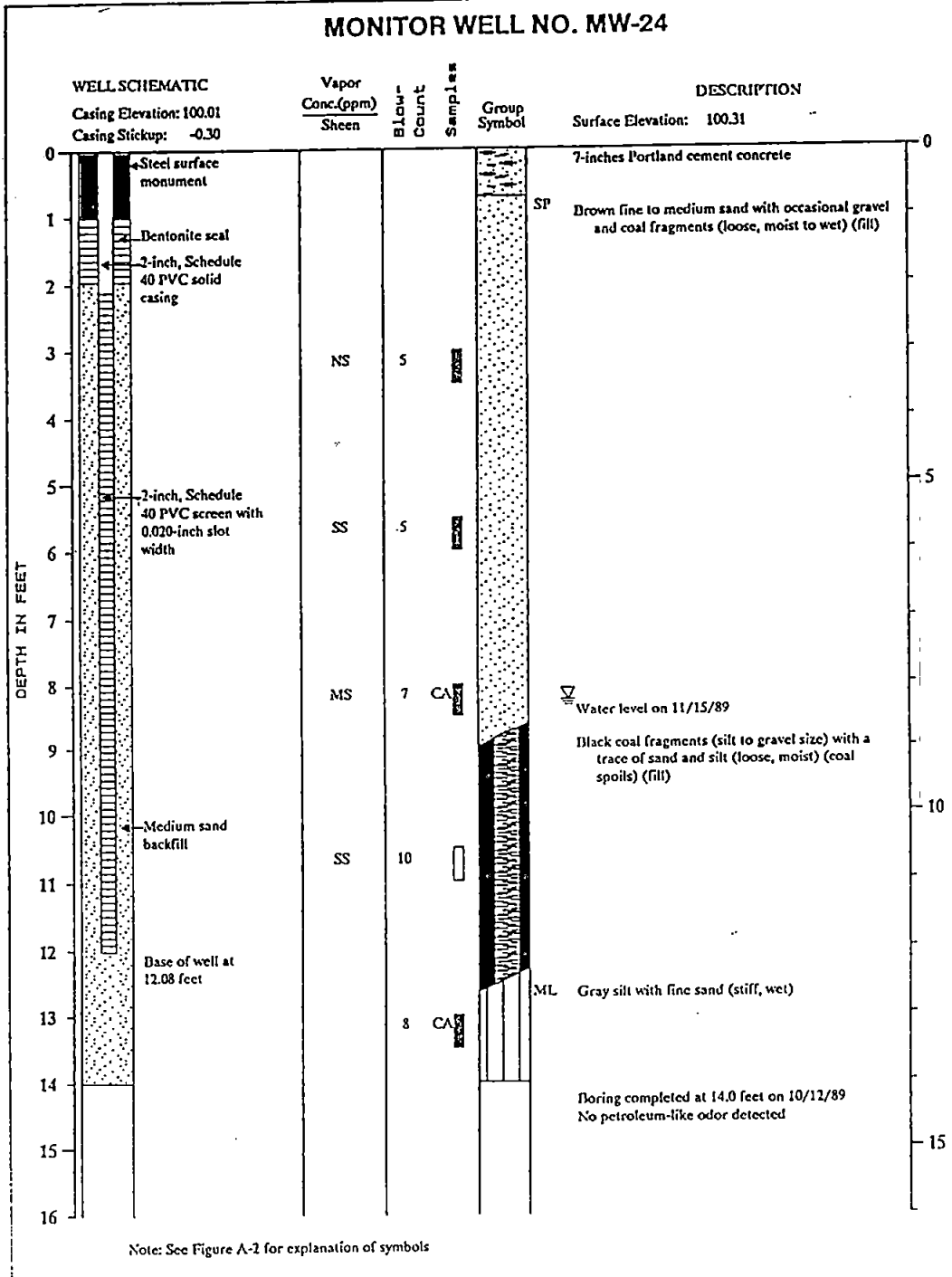
200 FT. FROM E/W SECTION LINE

DATUM: \_\_\_\_\_

WATER LEVEL ELEVATION: \_\_\_\_\_

INSTALLED: Abandoned on 9-26-90

DEVELOPED: \_\_\_\_\_

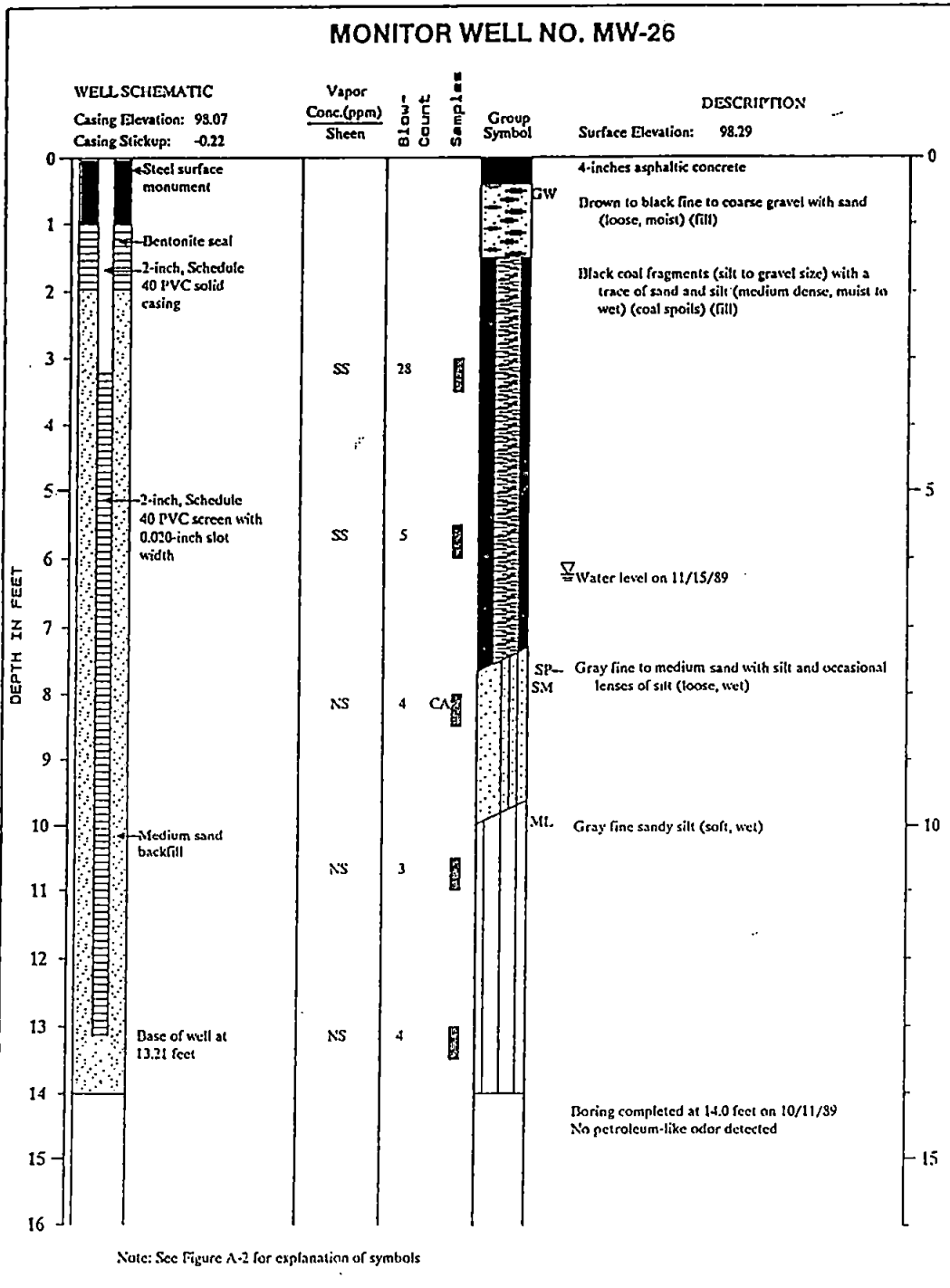


# RESOURCE PROTECTION WELL REPORT

START CARD NO. 027964

PROJECT NAME: Puget Sound Power and Light  
 WELL IDENTIFICATION NO. MW-26  
 DRILLING METHOD: Well Abandonment  
 DRILLER: Jon C. Koloski  
 FIRM: GeoEngineers Inc.  
 SIGNATURE: Jon C. Koloski  
 CONSULTING FIRM: Same  
 REPRESENTATIVE: Same

LOCATION: T 23N, R 5E, SEC. 19  
 DISTANCE: 150 FT. FROM N/S SECTION LINE  
200 FT. FROM E/W SECTION LINE  
 DATUM: \_\_\_\_\_  
 WATER LEVEL ELEVATION: \_\_\_\_\_  
 INSTALLED: Abandoned on 9-26-90  
 DEVELOPED: \_\_\_\_\_

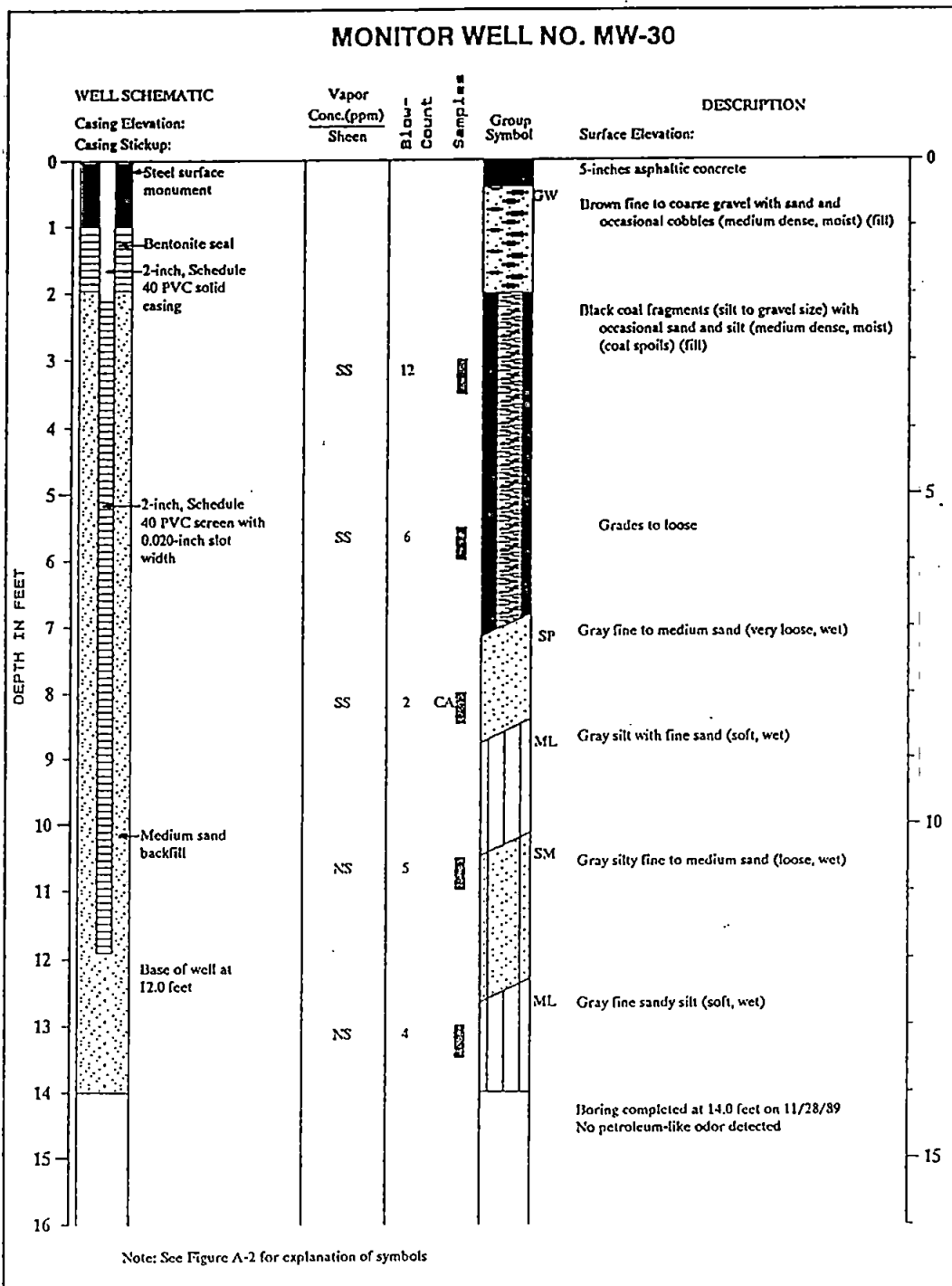


# RESOURCE PROTECTION WELL REPORT

START CARD NO. 027964

PROJECT NAME: Puget Sound Power and Light  
 WELL IDENTIFICATION NO. MW-30  
 DRILLING METHOD: Well Abandonment  
 DRILLER: Jon C. Koloski  
 FIRM: GeoEngineers Inc.  
 SIGNATURE: Jon C. Koloski  
 CONSULTING FIRM: Same  
 REPRESENTATIVE: Same

LOCATION: T 23N, R SE, SEC. 19  
 DISTANCE: 150 FT. FROM N/S SECTION LINE  
200 FT. FROM E/W SECTION LINE  
 DATUM: \_\_\_\_\_  
 WATER LEVEL ELEVATION: \_\_\_\_\_  
 INSTALLED: Abandoned on 9-26-90  
 DEVELOPED: \_\_\_\_\_

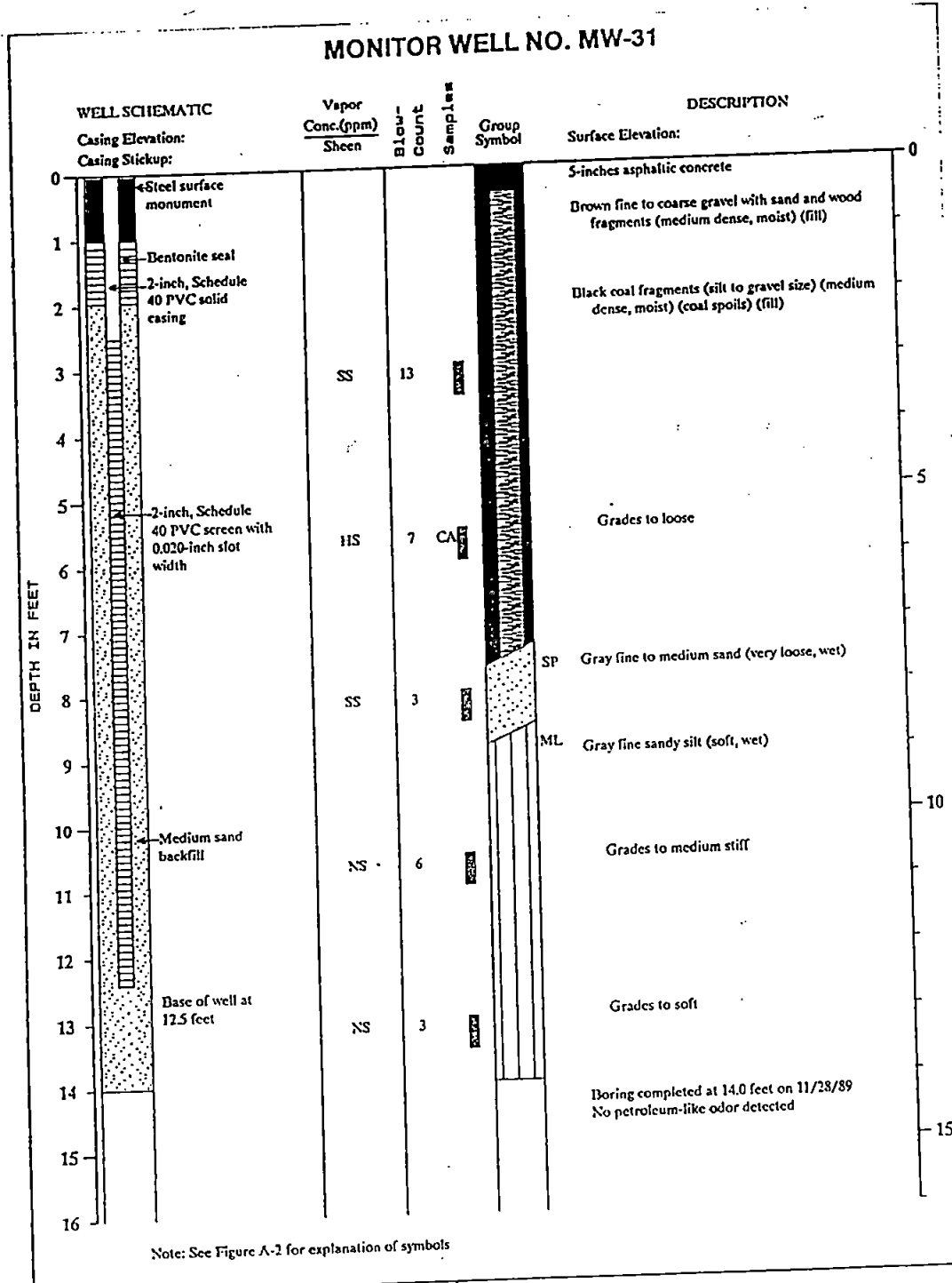


# RESOURCE PROTECTION WELL REPORT

START CARD NO. 027964

PROJECT NAME: Puget Sound Power and Light  
 WELL IDENTIFICATION NO. MW-31  
 DRILLING METHOD: Well Abandonment  
 DRILLER: Jon C. Koloski  
 FIRM: GeoEngineers Inc.  
 SIGNATURE: Jon C. Koloski  
 CONSULTING FIRM: Same  
 REPRESENTATIVE: Same

LOCATION: T 23N, R 5E, SEC. 19  
 DISTANCE: 150 FT. FROM N/S SECTION LINE  
200 FT. FROM E/W SECTION LINE  
 DATUM: \_\_\_\_\_  
 WATER LEVEL ELEVATION: \_\_\_\_\_  
 INSTALLED: Abandoned on 9-26-90  
 DEVELOPED: \_\_\_\_\_



MONITOR WELL ABANDONMENT SUMMARY SHEET

JOB NAME PSPL LOCATION Renton  
 BY JcK DATE 10-3-90 GEI JOB # 0186-101-B04

MONITOR WELL NUMBER	MW-1	MW-2	MW-3	MW-5
Drilled Depth of Well, D (ft)	15	15	15.5	14.0
Depth of Casing, L (ft)	15	15	15	12.36
Length of Screen, S (ft)	10	10	10	10
Depth to Top of Well Screen, d (ft)	5	5	5	2
Length of Filter Pack, l (ft)	12	12	12	12
Depth to Water (ft)	6.9	6.5	6.7	8.0
Grout Mix (Sack Mix / % Bentonite)	6 gal/sack	6 gal/sack	6 gal/sack	6 gal/sack
Grout Pressure, P (psi)	—	—	—	—
Duration of Pressure (min)	—	—	—	—
Grout Volume, V, To Fill Casing (gal)	2.4	2.4	2.4	2.0
Grout Volume Used, V, (gal)	4.0	4.0	4.0	3.5
Packer Pressure (psi)	—	—	—	—
Time of Abandonment				
Date of Abandonment	9-26-90	9-26-90	9-26-90	9-26-90

Comments:

MONITOR WELL ABANDONMENT SUMMARY SHEET

JOB NAME PSPI  
 BY JCK

DATE 10-3-90

LOCATION Renton  
 GEI JOB # 0186-101-804

MONITOR WELL NUMBER	mw-6	mw-9	mw-11	MW-13
Drilled Depth of Well, D (ft)	14.0	14.0	14.0	14.0
Depth of Casing, L (ft)	11.56	12.39	12.77	12.39
Length of Screen, S (ft)	10	10	10	10
Depth to Top of Well Screen, d (ft)	2	2.2	2.5	2.5
Length of Filter Pack, l (ft)	10	12	12	12
Depth to Water (ft)	8.5	7.8	8.0	8.2
Grout Mix (Sack Mix / % Bentonite)	6gal/sack	6gal/sack	6gal/sack	6gal/sack
Grout Pressure, P (psi)	—	—	—	—
Duration of Pressure (min)	—	—	—	—
Grout Volume, V, To Fill Casing (gal)	1.8	2.0	2.0	2.0
Grout Volume Used, V, (gal)	3.0	3.5	3.5	3.5
Packer Pressure (psi)	—	—	—	—
Time of Abandonment				
Date of Abandonment	9-26-90	9-26-90	9-26-90	9-26-90

Comments:

MONITOR WELL ABANDONMENT SUMMARY SHEET

JOB NAME PSPI

LOCATION Renton

BY JCK

DATE 10-3-90

GEI JOB # 0186-101-B04

MONITOR WELL NUMBER	mw-14	mw-15	mw-16	mw-17
Drilled Depth of Well, D (ft)	14.0	14.0	14.0	14.0
Depth of Casing, L (ft)	13.23	12.26	12.77	12.83
Length of Screen, S (ft)	10	10	10	10
Depth to Top of Well Screen, d (ft)	3	2.5	2.5	3
Length of Filter Pack, l (ft)	12	12	12	12
Depth to Water (ft)	8.2	8.0	8.6	8.5
Grout Mix (Sack Mix / % Bentonite)	6gal/sack	6gal/sack	6gal/sack	6gal/sack
Grout Pressure, P (psi)	—	—	—	—
Duration of Pressure (min)	—	—	—	—
Grout Volume, V, To Fill Casing (gal)	2.1	2.00	2.0	2.0
Grout Volume Used, V, (gal)	4.0	3.5	3.5	3.5
Packer Pressure (psi)	—	—	—	—
Time of Abandonment				
Date of Abandonment	9-26-90	9-26-90	9-26-90	9-26-90

Comments:

MONITOR WELL ABANDONMENT SUMMARY SHEET

JOB NAME PSPI  
 BY JCK

DATE 10-3-90

LOCATION Renton  
 GEI JOB # 0186-101-B04

MONITOR WELL NUMBER	mw-18	mw-21	mw-22	mw-23
Drilled Depth of Well, D (ft)	14	14	14	15
Depth of Casing, L (ft)	12.56	12.81	13.09	14
Length of Screen, S (ft)	10	10	10	10
Depth to Top of Well Screen, d (ft)	2.5	3	3	3
Length of Filter Pack, l (ft)	10	12	12	12
Depth to Water (ft)	7	8		
Grout Mix (Sack Mix / % Bentonite)	6gal/sack	6gal/sack	6gal/sack	
Grout Pressure, P (psi)	—	—	—	—
Duration of Pressure (min)	—	—	—	—
Grout Volume, V, To Fill Casing (gal)	2.0	2.0	2.1	2.2
Grout Volume Used, V, (gal)	3.5	3.5	4.0	4.0
Packer Pressure (psi)	—	—	—	—
Time of Abandonment				
Date of Abandonment	9-26-90	9-26-90	9-26-90	9-26-90

Comments:

MONITOR WELL ABANDONMENT SUMMARY SHEET

JOB NAME PSPL  
 BY JCK

LOCATION Renton  
 DATE 10-3-90

GEI JOB # 0186-101-B04

MONITOR WELL NUMBER	mw-24	mw-26	mw-30	mw-31
Drilled Depth of Well, D (ft)	14.0	14.0	14.0	14.0
Depth of Casing, L (ft)	12.08	13.21	12.0	12.5
Length of Screen, S (ft)	10	10	10	10
Depth to Top of Well Screen, d (ft)	2	3	2	2.5
Length of Filter Pack, l (ft)	10	10	10	10
Depth to Water (ft)	8.1	6.2	7	7
Grout Mix (Sack Mix / % Bentonite)	6gal/sack	6gal/sack	6gal/sack	6gal/sack
Grout Pressure, P (psi)	_____	_____	_____	_____
Duration of Pressure (min)	_____	_____	_____	_____
Grout Volume, V, To Fill Casing (gal)	1.9	2.1	1.95	2.0
Grout Volume Used, V, (gal)	3.5	3.5	3.5	3.5
Packer Pressure (psi)	_____	_____	_____	_____
Time of Abandonment				
Date of Abandonment	9-26-90	9-26-90	9-26-90	9-26-90

Comments:

November 29, 1990

Washington Department of Ecology  
Northwest Regional Office  
4550 - 150th Avenue Northeast  
Redmond, Washington 98052-5301

Attention: Mr. Rod Thompson

Monitor Well Abandonment Services  
Puget Sound Power & Light Company  
Renton Service Center  
Renton, Washington  
File No. 0186-106-B69

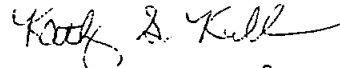
This letter summarizes our recent monitor well abandonment activities at the site of the Renton Service Center in Renton, Washington. The monitor wells were sealed and abandoned on November 12, 1990 by our staff technician who is a licensed well driller in the State of Washington.

There were two monitor wells on this site which were abandoned. The wells varied from about 11.5 to 12.5 feet in depth. The monitor wells were abandoned in accordance with Washington State Administrative Code (Chapter 173-160). The wells were sealed and abandoned by filling well casings with a slurry of Portland cement.

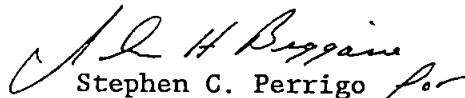
A data sheet summarizing the well abandonment details has been included with the attached water well reports. Please contact us if you have any questions regarding this report.

Yours very truly,

GeoEngineers, Inc.



Jon C. Koloski  
Technician



Stephen C. Perrigo  
Associate

JCK:SCP:ira

Attachments

Two copies submitted

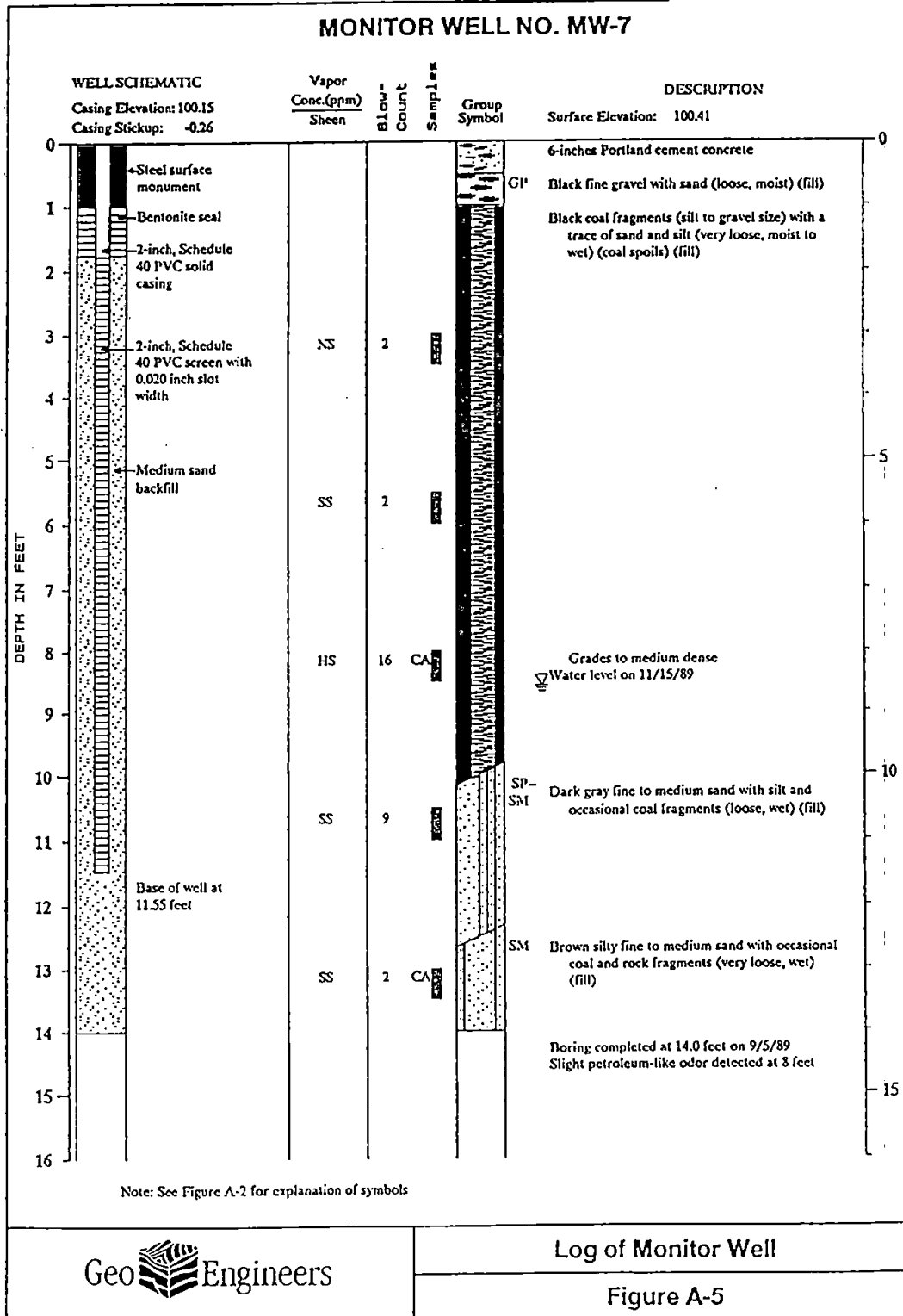
cc: Mr. Gary R. Reid  
Puget Sound Power & Light Co.

# RESOURCE PROTECTION WELL REPORT

START CARD NO. 27964

PROJECT NAME: PSPL - Renton  
 WELL IDENTIFICATION NO. MW-7  
 DRILLING METHOD: Well Abandonment  
 DRILLER: Jon C. Koloski  
 FIRM: GeoEngineers Inc.  
 SIGNATURE: Jon C. Koloski  
 CONSULTING FIRM: Same  
 REPRESENTATIVE: Same

LOCATION: T 23N, R 5E, SEC. 20 NE 1/4 NE 1/4  
 DISTANCE: \_\_\_\_\_ FT. FROM N/S SECTION LINE  
 \_\_\_\_\_ FT. FROM E/W SECTION LINE  
 DATUM: \_\_\_\_\_  
 WATER LEVEL ELEVATION: \_\_\_\_\_  
 INSTALLED: Abandoned 11-12-90  
 DEVELOPED: \_\_\_\_\_

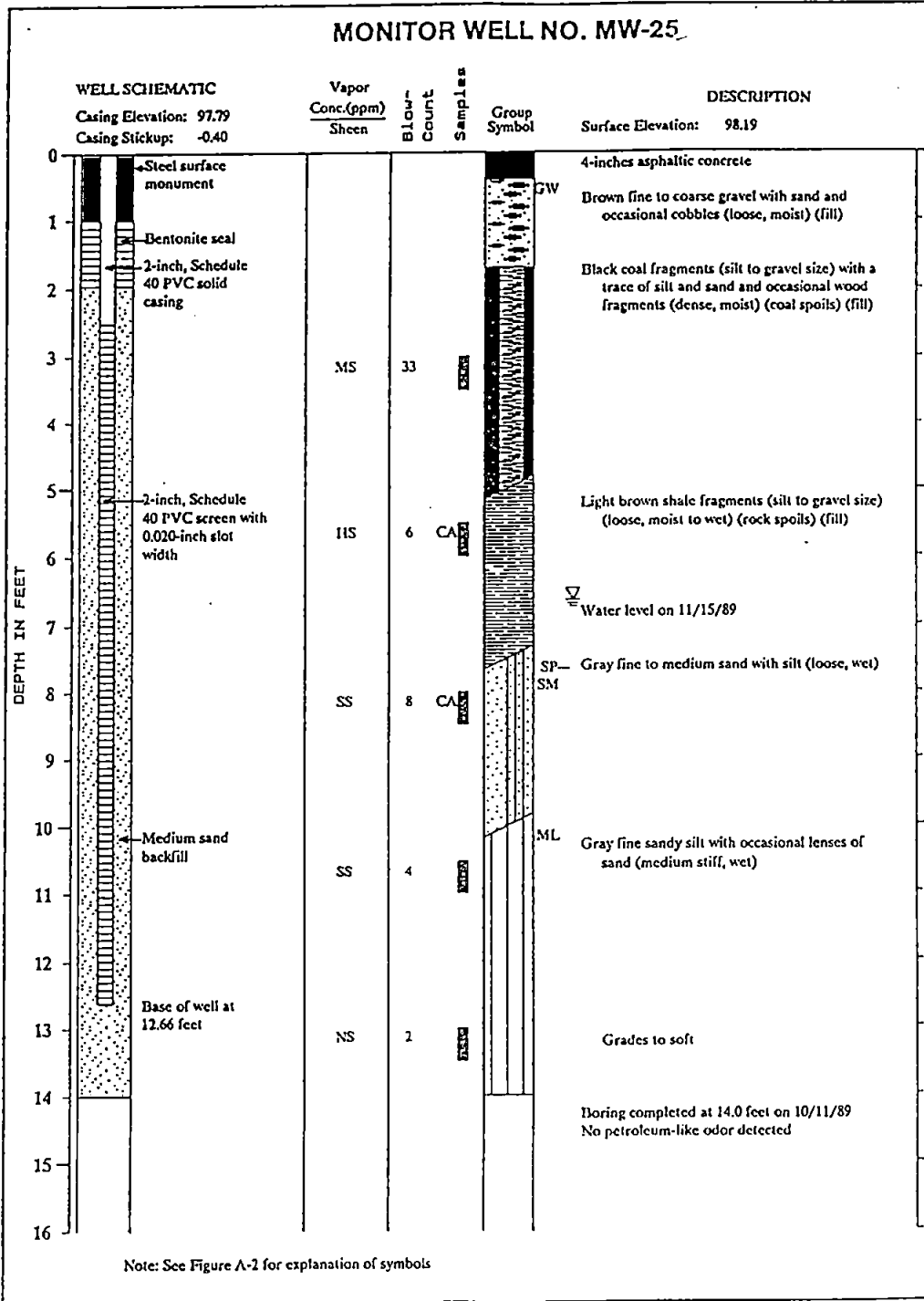


# RESOURCE PROTECTION WELL REPORT

START CARD NO. 27964

PROJECT NAME: PSPL-Renton  
 WELL IDENTIFICATION NO. MW-25  
 DRILLING METHOD: Well Abandonment  
 DRILLER: Jon C Koloski  
 FIRM: GeoEngineers Inc.  
 SIGNATURE: Jon C Koloski  
 CONSULTING FIRM: Same  
 REPRESENTATIVE: Same

LOCATION: T 23N, R SE, SEC. 20 NE 1/4 NE 1/4  
 DISTANCE: \_\_\_\_\_ FT. FROM N/S SECTION LINE  
 \_\_\_\_\_ FT. FROM E/W SECTION LINE  
 DATUM: \_\_\_\_\_  
 WATER LEVEL ELEVATION: \_\_\_\_\_  
 INSTALLED: Abandoned 11-12-90  
 DEVELOPED: \_\_\_\_\_



Log of Monitor Well

Figure A-23

MONITOR WELL ABANDONMENT SUMMARY SHEET

JOB NAME PSPL. Renton

LOCATION Renton

BY JCK

DATE 11-12-90

GEI JOB # 186-101-B69

MONITOR WELL NUMBER	<u>mw-7</u>	<u>mw-25</u>		
Drilled Depth of Well, D (ft)	<u>14.0</u>	<u>14.0</u>		
Depth of Casing, L (ft)	<u>11.55</u>	<u>12.66</u>		
Length of Screen, S (ft)	<u>9</u>	<u>10</u>		
Depth to Top of Well Screen, d (ft)	<u>2</u>	<u>2.5</u>		
Length of Filter Pack, l (ft)	<u>12</u>	<u>12</u>		
Depth to Water (ft)	<u>8.5</u>	<u>6.5</u>		
Grout Mix (Sack Mix / % Bentonite)	<u>6gal/sack</u>	<u>6gal/sack</u>		
Grout Pressure, P (psi)	<u>—</u>	<u>—</u>		
Duration of Pressure (min)	<u>—</u>	<u>—</u>		
Grout Volume, V, To Fill Casing (gal)	<u>1.8</u>	<u>2</u>		
Grout Volume Used, V, (gal)	<u>3</u>	<u>3</u>		
Packer Pressure (psi)	<u>—</u>	<u>—</u>		
Time of Abandonment				
Date of Abandonment	<u>11-12-90</u>	<u>11-12-90</u>		

Comments:

September 27, 1991

Washington State Department of Ecology  
Northwest Regional Office  
3190 160th Avenue Southeast  
Bellevue, Washington 98008

Monitor Well Removal  
Puget Sound Power & Light Company  
Renton Service Center  
Renton, Washington  
File No. 0186-106-R69

Attention Mr. Rod Thompson:

During remedial excavation activities at the Puget Power Renton Service Center in Renton, Washington, one monitor well (MW-12) was removed from the site. Remedial activities were completed between the dates of September 27 and December 17, 1990.

Monitor well MW-12 was installed by GeoBoring & Development, Inc. on October 9, 1989. We understand that GeoBoring filed a start card with Ecology around the date of installation. The base of monitor well MW-12 was 12.36 feet below ground surface inside the General Stores Building. The total depth of the excavation in the vicinity of MW-12 was approximately 13 feet below the ground surface.

Please contact us if you have any questions regarding this letter.

Yours very truly,  
GeoEngineers, Inc.



Craig A. Hart  
Staff Geologist



Stephen C. Perrigo  
Associate

CAH:KSK:SCP:smj

Two copies submitted

cc: Puget Sound Power & Light Co.  
Attn: Mr. Gary R. Reid