PACIFIC groundwater GROUP

Scougal Rubber
Final Remedial Action Plan

February 14, 2007

FINAL REMEDIAL ACTION PLAN
SCOUGAL RUBBER
SEATTLE, WASHINGTON

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SIGNATURE

This report, and Pacific Groundwater Group's work contributing to this report, were reviewed by the undersigned and approved for release.

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1.0 OVERVIEW

Scougal Rubber is located at 6239 Corson Avenue south in the Georgetown neighborhood of Seattle, Washington. Scougal manufactures rubber parts for heavy machinery and infrastructure. TCE and other solvents have historically been stored and used on the site as part of the manufacturing process.

Contamination at the site was identified in several areas on the Scougal property leading to remedial efforts including UST removal in 1988, soil excavation, and operation of an air-sparging/soil vapor extraction system from 1993 through 1995.

Pacific Groundwater Group was hired in 2006 to bring the site to environmental closure and no further action. PGG conducted two rounds of groundwater and soil sampling to investigate the current environmental conditions.

PGG recommends additional excavation of shallow soils and installation of an in-situ chemical oxidation system to remediate residual soil and groundwater contamination at the Scougal Rubber site.

This report summarizes the previous investigations and remedial actions and outlines recommendations for the final remedial measures at Scougal Rubber.

The work was performed consistent with the Model Toxics Control Act (MTCA) Washington Administrative Code (WAC) 173-340 using generally accepted hydrogeologic practices at this time and in this vicinity, for exclusive application to the Scougal Rubber site. This statement is in lieu of other warranties, express or implied.

2.0 HYDROGEOLOGIC SETTING

The site is underlain by sands and silty sands of the Duwamish river floodplain. Sands are fairly homogeneous brown to gray, with occasional thin layers of gravelly sand, silt, or silty sand. The depth to water varies seasonally, but is typically 7 to 8 feet below ground surface. Groundwater flow direction is generally to the west. The Scougal site is mostly paved with a few exposed patches of dirt between buildings or where asphalt paving has been damaged.

3.0 PREVIOUS REMEDIAL ACTION

Remedial action began in the late 1980s with the removal of three underground storage tanks from the Scougal property followed by excavation and operation of a soil vapor extraction (SVE) system through the 1990s (Appendix B, Figure 5-1).

3.1 UST REMOVAL

Five underground storage tanks (UST) were removed from the alley area in December 1989. The excavation was backfilled after tank removal. Soil samples collected from the excavation indicated the presence of petroleum hydrocarbons at concentrations up to 3,066 milligrams per kilogram (mg/kg) (Retec, 2002- referencing RZA 1990).

3.2 EXCAVATION

Excavations were completed at the former UST area and east of the warehouse building to remove trichloroethylene (TCE) and total petroleum hydrocarbon (TPH) impacted soils in 1992.

3.2.1 Excavation in Former UST Area

Soil in the former UST area was excavated in 1992 in an attempt to remove remaining contaminated soils noted during UST removal in 1989. Approximately 51.4 cubic yards of material were removed from the excavation and sent off-site. A sample collected from the east sidewall had 16,000 mg/kg diesel and oil TPH (analyzed by EPA Method 418.1). This method is no

longer used due to its inaccuracies and inability to discern types of petroleum or naturally-occurring hydrocarbons. The excavation was not able to be advanced further to the east without destabilizing the adjacent building. Confirmation samples collected at the north end of the excavation, near the drum storage area, were non-detect for TPH.

Retec argued that the remaining petroleum-impacted soils beneath the building were not a threat to human health as the overlying paved surface would prevent direct human contact and also prevent infiltration of rainwater and thus transport to the water table (Retec, 2002).

3.2.2 Excavation East of Warehouse

Approximately 6 cubic yards of soil were removed from the area east of the warehouse in 1992 in response to detections of TCE in soil of 3 mg/kg and 380 mg/kg (Retec, 2002). Soil contamination appeared to be limited to shallow soils.

Confirmation samples collected from the floor of the excavation were below cleanup levels in the Retec report (2002). Samples were not collected from sidewalls because the excavation extended to the edge of the concrete building foundations on either side. No further sampling or action has been taken in this area since 1992.

3.3 AIR SPARGING/ SOIL VAPOR EXTRACTION

Groundwater pumping was operated as an interim measure until an air sparging/soil vapor extraction (AS/SVE) system was started in March 1994. The AS/SVE system consisted of six air-injection wells to 30 feet below ground surface and a network of vapor recovery pipes near the ground surface. The system was operated in four cycles from March 1994 to April 1995; December 1995 to March 1997; and January 1998 to June 1999.

Groundwater monitoring data indicated substantial reductions in dichloroethene (DCE), vinyl chloride (VC) and trichloroethene (TCE) over the course of system operation, with a small rebound in groundwater concentrations after each operation cycle (Appendix B, Figure 3-3).

4.0 SUPPLEMENTAL INVESTIGATION

PGG was contacted in 2005 to conduct a final remedial action at Scougal Rubber. PGG collected supplemental groundwater and soil samples in August and October of 2006 to assess the current distribution of contaminants. Sampling was initially restricted to existing monitoring wells. The results of the initial monitoring suggested that a residual vadose source was contributing to groundwater contamination. Additional soil and groundwater samples were collected in October 2006 to investigate residual soil contamination and fill data gaps.

4.1 AUGUST 2006 GROUNDWATER SAMPLING

4.1.1 Sampling

Monitoring wells MW-4, MW-11, MW-12, MW-13, MW-14 and OW-10 were sampled on August 8, 2006. Wells were purged with a peristaltic pump using low-flow techniques. Samples were placed in coolers and delivered to Analytical Resources, Inc. in Tukwila, Washington for analysis. Samples were analyzed for total petroleum hydrocarbons and volatile organic compounds (VOC) by EPA Method 8260B.

4.1.2 Results

Analytical results are presented in Table 1. Key results are summarized in Figure 2.

TCE concentrations ranged from 0.2 micrograms per liter (ug/L) at MW-2 to 110 ug/L at MW-14. TCE concentrations were above MTCA Method A cleanup levels (5 ug/L) at 4 of 6 wells sampled. The two wells downgradient from the drum storage area had the highest TCE concentrations. Concentrations at MW-4 upgradient

from the drum storage area are below cleanup levels.

Detections of motor oil range (2 milligrams per liter (mg/L)) and diesel range (3.1 mg/L) petroleum hydrocarbons above cleanup levels were present in samples collected at OW-10 (Tables 1 and 3).

4.1.3 Discussion

Results were generally consistent with the October 2002 sampling by Retec. The data indicate that TPH impacts to groundwater are mostly located at the former UST area and the chlorinated solvent impact areas are mostly at and down-gradient from the drum storage area.

The elevated TCE concentrations at MW-14 indicated that there may be a residual soil source nearby. A soil sample collected in 1995 indicated elevated concentrations of TCE in soil west of the drum storage area (Retec, 2002).

The high levels of TCE relative to DCE and VC in groundwater indicated that the SVE system had been more effective at stripping lighter compounds from soil and groundwater than the heavier, less volatile TCE. Typically VC and DCE increase relative to TCE over time due to degradation. The monitoring data indicate the opposite trend.

4.2 OCTOBER 2006 SOIL AND GROUNDWATER SAMPLING

Based on the results of the August 8, 2006 groundwater sampling, additional soil and ground water sampling was conducted on October 2, 2006. The groundwater data indicated possible residual soil contamination at the bend in the alley adjacent to the drum storage area. Soil samples collected by Retec in the 1990s had shown elevated VOC and TPH levels in the area consistent with the distribution of these compounds in groundwater.

Retec sample 95-S1-5, located adjacent to MW-14, had a TCE concentration in soil of 350 micrograms per kilogram (ug/kg). Soil samples collected along the eastern margin of the excavation showed elevated levels of oil and diesel range petroleum hydrocarbons in addition to low-to-moderate levels of TCE.

4.2.1 Sampling

Soil and groundwater sampling was conducted on October 2, 2006 using a limited-access direct-push rig. The direct-push technology involves advancing a 2-inch boring tool into the subsurface and using a plastic sleeve inner core to extract a relatively undisturbed soil sample every four feet. Soil recovery is relatively continuous. Environmental Service Network (ESN) Northwest was the Washington-licensed driller for the work.

Soils were collected directly from the 4-ft sleeved soil samples according to U.S. EPA Method 5035A using a laboratory-supplied soil syringe to minimize disturbance and placed into 40 milliliter (mL) glass vials. Groundwater was sampled by advancing a temporary 3-foot long stainless steel screen beyond the bottom of the boring into undisturbed, saturated sediment. A disposable polyethylene discharge line connected to a peristaltic pump was lowered down the boring and water was pumped from the boring into sample bottles. Groundwater samples were collected directly from the discharge line in 40 mL glass vials with HCl preservative. Samples were placed on ice and chain-of-custody maintained until delivery to Analytical Resources, Inc. Samples were analyzed for VOCs using U.S. EPA Method 8260B.

Borings were advanced at the locations shown in Figure 2. Boring logs are included in Appendix A.

4.2.2 Soil Analytical Results

Analytical Results are presented in Table 1. Key results are summarized in Figure 2.

TCE concentrations ranged from 9.2 ug/kg at PGG-E to 25,000 ug/kg at PGG-A with 7 of 8 samples analyzed reporting above MTCA

Method A cleanup levels (30 ug/kg). The highest TCE concentrations were located in the former drum storage area and ranged from 230 ug/kg at PGG-D to 25,000 ug/kg at PGG-A at 2-3 feet below ground surface. A second sample at PGG-A collected from 6 feet bgs had a TCE detection of 300 ug/kg indicating decreasing concentration with depth. TCE concentrations in the former UST area were generally lower. TCE was detected beneath a seam in the floor in the manufacturing building at 43 ug/kg.

Three samples were analyzed for petroleum hydrocarbons. Sample PGG-S1-B had concentrations of diesel (1,100 mg/kg) and motor oil (2,500 mg/kg) above MTCA Method A table cleanup values.

4.2.3 Groundwater Analytical Results

Analytical results are presented in Table 1. Key results are summarized in Figure 2.

TCE concentrations ranged from 6.9 ug/L at PGG-D to 160 ug/L at PGG-C. Concentrations generally increased to the northwest across the drum storage area. VC concentrations were non-detect at all samples except PGG-GW-A (150 ug/L) which was well above MTCA Method A cleanup levels (0.2 ug/L). Concentrations of cis-1,2 DCE followed a similar pattern to VC, but were below cleanup levels.

All other analyzed compounds were below cleanup levels.

4.2.4 Discussion

Results indicate that higher than expected concentrations of TCE are present in shallow soil adjacent to MW-14. The elevated concentrations are consistent with the limited success of the SVE system in mitigating groundwater TCE levels at MW-14, despite being immediately adjacent. It is worth noting that concentrations of cis-1,2 DCE appears to be much lower than expected for TCE-contaminated soils at least 15 years old. This indicates that the SVE system was effective at stripping the more volatile constituents (cis-1,2 DCE and VC), but not as effective with TCE.

Remediation of the soil hotspot adjacent to MW-14 is considered necessary to attain successful cleanup of groundwater.

5.0 PROPOSED FINAL REMEDIAL MEASURES

PGG proposes a combination of excavation and in situ chemical oxidation to remediate chlorinated solvents and petroleum hydrocarbons in soil and groundwater at Scougal Rubber. Remedial excavations and infiltration areas are shown in Figure 3.

This final action plan is not intended as a full-scale feasibility study for remediation at Scougal Rubber. Feasibility of remedial alternatives was evaluated by Retec in the 1990's and soil vapor extraction was implemented based on understanding of site conditions at that time. These proposed final remedial measures are intended to provide final remediation to cleanup levels.

The proposed final remedial measures are outlined as components to address different parts of the known contamination. The remedial action components are:

- Excavation near the drum storage area;
- $KMnO_4$ application through an infiltration gallery; and,
- $KMnO_4$ application through an infiltration trench.

Because potassium permanganate is an integral part of the proposed final remedial action, a section discussing the chemistry, effectiveness and potential secondary effects is included in Section 5.5.

5.1 STRATEGY

The strategy for the final remedial action plan is to use both excavation and in-situ chemical oxidation (ISCO) to remediate remaining TCE and TPH contamination in the former UST and Drum Storage areas.

Construction of the ISCO infrastructure requires excavation to install the infiltration trench and infiltration gallery. Because soil contamination in the drum storage area appears to be limited to the upper 1-3 feet of soil, excavation for the infiltration gallery may remove most of the contaminated soil. Consequently, a round of confirmation soil sampling will be conducted after excavation of shallow soils in the drum storage area. The infiltration gallery design will be modified to apply chemical oxidant only to those areas above cleanup levels. This adaptive approach will prevent unnecessary effort and expense, and improve project efficiency.

After excavation, remediation will proceed to ISCO using potassium permanganate followed by final soil and groundwater confirmation sampling and reporting to Ecology.

5.2 EXCAVATION NEAR THE DRUM STORAGE AREA

Objective: Removal of the vadose zone TCE hotspot identified surrounding boring PGG-5.

Excavation will focus on removal of the soils with the highest concentrations near PGG-5. Permanganate injection at the infiltration gallery will remediate the remaining contaminated soil in situ.

Excavation will coordinate with construction of the infiltration system (see Section 5.3.1).

5.2.1 Soil and Water Waste Handling

The soil excavated during this work is not considered spent halogenated solvents, F001 or F002, as the releases appear to be from pure and not spent product. Also, the releases were inadvertent to the environment and have moved into soil via transport mechanisms such as infiltration, volatilization, partitioning, tracking, dilution, and mixing with soil. Therefore, the soil excavated during this cleanup should not be considered a hazardous waste based on origin. The toxicity characteristic of the soil will be assessed. The soil will be excavated into a lined container or other suitable vessel. Three grab samples will be collected using EPA Method 5035A for analysis of chlorinated volatiles by EPA Method 8260B. If the concentration of PCE, TCE, DCE, or VC exceed the minimum concentration that could leach and exceed the toxicity characteristic, the samples will be run by the Toxicity Characteristic Leaching Procedure (TCLP), to assess whether the soil is considered hazardous waste by TCLP. Based on this testing, the soil will be disposed of appropriately at a Subtitle D or C Landfill.

Water and decontaminated water produced during the investigation and cleanup will be drummed and removed by Marine Vacuum Services.

5.3 $KMNO_4$ APPLICATION THROUGH INFILTRATION GALLERY

Potassium permanganate ($KMnO_4$) will be applied through two systems: a shallow infiltration gallery in the drum storage area and an infiltration trench in the former UST area. The infiltration trench may also be modified from the existing vapor extraction system.

5.3.1 Infiltration Gallery Design

Objective: In situ chemical oxidation of vadose zone TCE and VC at drum storage area.

The infiltration gallery will be installed commensurate with the excavation of the soil hotspot adjacent to MW-14 (Figure 4). The infiltration gallery will be 2 feet deep with a flat bottom of native material. A 6-inch gravel bed will be placed on the bottom of the excavation. Horizontal 3-inch diameter perforated pipes will be

placed on the gravel bed. The infiltration pipes will be fitted with vertical risers at one end for permanganate application. The excavation will then be filled to just below grade with gravel and a layer of filter fabric placed over the gravel. The excavation will then be capped by asphalt. The pipe risers will be fitted with 10-inch steel monuments.

The excavation will be based on the supplemental soil data collected in October 2006. The actual application area for the infiltration gallery will be based on confirmation samples collected after excavation. Areas with confirmation samples above cleanup levels will be included in the infiltration gallery. Areas below cleanup levels will be backfilled with clean soil and paved.

5.3.2 Permanganate Application

Objective: apply potassium permanganate to infiltration areas on a monthly basis.

Potassium permanganate will be applied to infiltrations areas on a monthly basis for 6 months. Permanganate solution will be pre-mixed and brought to the site by truck and gravity fed into the access points in the infiltration areas.

The vadose zone beneath the infiltration gallery has an estimated pore volume of 5,800 gallons. 1,800 gallons of permanganate solution will be applied to the infiltration gallery each month for a total of 10,800 gallons over 6 months. The entire vadose zone will not be saturated by a single permanganate application.

5.4 $KMNO_4$ APPLICATION THROUGH INFILTRATION TRENCH

Objective: In situ chemical oxidation of TPH, TCE and VC in groundwater.

5.4.1 Infiltration Trench Design

The infiltration trench will be located along the fence line in the former UST area. The trench is estimated to be 60 feet long, 8 feet deep and 2.5 feet wide (Figure 5). The trench will be backfilled with pea gravel and have 4 vertical 4-inch perforated pipe injection points with flush mount access monuments.

One end of the trench will be matched to the edge of the infiltration gallery, but the two infiltration areas will not connect. If leakage from the infiltration gallery into the infiltration trench appears to be an issue at the time of construction, plastic sheeting will be used to limit lateral flow between them.

5.4.2 Permanganate Application

Objective: apply potassium permanganate to infiltration areas on a monthly basis.

Potassium permanganate will be applied to infiltrations areas on a monthly basis for 6 months. Permanganate solution will be pre-mixed and brought to the site by truck and gravity fed into the access points in the infiltration areas. The infiltration trench will require approximately 2,500 gallons per application.

5.5 POTASSIUM PERMANGANATE BACKGROUND

Potassium permanganate (Chemical formula: $KMnO_4$) has an established track record for in situ degradation of chlorinated solvents (ITRC, 2005; DOE, 1999).

5.5.1 Potassium Permanganate Chemistry

Potassium permanganate ($KMnO_4$) is capable of degrading gasoline- through oil-range petroleum hydrocarbons and chlorinated ethenes such as trichloroethene. Potassium permanganate does not readily degrade benzene.

The reactions for the breakdown of chlorinated ethenes are (ITRC, 2005):

Tetrachloroethene (PCE)

$4KMnO_4 + 3C_2Cl_4 + 4H_2O \rightarrow 6CO_2 + 4MnO_2(s) + 4K^+ + 12Cl^- + 8H^+$

Trichloroethene (TCE)

$2MnO_4 + C2HCl3 \rightarrow 2CO_2 + 2MnO_2(s) + 2K^+ + 6Cl^- + H^+$

Dichloroethene (DCE)

$8KMnO_4 + 3C_2H_2Cl_2 + 2H^+ \rightarrow 6CO_2 + 8MnO_2(s) + 8K^+ + 6Cl^- + 4H_2O$

Vinyl Chloride (VC)

$10KMnO_4 + 3C_2H_3Cl \rightarrow 6CO_2 + 10MnO_2(s) + 10K^+ + 3Cl^- + 8H^+ + H_2O + 7OH^-$

All four reactions produce a solid manganese precipitate and compounds which are non-toxic at the expected concentrations (less than 3% solutions). These equations are simplified versions of the chemistry. In actuality, the reaction may involve a number of intermediate steps. For example, the degradation of TCE may involve intermediate reactions to cis-1,2 DCE and VC (each of which has fewer chlorine bonds than TCE). As a result, there may be transient increases in the concentrations of cis-1,2 DCE and VC during remediation.

The primary limiting factors on permanganate effectiveness as an in-situ chemical oxidant are:

1. ability to bring permanganate into contact with TCE;
2. consumption of permanganate by native aquifer materials such as organic carbon;
3. thermodynamic conditions (pH, temperature); and
4. the rate that permanganate oxidizes chlorinated solvents.

The ability to bring permanganate into contact with TCE is a primary control on the effectiveness of the remedial technique. The ability to bring permanganate into contact with TCE in the vadose zone is limited by the transmissivity of the soils, influence of preferential pathways, and application of permanganate to the correct area. Soils are generally sandy at Scougal with occasional silt layers. The silt layers are expected to be the limiting lithology for infiltration and, therefore, the primary control on preferential pathways. Chlorinated solvents spilled on the surface at the time of release will have followed preferential pathways through the vadose zone. Potassium permanganate applied through the infiltration gallery is expected to follow the same preferential pathways.

The consumption of permanganate by native aquifer materials such as organic carbon limits the effectiveness of the remedial technique through competition. The majority of the permanganate applied to the system will likely be consumed by oxidation of native vadose zone materials such as metals and natural organic carbon. This competition will buffer the effectiveness of the permanganate solution. However, the oxidation of native materials is limited by kinetics and TCE will likely be oxidized before the native oxidation demand is reached.

Thermodynamic conditions will control whether or not permanganate degradation reactions are feasible. Permanganate is an effective oxidant over a pH range of 4–8 (Yan and Schwartz, 1999). Groundwater samples collected in 2006 had a pH range of 5.5 to 6.3 indicating that the pH range is appropriate for permanganate. Oxidation reaction zones at lithologic contacts noted in soil borings indicate somewhat oxidizing conditions in the vadose zone; however, oxidation-reduction potential measurements were not taken during sampling.

The rate that permanganate oxidizes chlorinated solvents will depend on the concentrations of permanganate and contaminants, temperature and distribution of contaminants in the subsurface. If TCE is sorbed onto particles, or in low permeability geologic layers, the overall reaction rate may be limited by the transport of TCE and permanganate rather than the chemical reaction.

In summary, the conditions at Scougal Rubber appear favorable for the use of potassium permanganate for the degradation of contaminants in soil and groundwater.

5.5.2 Potential Secondary Effects

The chemical degradation of chlorinated ethenes produces compounds which are not hazards to human health such as: chloride (Cl^-), potassium (K^+), hydrogen (H^+) and water (H_2O). The manganese precipitates out of solution as a solid (manganese oxide, MnO_2 (s)). The degradation of TCE may progress through intermediate steps involving the reaction of TCE to cis-1,2 DCE and VC. These compounds will also be oxidized by potassium permanganate. This chemical pathway may be observed in groundwater monitoring as a transient increase in cis-1,2 DCE and VC during remediation commensurate with a decrease in TCE concentrations.

One of the primary concerns some regulators have with the use of permanganate as an oxidant is the possibility of secondary elevated manganese concentrations. However, because the end point of the oxidation pathway is solid manganese oxide, manganese will fairly quickly precipitate out of solution at pH 2 to 12.5.

Under acidic conditions (pH <3) Mn^{2+} solubility increases and may result in leaching of Mn^{2+} from MnO_4. Measurements of pH in monitoring wells range from 5.5 to 6.2—significantly above the range in which Mn^{2+} solubility increases significantly. Therefore, groundwater chemical conditions at Scougal Rubber indicate that manganese should precipitate out of solution as a solid.

In summary, under the expected geochemical conditions at Scougal Rubber, in-situ chemical oxidation using potassium permanganate is expected to have minimal secondary effects.

6.0 CONFIRMATION MONITORING AND SAMPLING

Soil and groundwater samples will be collected to verify that remedial action has achieved cleanup levels.

6.1 CLEANUP LEVELS

Cleanup levels for soil and groundwater at the Scougal Rubber site are presented in Table 3. MTCA Method A table values for unrestricted land use are used where available. MTCA Method B standard formula values are used where MTCA Method A values are not available. MTCA standard table values are calculated using conservative assumptions and do not represent a site-specific risk based approach to determining cleanup levels for the Scougal Rubber site.

6.2 SOIL CONFIRMATION SAMPLING

Objective: the objective of soil confirmation sampling is to verify that soil concentrations are below cleanup levels for the contaminants of concern.

6.2.1 Excavation Confirmation Sampling

Up to 10 soil samples will be collected from the bottom and side walls of the excavation near the drum storage area. Soil samples will not be collected from the excavation for the infiltration trench. Confirmation soil samples will be sent to Friedman and Bruya for analysis to assess if additional contaminated soil above cleanup levels for chlorinated solvents is present.

If soil data indicate concentrations below cleanup levels, the data will be used in final reporting to Ecology. If data indicate that soil above cleanup levels remains in the drum storage area, the data will be used to determine the distribution area for the infiltration gallery. This

approach assures that the application area is matched to the contaminated areas improving the efficiency and cost-effectiveness of the remediation. See Section 5.2 for infiltration gallery design criteria.

6.2.2 Infiltration Gallery Confirmation Sampling

If an infiltration gallery is deemed appropriate after excavation, soil samples will be collected 6 months after the last permanganate injection. Up to 6 soil samples will be collected from the drum storage area. The samples will be collected using a hand-auger at 4 feet below ground surface. Samples will be arranged to provide even spatial coverage over the final infiltration gallery area.

If soil samples are above cleanup levels, and additional 3 rounds of permanganate injection will be conducted followed by another round of soil sampling.

6.2.3 Soil Sampling and Analytical Methods

Soil samples will be analyzed for chlorinated ethenes (PCE, TCE, cis-1,2 DCE and VC) as outlined in Table 3.

Soil samples will be collected using EPA Method 5035. For soil samples obtained using a hand-auger, the auger will be decontaminated just before sampling.

6.3 GROUNDWATER CONFIRMATION SAMPLING

Objective: the objective of groundwater monitoring will be to verify that groundwater concentrations are below cleanup levels for the contaminants of concern.

6.3.1 Monitoring

Groundwater monitoring will begin 6 months after the last round of permanganate injection and continue for 12 months on a quarterly basis for a total of 4 events. Groundwater monitoring will include monitoring wells MW-11, MW-12 and MW-14 for the constituents listed in Table 3.

6.3.2 Sample Collection Methods

Field water quality instruments to measure pH, specific conductivity, and temperature will be calibrated at the beginning (prior to sampling) and middle of each sampling day. Calibration data will be recorded in the field notes.

The monitoring wells will be sampled using a decontaminated stainless steel bailer or peristaltic pump. New, 0.25-inch inner diameter, polyethylene tubing will be used to sample the wells.

The following tasks will be performed at each well:

- Measure and record static water level to the nearest 0.01 foot using an electric well sounder and measuring tape. Water level measurement points will be the north edge of the top of the PVC well casing.
- Calculate and record purge volume, which is equivalent to three casing volumes. Purge volume for a 4-inch well is calculated by subtracting the depth to water from the total well depth and multiplying the result by 1.96.
- Lower the tubing into the well until the tubing intake is in the middle of the screened interval, or slightly above the middle of the screened interval. It may be necessary to weight the polyethylene tubing with washed stainless steel nuts to reach the desired depth. Secure the tubing to the top of the well and leave approximately 5 feet of tubing outside the well. Attach a 1-foot length of silicon tubing that is appropriate for a peristaltic pump to the polyethylene tubing.
- Attach the silicon tubing to the peristaltic pump. Purge (remove with pump) water from the well into a calibrated 5-gallon pail or similar and monitor flow rate. Begin purging at approximately 100 milliliters per minute (ml/min or 0.03 gpm) and monitor drawdown. The goal is to create minimal draw-

down, less than 10 centimeters or 0.3 feet, during purging. This goal may be difficult to achieve under some circumstances and may require adjustment based on site-specific conditions and personal experience. Increase the flow rate in steps if drawdown is less than 0.3 feet; however, the flow rate should not exceed 1 L/min (0.25 gpm). Excessive drawdown, greater than 0.3 feet, indicates a need to reduce the flow rate.

- Monitor the water level in the well during purging to avoid excessive drawdown. Monitor the discharge water for pH, temperature, and conductivity at approximately 1 gallon or 5-minute intervals. Record pumping rate, time, purge water volume, water level, and field parameter values in the field notes.
- Sampling may begin when temperature, pH, and specific conductance are "stable," (see explanation below). If the field water quality parameters continue to increase or decrease, continue purging until readings are "stable," then sample.
- In the event that field water quality instruments are not functioning properly, remove at least the purge volume calculated above before sampling begins.
- Collect samples of water for laboratory analysis in a manner that minimizes volatilization of potential contaminants from the water into the air. Hands and clothing will be clean when handling sampling equipment and during sampling. Clean, disposable, latex gloves will be worn when filling bottles for analyses. Gloves will be changed when dirty and between samples. All water samples will be collected from the pump discharge lines directly into the appropriate sample containers.

Collect samples in the following manner:

- Volatile Organic Compounds - Fill three 40-ml vials preserved with hydrochloric acid, per sample. Slowly fill each vial until all air is removed and sample water "bulges" over the top of the vial. Wet cap with sample water and screw onto top of vial. Invert vial and tap with finger. If air bubbles are present remove lid and top up vial until water bulges over the top. Repeat capping and checking for air bubbles. The properly filled vial has no visible air bubbles.
- Record sample identification data on each sample container, in the field notes, and on the chain-of-custody. Sample identification will be the same as the well name/number.

"Stable" is defined as:

- Drawdown does not exceed 10 centimeters or 0.3 feet, during purging. This goal may require adjustment based on site-specific conditions and personal experience.
- Specific conductance and temperature that do not indicate a trend (continuously increase or decrease between readings).
- Specific conductance and temperature that do not vary by more than 10 percent between readings.
- pH measurements that do not vary by more than 0.1 pH units between readings
- Temperature measurements that do not vary by more than 2 degrees Fahrenheit between readings.

6.3.3 Monitoring Well Abandonment

Upon notification of no further action by the Department of Ecology, the monitoring well network on the Scougal Rubber Site will be decommissioned. A licensed driller will be contracted to perform the decommissioning according to WAC 173-270 and report to Ecology.

7.0 REPORTING

Objective: To produce a report for submission to the Washington Department of Ecology demonstrating remediation to concentrations below cleanup levels.

After the last round of groundwater sampling, a report will be prepared documenting remedial

actions and results of groundwater monitoring and soil confirmation sampling. The report will be submitted to the Department of Ecology within 3 months of receipt of final analytical data.

If concentrations of contaminants of concern remain above cleanup levels, the report will address what, if any, additional action is recommended.

8.0 REFERENCES

Retec, 2002. Independent Remedial Action Report, Scougal Rubber Property, Seattle, Washington. March 28, 2002.

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Table 1. Supplemental Groundwater Monitoring Results

Scougal Rubber, 6239 Corson Ave. S., Seattle, Washington

Constituents with units	Units	MW-11	MW-12	MW-13	MW-14	MW-4	OW-10	Trip Blank
1,1-Dichloroethane	ug/L	U	U	U	1.2	U	0.5	U
1,1-Dichloroethene	ug/L	U	U	U	U	U	0.2	U
Acetone	ug/L	4.8	2.1	U	U	1.7	19	1.6
Benzene	ug/L	U	U	U	U	U	1.5	U
Carbon Disulfide	ug/L	U	U	U	U	U	0.2	U
cis-1,2-Dichloroethene	ug/L	8.7	0.4	11	26	U	18	U
Diesel Range Hydrocarbons	mg/L	0.38	U	U	U	U	**3.1**	U
Gasoline Range Hydrocarbons	mg/L	U	U	U	U	U	U	U
Methylene Chloride	ug/L	U	U	U	U	0.4	U	0.4
Motor Oil	mg/L	U	U	U	U	U	**2**	U
Tetrachloroethene	ug/L	0.3	U	U	4.1	0.2	U	U
trans-1,2-Dichloroethene	ug/L	U	U	U	U	U	0.3	U
Trichloroethene	ug/L	**9.4**	0.2	**46**	**110**	3.3	**9.6**	U
Vinyl Chloride	ug/L	U	**0.7**	**2.6**	**33**	U	**3.5**	U

Analytes not shown were non-detect.

U indicates non-detect

Samples collected August, 2006.

Table 2. Supplemental Soil and Groundwater Sampling Results

Scougal Rubber, 6239 Corson Ave. S., Seattle, Washington

Soil Data

Constituent	PGG-S1-A	PGG-S2-A	PGG-S1-B	PGG-S1-C	PGG-S1-D	PGG-S1-E	PGG-S1-F	PGG-S1-G
1,1-Dichloroethene, ug/kg	U	U	U	U	U	U	U	U
Benzene, ug/kg	U	U	U	U	U	U	U	**4.6**
cis-1,2-Dichloroethene, ug/kg	**150**	**4.3**	**180**	U	U	**12**	**4.2**	**5.6**
Ethylbenzene, ug/kg	**95**	U	U	U	U	U	U	**3.3**
m,p-Xylene, ug/kg	**420**	U	**97**	U	U	U	U	**12**
o-Xylene, ug/kg	**70**	U	U	U	U	U	U	**3.3**
Tetrachloroethene, ug/kg	**4000**	**25**	U	**170**	U	U	**1.5**	**1.5**
Toluene, ug/kg	**350**	U	**1600**	**140**	U	U	U	**13**
trans-1,2-Dichloroethene, ug/kg	U	U	U	U	U	U	U	U
Trichloroethene, ug/kg	**25000**	**300**	**100**	**1800**	**230**	**9.2**	**43**	**34**
Vinyl Chloride, ug/kg	U	U	U	U	U	U	U	U
Diesel Range Hydrocarbons, mg/kg	--	--	**1100**	--	--	U	--	**760**
Gasoline, mg/kg	--	--	**15**	--	--	U	--	**18**
Motor Oil, mg/kg	--	--	**2500**	--	--	U	--	**770**

U indicates that the compound was not detected above the reporting limit.

-- indicates that the compound was not analyzed for in that sample.

Groundwater Data

Constituent	PGG-GW-A	PGG-GW-C	PGG-GW-D	PGG-GW-F	PGG-GW-G	TRIP BLANK
1,1-Dichloroethene, ug/L	**1.9**	U	U	U	U	U
Benzene, ug/L	U	U	U	U	U	U
cis-1,2-Dichloroethene, ug/L	**100**	**6.6**	**1.5**	**1.4**	**12**	U
Ethylbenzene, ug/L	U	U	U	U	U	U
m,p-Xylene, ug/L	U	U	U	U	U	U
o-Xylene, ug/L	U	U	U	U	U	U
Tetrachloroethene, ug/L	**8**	**2.7**	U	U	U	U
Toluene, ug/L	U	**1.2**	**1.2**	U	U	U
trans-1,2-Dichloroethene, ug/L	**1.2**	U	U	U	U	U
Trichloroethene, ug/L	**120**	**160**	**6.9**	**25**	**16**	U
Vinyl Chloride, ug/L	**150**	U	U	U	U	U
Diesel Range Hydrocarbons, mg/L	--	--	--	U	U	--
Gasoline Range Hydrocarbons, mg/L	--	--	--	U	U	--
Motor Oil, mg/L	--	--	--	U	U	--

U indicates that the compound was not detected above the reporting limit.

-- indicates that the compound was not analyzed for in that sample.

Samples Collected October 2, 2006

Table 3. Confirmation Sampling Analytes and Cleanup Levels
Scougal Rubber, Seattle, Washington

Compound	Cleanup Level	Units	Cleanup Level Basis
Groundwater			
Tetrachloroethene (PCE)	5	ug/L	Ground Water, Method A, Table Value
Trichloroethene (TCE)	5	ug/L	Ground Water, Method A, Table Value
cis-1,2 Dichloroethene (DCE)	80	ug/L	Ground Water, Method B, Non-carcinogen, Standard Formula Value
Vinyl Chloride (VC)	0.2	ug/L	Ground Water, Method A, Table Value
Manganese (dissolved)	2200	ug/L	Ground Water, Method A, Table Value
Iron (dissolved)	0.3	ug/L	WAC 173-200-040
Temperature	--	Celcius	--
pH	--	Standard	--
Oxidation-reduction potential (ORP)	--	mV	--
TPH-O	2,000	ug/L	Ground Water, Method A, Table Value
TPH-D	2,000	ug/L	Ground Water, Method A, Table Value
Soil			
Tetrachloroethene (PCE)	0.05	mg/kg	Soil, Method A, Industrial Land Use, Table Value
Trichloroethene (TCE)	0.03	mg/kg	Soil, Method A, Industrial Land Use, Table Value
cis-1,2 Dichloroethene (DCE)	8000	mg/kg	Soil, Method B, Non-carcinogen, Standard Formula Value, Direct Contact (ingestion only), unrestricted
Vinyl Chloride (VC)	0.67	mg/kg	Soil, Method B, Carcinogen, Standard Formula Value, Direct Contact (ingestion only), unrestricted

MTCA Method A and B cleanup levels are from: *https://fortress.wa.gov/ecy/clarc/Reporting/CLARCReporting.aspx*

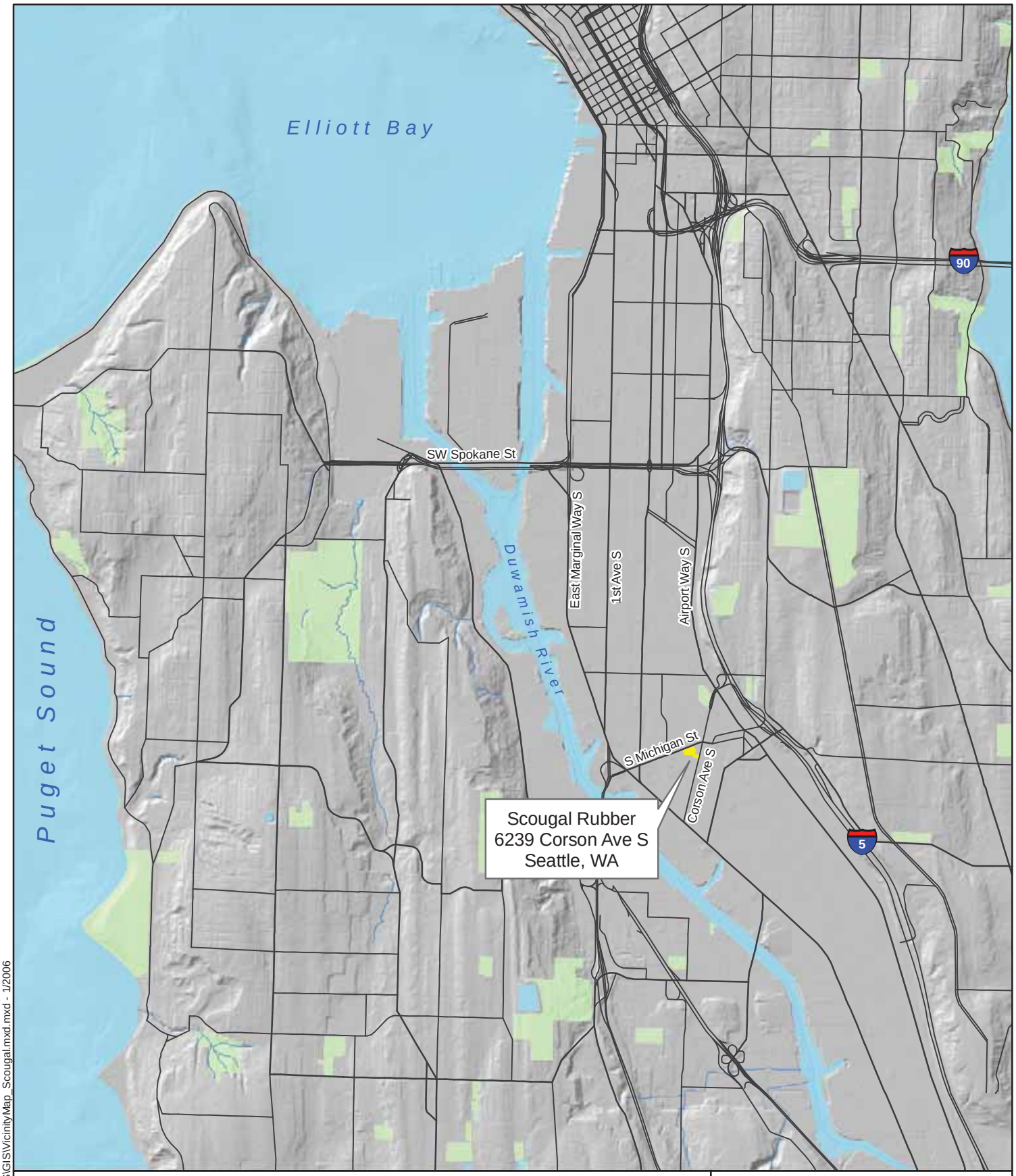

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FIGURE 1
Regional Location Map

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	cis-DCE	PCE	TCE	TPH-G/D/O
PGG-S1-A	150	4000	25000	--
PGG-S2-A	4.3	25	300	--
PGG-GW-A	100	8	120	--

	cis-DCE	PCE	TCE	TPH
PGG-S1-C	U	170	1800	--
PGG-GW-C	6.6	2.7	160	--

	cis-DCE	PCE	TCE	TPH
PGG-S1-D	U	U	230	--
PGG-GW-D	1.5	U	6.9	--

	cis-DCE	PCE	TCE	TPH
PGG-S1-B	180	U	100	3615

	cis-DCE	PCE	TCE	TPH
PGG-S1-F	4.2	1.5	43	--
PGG-GW-F	1.4	U	25	U

	cis-DCE	PCE	TCE	TPH
PGG-S1-G	5.6	1.5	34	1548
PGG-GW-G	12	U	16	U

	cis-DCE	PCE	TCE	TPH
PGG-S1-E	12	U	9.2	U

MW-4	1/03	8/06
TCE	8.5	3.3
VC	< 0.2 U	U

MW-14	1/03	8/06
TCE	120	110
VC	15	33

MW-13	1/03	8/06
TCE	84	46
VC	3.5	2.6

MW-12	1/03	8/06
TCE	< 0.1 U	0.2
VC	0.6	0.7

MW-11	1/03	8/06
TCE	22	9.4
VC	< 0.1 U	U

OW-10	7/97	8/06
TCE	17	9.6
VC	0.37 J	3.5
TPH-O	--	2000

Well_Locations

Type

- Air Sparging Well
- Monitoring Well
- Geoprobe Location
- UST

0 Feet 100

Figure 2
Boring Location and Selected Results
Scougal Rubber Final Remedial Action Plan

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Monitoring Well

Excavation Area (Infiltration Gallery)

Infiltration Trench

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0 Feet 15

Figure 3
Excavation & Infiltration Areas

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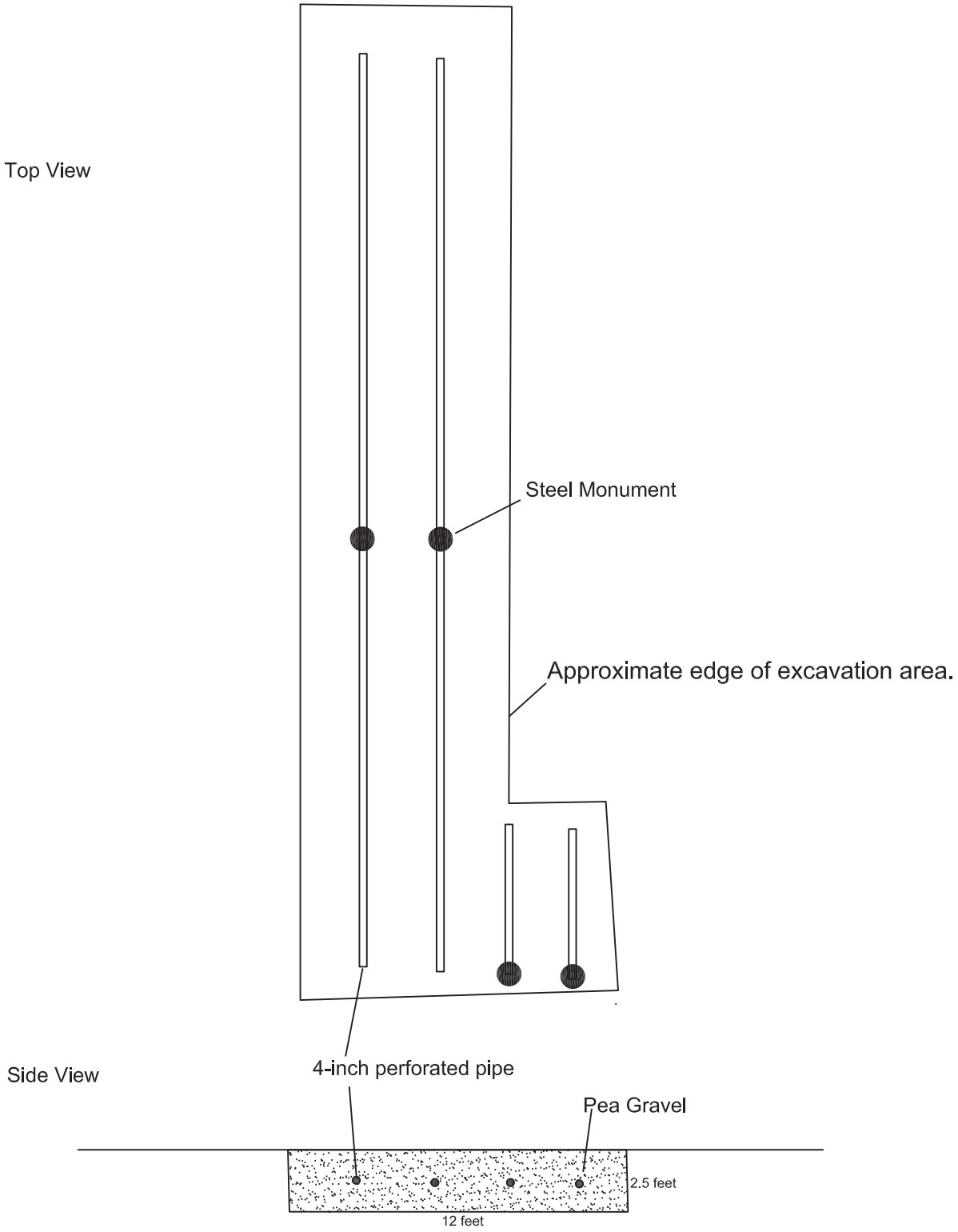
Infiltration Gallery Design



Note: Areal Extent of Infiltration Gallery will be determined from results of excavation confirmation samples.

Figure 4. Infiltration Gallery Design

Scougal Rubber Final Remedial Action Plan

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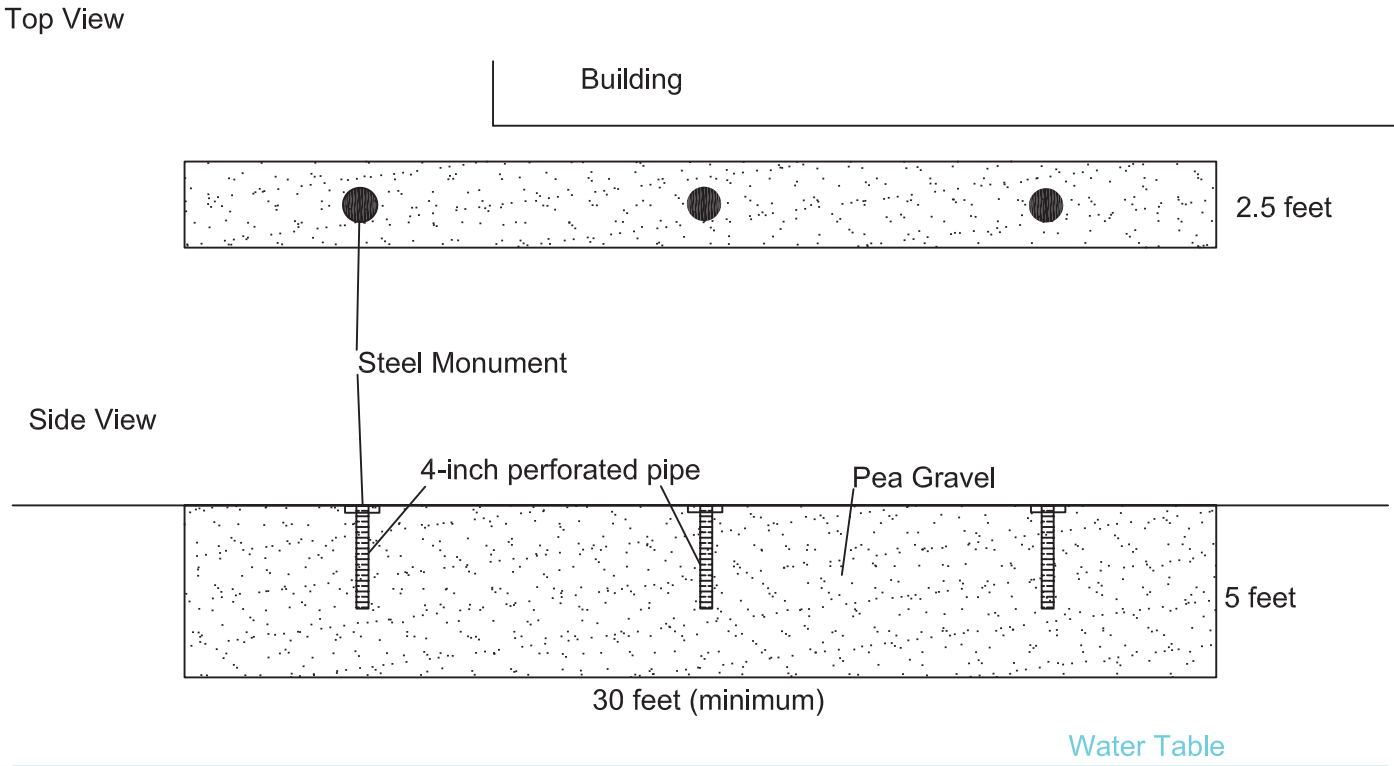
Infiltration Trench Design



Note: Length of infiltration trench will be coordinated with installation of infiltration gallery.

Figure 5. Infiltration Trench Design

Scougal Rubber Final Remedial Action Plan

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APPENDIX A
ANALYTICAL DATA

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TPHG by Method NWTPHG
Matrix: Soil

QC Report No: JZ38-Pacific Groundwater Group
Project: Scougal Rubber
Event: JK0605
Date Sampled: 10/02/06
Date Received: 10/03/06

Data Release Authorized:
Reported: 10/19/06

ARI ID	Client ID	Analysis Date	Basis	Range	Result
MB-101206	Method Blank	10/12/06	Dry	Gasoline	< 5.0 U
06-18464		PID2		HC ID	---
				Trifluorotoluene	94.1%
				Bromobenzene	90.2%
JZ38C	PGG-S1-B	10/12/06	Dry	**Gasoline**	**15**
06-18464		PID2		HC ID	GRO
				Trifluorotoluene	88.4%
				Bromobenzene	82.9%
JZ38F	PGG-S1-E	10/12/06	Dry	Gasoline	< 6.8 U
06-18467		PID2		HC ID	---
				Trifluorotoluene	92.3%
				Bromobenzene	81.8%
JZ38H	PGG-S1-G	10/12/06	Dry	**Gasoline**	**18**
06-18469		PID2		HC ID	GRO
				Trifluorotoluene	93.2%
				Bromobenzene	93.1%

Gasoline values reported in mg/kg (ppm)

Quantitation on total peaks in the gasoline range from Toluene to Naphthalene.

GAS: Indicates the presence of gasoline or weathered gasoline.
GRO: Positive result that does not match an identifiable gasoline pattern.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TPHG by Method NWTPHG
Page 1 of 1

Sample ID: LCS-101206
LAB CONTROL SAMPLE

Lab Sample ID: LCS-101206
LIMS ID: 06-18464
Matrix: Soil
Data Release Authorized:
Reported: 10/20/06

QC Report No: JZ38-Pacific Groundwater Group
Project: Scougal Rubber
Event: JK0605
Date Sampled: NA
Date Received: NA

Date Analyzed LCS: 10/12/06 11:33
LCSD: 10/12/06 12:02
Instrument/Analyst LCS: PID2/PKC
LCSD: PID2/PKC

Purge Volume: 5.0 mL

Sample Amount LCS: 100 mg-dry-wt
LCSD: 100 mg-dry-wt

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Gasoline Range Hydrocarbons	51.5	50.0	103%	45.0	50.0	90.0%	13.5%

Reported in mg/kg (ppm)

RPD calculated using sample concentrations per SW846.

TPHG Surrogate Recovery

	LCS	LCSD
Trifluorotoluene	102%	99.5%
Bromobenzene	104%	102%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260B **Sample ID: PGG-S1-A**
Page 1 of 1 **SAMPLE**

Lab Sample ID: JZ38A
LIMS ID: 06-18462
Matrix: Soil
Data Release Authorized:
Reported: 10/19/06

QC Report No: JZ38-Pacific Groundwater Group
Project: Scougal Rubber
JK0605
Date Sampled: 10/02/06
Date Received: 10/03/06

Instrument/Analyst: FINN5/JLM
Date Analyzed: 10/12/06 15:43

Sample Amount: 82.3 mg-dry-wt
Purge Volume: 5.0 mL
Moisture: 12.0%

CAS Number	Analyte	RL	Result	Q
75-01-4	Vinyl Chloride	61	< 61	U
75-35-4	1,1-Dichloroethene	61	< 61	U
156-60-5	trans-1,2-Dichloroethene	61	< 61	U
156-59-2	**cis-1,2-Dichloroethene**	**61**	**150**	
79-01-6	**Trichloroethene**	**61**	**21,000**	**E**
71-43-2	Benzene	61	< 61	U
127-18-4	**Tetrachloroethene**	**61**	**3,500**	
108-88-3	**Toluene**	**61**	**210**	
100-41-4	**Ethylbenzene**	**61**	**95**	
1330-20-7	**m,p-Xylene**	**61**	**190**	
95-47-6	**o-Xylene**	**61**	**70**	

Reported in µg/kg (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	127%
d8-Toluene	103%
Bromofluorobenzene	103%
d4-1,2-Dichlorobenzene	108%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260B **Sample ID: PGG-S1-A**
Page 1 of 1 **REANALYSIS**

Lab Sample ID: JZ38A
LIMS ID: 06-18462
Matrix: Soil
Data Release Authorized:
Reported: 10/19/06

QC Report No: JZ38-Pacific Groundwater Group
Project: Scougal Rubber
JK0605
Date Sampled: 10/02/06
Date Received: 10/03/06

Instrument/Analyst: FINN5/JLM
Date Analyzed: 10/13/06 15:29

Sample Amount: 16.5 mg-dry-wt
Purge Volume: 5.0 mL
Moisture: 12.0%

CAS Number	Analyte	RL	Result	Q
75-01-4	Vinyl Chloride	300	< 300	U
75-35-4	1,1-Dichloroethene	300	< 300	U
156-60-5	trans-1,2-Dichloroethene	300	< 300	U
156-59-2	cis-1,2-Dichloroethene	300	< 300	U
79-01-6	**Trichloroethene**	**300**	**25,000**	
71-43-2	Benzene	300	< 300	U
127-18-4	**Tetrachloroethene**	**300**	**4,000**	
108-88-3	**Toluene**	**300**	**350**	
100-41-4	Ethylbenzene	300	< 300	U
1330-20-7	**m,p-Xylene**	**300**	**420**	
95-47-6	o-Xylene	300	< 300	U

Reported in µg/kg (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	124%
d8-Toluene	105%
Bromofluorobenzene	107%
d4-1,2-Dichlorobenzene	103%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260B **Sample ID: PGG-S2-A**
Page 1 of 1 **SAMPLE**

Lab Sample ID: JZ38B
LIMS ID: 06-18463
Matrix: Soil
Data Release Authorized:
Reported: 10/19/06

QC Report No: JZ38-Pacific Groundwater Group
Project: Scougal Rubber
JK0605
Date Sampled: 10/02/06
Date Received: 10/03/06

Instrument/Analyst: FINN5/JLM
Date Analyzed: 10/12/06 16:11

Sample Amount: 73.4 mg-dry-wt
Purge Volume: 5.0 mL
Moisture: 20.3%

CAS Number	Analyte	RL	Result	Q
75-01-4	Vinyl Chloride	68	< 68	U
75-35-4	1,1-Dichloroethene	68	< 68	U
156-60-5	trans-1,2-Dichloroethene	68	< 68	U
156-59-2	cis-1,2-Dichloroethene	68	< 68	U
79-01-6	**Trichloroethene**	**68**	**140**	
71-43-2	Benzene	68	< 68	U
127-18-4	Tetrachloroethene	68	< 68	U
108-88-3	Toluene	68	< 68	U
100-41-4	Ethylbenzene	68	< 68	U
1330-20-7	m,p-Xylene	68	< 68	U
95-47-6	o-Xylene	68	< 68	U

Reported in µg/kg (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	112%
d8-Toluene	96.6%
Bromofluorobenzene	108%
d4-1,2-Dichlorobenzene	96.7%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260B **Sample ID: PGG-S2-A**
Page 1 of 1 **REANALYSIS**

Lab Sample ID: JZ38B
LIMS ID: 06-18463
Matrix: Soil
Data Release Authorized:
Reported: 10/19/06

QC Report No: JZ38-Pacific Groundwater Group
Project: Scougal Rubber
JK0605
Date Sampled: 10/02/06
Date Received: 10/03/06

Instrument/Analyst: FINN5/JLM
Date Analyzed: 10/13/06 15:57

Sample Amount: 4.74 g-dry-wt
Purge Volume: 5.0 mL
Moisture: 20.3%

CAS Number	Analyte	RL	Result	Q
75-01-4	Vinyl Chloride	1.0	< 1.0	U
75-35-4	1,1-Dichloroethene	1.0	< 1.0	U
156-60-5	trans-1,2-Dichloroethene	1.0	< 1.0	U
156-59-2	**cis-1,2-Dichloroethene**	**1.0**	**4.3**	
79-01-6	**Trichloroethene**	**1.0**	**300**	**E**
71-43-2	Benzene	1.0	< 1.0	U
127-18-4	**Tetrachloroethene**	**1.0**	**25**	
108-88-3	Toluene	1.0	< 1.0	U
100-41-4	Ethylbenzene	1.0	< 1.0	U
1330-20-7	m,p-Xylene	1.0	< 1.0	U
95-47-6	o-Xylene	1.0	< 1.0	U

Reported in µg/kg (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	145%
d8-Toluene	100%
Bromofluorobenzene	95.0%
d4-1,2-Dichlorobenzene	111%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260B **Sample ID: PGG-S1-B**
Page 1 of 1 **SAMPLE**

Lab Sample ID: JZ38C
LIMS ID: 06-18464
Matrix: Soil
Data Release Authorized:
Reported: 10/19/06

QC Report No: JZ38-Pacific Groundwater Group
Project: Scougal Rubber
JK0605
Date Sampled: 10/02/06
Date Received: 10/03/06

Instrument/Analyst: FINN5/JLM
Date Analyzed: 10/12/06 16:38

Sample Amount: 93.0 mg-dry-wt
Purge Volume: 5.0 mL
Moisture: 18.9%

CAS Number	Analyte	RL	Result	Q
75-01-4	Vinyl Chloride	54	< 54	U
75-35-4	1,1-Dichloroethene	54	< 54	U
156-60-5	trans-1,2-Dichloroethene	54	< 54	U
156-59-2	**cis-1,2-Dichloroethene**	**54**	**180**	
79-01-6	**Trichloroethene**	**54**	**100**	
71-43-2	Benzene	54	< 54	U
127-18-4	Tetrachloroethene	54	< 54	U
108-88-3	**Toluene**	**54**	**1,600**	
100-41-4	Ethylbenzene	54	< 54	U
1330-20-7	**m,p-Xylene**	**54**	**97**	
95-47-6	o-Xylene	54	< 54	U

Reported in µg/kg (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	126%
d8-Toluene	99.9%
Bromofluorobenzene	108%
d4-1,2-Dichlorobenzene	97.6%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260B **Sample ID: PGG-S1-C**
Page 1 of 1 **SAMPLE**

Lab Sample ID: JZ38D
LIMS ID: 06-18465
Matrix: Soil
Data Release Authorized:
Reported: 10/19/06

QC Report No: JZ38-Pacific Groundwater Group
Project: Scougal Rubber
JK0605
Date Sampled: 10/02/06
Date Received: 10/03/06

Instrument/Analyst: FINN5/JLM
Date Analyzed: 10/12/06 17:06

Sample Amount: 93.7 mg-dry-wt
Purge Volume: 5.0 mL
Moisture: 13.6%

CAS Number	Analyte	RL	Result	Q
75-01-4	Vinyl Chloride	53	< 53	U
75-35-4	1,1-Dichloroethene	53	< 53	U
156-60-5	trans-1,2-Dichloroethene	53	< 53	U
156-59-2	cis-1,2-Dichloroethene	53	< 53	U
79-01-6	**Trichloroethene**	**53**	**1,800**	
71-43-2	Benzene	53	< 53	U
127-18-4	**Tetrachloroethene**	**53**	**170**	
108-88-3	**Toluene**	**53**	**140**	
100-41-4	Ethylbenzene	53	< 53	U
1330-20-7	m,p-Xylene	53	< 53	U
95-47-6	o-Xylene	53	< 53	U

Reported in µg/kg (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	114%
d8-Toluene	98.8%
Bromofluorobenzene	101%
d4-1,2-Dichlorobenzene	86.1%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260B **Sample ID: PGG-S1-D**
Page 1 of 1 **SAMPLE**

Lab Sample ID: JZ38E
LIMS ID: 06-18466
Matrix: Soil
Data Release Authorized:
Reported: 10/19/06

QC Report No: JZ38-Pacific Groundwater Group
Project: Scougal Rubber
JK0605
Date Sampled: 10/02/06
Date Received: 10/03/06

Instrument/Analyst: FINN5/JLM
Date Analyzed: 10/12/06 17:33

Sample Amount: 97.7 mg-dry-wt
Purge Volume: 5.0 mL
Moisture: 3.4%

CAS Number	Analyte	RL	Result	Q
75-01-4	Vinyl Chloride	51	< 51	U
75-35-4	1,1-Dichloroethene	51	< 51	U
156-60-5	trans-1,2-Dichloroethene	51	< 51	U
156-59-2	cis-1,2-Dichloroethene	51	< 51	U
79-01-6	**Trichloroethene**	**51**	**230**	
71-43-2	Benzene	51	< 51	U
127-18-4	Tetrachloroethene	51	< 51	U
108-88-3	Toluene	51	< 51	U
100-41-4	Ethylbenzene	51	< 51	U
1330-20-7	m,p-Xylene	51	< 51	U
95-47-6	o-Xylene	51	< 51	U

Reported in µg/kg (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	125%
d8-Toluene	97.7%
Bromofluorobenzene	108%
d4-1,2-Dichlorobenzene	98.9%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260B **Sample ID: PGG-S1-E**
Page 1 of 1 **SAMPLE**

Lab Sample ID: JZ38F
LIMS ID: 06-18467
Matrix: Soil
Data Release Authorized:
Reported: 10/19/06

QC Report No: JZ38-Pacific Groundwater Group
Project: Scougal Rubber
JK0605
Date Sampled: 10/02/06
Date Received: 10/03/06

Instrument/Analyst: FINN5/JLM
Date Analyzed: 10/13/06 16:24

Sample Amount: 3.50 g-dry-wt
Purge Volume: 5.0 mL
Moisture: 25.1%

CAS Number	Analyte	RL	Result	Q
75-01-4	Vinyl Chloride	2.6	< 2.6	Y
75-35-4	1,1-Dichloroethene	1.4	< 1.4	U
156-60-5	trans-1,2-Dichloroethene	1.4	< 1.4	U
156-59-2	**cis-1,2-Dichloroethene**	**1.4**	**12**	
79-01-6	**Trichloroethene**	**1.4**	**9.2**	
71-43-2	Benzene	1.4	< 1.4	U
127-18-4	Tetrachloroethene	1.4	< 1.4	U
108-88-3	Toluene	1.4	< 1.4	U
100-41-4	Ethylbenzene	1.4	< 1.4	U
1330-20-7	m,p-Xylene	1.4	< 1.4	U
95-47-6	o-Xylene	1.4	< 1.4	U

Reported in µg/kg (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	172%
d8-Toluene	99.7%
Bromofluorobenzene	103%
d4-1,2-Dichlorobenzene	116%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260B **Sample ID: PGG-S1-E**
Page 1 of 1 **REANALYSIS**

Lab Sample ID: JZ38F
LIMS ID: 06-18467
Matrix: Soil
Data Release Authorized:
Reported: 10/19/06

QC Report No: JZ38-Pacific Groundwater Group
Project: Scougal Rubber
JK0605
Date Sampled: 10/02/06
Date Received: 10/03/06

Instrument/Analyst: FINN5/JLM
Date Analyzed: 10/17/06 15:04

Sample Amount: 3.50 g-dry-wt
Purge Volume: 5.0 mL
Moisture: 25.1%

CAS Number	Analyte	RL	Result	Q
75-01-4	Vinyl Chloride	1.4	< 1.4	U
75-35-4	1,1-Dichloroethene	1.4	< 1.4	U
156-60-5	trans-1,2-Dichloroethene	1.4	< 1.4	U
156-59-2	**cis-1,2-Dichloroethene**	**1.4**	**7.8**	
79-01-6	**Trichloroethene**	**1.4**	**6.0**	
71-43-2	Benzene	1.4	< 1.4	U
127-18-4	Tetrachloroethene	1.4	< 1.4	U
108-88-3	Toluene	1.4	< 1.4	U
100-41-4	Ethylbenzene	1.4	< 1.4	U
1330-20-7	m,p-Xylene	1.4	< 1.4	U
95-47-6	o-Xylene	1.4	< 1.4	U

Reported in µg/kg (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	126%
d8-Toluene	106%
Bromofluorobenzene	105%
d4-1,2-Dichlorobenzene	108%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260B **Sample ID: PGG-S1-F**
Page 1 of 1 **SAMPLE**

Lab Sample ID: JZ38G
LIMS ID: 06-18468
Matrix: Soil
Data Release Authorized:
Reported: 10/19/06

QC Report No: JZ38-Pacific Groundwater Group
Project: Scougal Rubber
JK0605
Date Sampled: 10/02/06
Date Received: 10/03/06

Instrument/Analyst: FINN5/JLM
Date Analyzed: 10/13/06 16:51

Sample Amount: 4.61 g-dry-wt
Purge Volume: 5.0 mL
Moisture: 14.5%

CAS Number	Analyte	RL	Result	Q
75-01-4	Vinyl Chloride	1.1	< 1.1	U
75-35-4	1,1-Dichloroethene	1.1	< 1.1	U
156-60-5	trans-1,2-Dichloroethene	1.1	< 1.1	U
156-59-2	**cis-1,2-Dichloroethene**	**1.1**	**4.2**	
79-01-6	**Trichloroethene**	**1.1**	**43**	
71-43-2	Benzene	1.1	< 1.1	U
127-18-4	**Tetrachloroethene**	**1.1**	**1.5**	
108-88-3	Toluene	1.1	< 1.1	U
100-41-4	Ethylbenzene	1.1	< 1.1	U
1330-20-7	m,p-Xylene	1.1	< 1.1	U
95-47-6	o-Xylene	1.1	< 1.1	U

Reported in µg/kg (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	147%
d8-Toluene	103%
Bromofluorobenzene	110%
d4-1,2-Dichlorobenzene	102%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260B **Sample ID: PGG-S1-G**
Page 1 of 1 **REANALYSIS**

Lab Sample ID: JZ38H
LIMS ID: 06-18469
Matrix: Soil
Data Release Authorized:
Reported: 10/19/06

QC Report No: JZ38-Pacific Groundwater Group
Project: Scougal Rubber
JK0605
Date Sampled: 10/02/06
Date Received: 10/03/06

Instrument/Analyst: FINN5/JLM
Date Analyzed: 10/13/06 17:19

Sample Amount: 4.46 g-dry-wt
Purge Volume: 5.0 mL
Moisture: 7.8%

CAS Number	Analyte	RL	Result	Q
75-01-4	Vinyl Chloride	1.1	< 1.1	U
75-35-4	1,1-Dichloroethene	1.1	< 1.1	U
156-60-5	trans-1,2-Dichloroethene	1.1	< 1.1	U
156-59-2	**cis-1,2-Dichloroethene**	**1.1**	**5.6**	
79-01-6	**Trichloroethene**	**1.1**	**34**	
71-43-2	**Benzene**	**1.1**	**4.6**	
127-18-4	**Tetrachloroethene**	**1.1**	**1.5**	
108-88-3	**Toluene**	**1.1**	**13**	
100-41-4	**Ethylbenzene**	**1.1**	**3.3**	
1330-20-7	**m,p-Xylene**	**1.1**	**12**	
95-47-6	**o-Xylene**	**1.1**	**3.3**	

Reported in µg/kg (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	158%
d8-Toluene	91.8%
Bromofluorobenzene	110%
d4-1,2-Dichlorobenzene	88.7%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260B **Sample ID: PGG-S1-G**
Page 1 of 1 **SAMPLE**

Lab Sample ID: JZ38H
LIMS ID: 06-18469
Matrix: Soil
Data Release Authorized:
Reported: 10/19/06

QC Report No: JZ38-Pacific Groundwater Group
Project: Scougal Rubber
JK0605
Date Sampled: 10/02/06
Date Received: 10/03/06

Instrument/Analyst: FINN5/JLM
Date Analyzed: 10/12/06 18:56

Sample Amount: 82.7 mg-dry-wt
Purge Volume: 5.0 mL
Moisture: 7.8%

CAS Number	Analyte	RL	Result	Q
75-01-4	Vinyl Chloride	60	< 60	U
75-35-4	1,1-Dichloroethene	60	< 60	U
156-60-5	trans-1,2-Dichloroethene	60	< 60	U
156-59-2	cis-1,2-Dichloroethene	60	< 60	U
79-01-6	Trichloroethene	60	< 60	U
71-43-2	Benzene	60	< 60	U
127-18-4	Tetrachloroethene	60	< 60	U
108-88-3	Toluene	60	< 60	U
100-41-4	Ethylbenzene	60	< 60	U
1330-20-7	m,p-Xylene	60	< 60	U
95-47-6	o-Xylene	60	< 60	U

Reported in µg/kg (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	138%
d8-Toluene	107%
Bromofluorobenzene	106%
d4-1,2-Dichlorobenzene	124%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260B **Sample ID: PGG-S1-G**
Page 1 of 1 **MATRIX SPIKE**

Lab Sample ID: JZ38H
LIMS ID: 06-18469
Matrix: Soil
Data Release Authorized:
Reported: 10/20/06

QC Report No: JZ38-Pacific Groundwater Group
Project: Scougal Rubber
JK0605
Date Sampled: 10/02/06
Date Received: 10/03/06

Instrument/Analyst MS: FINN5/JLM
MSD: FINN5/JLM
Date Analyzed MS: 10/12/06 19:23
MSD: 10/12/06 19:51

Sample Amount MS: 82.7 mg-dry-wt
MSD: 82.7 mg-dry-wt
Purge Volume MS: 5.0 mL
MSD: 5.0 mL
Moisture: 7.8%

Analyte	Sample	MS	Spike Added-MS	MS Recovery	MSD	Spike Added-MSD	MSD Recovery	RPD
Vinyl Chloride	< 60.5 U	2540	3020	84.1%	2730	3020	90.4%	7.2%
1,1-Dichloroethene	< 60.5 U	2850	3020	94.4%	3260	3020	108%	13.4%
trans-1,2-Dichloroethene	< 60.5 U	2720	3020	90.1%	3530	3020	117%	25.9%
cis-1,2-Dichloroethene	< 60.5 U	2920	3020	96.7%	3110	3020	103%	6.3%
Trichloroethene	< 60.5 U	2800	3020	92.7%	3010	3020	99.7%	7.2%
Benzene	< 60.5 U	2700	3020	89.4%	3020	3020	100%	11.2%
Tetrachloroethene	< 60.5 U	2530	3020	83.8%	2780	3020	92.1%	9.4%
Toluene	< 60.5 U	2830	3020	93.7%	3060	3020	101%	7.8%
Ethylbenzene	< 60.5 U	3050	3020	101%	3270	3020	108%	7.0%
m,p-Xylene	< 60.5 U	5770	6050	95.4%	6430	6050	106%	10.8%
o-Xylene	< 60.5 U	2960	3020	98.0%	3200	3020	106%	7.8%

Reported in µg/kg (ppb)

RPD calculated using sample concentrations per SW846.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260B **Sample ID: PGG-S1-G**
Page 1 of 1 **MATRIX SPIKE**

Lab Sample ID: JZ38H
LIMS ID: 06-18469
Matrix: Soil
Data Release Authorized:
Reported: 10/20/06

QC Report No: JZ38-Pacific Groundwater Group
Project: Scougal Rubber
JK0605
Date Sampled: 10/02/06
Date Received: 10/03/06

Instrument/Analyst: FINN5/JLM
Date Analyzed: 10/12/06 19:23

Sample Amount: 82.7 mg-dry-wt
Purge Volume: 5.0 mL
Moisture: 7.8%

CAS Number	Analyte	RL	Result	Q
75-01-4	Vinyl Chloride	60	---	
75-35-4	1,1-Dichloroethene	60	---	
156-60-5	trans-1,2-Dichloroethene	60	---	
156-59-2	cis-1,2-Dichloroethene	60	---	
79-01-6	Trichloroethene	60	---	
71-43-2	Benzene	60	---	
127-18-4	Tetrachloroethene	60	---	
108-88-3	Toluene	60	---	
100-41-4	Ethylbenzene	60	---	
1330-20-7	m,p-Xylene	60	---	
95-47-6	o-Xylene	60	---	

Reported in µg/kg (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	111%
d8-Toluene	96.3%
Bromofluorobenzene	104%
d4-1,2-Dichlorobenzene	106%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260B **Sample ID: PGG-S1-G**
Page 1 of 1 **MATRIX SPIKE DUP**

Lab Sample ID: JZ38H
LIMS ID: 06-18469
Matrix: Soil
Data Release Authorized:
Reported: 10/20/06

QC Report No: JZ38-Pacific Groundwater Group
Project: Scougal Rubber
JK0605
Date Sampled: 10/02/06
Date Received: 10/03/06

Instrument/Analyst: FINN5/JLM
Date Analyzed: 10/12/06 19:51

Sample Amount: 82.7 mg-dry-wt
Purge Volume: 5.0 mL
Moisture: 7.8%

CAS Number	Analyte	RL	Result	Q
75-01-4	Vinyl Chloride	60	---	
75-35-4	1,1-Dichloroethene	60	---	
156-60-5	trans-1,2-Dichloroethene	60	---	
156-59-2	cis-1,2-Dichloroethene	60	---	
79-01-6	Trichloroethene	60	---	
71-43-2	Benzene	60	---	
127-18-4	Tetrachloroethene	60	---	
108-88-3	Toluene	60	---	
100-41-4	Ethylbenzene	60	---	
1330-20-7	m,p-Xylene	60	---	
95-47-6	o-Xylene	60	---	

Reported in µg/kg (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	111%
d8-Toluene	93.2%
Bromofluorobenzene	106%
d4-1,2-Dichlorobenzene	99.1%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260B **Sample ID: MB-101206**
Page 1 of 1 **METHOD BLANK**

Lab Sample ID: MB-101206
LIMS ID: 06-18469
Matrix: Soil
Data Release Authorized:
Reported: 10/19/06

QC Report No: JZ38-Pacific Groundwater Group
Project: Scougal Rubber
JK0605
Date Sampled: NA
Date Received: NA

Instrument/Analyst: FINN5/JLM
Date Analyzed: 10/12/06 12:47

Sample Amount: 100 mg-dry-wt
Purge Volume: 5.0 mL
Moisture: NA

CAS Number	Analyte	RL	Result	Q
75-01-4	Vinyl Chloride	50	< 50	U
75-35-4	1,1-Dichloroethene	50	< 50	U
156-60-5	trans-1,2-Dichloroethene	50	< 50	U
156-59-2	cis-1,2-Dichloroethene	50	< 50	U
79-01-6	Trichloroethene	50	< 50	U
71-43-2	Benzene	50	< 50	U
127-18-4	Tetrachloroethene	50	< 50	U
108-88-3	Toluene	50	< 50	U
100-41-4	Ethylbenzene	50	< 50	U
1330-20-7	m,p-Xylene	50	< 50	U
95-47-6	o-Xylene	50	< 50	U

Reported in µg/kg (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	118%
d8-Toluene	102%
Bromofluorobenzene	99.4%
d4-1,2-Dichlorobenzene	106%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260B **Sample ID: MB-101306**
Page 1 of 1 **METHOD BLANK**

Lab Sample ID: MB-101306
LIMS ID: 06-18468
Matrix: Soil
Data Release Authorized:
Reported: 10/19/06

QC Report No: JZ38-Pacific Groundwater Group
Project: Scougal Rubber
JK0605
Date Sampled: NA
Date Received: NA

Instrument/Analyst: FINN5/JLM
Date Analyzed: 10/13/06 13:32

Sample Amount: 5.00 g-dry-wt
Purge Volume: 5.0 mL
Moisture: NA

CAS Number	Analyte	RL	Result	Q
75-01-4	Vinyl Chloride	1.0	< 1.0	U
75-35-4	1,1-Dichloroethene	1.0	< 1.0	U
156-60-5	trans-1,2-Dichloroethene	1.0	< 1.0	U
156-59-2	cis-1,2-Dichloroethene	1.0	< 1.0	U
79-01-6	Trichloroethene	1.0	< 1.0	U
71-43-2	Benzene	1.0	< 1.0	U
127-18-4	Tetrachloroethene	1.0	< 1.0	U
108-88-3	Toluene	1.0	< 1.0	U
100-41-4	Ethylbenzene	1.0	< 1.0	U
1330-20-7	m,p-Xylene	1.0	< 1.0	U
95-47-6	o-Xylene	1.0	< 1.0	U

Reported in µg/kg (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	122%
d8-Toluene	101%
Bromofluorobenzene	99.3%
d4-1,2-Dichlorobenzene	102%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260B **Sample ID: MB-101306**
Page 1 of 1 **METHOD BLANK**

Lab Sample ID: MB-101306
LIMS ID: 06-18462
Matrix: Soil
Data Release Authorized:
Reported: 10/19/06

QC Report No: JZ38-Pacific Groundwater Group
Project: Scougal Rubber
JK0605
Date Sampled: NA
Date Received: NA

Instrument/Analyst: FINN5/JLM
Date Analyzed: 10/13/06 13:32

Sample Amount: 100 mg-dry-wt
Purge Volume: 5.0 mL
Moisture: NA

CAS Number	Analyte	RL	Result	Q
75-01-4	Vinyl Chloride	50	< 50	U
75-35-4	1,1-Dichloroethene	50	< 50	U
156-60-5	trans-1,2-Dichloroethene	50	< 50	U
156-59-2	cis-1,2-Dichloroethene	50	< 50	U
79-01-6	Trichloroethene	50	< 50	U
71-43-2	Benzene	50	< 50	U
127-18-4	Tetrachloroethene	50	< 50	U
108-88-3	Toluene	50	< 50	U
100-41-4	Ethylbenzene	50	< 50	U
1330-20-7	m,p-Xylene	50	< 50	U
95-47-6	o-Xylene	50	< 50	U

Reported in µg/kg (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	122%
d8-Toluene	101%
Bromofluorobenzene	99.3%
d4-1,2-Dichlorobenzene	102%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260B **Sample ID: MB-101706**
Page 1 of 1 **METHOD BLANK**

Lab Sample ID: MB-101706
LIMS ID: 06-18467
Matrix: Soil
Data Release Authorized:
Reported: 10/19/06

QC Report No: JZ38-Pacific Groundwater Group
Project: Scougal Rubber
JK0605
Date Sampled: NA
Date Received: NA

Instrument/Analyst: FINN5/JLM
Date Analyzed: 10/17/06 13:34

Sample Amount: 5.00 g-dry-wt
Purge Volume: 5.0 mL
Moisture: NA

CAS Number	Analyte	RL	Result	Q
75-01-4	Vinyl Chloride	1.0	< 1.0	U
75-35-4	1,1-Dichloroethene	1.0	< 1.0	U
156-60-5	trans-1,2-Dichloroethene	1.0	< 1.0	U
156-59-2	cis-1,2-Dichloroethene	1.0	< 1.0	U
79-01-6	Trichloroethene	1.0	< 1.0	U
71-43-2	Benzene	1.0	< 1.0	U
127-18-4	Tetrachloroethene	1.0	< 1.0	U
108-88-3	Toluene	1.0	< 1.0	U
100-41-4	Ethylbenzene	1.0	< 1.0	U
1330-20-7	m,p-Xylene	1.0	< 1.0	U
95-47-6	o-Xylene	1.0	< 1.0	U

Reported in µg/kg (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	103%
d8-Toluene	105%
Bromofluorobenzene	104%
d4-1,2-Dichlorobenzene	99.4%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260B **Sample ID: LCS-101206**
Page 1 of 1 **LAB CONTROL SAMPLE**

Lab Sample ID: LCS-101206
LIMS ID: 06-18469
Matrix: Soil
Data Release Authorized:
Reported: 10/19/06

QC Report No: JZ38-Pacific Groundwater Group
Project: Scougal Rubber
JK0605
Date Sampled: NA
Date Received: NA

Instrument/Analyst LCS: FINN5/JLM
LCSD: FINN5/JLM
Date Analyzed LCS: 10/12/06 11:40
LCSD: 10/12/06 12:12

Sample Amount LCS: 100 mg-dry-wt
LCSD: 100 mg-dry-wt
Purge Volume LCS: 5.0 mL
LCSD: 5.0 mL
Moisture: NA

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Vinyl Chloride	2700	2500	108%	2830	2500	113%	4.7%
1,1-Dichloroethene	2520	2500	101%	2530	2500	101%	0.4%
trans-1,2-Dichloroethene	2470	2500	98.8%	2430	2500	97.2%	1.6%
cis-1,2-Dichloroethene	2590	2500	104%	2610	2500	104%	0.8%
Trichloroethene	2530	2500	101%	2590	2500	104%	2.3%
Benzene	2490	2500	99.6%	2490	2500	99.6%	0.0%
Tetrachloroethene	2480	2500	99.2%	2480	2500	99.2%	0.0%
Toluene	2690	2500	108%	2450	2500	98.0%	9.3%
Ethylbenzene	2690	2500	108%	2640	2500	106%	1.9%
m,p-Xylene	5490	5000	110%	5330	5000	107%	3.0%
o-Xylene	2410	2500	96.4%	2580	2500	103%	6.8%

Reported in µg/kg (ppb)

RPD calculated using sample concentrations per SW846.

Volatile Surrogate Recovery

	LCS	LCSD
d4-1,2-Dichloroethane	117%	124%
d8-Toluene	102%	104%
Bromofluorobenzene	104%	106%
d4-1,2-Dichlorobenzene	104%	93.9%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260B **Sample ID: LCS-101306**
Page 1 of 1 **LAB CONTROL SAMPLE**

Lab Sample ID: LCS-101306
LIMS ID: 06-18462
Matrix: Soil
Data Release Authorized:
Reported: 10/19/06

QC Report No: JZ38-Pacific Groundwater Group
Project: Scougal Rubber
JK0605
Date Sampled: NA
Date Received: NA

Instrument/Analyst LCS: FINN5/JLM
LCSD: FINN5/JLM
Date Analyzed LCS: 10/13/06 12:02
LCSD: 10/13/06 12:30

Sample Amount LCS: 100 mg-dry-wt
LCSD: 100 mg-dry-wt
Purge Volume LCS: 5.0 mL
LCSD: 5.0 mL
Moisture: NA

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Vinyl Chloride	2720	2500	109%	2900	2500	116%	6.4%
1,1-Dichloroethene	2360	2500	94.4%	2550	2500	102%	7.7%
trans-1,2-Dichloroethene	2220	2500	88.8%	2420	2500	96.8%	8.6%
cis-1,2-Dichloroethene	2410	2500	96.4%	2720	2500	109%	12.1%
Trichloroethene	2480	2500	99.2%	2530	2500	101%	2.0%
Benzene	2390	2500	95.6%	2590	2500	104%	8.0%
Tetrachloroethene	2230	2500	89.2%	2260	2500	90.4%	1.3%
Toluene	2540	2500	102%	2630	2500	105%	3.5%
Ethylbenzene	2520	2500	101%	2650	2500	106%	5.0%
m,p-Xylene	5110	5000	102%	5300	5000	106%	3.7%
o-Xylene	2460	2500	98.4%	2440	2500	97.6%	0.8%

Reported in µg/kg (ppb)

RPD calculated using sample concentrations per SW846.

Volatile Surrogate Recovery

	LCS	LCSD
d4-1,2-Dichloroethane	117%	121%
d8-Toluene	103%	100%
Bromofluorobenzene	104%	102%
d4-1,2-Dichlorobenzene	101%	101%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260B **Sample ID: LCS-101306**
Page 1 of 1 **LAB CONTROL SAMPLE**

Lab Sample ID: LCS-101306
LIMS ID: 06-18468
Matrix: Soil
Data Release Authorized:
Reported: 10/19/06

QC Report No: JZ38-Pacific Groundwater Group
Project: Scougal Rubber
JK0605
Date Sampled: NA
Date Received: NA

Instrument/Analyst LCS: FINN5/JLM
LCSD: FINN5/JLM
Date Analyzed LCS: 10/13/06 12:02
LCSD: 10/13/06 12:30

Sample Amount LCS: 5.00 g-dry-wt
LCSD: 5.00 g-dry-wt
Purge Volume LCS: 5.0 mL
LCSD: 5.0 mL
Moisture: NA

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Vinyl Chloride	54.4	50.0	109%	57.9	50.0	116%	6.2%
1,1-Dichloroethene	47.2	50.0	94.4%	50.9	50.0	102%	7.5%
trans-1,2-Dichloroethene	44.4	50.0	88.8%	48.5	50.0	97.0%	8.8%
cis-1,2-Dichloroethene	48.2	50.0	96.4%	54.4	50.0	109%	12.1%
Trichloroethene	49.6	50.0	99.2%	50.6	50.0	101%	2.0%
Benzene	47.8	50.0	95.6%	51.7	50.0	103%	7.8%
Tetrachloroethene	44.5	50.0	89.0%	45.2	50.0	90.4%	1.6%
Toluene	50.7	50.0	101%	52.7	50.0	105%	3.9%
Ethylbenzene	50.4	50.0	101%	53.0	50.0	106%	5.0%
m,p-Xylene	102	100	102%	106	100	106%	3.8%
o-Xylene	49.2	50.0	98.4%	48.8	50.0	97.6%	0.8%

Reported in µg/kg (ppb)

RPD calculated using sample concentrations per SW846.

Volatile Surrogate Recovery

	LCS	LCSD
d4-1,2-Dichloroethane	117%	121%
d8-Toluene	103%	100%
Bromofluorobenzene	104%	102%
d4-1,2-Dichlorobenzene	101%	101%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260B **Sample ID: LCS-101706**
Page 1 of 1 **LAB CONTROL SAMPLE**

Lab Sample ID: LCS-101706
LIMS ID: 06-18467
Matrix: Soil
Data Release Authorized:
Reported: 10/19/06

QC Report No: JZ38-Pacific Groundwater Group
Project: Scougal Rubber
JK0605
Date Sampled: NA
Date Received: NA

Instrument/Analyst LCS: FINN5/JLM
Date Analyzed LCS: 10/17/06 12:34

Sample Amount LCS: 5.00 g-dry-wt
Purge Volume LCS: 5.0 mL
Moisture: NA

Analyte	LCS	Spike Added	Recovery
Vinyl Chloride	46.5	50.0	93.0%
1,1-Dichloroethene	51.9	50.0	104%
trans-1,2-Dichloroethene	47.8	50.0	95.6%
cis-1,2-Dichloroethene	49.9	50.0	99.8%
Trichloroethene	60.6	50.0	121%
Benzene	54.5	50.0	109%
Tetrachloroethene	54.4	50.0	109%
Toluene	56.7	50.0	113%
Ethylbenzene	51.0	50.0	102%
m,p-Xylene	108	100	108%
o-Xylene	51.6	50.0	103%

Reported in µg/kg (ppb)

NA-No recovery due to high concentration of analyte in original sample, calculated negative recovery, or undetected spike.

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	104%
d8-Toluene	108%
Bromofluorobenzene	102%
d4-1,2-Dichlorobenzene	106%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TPHG by Method NWTPHG
Matrix: Water

Data Release Authorized:
Reported: 10/19/06

QC Report No: JZ38-Pacific Groundwater Group
Project: Scougal Rubber
Event: JK0605
Date Sampled: 10/02/06
Date Received: 10/03/06

ARI ID	Client ID	Analysis Date	DL	Range	Result
MB-101206	Method Blank	10/12/06	1.0	Gasoline	< 0.25 U
06-18478		PID2		HC ID	---
				Trifluorotoluene	94.1%
				Bromobenzene	90.2%
JZ38Q	PGG-GW-F	10/12/06	1.0	Gasoline	< 0.25 U
06-18478		PID2		HC ID	---
				Trifluorotoluene	104%
				Bromobenzene	87.2%
JZ38R	PGG-GW-G	10/12/06	1.0	Gasoline	< 0.25 U
06-18479		PID2		HC ID	---
				Trifluorotoluene	104%
				Bromobenzene	93.2%

Gasoline values reported in mg/L (ppm)

Quantitation on total peaks in the gasoline range from Toluene to Naphthalene.

GAS: Indicates the presence of gasoline or weathered gasoline.
GRO: Positive result that does not match an identifiable gasoline pattern.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TPHG by Method NWTPHG
Page 1 of 1

Sample ID: LCS-101206
LAB CONTROL SAMPLE

Lab Sample ID: LCS-101206
LIMS ID: 06-18478
Matrix: Water
Data Release Authorized:
Reported: 10/19/06

QC Report No: JZ38-Pacific Groundwater Group
Project: Scougal Rubber
Event: JK0605
Date Sampled: NA
Date Received: NA

Date Analyzed LCS: 10/12/06 11:33
LCSD: 10/12/06 12:02
Instrument/Analyst LCS: PID2/PKC
LCSD: PID2/PKC

Purge Volume: 5.0 mL

Dilution Factor LCS: 1.0 mL
LCSD: 1.0 mL

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Gasoline Range Hydrocarbons	1.03	1.00	103%	0.90	1.00	90.0%	13.5%

Reported in mg/L (ppm)

RPD calculated using sample concentrations per SW846.

TPHG Surrogate Recovery

	LCS	LCSD
Trifluorotoluene	102%	99.5%
Bromobenzene	104%	102%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260B **Sample ID: PGG-GW-A**
Page 1 of 1 **SAMPLE**

Lab Sample ID: JZ38N
LIMS ID: 06-18475
Matrix: Water
Data Release Authorized:
Reported: 10/19/06

QC Report No: JZ38-Pacific Groundwater Group
Project: Scougal Rubber
JK0605
Date Sampled: 10/02/06
Date Received: 10/03/06

Instrument/Analyst: FINN3/PAB
Date Analyzed: 10/09/06 14:05

Sample Amount: 20.0 mL
Purge Volume: 20.0 mL

CAS Number	Analyte	RL	Result	Q
75-01-4	**Vinyl Chloride**	**0.2**	**60**	**ES**
75-35-4	**1,1-Dichloroethene**	**0.2**	**1.9**	
156-60-5	**trans-1,2-Dichloroethene**	**0.2**	**1.2**	
156-59-2	**cis-1,2-Dichloroethene**	**0.2**	**87**	**ES**
79-01-6	**Trichloroethene**	**0.2**	**94**	**E**
71-43-2	Benzene	0.2	< 0.2	U
127-18-4	**Tetrachloroethene**	**0.2**	**7.2**	
108-88-3	**Toluene**	**0.2**	**0.9**	
100-41-4	**Ethylbenzene**	**0.2**	**0.2**	
1330-20-7	**m,p-Xylene**	**0.4**	**0.4**	
95-47-6	**o-Xylene**	**0.2**	**0.4**	

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	99.8%
d8-Toluene	99.2%
Bromofluorobenzene	97.5%
d4-1,2-Dichlorobenzene	94.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260B **Sample ID: PGG-GW-A**
Page 1 of 1 **DILUTION**

Lab Sample ID: JZ38N
LIMS ID: 06-18475
Matrix: Water
Data Release Authorized:
Reported: 10/19/06

QC Report No: JZ38-Pacific Groundwater Group
Project: Scougal Rubber
JK0605
Date Sampled: 10/02/06
Date Received: 10/03/06

Instrument/Analyst: FINN3/PAB
Date Analyzed: 10/10/06 12:09

Sample Amount: 1.00 mL
Purge Volume: 20.0 mL

CAS Number	Analyte	RL	Result	Q
75-01-4	**Vinyl Chloride**	**4.0**	**150**	
75-35-4	1,1-Dichloroethene	4.0	< 4.0	U
156-60-5	trans-1,2-Dichloroethene	4.0	< 4.0	U
156-59-2	**cis-1,2-Dichloroethene**	**4.0**	**100**	
79-01-6	**Trichloroethene**	**4.0**	**120**	
71-43-2	Benzene	4.0	< 4.0	U
127-18-4	**Tetrachloroethene**	**4.0**	**8.0**	
108-88-3	Toluene	4.0	< 4.0	U
100-41-4	Ethylbenzene	4.0	< 4.0	U
1330-20-7	m,p-Xylene	8.0	< 8.0	U
95-47-6	o-Xylene	4.0	< 4.0	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	98.5%
d8-Toluene	97.5%
Bromofluorobenzene	90.2%
d4-1,2-Dichlorobenzene	97.2%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260B **Sample ID: PGG-GW-C**
Page 1 of 1 **SAMPLE**

Lab Sample ID: JZ380 QC Report No: JZ38-Pacific Groundwater Group
LIMS ID: 06-18476 Project: Scougal Rubber
Matrix: Water JK0605
Data Release Authorized: Date Sampled: 10/02/06
Reported: 10/19/06 Date Received: 10/03/06

Instrument/Analyst: FINN3/PAB Sample Amount: 20.0 mL
Date Analyzed: 10/09/06 14:32 Purge Volume: 20.0 mL

CAS Number	Analyte	RL	Result	Q
75-01-4	**Vinyl Chloride**	**0.2**	**0.8**	
75-35-4	1,1-Dichloroethene	0.2	< 0.2	U
156-60-5	trans-1,2-Dichloroethene	0.2	< 0.2	U
156-59-2	**cis-1,2-Dichloroethene**	**0.2**	**3.9**	
79-01-6	**Trichloroethene**	**0.2**	**88**	**E**
71-43-2	Benzene	0.2	< 0.2	U
127-18-4	**Tetrachloroethene**	**0.2**	**2.7**	
108-88-3	**Toluene**	**0.2**	**1.2**	
100-41-4	Ethylbenzene	0.2	< 0.2	U
1330-20-7	**m,p-Xylene**	**0.4**	**0.4**	
95-47-6	o-Xylene	0.2	< 0.2	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	106%
d8-Toluene	100%
Bromofluorobenzene	98.8%
d4-1,2-Dichlorobenzene	98.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260B **Sample ID: PGG-GW-C**
Page 1 of 1 **DILUTION**

Lab Sample ID: JZ380
LIMS ID: 06-18476
Matrix: Water
Data Release Authorized:
Reported: 10/19/06

QC Report No: JZ38-Pacific Groundwater Group
Project: Scougal Rubber
JK0605
Date Sampled: 10/02/06
Date Received: 10/03/06

Instrument/Analyst: FINN3/PAB
Date Analyzed: 10/10/06 12:29

Sample Amount: 0.667 mL
Purge Volume: 20.0 mL

CAS Number	Analyte	RL	Result	Q
75-01-4	Vinyl Chloride	6.0	< 6.0	U
75-35-4	1,1-Dichloroethene	6.0	< 6.0	U
156-60-5	trans-1,2-Dichloroethene	6.0	< 6.0	U
156-59-2	**cis-1,2-Dichloroethene**	**6.0**	**6.6**	
79-01-6	**Trichloroethene**	**6.0**	**160**	
71-43-2	Benzene	6.0	< 6.0	U
127-18-4	Tetrachloroethene	6.0	< 6.0	U
108-88-3	Toluene	6.0	< 6.0	U
100-41-4	Ethylbenzene	6.0	< 6.0	U
1330-20-7	m,p-Xylene	12	< 12	U
95-47-6	o-Xylene	6.0	< 6.0	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	92.5%
d8-Toluene	101%
Bromofluorobenzene	88.0%
d4-1,2-Dichlorobenzene	96.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260B **Sample ID: PGG-GW-D**
Page 1 of 1 **SAMPLE**

Lab Sample ID: JZ38P
LIMS ID: 06-18477
Matrix: Water
Data Release Authorized:
Reported: 10/19/06

QC Report No: JZ38-Pacific Groundwater Group
Project: Scougal Rubber
JK0605
Date Sampled: 10/02/06
Date Received: 10/03/06

Instrument/Analyst: FINN3/PAB
Date Analyzed: 10/10/06 12:55

Sample Amount: 20.0 mL
Purge Volume: 20.0 mL

CAS Number	Analyte	RL	Result	Q
75-01-4	**Vinyl Chloride**	**0.2**	**0.3**	
75-35-4	1,1-Dichloroethene	0.2	< 0.2	U
156-60-5	trans-1,2-Dichloroethene	0.2	< 0.2	U
156-59-2	**cis-1,2-Dichloroethene**	**0.2**	**1.5**	
79-01-6	**Trichloroethene**	**0.2**	**6.9**	
71-43-2	Benzene	0.2	< 0.2	U
127-18-4	Tetrachloroethene	0.2	< 0.2	U
108-88-3	**Toluene**	**0.2**	**1.2**	
100-41-4	**Ethylbenzene**	**0.2**	**0.2**	
1330-20-7	**m,p-Xylene**	**0.4**	**0.9**	
95-47-6	**o-Xylene**	**0.2**	**0.5**	

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	99.0%
d8-Toluene	99.0%
Bromofluorobenzene	92.8%
d4-1,2-Dichlorobenzene	99.2%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260B **Sample ID: PGG-GW-F**
Page 1 of 1 **SAMPLE**

Lab Sample ID: JZ38Q
LIMS ID: 06-18478
Matrix: Water
Data Release Authorized:
Reported: 10/19/06

QC Report No: JZ38-Pacific Groundwater Group
Project: Scougal Rubber
JK0605
Date Sampled: 10/02/06
Date Received: 10/03/06

Instrument/Analyst: FINN3/PAB
Date Analyzed: 10/09/06 13:38

Sample Amount: 20.0 mL
Purge Volume: 20.0 mL

CAS Number	Analyte	RL	Result	Q
75-01-4	Vinyl Chloride	0.2	< 0.2	U
75-35-4	1,1-Dichloroethene	0.2	< 0.2	U
156-60-5	trans-1,2-Dichloroethene	0.2	< 0.2	U
156-59-2	**cis-1,2-Dichloroethene**	**0.2**	**1.4**	
79-01-6	**Trichloroethene**	**0.2**	**24**	**E**
71-43-2	Benzene	0.2	< 0.2	U
127-18-4	**Tetrachloroethene**	**0.2**	**0.8**	
108-88-3	**Toluene**	**0.2**	**0.3**	
100-41-4	Ethylbenzene	0.2	< 0.2	U
1330-20-7	m,p-Xylene	0.4	< 0.4	U
95-47-6	o-Xylene	0.2	< 0.2	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	98.5%
d8-Toluene	99.5%
Bromofluorobenzene	98.2%
d4-1,2-Dichlorobenzene	97.2%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260B **Sample ID: PGG-GW-F**
Page 1 of 1 **DILUTION**

Lab Sample ID: JZ38Q
LIMS ID: 06-18478
Matrix: Water
Data Release Authorized:
Reported: 10/19/06

QC Report No: JZ38-Pacific Groundwater Group
Project: Scougal Rubber
JK0605
Date Sampled: 10/02/06
Date Received: 10/03/06

Instrument/Analyst: FINN3/PAB
Date Analyzed: 10/10/06 13:22

Sample Amount: 6.67 mL
Purge Volume: 20.0 mL

CAS Number	Analyte	RL	Result	Q
75-01-4	Vinyl Chloride	0.6	< 0.6	U
75-35-4	1,1-Dichloroethene	0.6	< 0.6	U
156-60-5	trans-1,2-Dichloroethene	0.6	< 0.6	U
156-59-2	**cis-1,2-Dichloroethene**	**0.6**	**1.4**	
79-01-6	**Trichloroethene**	**0.6**	**25**	
71-43-2	Benzene	0.6	< 0.6	U
127-18-4	**Tetrachloroethene**	**0.6**	**0.8**	
108-88-3	Toluene	0.6	< 0.6	U
100-41-4	Ethylbenzene	0.6	< 0.6	U
1330-20-7	m,p-Xylene	1.2	< 1.2	U
95-47-6	o-Xylene	0.6	< 0.6	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	96.0%
d8-Toluene	93.8%
Bromofluorobenzene	91.5%
d4-1,2-Dichlorobenzene	99.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260B **Sample ID: PGG-GW-G**
Page 1 of 1 **SAMPLE**

Lab Sample ID: JZ38R
LIMS ID: 06-18479
Matrix: Water
Data Release Authorized:
Reported: 10/19/06

QC Report No: JZ38-Pacific Groundwater Group
Project: Scougal Rubber
JK0605
Date Sampled: 10/02/06
Date Received: 10/03/06

Instrument/Analyst: FINN3/PAB
Date Analyzed: 10/10/06 13:49

Sample Amount: 10.0 mL
Purge Volume: 20.0 mL

CAS Number	Analyte	RL	Result	Q
75-01-4	**Vinyl Chloride**	**0.4**	**0.8**	
75-35-4	1,1-Dichloroethene	0.4	< 0.4	U
156-60-5	**trans-1,2-Dichloroethene**	**0.4**	**0.5**	
156-59-2	**cis-1,2-Dichloroethene**	**0.4**	**12**	
79-01-6	**Trichloroethene**	**0.4**	**16**	
71-43-2	**Benzene**	**0.4**	**0.6**	
127-18-4	Tetrachloroethene	0.4	< 0.4	U
108-88-3	Toluene	0.4	< 0.4	U
100-41-4	Ethylbenzene	0.4	< 0.4	U
1330-20-7	m,p-Xylene	0.8	< 0.8	U
95-47-6	o-Xylene	0.4	< 0.4	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	93.8%
d8-Toluene	90.2%
Bromofluorobenzene	93.0%
d4-1,2-Dichlorobenzene	93.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260B **Sample ID: TRIP BLANK SAMPLE**
Page 1 of 1

Lab Sample ID: JZ38S
LIMS ID: 06-18480
Matrix: Water
Data Release Authorized:
Reported: 10/19/06

QC Report No: JZ38-Pacific Groundwater Group
Project: Scougal Rubber JK0605
Date Sampled: 10/02/06
Date Received: 10/03/06

Instrument/Analyst: FINN3/PAB
Date Analyzed: 10/09/06 15:52

Sample Amount: 20.0 mL
Purge Volume: 20.0 mL

CAS Number	Analyte	RL	Result	Q
75-01-4	Vinyl Chloride	0.2	< 0.2	U
75-35-4	1,1-Dichloroethene	0.2	< 0.2	U
156-60-5	trans-1,2-Dichloroethene	0.2	< 0.2	U
156-59-2	cis-1,2-Dichloroethene	0.2	< 0.2	U
79-01-6	Trichloroethene	0.2	< 0.2	U
71-43-2	Benzene	0.2	< 0.2	U
127-18-4	Tetrachloroethene	0.2	< 0.2	U
108-88-3	Toluene	0.2	< 0.2	U
100-41-4	Ethylbenzene	0.2	< 0.2	U
1330-20-7	m,p-Xylene	0.4	< 0.4	U
95-47-6	o-Xylene	0.2	< 0.2	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	102%
d8-Toluene	99.5%
Bromofluorobenzene	94.8%
d4-1,2-Dichlorobenzene	104%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260B **Sample ID: MB-100906**
Page 1 of 1 **METHOD BLANK**

Lab Sample ID: MB-100906
LIMS ID: 06-18475
Matrix: Water
Data Release Authorized:
Reported: 10/19/06

QC Report No: JZ38-Pacific Groundwater Group
Project: Scougal Rubber
JK0605
Date Sampled: NA
Date Received: NA

Instrument/Analyst: FINN3/PAB
Date Analyzed: 10/09/06 11:32

Sample Amount: 20.0 mL
Purge Volume: 20.0 mL

CAS Number	Analyte	RL	Result	Q
75-01-4	Vinyl Chloride	0.2	< 0.2	U
75-35-4	1,1-Dichloroethene	0.2	< 0.2	U
156-60-5	trans-1,2-Dichloroethene	0.2	< 0.2	U
156-59-2	cis-1,2-Dichloroethene	0.2	< 0.2	U
79-01-6	Trichloroethene	0.2	< 0.2	U
71-43-2	Benzene	0.2	< 0.2	U
127-18-4	Tetrachloroethene	0.2	< 0.2	U
108-88-3	Toluene	0.2	< 0.2	U
100-41-4	Ethylbenzene	0.2	< 0.2	U
1330-20-7	m,p-Xylene	0.4	< 0.4	U
95-47-6	o-Xylene	0.2	< 0.2	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	93.5%
d8-Toluene	98.5%
Bromofluorobenzene	92.0%
d4-1,2-Dichlorobenzene	98.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260B **Sample ID: MB-101006**
Page 1 of 1 **METHOD BLANK**

Lab Sample ID: MB-101006
LIMS ID: 06-18476
Matrix: Water
Data Release Authorized:
Reported: 10/19/06

QC Report No: JZ38-Pacific Groundwater Group
Project: Scougal Rubber
JK0605
Date Sampled: NA
Date Received: NA

Instrument/Analyst: FINN3/PAB
Date Analyzed: 10/10/06 09:53

Sample Amount: 20.0 mL
Purge Volume: 20.0 mL

CAS Number	Analyte	RL	Result	Q
75-01-4	Vinyl Chloride	0.2	< 0.2	U
75-35-4	1,1-Dichloroethene	0.2	< 0.2	U
156-60-5	trans-1,2-Dichloroethene	0.2	< 0.2	U
156-59-2	cis-1,2-Dichloroethene	0.2	< 0.2	U
79-01-6	Trichloroethene	0.2	< 0.2	U
71-43-2	Benzene	0.2	< 0.2	U
127-18-4	Tetrachloroethene	0.2	< 0.2	U
108-88-3	Toluene	0.2	< 0.2	U
100-41-4	Ethylbenzene	0.2	< 0.2	U
1330-20-7	m,p-Xylene	0.4	< 0.4	U
95-47-6	o-Xylene	0.2	< 0.2	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	82.0%
d8-Toluene	94.8%
Bromofluorobenzene	85.8%
d4-1,2-Dichlorobenzene	96.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260B **Sample ID: LCS-100906**
Page 1 of 1 **LAB CONTROL SAMPLE**

Lab Sample ID: LCS-100906
LIMS ID: 06-18475
Matrix: Water
Data Release Authorized:
Reported: 10/19/06

QC Report No: JZ38-Pacific Groundwater Group
Project: Scougal Rubber
JK0605
Date Sampled: NA
Date Received: NA

Instrument/Analyst LCS: FINN3/PAB
LCSD: FINN3/PAB
Date Analyzed LCS: 10/09/06 10:25
LCSD: 10/09/06 11:03

Sample Amount LCS: 20.0 mL
LCSD: 20.0 mL
Purge Volume LCS: 20.0 mL
LCSD: 20.0 mL

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Vinyl Chloride	3.3	4.0	82.5%	3.2	4.0	80.0%	3.1%
1,1-Dichloroethene	4.0	4.0	100%	4.0	4.0	100%	0.0%
trans-1,2-Dichloroethene	4.1	4.0	102%	4.4	4.0	110%	7.1%
cis-1,2-Dichloroethene	3.7	4.0	92.5%	3.6	4.0	90.0%	2.7%
Trichloroethene	3.8	4.0	95.0%	3.8	4.0	95.0%	0.0%
Benzene	3.5	4.0	87.5%	3.6	4.0	90.0%	2.8%
Tetrachloroethene	4.4	4.0	110%	4.2	4.0	105%	4.7%
Toluene	3.5	4.0	87.5%	3.7	4.0	92.5%	5.6%
Ethylbenzene	4.2	4.0	105%	4.2	4.0	105%	0.0%
m,p-Xylene	8.2	8.0	102%	8.0	8.0	100%	2.5%
o-Xylene	3.9	4.0	97.5%	3.9	4.0	97.5%	0.0%

Reported in µg/L (ppb)

RPD calculated using sample concentrations per SW846.

Volatile Surrogate Recovery

	LCS	LCSD
d4-1,2-Dichloroethane	88.5%	86.5%
d8-Toluene	93.8%	94.2%
Bromofluorobenzene	94.8%	95.8%
d4-1,2-Dichlorobenzene	88.0%	90.5%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260B **Sample ID: LCS-101006**
Page 1 of 1 **LAB CONTROL SAMPLE**

Lab Sample ID: LCS-101006
LIMS ID: 06-18476
Matrix: Water
Data Release Authorized:
Reported: 10/19/06

QC Report No: JZ38-Pacific Groundwater Group
Project: Scougal Rubber
JK0605
Date Sampled: NA
Date Received: NA

Instrument/Analyst LCS: FINN3/PAB
LCSD: FINN3/PAB
Date Analyzed LCS: 10/10/06 08:49
LCSD: 10/10/06 09:25

Sample Amount LCS: 20.0 mL
LCSD: 20.0 mL
Purge Volume LCS: 20.0 mL
LCSD: 20.0 mL

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Vinyl Chloride	3.4	4.0	85.0%	3.4	4.0	85.0%	0.0%
1,1-Dichloroethene	4.1	4.0	102%	4.1	4.0	102%	0.0%
trans-1,2-Dichloroethene	4.4	4.0	110%	4.4	4.0	110%	0.0%
cis-1,2-Dichloroethene	3.7	4.0	92.5%	3.8	4.0	95.0%	2.7%
Trichloroethene	3.6	4.0	90.0%	3.7	4.0	92.5%	2.7%
Benzene	3.5	4.0	87.5%	3.6	4.0	90.0%	2.8%
Tetrachloroethene	4.1	4.0	102%	4.2	4.0	105%	2.4%
Toluene	3.5	4.0	87.5%	3.8	4.0	95.0%	8.2%
Ethylbenzene	4.0	4.0	100%	4.2	4.0	105%	4.9%
m,p-Xylene	8.0	8.0	100%	8.3	8.0	104%	3.7%
o-Xylene	3.8	4.0	95.0%	4.1	4.0	102%	7.6%

Reported in µg/L (ppb)

RPD calculated using sample concentrations per SW846.

Volatile Surrogate Recovery

	LCS	LCSD
d4-1,2-Dichloroethane	89.8%	91.0%
d8-Toluene	91.2%	93.2%
Bromofluorobenzene	93.8%	97.2%
d4-1,2-Dichlorobenzene	88.8%	93.0%

APPENDIX B
RETEC REPORT

APPENDIX C
QA/QC REPORT

Appendix B: Quality Assurance/Quality Control

Quality Assurance/Quality Control (QA/QC) data were reviewed for this report to assess the validity of the analytical results.

Six groundwater samples were collected on August 10, 2006 and sent to Analytical Resources, Inc. (ARI) on August 11, 2006. The samples arrived intact and were assigned job number JS79 by ARI.

The analytical results were found to be generally acceptable with respect to the QA/QC program. Minor quality control issues were found associated with the water samples, but these issues did not significantly affect the quality of analyses.

The following summarizes the findings of the QA/QC review:

1. Methodology: ACCEPTABLE

Samples were analyzed using acceptable EPA and standard methods as listed on each page of the analytical results. The methods used correspond to those requested on Chain-of-Custody (COC) forms.

2. Holding Times: ACCEPTABLE

The holding times were met for all analyses.

3. Lab Control Sample: ACCEPTABLE

Laboratory control samples (LCS) are known concentrations of analytes added to a matrix free of interferences in order to demonstrate that the laboratory can perform the analytical approach in a matrix free of interferences (e.g. clean sand or DI water). The LCS results are used in conjunction with MS/MSD results to separate issues of laboratory performance and matrix effects.

All laboratory control sample analysis recoveries were within acceptable ranges for groundwater samples.

4. Matrix Spikes/Matrix Spike Duplicate (MS/MSD): ACCEPTABLE

Exception: Surrogate recoveries of trifluorotoluene in MW-14 MS/MSD.

Matrix Spikes/Matrix Spike Duplicates (MS/MSD) are known concentrations of analytes added to one sample in 20 to check for matrix interferences in recovering the analyte from the sample matrix; the duplicate is then run to check analytical duplication.

Percent recoveries for trifluorotoluene in the MS/MSD samples prepared from sample MW-14 were high. The laboratory noted tat this was due to an interference and, because no TPH-G was detected in the samples, no corrective action was taken by the lab.

5. Surrogate Spikes / Internal Standards: ACCEPTABLE

Internal standards are surrogate compounds at known concentrations added to every sample prior to analysis used for monitoring instrument performance and quantitation of target compounds. The recommended internal standards are fluorobenzene, d5-chlorobenzene, and d4-1, 4-dichlorobenzene.

Surrogate spike recoveries were within control limits.

6. Method Blanks: ACCEPTABLE

Method blanks were analyzed for all analytes in all analytical batches at a rate of at least one in 20. No lab contamination was detected.

7. Method Detection Limits: ACCEPTABLE

Method reporting limits were found to be lower or equivalent to Method Detection Limits (MDLs) or Practical Quantitation Limits (PQLs) for all analyses except those where sample concentrations required

dilution or re-extraction. Dilutions ranged from 1 (no dilution) up to 2:1 in OW-10. When used, dilution procedures result in elevated detection limits, possibly above MTCA cleanup levels. MDLs are not always achievable. Because the reported detection limits are within lab internal controls, reporting limits are considered acceptable.

8. Trip Blanks: ACCEPTABLE with reservation for acetone.

Exception: Acetone was detected at 1.6 ug/L in the trip blank.

Exception: Methylene Chloride was detected at 0.4 ug/L in the trip blank.

A trip blank was transported with the samples and analyzed by ARI for all analytes. Acetone was detected in one of the trip blank vials at 1.6 ug/L with a reporting limit of 1 ug/L. Methylene chloride was detected in the trip blank at 0.4 ug/L. Methylene chloride is a common laboratory contaminant.

Because methylene chloride is a common laboratory contaminant and all acetone detections are below MTCA Method A cleanup levels, the trip blank data are considered acceptable for the intended use. However, acetone data should be considered inaccurate due to detection in the trip blank.

9. Chain-of-Custody: ACCEPTABLE

Chain-of-Custody procedures were followed for all soil and groundwater samples and are considered acceptable.

APPENDIX D
REMEDIAL ACTION HEALTH AND SAFETY PLAN

Pacific Groundwater Group

HEALTH AND SAFETY PLAN
Scougal Rubber Site, Seattle, Washington

Revised: 12/19/2006

Job No. JK0605

Name of Site: Scougal Rubber

Address of Site: 6239 Corson Avenue S
Seattle, Washington

Client: Scougal Rubber

Site Contact: Matt Bowman or Tom Nielsen, (206) 763-2650

Site Activities Planned: Excavation, Direct Push soil sampling, groundwater sampling.

Activity	Location	Date
Excavation	Drum Storage Area and Alley	March 2007
Soil Sampling	Drum Storage Area	March 2008
Groundwater Sampling	MW-11, MW-12, MW-14	March 2008-September 2009
Potassium Permanganate Injection	Infiltration Gallery and Trench	March 2007-September 2007

Estimation of Direct Exposure Hazard to Pacific Groundwater Group Personnel

High___ Medium___ Low_X__ None___

Physical Description of the Facility (attach map):

The Scougal Facility is a collection of single-story buildings between Corson Ave S and Michigan Ave S.

Operational Description of the Facility:

The facility is used to make industrial rubber parts.

Site Status

Active ☒ Inactive ☐ Abandoned ☐ Unknown ☐

PGG HEALTH AND SAFETY PLAN
Scougal Rubber Site, Seattle, Washington

HAZARD ASSESSMENT

Chemical State: Liquid ☒ Solid ☒ Gas ☒ Unknown ☐ Other ☐

Chemical Characteristics:

Corrosive ☐ Flammable ☐ Toxic ☒ Volatile ☒ Inert ☒ Other ☐

List the Chemicals of Concern:

Chemical Name	Physical/Chemical Characteristics	Regulatory Standards	Exposure Routes/Symptoms
Tetrachloroethylene	Colorless liquid with a mild, chloroform-like odor.	PEL =TWA 100 ppm C 200 ppm 300 ppm	Inhalation, skin absorption, ingestion, skin and/or eye contact. Irritation eyes, skin, nose, throat, respiratory system; nausea; flush face, neck; dizziness, incoordination; headache, drowsiness; skin erythema (skin redness); liver damage; [potential occupational carcinogen]
Trichloroethylene	Colorless liquid (unless dyed blue) with a chloroform-like odor.	PEL = TWA 100 ppm C 200 ppm 300 ppm (5-minute maximum peak in any 2 hours)	Inhalation, skin absorption, ingestion, skin and/or eye contact. Irritation eyes, skin, nose, throat, respiratory system; nausea; flush face, neck; dizziness, incoordination; headache, drowsiness; skin erythema (skin redness); liver damage; [potential occupational carcinogen]
Vinyl Chloride	Colorless gas or liquid (below 7°F) with a pleasant odor at high concentrations.	PEL = TWA 1 ppm C 5 ppm [15-minute]	Inhalation, skin absorption, ingestion, skin and/or eye contact. Lassitude (weakness, exhaustion); abdominal pain, gastrointestinal bleeding; enlarged liver; pallor or cyanosis of extremities; liquid: frostbite; [potential occupational carcinogen]
1,2-Dichloroethylene	Colorless liquid (usually a mixture of the cis & trans isomers) with a slightly acrid, chloroform-like odor.	PEL = TWA 200 ppm (790 mg/m3)	Inhalation, skin absorption, ingestion, skin and/or eye contact Irritation eyes, respiratory system; central nervous system depression
Gasoline	Clear liquid with characteristic odor	PEL = none	Inhalation, absorption, ingestion, contact/ irritated eyes, skin, mucous membrane, fatigue, blurred vision, dizziness, slurred speech, convulsion, possible liver, kidney damage.
Potassium Permanganate	Purple liquid.	PEL = 5 mg/m3 (dust); none for dilute solution	Contact, absorption, ingestion / mild skin irritation with dilute solutions.
Diesel	Appearance varies	PEL = none established	Inhalation, contact/ eye irritation, pulmonary function changes

Hazards of Concern:

Heat Stress ☐ Cold Stress ☐ Explosive/Flammable ☐ Oxygen Deficient ☐

Excessive Noise ☒ Inorganic Chemicals ☒ Organic Chemicals X Other ☐

Describe Potential Environmental Hazards:

Exposure to chemicals of concern. Noise and physical hazards during excavation and soil sampling.

Describe Potential Worker Hazards:

Site is active. Potential hazards include:

- Falling and tripping hazards
- Working adjacent to moving vehicles.
- Loud noise.
- Potential contact with contaminated soils.
- Contact with dilute potassium permanganate solution

PGG HEALTH AND SAFETY PLAN
Scougal Rubber Site, Seattle, Washington

ACTIVITY CONSIDERATIONS

Will site representative be present? Yes ☒ Consultant familiar with site will be present

Exact location of chemicals: Known Assumed ☒ Unknown ☐

Identify nearest offsite population and describe: Residential ☐ Industrial ☒ Rural ☐ Urban ☒

Site is located in a light industrial area.

SAFETY CONSIDERATIONS

If there is more than one level of hazard, or if there are multiple "sites" within a site, a separate page should be completed to show specific safety considerations for each location.

Site locations:

6239 Corson Avenue South

Seattle, Washington

Objective of Work at this Location: To collect soil and ground water samples for analysis to investigate possible contamination.

Level of Protection Planned: C ☐ D ☒

Possible Modifications: Upgrade to level C [respirator with HEPA (dust) cartridge] if significant dust is generated during excavation.

Monitoring Equipment:

PID ☒ 0_2 Meter ☐ Explosimeter ☐ H2S Meter ☐ Other Visual ☒

Action Levels:

Visual	Visible dust	Upgrade to level C (respirator with HEPA cartridge) if significant visible dust is generated.

PGG HEALTH AND SAFETY PLAN
Scougal Rubber Site, Seattle, Washington

Type of Personal Protective Equipment to be Used:

NOTE: ALL PERSONS ON SITE MUST WEAR HARD HATS, SAFETY GLASSES, AND STEEL-TOE BOOTS DURING EXCAVATION.

Head:	Hard hat (optional)
Foot:	boots if wet
Hand:	Chemical resistant gloves (during all soil sampling and drilling)
Eye/Face:	Safety glasses if near direct push rig during operation
Clothing:	Coveralls or appropriate work clothes
Respiratory:	1/2-face respirator if: PID reading(s) exceed action levels; visible dust is generated
Additional Gear:	Noise protection when noise levels exceed 85 decibels.

Work Party:

Name of Personnel	Responsibility	Level of Protection
Janet Knox	Sampler	Level C or D
Glen Wallace	Sampler	Level C or D

Safe Entry Procedures: WEAR APPROPRIATE PPE.

Criteria for Changing Protection:

Dust is generated during sampling or other field activities. PID registers great than 1 ppm.

Decontamination Procedures:

Disposable PPE will be removed at the end of each day and disposed of as nonhazardous waste unless grossly contaminated.

Work boots in contact with site soils should be brushed off while at the site.

Work Limitations (time of day, conditions, etc.):

WORK WILL BE LIMITED TO DAYLIGHT HOURS.

PGG HEALTH AND SAFETY PLAN
Scougal Rubber Site, Seattle, Washington

Locations of Nearest:

Phone: A cellular telephone will be used by field personnel..
Running Water Source: Scougal Rubber Facility.
Public Road: Corson Avenue South
Rest Room: Scougal Rubber Facility

EMERGENCY PLANNING

Name	Contact Person	Phone Number
Local Police:		911
Local Ambulance:		911
Local Fire Department:		911
Poison Control Center:		911
Local Hospital:	Harborview Medical Center	Emergency Room **(206) 731-3074** Hospital Switchboard **(206) 598-3300**
Address:	325 9th Ave Seattle, WA 98104	
Ecology:		
Project Manager:	Janet Knox	(206) 329-0141

Provide Directions to Nearest Available Medical Facility (attach map):

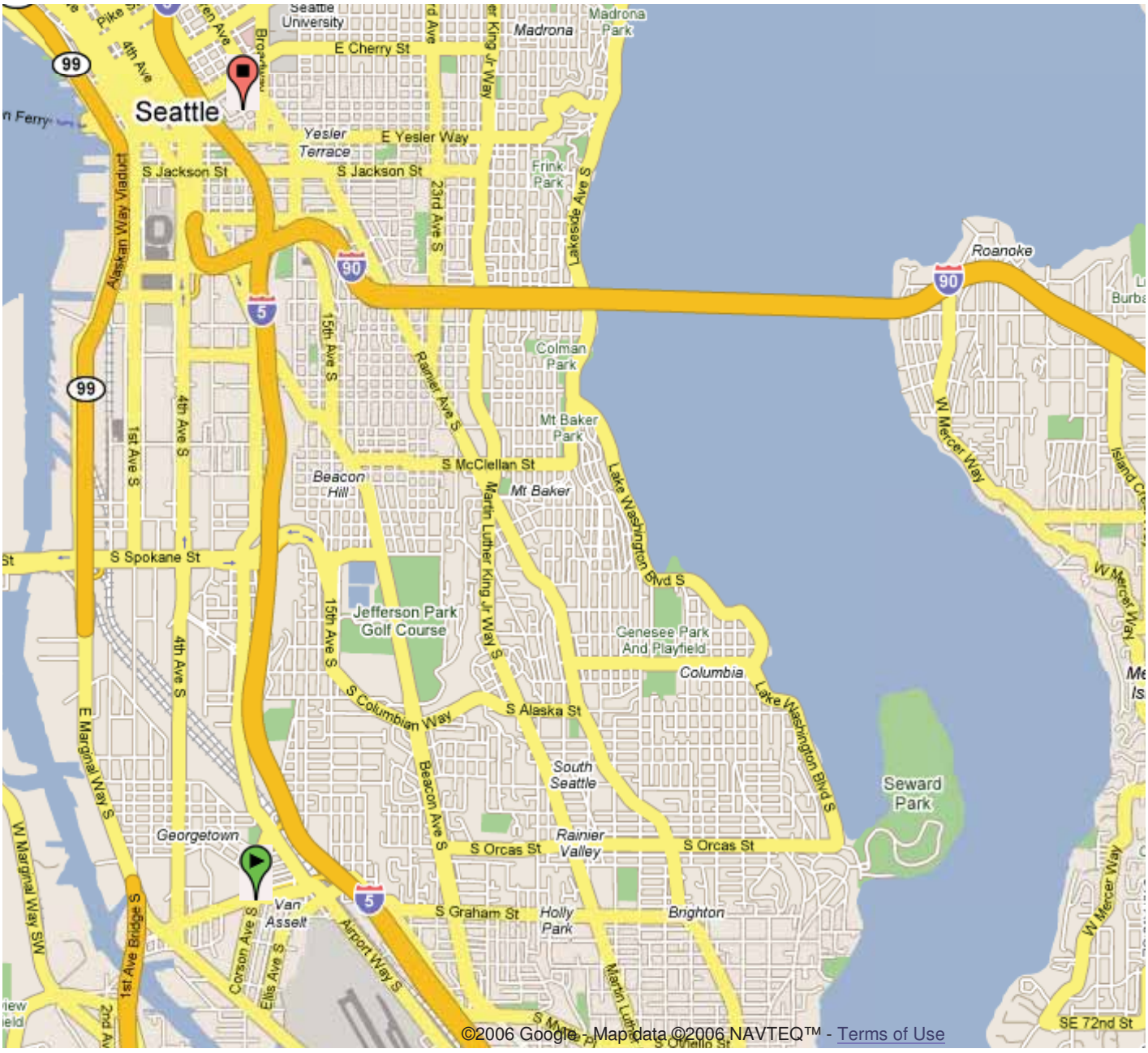
Start at 6239 Corson AVE S, SEATTLE - go < 0.1 miles.
Turn right on S ORCAS ST - go 0.1 miles.
Turn left on 4TH AVE - go 3.6 miles.
Turn right on JAMES ST - go 0.3 miles.
Turn right on 9TH AVE - go 0.2 miles.
Arrive at Harborview Medical Center on the right.

Approvals	Date	Signature
Sampler: Glen Wallace		
Sampler: Glenn Mutti		
Sampler: Jeff Witter		
Site Safety Officer:		
Project Manager: Janet Knox cc: Project File		

Google Maps

Start **6239 Corson Ave S**
Seattle, WA 98108
End **325 9th Ave**
Seattle, WA 98104
Travel **4.8 mi (about 8 mins)**

To see all the details that are visible on the screen,use the "Print" link next to the map.



6239 Corson Ave S
Seattle, WA 98108
Drive: 4.8 mi (about 8 mins)

1.	Head **north** on **Corson Ave S** toward **S Bailey St**	**131 ft**
➡ 2.	Turn **right** at **S Bailey St**	**335 ft** 1 min
3.	Turn **left** onto the **I-5** ramp	**0.2 mi** 1 min

4.	Take the **left** fork to **I-5 N/Vancouver BC** and merge onto **I-5 N**	**2.9 mi** 3 mins
5.	Take the **Dearborn St/James St** exit **164A** to **Madison St**, keep following signs	**0.7 mi** 1 min
6.	Take the **left** fork to **James St**	**0.3 mi**
7.	Take the **right** fork to **James St**	**0.3 mi**
8.	Turn **right** at **James St**	**0.1 mi**
9.	Turn **right** at **9th Ave**	**0.2 mi**

325 9th Ave
Seattle, WA 98104

These directions are for planning purposes only. You may find that construction projects, traffic, or other events may cause road conditions to differ from the map results.