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ENVIRONMENTAL SITE INVESTIGATION
DISPOSAL OF BLACK SAND FILL

PROPOSED WATER POLLUTION CONTROL LABORATORY

ST. JOHNS AREA
PORTLAND, OREGON

PREPARED FOR:
BUREAU OF ENVIRONMENTAL SERVICES
CITY OF PORTLAND

21-07197

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MARCH, 1994

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Engineering & Environmental Services

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March 10, 1994

21-07197

Randy Miller
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City of Portland
1120 S.W. Fifth Avenue, Room 400
Portland, OR 97204-1972

RE: ENVIRONMENTAL SITE INVESTIGATION
DISPOSAL OF BLACK SAND FILL
PROPOSED WATER POLLUTION CONTROL LABORATORY
PORTLAND, OREGON

Dear Mr. Miller:

Enclosed is our report that summarizes the results of our Environmental Site Investigation for the proposed Water Pollution Control Laboratory in the St. Johns area of Portland, Oregon.

Our investigation included the excavation of twenty test pits and the installation of five monitoring wells. In addition, more than 2,000 cubic yards of black sand, fill, construction debris and organic material were removed from the site and properly recycled or disposed.

A release of PCB-containing oil that was identified during the investigation was characterized, excavated and closed under a separate phase. Details regarding this phase are summarized in a report titled, "Soil Removal and Remediation Report, Water Pollution Control Laboratory, Portland, Oregon," dated March 7, 1994.

Based on the results of our limited Environmental Site Investigation and removal activities, no environmental problems appear to exist on the site that preclude future construction activities.

AGRA
Earth & Environmental Group

We appreciate the opportunity to have served you on this project. If you have any questions or desire further information, please feel free to contact the undersigned.

Sincerely,

RZA AGRA, Inc.

Denny Macomber,
Hazardous Waste Specialist

Gerard Koschal, R.G.,
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0.0 SUMMARY

The proposed site for the Bureau of Environmental Services Water Pollution Control Laboratory is located on the east bank of the Willamette River south of the St. Johns Bridge. The purpose of this investigation was to assess conditions at the site and provide remedial services to assure that the construction of the project could proceed.

Our scope included the characterization, removal and disposal of blast sand fill and debris from the site, the excavation of twenty test pits to characterize the fill material on the site, and the installation of a monitoring well network for the site.

The black sand, which was used sand blast grit, was characterized and segregated for disposal. A volume of 2,113 cubic yards of black sand, fill, and debris were disposed of at the St. Johns Landfill, the Hillsboro Landfill and the Durham Pit.

The results of our investigation indicate that no major environmental problems are present at the site that would delay construction of the laboratory. Three areas of potential concern were identified during the subsurface investigation. Our investigation indicates that none of these areas of concern appear to represent evidence of a reportable release.

Based on the nature and source of the fill material used on the site and the industrial usage of the site, several minor areas of impacted soil may be encountered during construction activities. If encountered, these localized areas should be assessed and addressed following the appropriate ODEQ guidelines.

An electrical conduit enclosing cable with PCB-containing insulation was located during the investigation. The conduit and impacted soils were excavated and are scheduled to be removed from the site to a permitted hazardous waste disposal facility. Closure sampling of the excavation indicates that the impacted soils have been removed. Documentation of the excavation and removal of this material is presented in a separate report.

The site appears to be an environmentally constructible site. No further environmental investigations are recommended that could delay the construction of the site.

The preceding summary is intended for introductory and reference use. A complete reading of our report is recommended.

1.0 INTRODUCTION

The purpose of this Environmental Site Investigation was to assess the environmental conditions at the site of the proposed Water Pollution Control Laboratory in the St. Johns area of Portland, Oregon, and provide remedial services to assure that construction of the project could proceed. The scope of work includes:

- Prepare a Health and Safety Plan for the field operations.
- A physical reconnaissance of the site and observation of surrounding properties for unusual land colorations, physical irregularities, and noticeable refuse piles.
- A review of available historical data pertaining to site and adjacent property use, including but not limited to; conversations with individuals familiar with the property, City of Portland records, and historical aerial photographs.
- The excavation of twenty test pits to an approximate depth of twenty feet. Ten pits would be located on the western portion of the site and ten pits located on the eastern portion of the site.
- The advancing of five auger borings to groundwater and the installation of monitoring wells in the borings.
- The characterization of the type and extent of the black sand fill by the excavation of shallow trenches.
- The collection of surface and subsurface soils from surface, borings and testpits.
- The analysis of selected soil samples to screen for the presence of fuel hydrocarbons, polychlorinated biphenyls- PCBs, and volatile organic compounds.
- The excavation, removal and proper disposal of the black sand fill and other fill material regulated by ODEQ as solid waste.
- Preparation of a Project Report summarizing all investigation and remedial activities.

This report has been prepared for the exclusive use of Bureau of Environmental Services, City of Portland and their agents, for specific application to the referenced scope of services in accordance with generally accepted environmental practices. No other warranty, expressed or implied is made. In the event that changes in nature, design or layout of the existing site and nearby properties are made, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed or verified in writing.

2.0 SITE DESCRIPTION

The approximately 7.6 acre site is located on east bank of the Willamette River, south of the St. Johns Bridge in the St. Johns area of Portland, Oregon (Figure 1).

Most of the site is located on a bench overlooking the Willamette River. The site is currently vacant. Foundations from previous structures are present on the northwestern and southwestern portions of the site. Asphalt pavement covers the northeastern portion of the

site. Prior to our investigation the non-paved portions of the site were overgrown with blackberry bushes. Construction debris and uncontrolled fill material have been dumped on the site.

The site is bounded on the northwest by N. Pittsburg Avenue, on the northeast by the Union Pacific Railroad tracks (Bradford St.), on the southeast by the yard for Lampros Steel (N. Burlington Avenue) and on the southwest by the Willamette River (Figure 2).

The proposed development of the site includes a 50,000 square foot Water Pollution Control Laboratory on the southeastern portion and a storm water detention facility on the northwestern portion of the site.

3.0 SITE HISTORY

Previous site investigation reports, historical aerial photographs, city records and interviews with individuals familiar with the site revealed a history of industrial usage until the 1970s. The structures on the site were demolished in the 1970s. The site is currently vacant. Vicinity usage has been industrial, commercial, residential and recreational.

The Coast Veneer Box Company was located on the northwest portion of the site, adjacent to N. Pittsburg Avenue. This facility manufactured fruit boxes from at the mid-1930s until the early 1970s. Based on a geotechnical investigation, the facility had been demolished by 1973.

The Portland Lumber Mill was located on the southeastern portion of the site from the mid-1930s until the late 1970s. The structures had been demolished by 1978 when the Rittenhouse-Zeman & Associates geotechnical report investigation was conducted.

A combined sewer overflow (CSO) line traverses the site along the Salem Street easement.

The Portland Development Commission purchased the land in the late-1970s as part of a proposed residential development in the St.Johns area.

4.0 PREVIOUS INVESTIGATIONS

Several previous geotechnical and environmental investigations have been conducted at or adjacent to the subject site.

A subsurface investigation was conducted in 1973 by Shannon and Wilson for Brand-S Corporation, the owner of the property at that time. The investigation concerned the fill activities in the Coast Veneer area of the site and the embankment along the Willamette River. The potential source of the fill material was an area south of Richmond Street or dredge material from the Willamette River adjacent to the site.

A subsurface geotechnical investigation was conducted in 1978 by Rittenhouse-Zeman & Associates for the Portland Development Commission. The Portland Lumber Mill had been demolished by this time. Included in the investigation were one boring and one test pit, which were located in the Coast Veneer area of the site.

Emcon Northwest conducted an Environmental Survey of the adjacent Lampros Steel property in 1988. The black sand fill, found on the subject site, was also identified on the adjacent property. The black sand was spent sandblast grit that had been used to clean petroleum tanks. The fill was placed in 1977-1978. The winter rains flushed oil out of the fill and washed into the river. After a request by the Coast Guard the owner stopped the placement of the fill. Analyses indicated that the sands did contain petroleum products, but was not an EPA characteristic hazardous waste.

Emcon Northwest conducted an Environmental Survey of the subject site in 1989 for a potential buyer. The results of their subsurface investigation indicated that approximately 600 cubic yards of black sand fill was present on the subject site. The black sand was not a characteristic hazardous waste but did contain some petroleum product. Groundwater was collected from four on-site borings. Slightly elevated levels of 2,4-dimethylphenol was detected in one sample. The boring (T-4) was located in the southeast corner of the site near the river.

The Bureau of Environmental Services (BES) conducted a sampling survey on the subject site in 1993 to determine if the black sands and other uncontrolled fill were hazardous wastes. Analyses conducted indicated that the black sand was not a characteristic hazardous waste.

5.0 SURFICIAL FILL CHARACTERIZATION AND REMOVAL

The original grade at the site appears to have been similar to the grade of the present Cathedral Park northwest of the site. The original grade gently sloped from the Union Pacific Rail Road (UPRR) tracks to the river. The site has been filled to the present grade by various fill episodes.

Based on a review of historic photographs, the Portland Lumber Mill was once located on a elevated deck at the level of the UPRR tracks. This deck extended from the UPRR tracks to above the river supported by timber piling. The volume below the deck appears to have been filled over the years to the present grade. The source of the fill material is not known. Based on this and previous investigations this fill material consisted of dredge material, construction debris, clinkers and ash.

At least four episodes of fill placement can be defined on the subject site.

Pre-1970s fill placement that brought the site to the grade of the pavement for the Portland Lumber Mill.

The placement of fill in the early-1970s in the foundation of the Coast Veneer facility and along the bank of the Willamette River.

The placement of the black sand fill in the Coast Veneer area and in isolated piles on the southern portion of the site.

The uncontrolled placement of piles of construction and other debris.

The purpose of this phase of the investigation was to characterize the black sand and uncontrolled fill materials and to determine the most cost efficient disposal option for the materials.

5.1 REGULATORY REVIEW - DISPOSAL OF BLACK SAND FILL

The Oregon Department of Environmental Quality (ODEQ) regulates the disposal of solid and hazardous wastes. Solid waste is defined in 40 CFR Section 261.2. Certain construction debris and other clean fill are not considered a solid waste and are not regulated by ODEQ. The determination of the type of waste is made based on the source of the material and the impact the material can have on the environment.

Hazardous waste is defined by the US EPA in 40 CFR Section 261.3. A listed hazardous waste is a waste that is derived from one of the listed processes or contains a certain level of a listed hazardous material. A characteristic hazardous waste is a waste that displays certain hazardous characteristics, such as, toxicity, reactivity, corrosivity or flammability. EPA hazardous wastes must be handled and disposed according to EPA regulations. Most oil and petroleum products are not EPA listed hazardous wastes.

The State of Oregon administers the EPA Hazardous Waste Program. In Oregon, oil and petroleum products are included with EPA Hazardous substances for spill and release reporting and requirements for remedial activities (OAR 340-108, OAR 340-122). Soils impacted by petroleum products must be disposed according to ODEQ guidelines.

Solid waste in Oregon is also regulated by ODEQ. Solid wastes are wastes from specific sources and are defined in OAR 340-93. Solid waste must be disposed according to ODEQ regulations. Spent sandblast grit or sand is a listed ODEQ solid waste. This material can be recycled, disposed at a permitted landfill, or if determined to be inert, used as fill material. The process to determine if a solid waste is inert involves a ODEQ permit.

Clean fill is defined in OAR-340-93-030 (10) as material consisting of soil, rock, concrete, brick, building block, tile, or asphalt paving, which do not contain contaminants which could adversely impact the waters of the State or public health. This term does not include putrescible wastes, construction and demolition wastes and industrial solid waste. The disposal of clean fill is not formally regulated by ODEQ.

The previous Emcon Northwest investigations identified the black sand as waste sandblast grit. This "knowledge of process" makes the black sand a solid waste. The Emcon Northwest and

the BES investigation determined that the black sand did not meet the definition of a EPA listed or characteristic hazardous waste. Some of the black sand contained levels of petroleum product that exceeded the ODEQ guidelines for an inert waste.

Based on this information, RZA AGRA choose excavation and disposal at a permitted landfill as the most prudent option for the removal of the black sand.

ODEQ solid waste permits consider levels greater than 100 ppm TPH for diesel and heavier hydrocarbons as petroleum contaminated soils. Soils with levels greater than 100 ppm TPH must be treated prior to disposal or disposed only at permitted landfills. In the Portland area, the Hillsboro Landfill accepts petroleum contaminated soils with levels greater than 100 ppm.

RZA AGRA's approach was to segregate the black sand based on TPH content. Black sand with levels of TPH greater than 100 ppm would be transported to either the Hillsboro Landfill for disposal or to Oregon Hydrocarbon for thermal treatment. The final destination would be based on cost.

For sand with TPH levels less than 100 ppm, the disposal options included disposal at Hillsboro Landfill or use as cover material at St. Johns Landfill or Hillsboro Landfill. The destination would be based on acceptance by the facility and cost.

5.2 FIELD METHODS

A Health and Safety plan was prepared for the field operations. All field operations were conducted following the procedures outlined in the Standard Field Protocols (Appendix C).

A utility locate survey was conducted by Maintenance NW, Portland, Oregon. Due to the past use of the site, an abundance of underground pipes were identified.

The southern portion of the site had been overgrown with blackberry bushes. The first field task was to remove the blackberry bushes to gain access to the site. Excavation and transportation services for the project were provided by C. Wark Trucking, Tualatin, Oregon. The brush was segregated for disposal.

A security fence was placed along the perimeter of two sides of the site. This fence was attached to an existing fence and limited access to the site.

Black Sand Fill

Five trenches were excavated across the black sand and uncontrolled fill area. Location of the trenches are shown on Plate 1. The purpose of the trenches was to determine the volume of the black sand and to provide a sampling grid for the area. The fill material was logged and thirty samples were collected from the trench system. In addition, one sample was collected from the black sand horizon in test pit TP-3. Each sample was placed in airtight, teflon sealed

containers, and transported on ice to RZA AGRA's Environmental Laboratory for chemical analysis.

The black sand was concentrated as a layer up to six feet thick in the area of the former Coast Veneer facility, trenches T-1 through T-4. Several isolated areas of black sand were identified near the southern portion of the site near the old foundation of the Portland Lumber buildings. The uncontrolled fill piles were tested with trench T-5. This material was placed on the old asphalt pavement surface and consisted primarily of sand and soil.

5.3 QUANTITATIVE ANALYSIS

Samples were identified by trench number and a consecutive sample number. Nineteen samples, based on visual evidence, were submitted to RZA AGRA's Environmental Laboratory in Portland, Oregon, for analysis for total petroleum hydrocarbons (TPH) by EPA Method 418.1 Modified. One sample (T2-10) was submitted to Hughes Analytical Laboratory , Gresham, Oregon, for analysis for TCLP-8 metals by EPA Method 1311, 6010, 7000, PCB by EPA Method 8080, and volatile organics by EPA Method 8240. Laboratory results and chain-of-custody documentation are presented in Appendix A.

SAMPLE #	Depth	TPH (ppm)
T1-1	12"	74.7
T1-3	36'	16.6
T1-5	24"	129
T1-6	8"	61.4
TP3-16	12"	667
T2-9	24"	41.0
T2-10	24"	380
T2-11	36"	24.0
T2-14	60"	17.6
T3-17	12"	15.0
T3-21	12"	12.3
T3-23	12"	17.3
T3-24	36"	33.0
T4-25	12"	28.6
T4-26	48"	134
T4-27	36"	62.7
T5-28	40"	32.3
T5-29	12"	15.3
T5-30	12"	25.0

No volatile organics compounds, leachable metals or PCBs were detected above regulatory limits in sample T2-10, which had a TPH level of 380 ppm.

Four of the 19 submitted samples reported levels of greater than 100 ppm TPH. Three of the samples were black sand, while the fourth sample consisted of white sand. The impacted

black sands could be visibly separated from the lesser impacted black sand. The black and white sand was segregated into two areas, impacted and non-impacted, based on the 100 ppm TPH criteria. The elevated black and white sand fill with clorated TPH levels was removed for disposal.

5.4 DISPOSAL

Copies of the analytical data was submitted to the Hillsboro Landfill and the St. Johns Landfill for approval for disposal. St. Johns Landfill accepted the clean black sand and clean fill as cover material with no tipping fee. The Hillsboro Landfill accepted the clean black sand and clean fill as cover material with no tipping fee. No large rocks or organic material was accepted as cover material. The Hillsboro Landfill accepted the briar and wood debris for recycling at a fee of $5.84/cubic yard. The Hillsboro Landfill accepted the impacted black sand and other construction debris for a tipping fee of $59.04/cubic yard. The Durham Pit accepted clean asphalt and concrete for recycling at a tipping fee of $2.50/cubic yard.

A summary of the disposal activities includes:

AMOUNT (cubic yards)	MATERIAL	DESTINATION
1446	Black Sand/Clean Fill	St. Johns Landfill
242	Clean Fill	Hillsboro Landfill
144	Briar/Wood	Hillsboro Landfill
27	Dirty Black Sand	Hillsboro Landfill
254	Asphalt/ Concrete	Durham Pit
2113	Total Cubic Yards Removed	

6.0 SUBSURFACE INVESTIGATION

Our subsurface exploration consisted of advancing five borings and excavating twenty test pits. A two inch-diameter monitoring well was installed in each of the borings. The purpose of the test pit investigation was to define the near-surface lithology of the site and to screen the subsurface for the presence of contamination that would have to be remediated prior to construction activities. The purpose of the monitoring wells was to provide a network of wells that could be used to provide baseline and future shallow groundwater quality data for the site.

6.1 REGULATORY REVIEW - PETROLEUM PRODUCT IMPACTED SOILS

The reporting requirements and remediation of soils impacted by petroleum products is based on the source of the contamination, the type of contamination and the level of impact. Soils impacted by any release from a underground storage tank system (UST) or underground heating oil tank system are regulated by OAR 340-122-205. Soil cleanup levels have been established by ODEQ. Soils impacted by petroleum products from other sources, such as, above ground storage tank systems or spills from vehicles, are regulated by OAR 340-108 and OAR 340-122.

Soils cleanup levels are determined by the amount released and the hazardous constituents in the petroleum product.

The reporting requirements for a release of petroleum product is described in OAR 340-108-010. The reportable quantity for a release of petroleum products that remain on site and do not enter a surface waterway or groundwater is one barrel (42 gallons). No reporting requirement exists for historic, small releases of petroleum products that are not from a UST and are not a threat to public health or the environment.

Total petroleum hydrocarbon (TPH) analysis is used as an indicator of the level of impact at sites with releases of petroleum products. Except in the case of a release from a UST system that does not impact the groundwater, TPH is not regulated and no cleanup levels are established. However, the levels of the constituents of the petroleum product (BETX and PAHs) are regulated.

For a release of petroleum products from a UST system that does not impact groundwater, cleanup levels have been established in OAR 340-122-250 through OAR 340-122-360. The cleanup levels are based on an evaluation matrix which rates the site. The matrix is based on precipitation, depth to groundwater and use of the groundwater. The proposed site would rank as a Level 2 site with cleanup levels of 80 ppm for gasoline and 500 ppm for diesel and heavier oils.

As a guideline to measure the impact from petroleum product releases at the subject site, the Matrix Level 2 cleanup levels were used. If TPH levels greater than 500 ppm were encountered, further evaluation was conducted to determine the extent of the impact and to investigate if the impacted soils constitute a reportable release.

6.2 TEST PITS

The test pits were scheduled to be excavated to a depth of twenty feet or refusal. Excavation activities were conducted by C. Wark trucking, Tualatin, Oregon. Ten of the test pits (TP-1 through TP-10) were located on the northwestern portion of the property, northwest of the CSO. A stormwater detention facility was planned for this area. Ten test pits (TP-11 through TP-20) were located over the remainder of the site. Concurrently with the RZA AGRA investigation, a separate subsurface geotechnical exploration was conducted by CH2M Hill C. Borings and test pits were advanced during that exploration. The test pits and borings were not observed by or inspected by RZA AGRA personnel. All test pit locations are shown on Plate 1. RZA AGRA test pit logs are presented in Appendix B.

Samples were classified in the field by a geologist from RZA AGRA. Representative portions of each sample were collected, placed in airtight, teflon-sealed containers, and transported to RZA AGRA's in-house laboratory for quantitative analyses.

Petroleum odors, as noted on the test pit logs, are subjective information provided at the time of sampling. Detection of petroleum odors is dependant on the olfactory sensitivity of the person classifying the sample, as well as other factors, including air and sample temperature, wind velocity, the length of time the sample is out of the boring, product type and product degradation. Because these limitations are not readily quantifiable, and no test standards exist, olfactory observations should be taken as general subjective information. It is our understanding that humans may be able to detect petroleum product odor in the range of one part per million (ppm).

All excavated materials were placed back into the test pits. No compaction testing of the backfill material was conducted.

6.3 MONITORING WELLS

The borings were drilled by Crisman Drilling, Portland, Oregon using a CME truck-mounted drilling rig with hollow stem auger and continuous core sampling. Augers and sampling equipment were decontaminated between holes with a steam cleaner.

The five environmental borings (MW-1 through MW-5) were drilled to depths ranging from of approximately 40 to 42 feet. Boring locations are presented on Plate 1. Soil samples were collected continuously using a casing advancer in each of the borings. This sampling, combined with the logging of drilling character, provided the basis for our geologic characterization of the site.

Samples were classified in the field by a geologist from RZA AGRA. Representative portions of each sample were collected, placed in airtight, teflon-sealed containers, and transported to RZA AGRA's Environmental Laboratory. Geologic boring logs are presented in Appendix B.

In addition, borehole and recovered samples were field-screened with a combustible gas indicator (Gastech model 1314) for volatile hydrocarbons, measured in parts per million (ppm) and Lower Explosive Limit (LEL). All drill cuttings were placed in drums. Since no evidence of contamination was identified, the cuttings were later used as backfill on-site.

Surveying the well elevations was to be conducted by others. No well elevation data is available.

6.4 PIPING TRENCH EXCAVATION

During a geotechnical exploration on the site by another contractor, a release of PCB-containing material was identified. RZA AGRA characterized and remediated the release, removing all the impacted soils. The remediation is presented in a separate report. During the release characterization, a trench approximately 10 feet in depth was excavated across the site. The location of the trench is shown on Plate 1.

6.5 SUBSURFACE CONDITIONS

In general, soils on the site consist of 10-20 feet of fill material overlying native silts and sands deposited by the Willamette River.

6.5.1 Non-native Fill

The nature of the fill material varies over the site, consisting of dredge spoils, construction debris, wood, clinkers and ash. A thin layer of spent blast sand covered the northwest portion of the site. Most of this blast sand has been removed from the site.

The fill in the northeastern portion of the site primarily consists of dredge spoils. Toward the river, the fill material includes more brick and demolition debris. Clinkers and ash are more abundant near the location of the old boiler, in the southern corner of the property.

An episode of fill placement was conducted in the early 1970s in the area of the former Coast Veneer facility and along the river bank. One source of this fill material may have been dredge spoils from activities adjacent to the site. The fill material from this episode appears to contain more organic material and displays a slight organic odor. This fill material appears to be fairly extensive over the former Coast Veneer area.

6.5.2 Foundations and Pipes

Concrete foundations, piling and pipes are present in the shallow subsurface over most of the site. The foundations and utility pipes were not removed during demolition activities at the site. Many of the foundations are placed on piling. Any construction activity will probably have to remove a portion of these features.

Figure 3 presents the pipes and foundation encountered during the trench excavation.

6.5.3 Field Volatile Screening

Petroleum-like odors were noted in four areas on the site.

1. Petroleum odors were noted in a layer of fill material extending over a portion of the area of the former Coast Veneer facility. Soil samples of the identified horizon were submitted for analysis for TPH by EPA Method 418.1 from test pits TP-2 (TP-2-5), TP-5 (TP-5-6), TP-6 (TP-6-5), and TP-8 (TP-8-10). Samples from the horizon below the impacted layer were submitted from test pits TP-5 (TP-5-12) and TP-8 (TP-8-20).

2. An visual discoloration was noted in the gravel base course in a test pit (TP-14) near the UPRR tracks. Similar impacted gravels were noted in a nearby CH2M Hill test pit. A sample of the base course material was submitted for analysis for TPH by EPA method 418.1 from test pit TP-14 (TP-14-1).

3. Petroleum odors were noted in samples from a CH2M Hill geotech boring. Soil samples from the 15 and 20 foot depths (CH2-B4-15 and CH2-B4-20) were

submitted for analysis for TPH by EPA Method 418.1. An RZA AGRA test pit was located near the boring. No evidence of contamination was noted in the excavation.

4. Petroleum odors were noted in the trench excavation near the dogleg of the trench. Sample TP-23-6 was submitted for analysis of volatile organic compounds by EPA Method 8010/8020.

In addition samples were submitted for analysis for TPH from two horizons in test pit TP-12 (TP-12-12 and TP-12-15).

6.6 GROUNDWATER

Shallow groundwater was encountered within sands of the Willamette River sediments at a depth of 20-26 feet. No odors or petroleum product sheen was noted during development and sampling. Groundwater samples from each monitoring well were submitted for analysis for PCBs by EPA Method 608 and chlorinated phenolics by EPA Method 8040.

7.0 QUANTITATIVE ANALYSES

Laboratory analyses for this project were carried out at RZA AGRA's Environmental Laboratory, Portland Oregon and Hughes Analytical Laboratory, Gresham, Oregon. Soil samples were identified by the test pit number and by the successively recorded sample number corresponding to depth as noted on the test pit logs. Groundwater samples were identified by the well number.

All laboratory analytical results and chain-of-custody forms are included in Appendix A

7.1 SOIL ANALYSES

Soil sample test results are described below. Sample locations are identified on Plate 1. Samples were chosen based on the visual or olfactory evidence of impact.

7.1.1 Total Petroleum Hydrocarbons (EPA Method 418.1, modified)

Eleven soil samples were submitted for analysis by infra-red (IR) to quantify TPH concentration.

SAMPLE #	Depth	TPH (ppm)
TP-2-5	5'	16.6
TP-5-6	6'	120
TP-5-12	12'	ND
TP-6-5	5'	28.5
TP-8-10	10'	12.6
TP-8-20	20'	19.3
TP-12-12	12'	6.6
TP-12-15	15'	ND
TP-14-1	1'	116
CH2-B4-15	15'	ND
CH2-B4-20	20'	534

7.1.2 Volatile Organic Compounds (EPA Method 8010/8020)

One sample, TP-23-6, was submitted for analysis by gas chromatography to determine the concentrations of volatile organic compounds by EPA Method 8010/8020.

No halogenated volatile compounds were detected in this sample. Ethylbenzene and xylenes were detected at levels well below ODEQ reference levels.

Three potential areas of concern were identified in the subsurface investigation. These areas include:

1. The fill in the area of the Coast Veneer facility exhibited a slight degraded petroleum product odor.

2. The samples from the depth of 15 and 20 feet in CH2M Hill's boring B-4 exhibited a petroleum product odor.

3. A petroleum product odor was noted in the base course material in the area of RZA AGRA test pit TP-14 and CH2M Hill test pit TP-5.

Coast Veneer Fill Area

The soil sampling survey indicates that all petroleum product concerns appear to be minor and all but one area below the ODEQ Matrix Level II reference standards (500 ppm).

The analyses of the fill material in the Coast Veneer area (TP-2-5, TP-5-6, TP-5-12, TP-6-5, TP-8-10, TP-8-20) indicate TPH levels well below the Matrix Level 2 cleanup levels. No source for the low levels of impact were identified. The fill material consists of silts which may have been dredge material. The impacted soils do not appear to represent a reportable release. No further action concerning these soils is recommended.

CH2M Hill Boring

The levels of TPH in the CH2M Hill boring B-4 are slightly above Matrix Level 2 standards. During drilling of boring B4, impacted soils were noted in fill material from the depth of 15 to 20 feet. No visual or olfactory evidence of impacted soils was noted for depths deeper than 20 feet. Analysis of the sample from a depth of 15 feet (CH2-B4-15) indicated TPH below detection levels (4 ppm). The analysis of thew sample from a depth of 20 feet indicated TPH at of 534 ppm.

To define the extent of soil impact, RZA AGRA excavated a test pit near the boring. Test pit TP-20 did not intersect the impacted soil. No visual or olfactory evidence of impacted soils was noted in the test pit. The area of impact appears limited. The source of the impact appears to be the fill material itself and not an external source. Neither groundwater nor surface water appear to be affected by the impacted soil. The impacted soil does not appear to represent a reportable release.

Test Pit TP-14 Area

The analysis of the impacted base course material from RZA AGRA test pit TP-14 indicated a TPH level below Matrix Level 2 standards. The impact was confined to the base course material and does not appear to represent a reportable release. During construction the base course material can be segregated and used in new pavement material or as a base course material.

7.2 GROUNDWATER SAMPLES

7.2.1 Polychlorinated biphenyls, PCBs (EPA Method 608)

Five water samples were analyzed for the presence of PCBs.

No PCBs were detected in any of the analyzed samples.

SAMPLE	RESULT
MW-1	ND
MW-2	ND
MW-3	ND
MW-4	ND
MW-5	ND

7.2.2 Chlorinated Phenolics (EPA Method 8040)

Five water samples were analyzed for the presence of pentachlorophenol and 2,4,5-Trichlorophenol.

Pentachlorophenol was detected in one of the analyzed samples.

SAMPLE	PENTACHLOROPHENOL	TRICHLOROPHENOL
MW-1	ND	ND
MW-2	ND	ND
MW-3	ND	ND
MW-4	ND	ND
MW-5	18 ppb	ND

The presence of the low levels of pentachlorophenol may be due to matrix interference by the sediment in the sample. The area of monitoring well MW-5 is fill material placed in the early 1970s. The area appeared to be part of the river in a 1963 air photo. This part of the river was covered by the deck of the Portland Lumber Company which may have been supported by treated timber piling.

8.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the our Environmental Site Investigation and disposal activities, no environmental impacts exist at the site that would significantly alter the construction plans for the site.

During our investigation, 2,113 cubic yards of spent blast sand, fill, and debris were characterized, removed from the site and disposed properly.

Three areas of potential concern were identified during the subsurface investigation. The fill in the Coast Veneer area displayed a slight, degrade petroleum product odor. Analysis of soil samples indicate TPH levels lower than the Matrix Level 2 standards.

Fill material at a depth from 15 to 20 feet in a boring displayed petroleum product odor. TPH levels in the 20 foot samples were slightly elevated above the Matrix level 2 standards. Further investigation indicated that no visual evidence of impacted soils were identified in an adjacent test pit. Since the extent of soil impact appears limited and groundwater does not appear to be impacted, the presence of petroleum hydrocarbons does not appear to represent evidence of a reportable release.

Impacted soils in test pit TP-14 were confined to the base course material. TPH levels were below Matrix Level 2 standards. This soil does not appear to represent evidence of a reportable release.

An electrical conduit enclosing cable with PCB-containing insulation was located during the investigation. The conduit and impacted soils were excavated and are scheduled to be removed from the site to a hazardous waste disposal facility. Closure sampling of the excavation indicates that the impacted soils have been removed. Documentation of the excavation and removal of this material is presented in a separate report.

Based on the amount of fill at the site, isolated pockets of contaminated fill may be encountered during construction. The areal extent of these pockets does not appear to be extensive. If impacted soil is encountered during construction, the soil should be assessed and remediated following ODEQ guidelines.

Based on our limited investigation the site currently does not appear to contain any environmental contamination concerns that would delay construction of the proposed laboratory. No further environmental investigations are recommended.

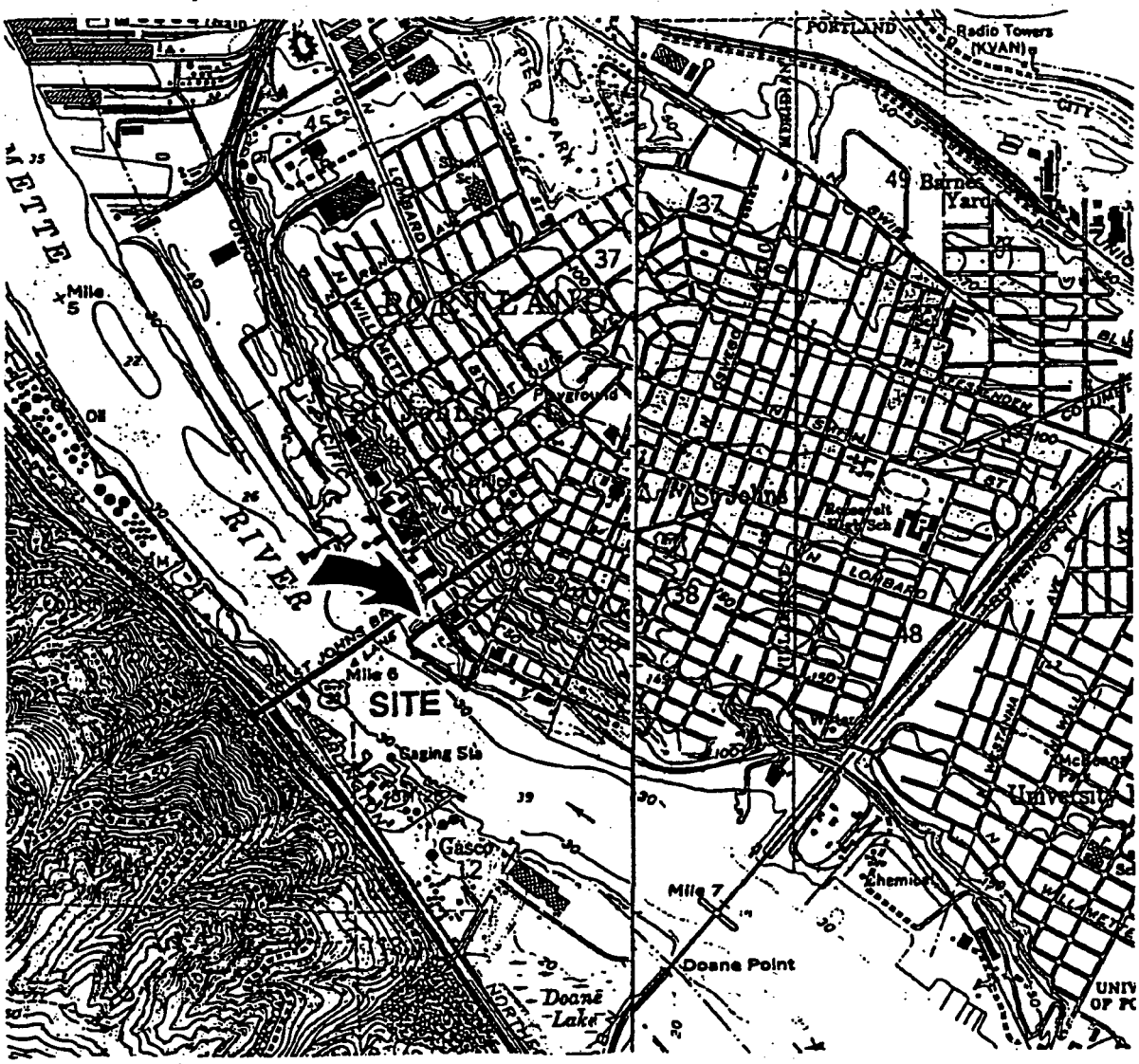
We appreciate the opportunity to have served you on this project. If you have any questions or desire further information, please feel free to contact the undersigned.

RZA AGRA, Inc.

Denny Macomber,
Hazardous Waste Specialist

Gerard Koschal, R.G.,
Senior Geologist

Charles T. Esler,
Senior Environmental Scientist



SCALE 1:24 000

1 0 1 MILE

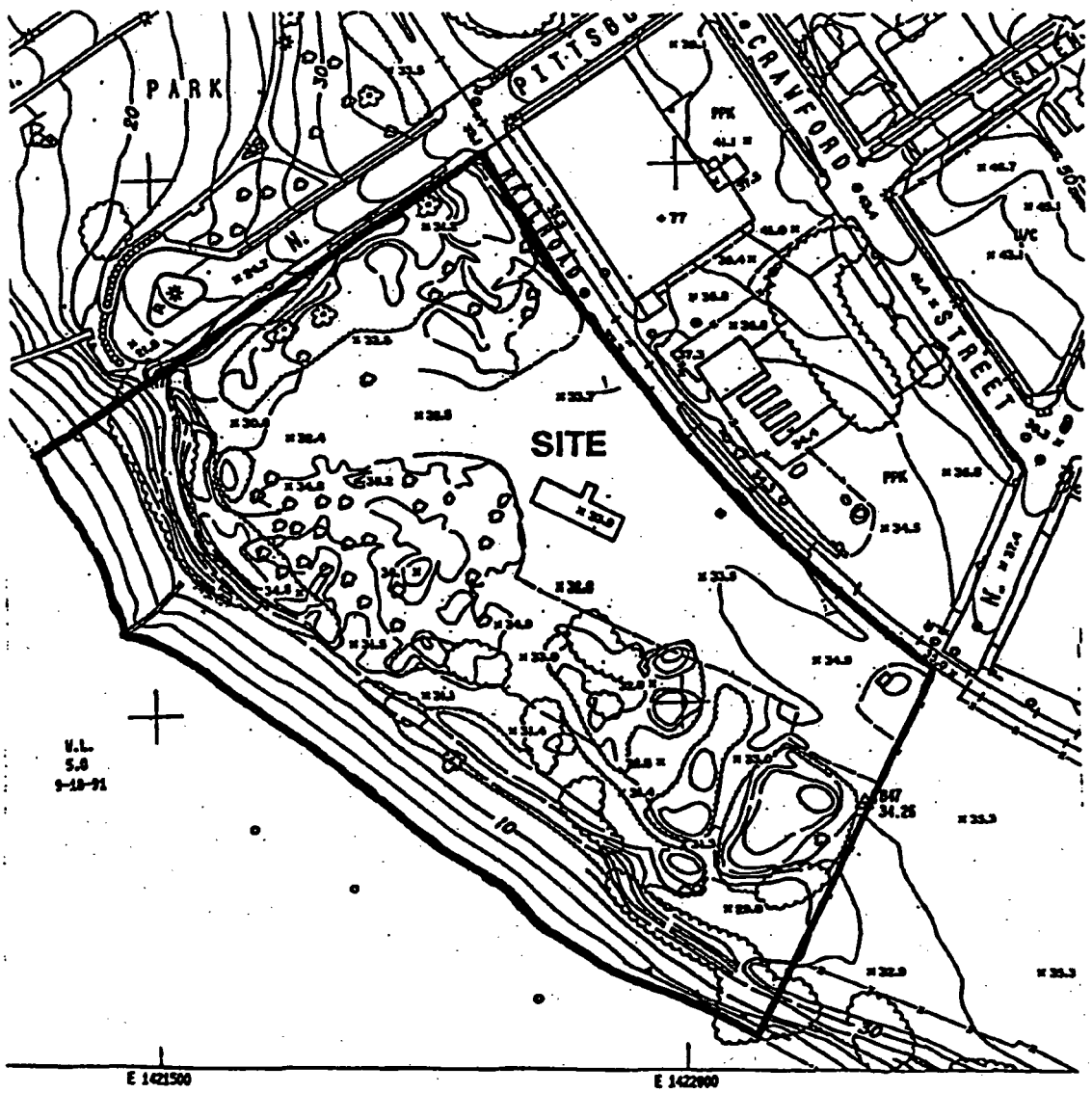
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

N

RZA AGRA, Inc. ENGINEERING & ENVIRONMENTAL SERVICES 7477 S.W. Tech Center Drive Portland, Oregon 97223-8024 Phone (503) 639-3400 Fax (503) 620-7892	W.O. 21-07197-00 DESIGN na DRAWN DATE 2/17/94 SCALE 1:24,000	FIGURE 1: SITE LOCATION MAP BUREAU OF ENVIRONMENTAL SERVICES WATER POLLUTION CONTROL LABORATORY ST. JOHNS BRIDGE AREA PORTLAND, OREGON Source: USGS 7.5' Portland, OR Quadrangle

THESE DRAWINGS ARE THE PROPERTY OF RZA AGRA CONSULTANTS AND ARE NOT TO BE REPRODUCED IN ANY MANNER EXCEPT WITH THE WRITTEN CONSENT OF RZA AGRA



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Fax (503) 620-7892

W.O. 21-07197-00
DESIGN na
DRAWN
DATE 2/17/94
SCALE

FIGURE 2: SITE VICINITY MAP
BUREAU OF ENVIRONMENTAL SERVICES
WATER POLLUTION CONTROL LABORATORY
ST. JOHNS BRIDGE AREA
PORTLAND, OREGON

THESE DRAWINGS ARE THE PROPERTY OF RZA AGRA CONSULTANTS AND ARE NOT TO BE REPRODUCED IN ANY MANNER EXCEPT WITH THE WRITTEN CONSENT OF RZA AGRA.

Appendix A

Quantitative Analysis
Chain-of-Custody

RZA AGRA, Inc.

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Engineering & Environmental Services

7477 SW Tech Center Drive
Portland, Oregon 97223-8024
(503) 639-3400
FAX (503) 620-7892

Client: City of Portland
Project No.: 7197-00
Project Manager: Gerry Koschal
Sample Matrix: Soil

Service Request No.: OR930189
Report Date: 10/13/93
Report No.: 5061
C.O.C. No.: 3750, 3751

Total Petroleum Hydrocarbons by IR
EPA Method 418.1 Modified
mg/kg(ppm)

Sample Name	Lab Code	Sample Date	Date Extracted	Date Analyzed	Method Detection Limit	Result
T1-1	0189-1	10/11	10/13	10/13	4.00	74.7
T2-3	0189-2	10/11	10/13	10/13	4.00	16.6
T1-5	0189-3	10/11	10/13	10/13	4.00	129
T1-6	0189-4	10/11	10/13	10/13	4.00	61.4
TP3-16	0189-5	10/11	10/13	10/13	4.00	667
T2-9	0189-6	10/11	10/13	10/13	4.00	41.0
T2-10	0189-7	10/11	10/13	10/13	4.00	380
T2-11	0189-8	10/11	10/13	10/13	4.00	24.0
T2-14	0189-9	10/11	10/13	10/13	4.00	17.6
T3-17	0189-10	10/11	10/13	10/13	4.00	15.0
T3-21	0189-11	10/11	10/13	10/13	4.00	12.3
T3-23	0189-12	10/11	10/13	10/13	4.00	17.3
T3-24	0189-13	10/11	10/13	10/13	4.00	33.0
LAB BLANK	10-13SBK	-	10/13	10/13	4.00	ND

ND Not Detected

Signature of Chemist

Laboratory Manager

AGRA
Earth & Environmental Group

RZA AGRA, Inc.

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Engineering & Environmental Services

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FAX (503) 620-7892

Client City of Portland
Project No. 7197-00
Project Manager Gerry Koschal
Sample Matrix Soil

Service Request No.: OR930189
Report Date: 10/14/93
Report No.: 5061qc
C.O.C. No.: 3750, 3751

Quality Assurance Data Report
Total Petroleum Hydrocarbons by IR
EPA Method 418.1 Modified
mg/kg (ppm)

Sample Name	Lab Code	Method Detection Limit	Sample Result	Dup. Sample Result	RPD	Spike Level	Spiked Result	% Recovery	% Recovery Acceptance Limits
T1-1	0189-1	4.00	74.70	69.4	5.19	200	256	91.9	75-125

RPD - Relative Percent Difference

Signature of Chemist

Laboratory Manager

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Client: City of Portland
Project No.: 7197-00
Project Manager: Gerry Koschal
Sample Matrix: Soil

Service Request No.: OR930191
Report Date: 10/14/93
Report No.: 5062
C.O.C. No.: 3752

Total Petroleum Hydrocarbons by IR
EPA Method 418.1 Modified
mg/kg (ppm)

Sample Name	Lab Code	Sample Date	Date Extracted	Date Analyzed	Method Detection Limit	Result
T4-25	0191-1	10/14	10/14	10/14	4.00	28.6
T4-26	0191-2	10/14	10/14	10/14	4.00	134
T4-27	0191-3	10/14	10/14	10/14	4.00	62.7
T5-28	0191-4	10/14	10/14	10/14	4.00	32.3
T5-29	0191-5	10/14	10/14	10/14	4.00	15.3
T5-30	0191-6	10/14	10/14	10/14	4.00	25.0
LAB BLANK	10-14SBK	10/14	10/14	10/14	4.00	ND

ND Not Detected

Signature of Chemist

Laboratory Manager

EPA418.1mod.

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Engineering & Environmental Services

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Portland, Oregon 97223-8024
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FAX (503) 620-7892

Client City of Portland
Project No. 7197-00
Project Manager Gerry Koschal
Sample Matrix Soil

Service Request No.: OR930189
Report Date: 10/14/93
Report No.: 5062qc
C.O.C. No.: 3752

Quality Assurance Data Report
Total Petroleum Hydrocarbons by IR
EPA Method 418.1 Modified
mg/kg (ppm)

Sample Name	Lab Code	Method Detection Limit	Sample Result	Dup. Sample Result	RPD	Spike Level	Spiked Result	% Recovery	% Recovery Acceptance Limits
Blank Spike	10-14blk spk	4.00	ND	NA	NA	200	204	102	75-125

ND Not Detected
NA Not Applicable
RPD Relative Percent Difference

Signature of Chemist

Laboratory Manager

AGRA
Earth & Environmental Group

HUGHES
ANALYTICAL LABORATORY

October 27, 1993

Mr. Gerry Koschal
RZA AGRA, Inc.
7477 SW Tech Center Drive
Portland, OR 97223

Dear Mr. Koschal:

Enclosed is the lab report for your samples which were received on October 19, 1993. The Hughes Report # is 93-0438 and the Client Project is 7197, City of Portland BES St. Johns.

One soil sample was received under a chain of custody. The sample was received in containers consistent with U.S. EPA (United States Environmental Protection Agency) protocol.

Standard Quality Assurance/Quality Control (QA/QC) procedures were performed as stated in "EPA Test Methods for Evaluating Solid Waste (SW-846)", 3rd Edition and "Standard Methods for the Examination of Water and Wastewater", 17th Edition. The EPA laboratory protocols followed include sample holding times, laboratory method blanks, laboratory matrix spikes, replicate samples and calibration standards. There were no significant variations from these protocols that would invalidate the analytical data.

Test methods may include minor modifications of detection limits or lists of parameters for the published methods. Solid samples are reported on a wet weight basis unless otherwise noted.

Compounds not detected are listed under results as ND.

Sincerely,

Kim Hughes

Kim Hughes
Lab Director

21920 N.E. Glisan ▪ Gresham, Oregon 97030 ▪ (503) 669-3745 ▪ FAX (503) 669-4165

HUGHES ANALYTICAL LABORATORY

HUGHES REPORT #: 93-0438
CLIENT: RZA AGRA, Inc.
DATE: October 27, 1993
ITEMS: One Soil Sample

CLIENT JOB: 7197 BES
St. Johns

METHOD: TCLP Metals
per EPA 1311,3005,6010,7000 series
Results in mg/L (ppm)

Extraction: 10/21/93
Analysis: 10/25/93

ANALYTE	T2-10	DETECTION LIMIT	REGULATORY LIMIT
Arsenic	ND	0.5	5.0
Barium	2.0	0.5	100.0
Cadmium	ND	0.05	1.0
Chromium	0.09	0.05	5.0
Lead	2.0	0.5	5.0
Mercury	ND	0.0002	0.2
Selenium	ND	0.7	1.0
Silver	ND	0.5	5.0

METHOD: PCB Analysis per EPA 8080
Results in mg/Kg (ppm)
Dry Weight Basis

Extraction: 10/25/93
Analysis: 10/25/93

SAMPLE I.D.	AROCLOR	PCB	SURROGATE RECOVERY, %
T2-10	1260	0.24	104
T2-10 replicate	1260	0.17	102
Lab Blank	--	ND	114
Detection Limit		0.05	

ND = Not Detected

HUGHES ANALYTICAL LABORATORY

HUGHES REPORT #: 93-0438
CLIENT: RZA AGRA, Inc.
DATE: October 27, 1993
ITEMS: One Soil Sample

CLIENT JOB: 7197 BES
St. Johns

METHOD: VOLATILE ORGANIC COMPOUNDS
per EPA 8240
Results in ug/Kg (ppb)

Extraction: 10/22/93
Analysis: 10/25/93

DESCRIPTION	T2-10	LAB BLANK	DETECTION LIMIT
ACETONE	ND	ND	1000
ACROLEIN	ND	ND	1000
ACRYLONITRILE	ND	ND	1000
ALLYL CHLORIDE	ND	ND	50
BENZENE	ND	ND	50
BROMODICHLOROMETHANE	ND	ND	25
BROMOFORM	ND	ND	25
BROMOMETHANE	ND	ND	50
2-BUTANONE	ND	ND	1000
CARBON DISULFIDE	ND	ND	25
CARBON TETRACHLORIDE	ND	ND	25
CHLOROBENZENE	ND	ND	25
CHLOROETHANE	ND	ND	25
2-CHLOROETHYL VINYL ETHER	ND	ND	500
CHLOROFORM	ND	ND	25
CHLOROMETHANE	ND	ND	50
DIBROMOCHLOROMETHANE	ND	ND	25
1,2-DIBROMOETHANE	ND	ND	25
DIBROMOMETHANE	ND	ND	25
1,2-DICHLOROBENZENE	ND	ND	50
1,3-DICHLOROBENZENE	ND	ND	50
1,4-DICHLOROBENZENE	ND	ND	50
1,4-DICHLORO-2-BUTENE	ND	ND	50
DICHLORODIFLUOROMETHANE	ND	ND	250
1,1-DICHLOROETHANE	ND	ND	25
1,2-DICHLOROETHANE	ND	ND	25
1,1-DICHLOROETHENE	ND	ND	25
trans-1,2-DICHLOROETHENE	ND	ND	25
1,2-DICHLOROPROPANE	ND	ND	25
cis-1,3-DICHLOROPROPENE	ND	ND	25

ND = Not Detected

HUGHES ANALYTICAL LABORATORY

HUGHES REPORT #: 93-0437
CLIENT: RZA AGRA, Inc.
DATE: October 27, 1993
ITEMS: One Soil Sample

CLIENT JOB: 6764-01 PDC
South Waterfront

METHOD: VOLATILE ORGANIC COMPOUNDS (Continued)
per EPA 8240
Results in ug/Kg (ppb)

Extraction: 10/22/93
Analysis: 10/25/93

DESCRIPTION	T2-10	LAB BLANK	DETECTION LIMIT
trans-1,3-DICHLOROPROPENE	ND	ND	25
ETHYLMETHACRYLATE	ND	ND	250
ETHYLBENZENE	ND	ND	25
2-HEXANONE	ND	ND	250
IODOMETHANE	ND	ND	50
METHACRYLONITRILE	ND	ND	250
METHYL ISOBUTYL KETONE	ND	ND	250
METHYLENE CHLORIDE	ND	ND	500
METHYLMETHACRYLATE	ND	ND	250
PENTACHLOROETHANE	ND	ND	25
STYRENE	ND	ND	25
1,1,1,2-TETRACHLOROETHANE	ND	ND	25
1,1,2,2-TETRACHLOROETHANE	ND	ND	25
TETRACHLOROETHENE	ND	ND	25
TOLUENE	ND	ND	25
1,1,1-TRICHLOROETHANE	ND	ND	25
1,1,2-TRICHLOROETHANE	ND	ND	25
TRICHLOROETHENE	ND	ND	25
TRICHLOROFLUOROMETHANE	ND	ND	25
VINYL CHLORIDE	ND	ND	50
TOTAL XYLENES	ND	ND	50

Surrogate Recovery, %			Acceptance Limits
d4-1,2-Dichloroethane	82.5	87.3	74-121
d8-Toluene	82.1	87.9	70-121
Bromofluorobenzene	87.4	93.6	81-117

ND = Not Detected

RZA AGRA, Inc.

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(503) 639-3400
FAX (503) 620-7892

Client: City of Portland
Project No.: 7197
ject Manager: Gerry Koschal
ample Matrix: Soil

Service Request No.: OR930188
Report Date: 10/18/93
Report No.: 5067
C.O.C. No.: 87

Total Petroleum Hydrocarbons - Diesel Range
ODEQ Method TPH-D
mg/kg (ppm)

Sample Name	Lab Code	Sample Date	Analysis Date	Method Detection Limit	Concentration	Surrogate Recovery 2-Fluorobiphenyl
TP-2-5	0188-1	10/12/93	10/15/93	12.50	16.6	147
TP-5-6	0188-2	10/12/93	10/15/93	12.50	120	*
TP-5-12	0188-3	10/12/93	10/15/93	12.50	ND	135
TP-6-5	0188-4	10/12/93	10/15/93	12.50	28.5	*
LAB BLANK	10-15SBKD	-	10/15/93	12.50	ND	137

* Surrogate recovery can not be reported due to target and non-target peaks within the retention time window of the surrogate.

ODEQ Acceptance Criteria 50%-150%

ND Not Detected

Signature of Chemist

Sean Hornsby
Laboratory Manager

ODEQTPHD.XLS

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(503) 639-3400
FAX (503) 620-7892

Client City of Portland
Project No. 7197-00
Project Manager Gerry Koschal
Sample Matrix Soil

Service Request No.: OR930188
Report Date: 10/18/93
Report No.: 5067qc
C.O.C. No.: 87

Quality Assurance Data Report
Diesel Range Organic Compounds
ODEQ Method WTPH-D
mg/kg(ppm)

Sample Name	Lab Code	Sample Result	Dup. Result	RPD	Spike Level	Spiked Result	% Recovery	% Rec. Acceptance Criteria	% Surrogate Recovery
Blank Spike	10-15blk spk	38.0	-	-	50.0	-	75.9	75.0-125	79.5

WDOE Acceptance Criteria: 50-150

Signature of Chemist

Laboratory Manager

AGRA
Earth & Environmental Group

outfall 49

DESIGNED BY: PJ	SCALE : AS SHOWN
DRAWN BY : RAW	DATE : 04/13/94
CHECKED BY :	FILE :
PROJECT NO.: 4024100201-4003	

centurywest
ENGINEERING CORPORATION

BUREAU OF ENVIRONMENTAL SERVICES
CITY OF PORTLAND

AERIAL PHOTOGRAPH
1977

CRAW00018018

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Engineering & Environmental Services

7477 SW Tech Center Drive
Portland, Oregon 97223-8024
(503) 639-3400
FAX (503) 620-7892

Client BES- St Johns
Project No. Gerry Koschal
Project Manager 7197-00
Sample Matrix Soil

Service Request No.: OR930196
eport Date: 10/19/93
Report No.: 5070qc
C.O.C. No.: 126

Quality Assurance Data Report
Total Petroleum Hydrocarbons by IR
EPA Method 418.1 Modified
mg/kg (ppm)

Sample Name	Lab Code	Sample Result	Dup. Result	RPD	Spike Level	Spiked Result	% Recovery	% Rec. Acceptance Criteria
Blank Spike	10-18sbk spk	101	-	-	100	-	101	75.0%-125%

Sean Gourley For Brian Hong
Signature of Chemist

Sean Gourley
Laboratory Manager

AGRA
Earth & Environmental Group

RZA AGRA, Inc.

(Formerly: Rittenhouse-Zeman & Associates, Inc.)
Engineering & Environmental Services

7477 SW Tech Center Drive
Portland, Oregon 97223-8024
(503) 639-3400
FAX (503) 620-7892

Client: City of Portland
Project No.: 7197-00
Project Manager: Gerry Koschal
Sample Matrix: Soil

Service Request No.: OR930192
Report Date: 10/14/93
Report No.: 5063
C.O.C. No.: 139

Total Petroleum Hydrocarbons by IR
EPA Method 418.1 Modified
mg/kg (ppm)

Sample Name	Lab Code	Sample Date	Date Extracted	Date Analyzed	Method Detection Limit	Result
TP-8-10	0192-1	10/14	10/14	10/14	4.00	12.6
TP-8-20	0192-2	10/14	10/14	10/14	4.00	19.3
LAB BLANK	10-14SBK	10/14	10/14	10/14	4.00	ND

ND Not Detected

Signature of Chemist

Sean Tormley
Laboratory Manager

EPA418.1mod.

AGRA
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RZA AGRA, Inc.

(Formerly: Rittenhouse-Zeman & Associates, Inc.)
Engineering & Environmental Services

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Portland, Oregon 97223-8024
(503) 639-3400
FAX (503) 620-7892

Client City of Portland
Project No. 7197-00
Project Manager Gerry Koschal
Sample Matrix Soil

Service Request No.: OR930192
Report Date: 10/14/93
Report No.: 5063QC
C.O.C. No.: 0139

Quality Assurance Data Report
Total Petroleum Hydrocarbons by IR
EPA Method 418.1 Modified
mg/kg (ppm)

Sample Name	Lab Code	Method Detection Limit	Sample Result	Dup. Sample Result	RPD	Spike Level	Spiked Result	% Recovery	% Recovery Acceptance Limits
TP-8-10	0192-1	4.00	12.6	8.27	29.9	200	210	99.8	75-125

RPD Relative Percent Difference

Signature of Chemist

Laboratory Manager

AGRA
Earth & Environmental Group

RZA AGRA, Inc.

(Formerly: Rittenhouse-Zeman & Associates, Inc.)
Engineering & Environmental Services

7477 SW Tech Center Drive
Portland, Oregon 97223-8024
(503) 639-3400
FAX (503) 620-7892

Client: City of Portland
Project No.: 21-07197-00
Project Manager: Gerry Koschal
Sample Matrix: Soil

Service Request No.: OR930215
Report Date: 11/8/93
Report No.: 5129
C.O.C. No.: 0173

Volatile Organic Compounds
EPA Methods 8010/8020
mg/kg(ppm)

Sample Name:	TP-23-6	Lab Blank	Detection
Lab Code:	0215-2	0215-MB	Limit
Bromodichloromethane	ND	ND	0.05
Bromoform	ND	ND	0.05
Bromomethane	ND	ND	0.10
Carbon Tetrachloride	ND	ND	0.05
Chlorobenzene	ND	ND	0.05
Chloroethane	ND	ND	0.10
2-Chloroethylvinyl ether	ND	ND	0.05
Chloroform	ND	ND	0.05
Chloromethane	ND	ND	0.10
Dibromochloromethane	ND	ND	0.05
1,2-Dibromoethane	ND	ND	0.05
1,2-Dichlorobenzene	ND	ND	0.05
1,3-Dichlorobenzene	ND	ND	0.05
1,4-Dichlorobenzene	ND	ND	0.05
1,1-Dichloroethane	ND	ND	0.05
1,2-Dichloroethane	ND	ND	0.05
1,1-Dichloroethene	ND	ND	0.05
C-1,2-Dichloroethene	ND	ND	0.05
T-1,2-Dichloroethene	ND	ND	0.05
1,2-Dichloropropane	ND	ND	0.05
C-1,3-Dichloropropene	ND	ND	0.05
T-1,3-Dichloropropene	ND	ND	0.05
Methylene Chloride	0.12(a)	0.15(a)	0.05
1,1,2,2-Tetrachloroethane	ND	ND	0.05
Tetrachloroethene (PCE)	ND	ND	0.05
1,1,1-Trichloroethane (TCA)	ND	ND	0.05
1,1,2-Trichloroethane	ND	ND	0.05
Trichloroethene (TCE)	ND	ND	0.05
Trichlorofluoromethane	ND	ND	0.05
Vinyl Chloride	ND	ND	0.10
Benzene	ND	ND	0.05
Ethylbenzene	0.47	ND	0.05
Toluene	ND	ND	0.05
m/p-Xylene	1.50	ND	0.05
o-Xylene	0.16	ND	0.05
Sample Date:	10/26/93	11/4/93	
Analysis Date:	11/5/93	11/5/93	

ND Not Detected
(a) Estimated value because the analyte is also found in the associated method blank.

AGRA
Earth & Environmental Group

RZA AGRA, Inc.

(Formerly: Rittenhouse-Zeman & Associates, Inc.)
Engineering & Environmental Services

7477 SW Tech Center Drive
Portland, Oregon 97223-8024
(503) 639-3400
FAX (503) 620-7892

Volatile Organic Compounds
EPA Methods 8010/8020

Surrogate Recoveries:			
Sample Name:	**TP-23-6**	**Lab Blank**	**Control**
Lab Code:	**0215-2**	**0215-MB**	**Limits**
Bromochloromethane:	101	84.1	72.7%-132%
1,4 - Dichlorobutane:	74.0	81.0	51.4%-133%
a,a,a - Trifluorotoluene:	104	106	77.7%-123%

Signature of Chemist

Laboratory Manager

801020.xls

AGRA
Earth & Environmental Group

HUGHES
ANALYTICAL LABORATORY

November 3, 1993

Mr. Gerry Koschal
RZA AGRA, Inc.
7477 SW Tech Center Drive
Portland, OR 97223

Dear Mr. Koschal:

Enclosed is the lab report for your samples which were received on October 20, 1993. The Hughes Report # is 93-0445 and the Client Project is 7197, BES St. Johns.

Five water samples were received under a chain of custody. The samples were received in containers consistent with U.S. EPA (United States Environmental Protection Agency) protocol.

Standard Quality Assurance/Quality Control (QA/QC) procedures were performed as stated in "EPA Test Methods for Evaluating Solid Waste (SW-846)", 3rd Edition and "Standard Methods for the Examination of Water and Wastewater", 17th Edition. The EPA laboratory protocols followed include sample holding times, laboratory method blanks, laboratory matrix spikes, replicate samples and calibration standards. There were no significant variations from these protocols that would invalidate the analytical data.

Test methods may include minor modifications of detection limits or lists of parameters for the published methods. Solid samples are reported on a wet weight basis unless otherwise noted.

Compounds not detected are listed under results as ND.

Sincerely,

Kim Hughes

Kim Hughes
Lab Director

21920 N.E. Glisan ▪ Gresham, Oregon 97030 ▪ (503) 669-3745 ▪ FAX (503) 669-4165

HUGHES ANALYTICAL LABORATORY

HUGHES REPORT #: 93-0434
CLIENT: RZA AGRA, Inc.
DATE: November 3, 1993
ITEMS: Five Water Samples

CLIENT JOB: 7197 BES
St. Johns

METHOD: PCB Analysis per EPA 608
Results in ug/L (ppb)

Extraction: 10/22/93
Analysis: 10/25/93

SAMPLE I.D.	AROCLOR	PCB	SURROGATE RECOVERY, %
MW-1	---	ND	89.4
MW-2	---	ND	95.5
MW-3	---	ND	96.0
MW-4	---	ND	103
MW-5	---	ND	95.4
Lab Blank	---	ND	100
Detection Limit		1.0	

ND = Not Detected

HUGHES ANALYTICAL LABORATORY

HUGHES REPORT #: 93-0434
CLIENT: RZA AGRA, Inc.
DATE: November 3, 1993
ITEMS: Five Water Samples

CLIENT JOB: 7197 BES
St. Johns

METHOD: Chlorinated Phenolics per EPA Method 8040 Results in ug/L (ppb)

Extraction: 10/22/93
Analysis: 10/26/93
11/01/93

SAMPLE I.D.	PENTACHLORO-PHENOL	2,4,5-TRICHLORO-PHENOL	SURROGATE RECOVERY, %
MW-1	ND	ND	43.7
MW-2	ND	ND	50.0
MW-3	ND	ND	59.7
MW-4	ND	ND	69.0
MW-5	18	ND	65.1
Lab Blank	ND	ND	61.6
Detection Limit	10	5	

ND = Not Detected

RZA

RITTENHOUSE-ZEMAN & ASSOCIATES, INC.
EARTH & ENVIRONMENTAL CONSULTANTS

7409 S.W. Tech Center Drive, Suite 135
Portland, Oregon 97223-8024
(503) 639-3400 FAX: (503) 620-7892

3751

CHAIN-OF-CUSTODY RECORD / LABORATORY ANALYSES REQUEST

PROJECT: BES JOB #: 7197-00

CLIENT: City of Portland

PROJ. MANAGER: Gary K PHONE #: 639-3400

SITE ADDRESS: Pittsburg / St Johns Bridge, St Helens, Oregon

SAMPLER'S NAME: Denny M PHONE #: 639-3400

SAMPLER'S SIGNATURE: [signature]

ANALYSIS REQUESTED: (Circle, Check Box, or Write Preferred Method in Box) OTHER: (Write In)

SAMPLE ID #	DATE	TIME	PRESERV.	MATRIX	Halogenated Volatiles EPA 601 EPA 8010	Aromatics (BTX&E) EPA 602 EPA 8020	Fuel Scan/TPH by GC EPA 602-mod/8015-mod.	Volatile Organ. Compnds	GC Fingerprint	Penta/Letra-chlorophenol EPA 604 EPA 8040	Tot. Petrol. Hydrocarbons EPA 413.1 418.1 / TLC	Total Metals ICP AA Other	EP-TOX Metals	Purgeable Organics EPA 624 8240	Base/Neut.Acids EPA 625 8270	pH Cond. Alk Color	NO3/NO2 N-NO3 NH3-N	Ca Mg Na K Fe Cl SO4	TOX TOC TDS COD	TPH			# of Containers	Sample Preparation	Detection Limits Desired
1. T3-21	10/11/93		Ice	Soil																+			1		
2. T3-23																							1		
3. T3-24																							1		
4.																									
5.																									
6.																									
7.																									
8.																									
9.																									
10.																									

RELINQUISHED BY RZA:	RELINQUISHED BY:	RELINQUISHED BY:
Signature: [signature]	Signature: [signature]	Signature:
Printed Name: DENNY MACMILLAN	Printed Name: DAVE ROBERTSON	Printed Name:
Firm: RZA AGRA, Inc.	Firm: RZA AGRA	Firm:
Date/Time: 10/12/93 6:00P	Date/Time: 10/13/93	Date/Time:

RECEIVED BY:	RECEIVED BY:	RECEIVED BY:
Signature: [signature]	Signature: Jean Gormley	Signature:
Printed Name: DAVE ROBERTSON	Printed Name: Jean Gormley	Printed Name:
Firm: RZA AGRA	Firm: RZA AGRA	Firm:
Date/Time: 10/12/93 6:00P	Date/Time: 10/13/93 7:36	Date/Time:

LABORATORY:

Shipping I.D. #:

Carrier:

DOT Designation:

SAMPLE RECEIPT:

Total # Containers:

Condition of Containers?

Condition of Seals?

SPECIAL INSTRUCTIONS/COMMENTS:

Lab Project: OR930189

DISTRIBUTION: WHITE-return to RZA; YELLOW-lab; PINK-retained by RZA.

PAGE____ OF ____.

CRAW00018027

RZA
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7409 S.W. Tech Center Drive, Suite 135
Portland, Oregon 97223-8024
(503) 639-3400 FAX: (503) 620-7892

3750

CHAIN-OF-CUSTODY RECORD / LABORATORY ANALYSES REQUEST

PROJECT: BES St Johns JOB #: 7197-00
CLIENT: City of Pdx
PROJ. MANAGER: Gerry K PHONE #: 639-3400
SITE ADDRESS: Pittsburg/St Johns Bridge St Helens Oregon
SAMPLER'S NAME: Denny M PHONE #: 639-3400
SAMPLER'S SIGNATURE: Denny Macomber

ANALYSIS REQUESTED: (Circle, Check Box, or Write Preferred Method in Box) OTHER: (Write in)

SAMPLE ID #	DATE	TIME	PRESERV.	MATRIX	Halogenated Volatiles EPA 601 EPA 8010	Aromatics (BTX&E) EPA 602 EPA 8020	Fuel Scan/TPH by GC EPA 602-mod/8015-mod.	Volatile Organ. Compds	GC Fingerprint	Pesticide/Chlorophenol EPA 604 EPA 8040	Tot. Petrol. Hydrocarbons EPA 413.1, 418.1 / TLC	Total Metals ICP AA Other	EP-TOX Metals	Purgeable Organics EPA 624 8240	Base/Neut.Acids EPA 625 8270	pH Cond. Alk Color	NO3/NO2 N-NO3 NH3-N	Ca Mg Na K Fe Cl SO4	TOX TOC TDS COD	TPH			# of Containers	Sample Preparation	Detection Limits Desired
1. T2-2	10/11/93		ice	Soil																X			1		
T2-3 1. T3-12																							1		
1. T2-5																							1		
T1-6 4. T1-16																							1		
5. TP3-16																							1		
6. T2-9																							1		
7. T2-10																							1		
8. T2-11																							1		
9. T2-14																							1		
10. T3-17																							1		

RELINQUISHED BY RZA:	RELINQUISHED BY:	RELINQUISHED BY:	LABORATORY:	SAMPLE RECEIPT:
Signature:	Signature:	Signature:		
Printed Name: Denny Macomber	Printed Name: Dave Robertson	Printed Name:	Shipper I.D. #:	Total # Containers:
Firm: RZA AGRA, Inc	Firm: RZA AGRA	Firm:	Carrier:	Condition of Containers?
Date/Time: 10/12/93	Date/Time: 10/12/93	Date/Time:	DOT Declaration:	Condition of Seals?

RECEIVED BY:	RECEIVED BY:	RECEIVED BY:
Signature:	Signature:	Signature:
Printed Name: Dave Robertson	Printed Name:	Printed Name: Jean Gaumbel
Firm: RZA AGRA	Firm:	Firm: RZA AGRA
Date/Time: 10/12/93	Date/Time:	Date/Time: 10/13/93 7:30

SPECIAL INSTRUCTIONS/COMMENTS: Lab Project: OR930185

DISTRIBUTION: WHITE-return to RZA; YELLOW-lab; PINK-retained by RZA.

...r TENHOUSE-ZEMAN & ASSOCIATES, INC.
EARTH & ENVIRONMENTAL CONSULTANTS

7409 S.W. Tech Center Drive, Suite 135
Portland, Oregon 97223-8024
(503) 639-3400 FAX: (503) 620-7892

3752

CHAIN-OF-CUSTODY RECORD / LABORATORY ANALYSES REQUEST

PROJECT: BES/St John's JOB #: 7197
CLIENT: City of Portland
PROJ. MANAGER: Gary K. PHONE #: 639-3400
SITE ADDRESS: St John's Bridge/Pittsburg St Portland Oregon
SAMPLER'S NAME: [illegible] PHONE #: 639-3400
SAMPLER'S SIGNATURE: [illegible]

ANALYSIS REQUESTED: (Circle, Check Box, or Write Preferred Method in Box) OTHER: (Write in)

SAMPLE ID #	DATE	TIME	PRESERV.	MATRIX	Halogenated Volatiles EPA 601 EPA 8010	Aromatics (BTX&E) EPA 602 EPA 8020	Fuel Scan/TPH by GC EPA 602-mod/8015-mod.	Volatile Organ. Compnds	GC Fingerprint	Penta/Tetra-chlorophenol EPA 604 EPA 8040	Tot. Petrol. Hydrocarbons EPA 413.1. 418.1 / TLC	Total Metals ICP AA Other	EP-TOX Metals	Purgeable Organics EPA 624 EPA 8240	Base/Neut.Acids EPA 625 EPA 8270	pH Cond. Alk Color	NO3/NO2 N-NO3 NH3-N	Ca Mg Na K Fe Cl SO4	TOX TOC TDS COD	TPH-418.1			# of Containers	Sample Preparation	Detection Limits Desired
1. T4-25	10/13/93	9:40	Ice	Soil																X			1		
2. T4-26		9:50																					1		
3. T4-27		10:10																					1		
4. T5-28		15:55																					1		
5. T5-29		16:00																					1		
6. T5-30		16:10																					1		
7.																									
8. ~~[illegible]~~		~~[illegible]~~	~~[illegible]~~	~~[illegible]~~																					
9.																									
10.																									

RELINQUISHED BY RZA:	RELINQUISHED BY:	RELINQUISHED BY:	LABORATORY:	SAMPLE RECEIPT:
Signature: [illegible]	Signature: [illegible]	Signature:		
Printed Name: Mary Mecomber	Printed Name: DAVE RASSERTON	Printed Name:	Shipping I.D. #:	Total # Containers:
Firm: RZA AGRA	Firm: RZA AGRA	Firm:	Carrier:	Condition of Containers?
Date/Time: 10/13/93 6:00P	Date/Time: 10/14/93 8:00	Date/Time:	DOT Designation:	Condition of Seals?
RECEIVED BY:	**RECEIVED BY:**	**RECEIVED BY:**	**SPECIAL INSTRUCTIONS/COMMENTS:**	
Signature: [illegible]	Signature:	Signature: [illegible]	OR93D162 0191	
Printed Name: DAVE RASSERTON	Printed Name:	Printed Name: Sean Crowley		
Firm: RZA AGRA	Firm:	Firm: RZA AGRA Inc.		
Date/Time: 10/13/93 6:00P	Date/Time:	Date/Time: 10/14/93 8:00		

DISTRIBUTION: WHITE-return to RZA; YELLOW-lab; PINK-retained by RZA.

PAGE_____ OF _____.

CRAW00018029

93-0450

0152

RZA AGRA, Inc.
(Formerly: Rittenhouse-Zeman & Associates, Inc.)
Engineering & Environmental Services
7477 SW Tech Center Drive • Portland, OR 97223-8024
(503) 639-3400 • FAX (503) 620-7892

Chain-of-Custody Record / Laboratory Analyses Request

Project: BES - ST Johns Job #: 7197
Client: City of Portland
Project Manager: Gerry Koschal Phone #: 639-3100
Sampler's Name: Barry Mercado Phone #: ↓
Sampler's Signature: —

Analysis Requested: (Circle, Check Box, or Write Preferred Method In Box)

	Sample I.D. #	Date	Time	Preserv.	Matrix	Halogenated Volatiles EPA 601 EPA 8010	Volatile Aromatics EPA 602 EPA 8020	BTXE or BTXE / TPH-G	WA. TPH-G or OR. TPH-G	WA. TPH-D or OR. TPH-D	Fuel Scan / TPH by GC 8015-modified	GC Fingerprint / HCID	WA. 418.1 Modified or OR. 418.1 Modified	GC / MS Volatiles 8240	GC / MS Semi Volatiles	Total Metals ICP AA Other	TC LP Metals	pH Cond. Alk Color	8080/PCB's		# of Containers	Comments
01	T2-10	10/18/93	11:00	Cool	S									X			X		X			
2.																						
3.																						
4.																						
5.																						
6.																						
7.																						
8.																						
9.																						
10.																						

Relinquished by (RZA):	Relinquished by:	Relinquished by:	Laboratory:	Sample Receipt:
Signature: Jean Gormley	Signature:	Signature:	Hughes Analytical Lab	
Printed Name: Jean Gormley	Printed Name:	Printed Name:	Shipping I.D.#	Total # Containers:
Firm: RZA AGRA, Inc	Firm:	Firm:	Carrier: Courier	Condition of Containers:
Date/Time: 10/19/93	Date/Time:	Date/Time:	DOT Designation:	Condition of Seals:

Received by:	Received by:	Received by:	Special Instructions/Comments:
Signature: Jenni Hughes	Signature:	Signature:	Original COC is 0150
Printed Name: Jenni Hughes	Printed Name:	Printed Name:	
Firm: Hughes Analytical	Firm:	Firm:	
Date/Time: 10-19-93 10:35	Date/Time:	Date/Time:	

DISTRIBUTION: WHITE & PINK returned to project manager, YELLOW - lab.

Page ____ of ____

SERVICE REQUEST #: _____

CRAW00018030

RZA AGRA, Inc.
(Formerly: Rittenhouse-Zaman & Associates, Inc.)
Engineering & Environmental Services
7477 SW Tech Center Drive • Portland, OR 97223-8024
(503) 639-3400 • FAX (503) 620-7892

Chain-of-Custody Record / Laboratory Analyses Request

Project: BES ST. JOHNS Job #: 7197-00
Client: CITY OF PORTLAND
Project Manager: KOSCHAL Phone #:
Sampler's Name: ROBERTSON/[redacted] Phone #:
Sampler's Signature: [signature]

Analysis Requested: (Circle, Check Box, or Write Preferred Method in Box)

Sample I.D. #	Date	Time	Preserv.	Matrix	Halogenated Volatiles EPA 601 EPA 8010	Volatile Aromatics EPA 602 EPA 8020	BTXE or BTXE / TPH-G	WA. TPH-G or OR. TPH-G	WA. TPH-D or OR. TPH-D	Fuel Scan / TPH by GC (8015-modified)	GC Fingerprint / HCID	WA. 418.1 Modified or OR. 418.1 Modified	GC / MS Volatiles	GC / MS Semi Volatiles	Total Metals ICP AA Other	TC LP Metals	pH Cond. Alk Color			# of Containers	Comments
1. TP-B-10	10/26	4:25	CHILL	SOIL						[redacted]		X									
2. TP-B-20	"	4:45	↓	↓						[redacted]		X									
3.																					
4.																					
5.																					
6.																					
7.																					
8.																					
9.																					
10.																					

Relinquished by RZA:	Relinquished by:	Relinquished by:	Laboratory:	Sample Receipt:
Signature:	Signature:	Signature:		
Printed Name:	Printed Name:	Printed Name:	Shipping I.D.#	Total # Containers:
Firm:	Firm:	Firm:	Carrier:	Condition of Containers:
Date/Time:	Date/Time:	Date/Time:	DOT Designation:	Condition of Seals:

Received by:	Received by:	Received by:	Special Instructions/Comments:
Signature: [signature]	Signature:	Signature:	0R930192
Printed Name: Jean Gorenby	Printed Name:	Printed Name:	
Firm: RZA AGRA	Firm:	Firm:	
Date/Time: 10/14/93	Date/Time:	Date/Time:	

DISTRIBUTION: WHITE & PINK returned to project manager, YELLOW - lab.

Page ____ of ____.
SERVICE REQUEST #: _____

RZA AGRA, Inc.
(Formerly: Rittenhouse-Zeman & Associates, Inc.)
Engineering & Environmental Services
7477 SW Tech Center Drive • Portland, OR 97223-8024
(503) 639-3400 • FAX (503) 620-7892

Chain-of-Custody Record / Laboratory Analyses Request

Project: BES - ST JOHNS Job #: 7197-00
Client: CITY OF PORTLAND
Project Manager: G. KOSCHAL Phone #:
Sampler's Name: D. ROBERTSON Phone #:
Sampler's Signature: [signature]

Analysis Requested: (Circle, Check Box, or Write Preferred Method in Box)

Sample I.D. #	Date	Time	Preserv.	Matrix	Halogenated Volatiles EPA 601 EPA 8010	Volatile Aromatics EPA 602 EPA 8020	BTXE or BTXE / TPH-G	WA. TPH-G or OR. TPH-G	WA. TPH-D or OR. TPH-D	Fuel Scan / TPH by GC 8015-modified	GC Fingerprint / HCID	WA. 418.1 Modified or OR. 418.1 Modified	GC / MS Volatile	GC / MS Semi Volatile	Total Metals ICP AA Other	TC LP Metals	pH Cond. Alk. Color			# of Containers	Comments
1. CH2B4-15	10/15	11:00	CHILL	SOIL								X								1	
2. CH2B4-20	"	11:00																		1	
3. TP-12-12	10/14	11:05																		2	
4. TP-12-15		11:20																		2	
5. TP-14-1		2:00																		1	
6.																					
7.																					
8.																					
9.																					
10.																					

Relinquished by RZA:	Relinquished by:	Relinquished by:	Laboratory:	Sample Receipt:
Signature: [signature]	Signature:	Signature:		
Printed Name: DAVE ROBERTSON	Printed Name:	Printed Name:	Shipping I.D.#	Total # Containers:
Firm: RZA AGRA	Firm:	Firm:	Carrier:	Condition of Containers:
Date/Time: 10/15/93 3:20P	Date/Time:	Date/Time:	DOT Designation:	Condition of Seals:
Received by:	**Received by:**	**Received by:**	**Special Instructions/Comments:**	
Signature: [signature]	Signature:	Signature:		
Printed Name: Jean Gosnley	Printed Name:	Printed Name:		
Firm: RZA AGRA, Inc.	Firm:	Firm:		
Date/Time: 10/15/93 15:20	Date/Time:	Date/Time:		

DISTRIBUTION: WHITE & PINK returned to project manager, YELLOW - lab.

Page ____ of ____.
SERVICE REQUEST #: 0530195

Appendix B

Test Pit Logs
Boring Logs

RZA AGRA, Inc.
(Formerly: Rittenhouse-Zeman & Associates, Inc.)
Engineering & Environmental Services
7477 SW Tech Center Drive • Portland, OR 97223-8024
(503) 639-3400 • FAX (503) 620-7892

Chain-of-Custody Record / Laboratory Analyses Request

Project: BES ST John Job #: 7197
Client: (BES) City of Portland
Project Manager: Gerry Koschel Phone #: 639-3400
Sampler's Name: Denny Macomber Phone #: 639-3400
Sampler's Signature: Denny Macomber

Analysis Requested: (Circle, Check Box, or Write Preferred Method in Box)

Sample I.D. #	Date	Time	Preserv.	Matrix	Halogenated Volatiles EPA 601 EPA 8010	Volatile Aromatics EPA 602 EPA 8020	BTXE or BTXE / TPH-G	WA. TPH-G or OR. TPH-G	WA. TPH-D or OR. TPH-D	Fuel Scan / TPH by GC 8015-modified	GC Fingerprint / HCID	WA. 418.1 Modified or OR. 418.1 Modified	GC / MS Volatiles	GC / MS Semi Volatiles	Total Metals ICP AA Other	TC LP Metals	pH Cond. Alk Color	8080/PCB's	8040*	# of Containers	Comments
01 1. MW-1	10/15/93	9:30	ice	H_2O														X	X	3	
02 2. MW-2		10:10																X	X	3	
03 3. MW-3		11:20																X	X	3	
04 4. MW-4		12:10																X	X	3	
05 5. MW-5		13:20																X	X	3	
6.																					
7.																					
8.																					
9.																					
10.																					

Relinquished by RZA:	Relinquished by:	Relinquished by:	Laboratory:	Sample Receipt:
Signature: Denny Macomber	Signature: Jean Gormley	Signature:		
Printed Name: Denny Macomber	Printed Name: Jean Gormley	Printed Name:	Shipping I.D.#:	Total # Containers:
Firm: RZA AGRA Inc	Firm: RZA AGRA, Inc.	Firm:	Carrier:	Condition of Containers:
Date/Time: 10/15/93 @ 16:00	Date/Time: 10/20/93	Date/Time:	DOT Designation:	Condition of Seals:
Received by:	**Received by:**	**Received by:**	**Special Instructions/Comments:**	
Signature: Jean Gormley	Signature: Jenni Hughes	Signature:	* 8040 = Pentachlorophenol 2,4,5-Trichlorophenol	
Printed Name: Jean Gormley	Printed Name: Jenni Hughes	Printed Name:		
Firm: RZA AGRA	Firm: Hughes Analytical	Firm:		
Date/Time: 10/15/93 16:00	Date/Time: 10-20-93 3:30	Date/Time:	Note: Extraction Holding Times are up Friday	

DISTRIBUTION: WHITE & PINK returned to project manager, YELLOW - lab.

Page ____ of ____.

SERVICE REQUEST #: _____

CRAW00018033

TEST PIT LOGS

Depth (ft.)	Materials Encountered
Test Pit 1	
0 – 5.5	Soft to medium stiff, moist, light brown, SILT with trace to some fine sand and scattered concrete chunks. (fill)
5.5 – 12	Medium stiff to stiff, moist grading to wet, brown, SILT with trace fine sand.
12 – 20	Medium dense, wet, gray-brown fine SAND grading from silty to trace sand at 18 feet.
	Terminated at 20 feet. No seepage observed. No caving observed.
Test Pit 2	
0 – 2	Loose, dry, black, green and white, blast SAND with some gravel and misc. debris (fill).
2 – 4	Soft, moist, gray-brown, SILT with areas of black discoloration and wood fragments (slight hydrocarbon-like odor) (fill).
10 – 11	Large concrete debris or foundation elements.
	Refusal on concrete at 11 feet. No seepage observed. No caving observed.
Test Pit 3	
0 – 3	Soft, dry to moist, tan to white, SILT with abundant brick and concrete debris (fill).
3 – 7.5	Loose, moist, black, blast sand (fill).
7.5 – 13	Medium stiff, moist, light brown, SILT with trace to some clay; grades to some fine sand, and no clay at 10 feet.
13 – 19	Medium dense, moist to wet, gray-brown, fine SAND grading from silty to some silt.
	Terminated at 19 feet. No seepage observed. No caving observed.

Depth (ft.)	Materials Encountered
Test Pit 4	
0 – 4	Soft to medium stiff, dry to moist, tan, SILT with scattered rootlets to 1.5 feet and some gravel (fill).
4 – 9	Medium stiff, moist, lightly rust mottled, light brown, SILT with trace clay and fine sand.
9 – 20	Medium dense, moist, fine SAND grading from silty to some silt at 12 feet.
	Terminated at 20 feet. No seepage observed. No caving observed.
Test Pit 5	
0 – 4	Loose to medium dense, dry to moist, black, blast SAND and tan gravelly SILT with brick and concrete debris (fill).
4 – 9	Medium stiff, moist, green-gray, SILT; some black discoloration and a slight hydrocarbon-like odor (fill).
9 – 13	Stiff, moist, lightly rust mottled, light brown SILT with trace clay.
13 – 19	Medium dense, moist grading to wet, gray-brown, fine SAND, silty grading to some silt at 16 feet.
19 – 20	Medium stiff, wet, gray, SILT with trace fine sand.
	Terminated at 20 feet. Light seepage at 9 feet. No caving observed.
Test Pit 6	
0 – 2	Soft, dry, tan and gray gravelly SILT and blast SAND (fill).
2 – 4	Soft to medium stiff, moist, light brown, gravelly SILT (fill).
4 – 7.5	Soft to medium stiff, moist, dark gray-green, gravelly SILT. Slight hydrocarbon-like odor (fill).
7.5 – 9	Large flat concrete object - possibly slab and foundation. Adjacent soils consist of medium stiff, wet, black, SILT, GRAVEL and CHARRED WOOD DEBRIS (fill).
	Refusal on (foundation elements?) at 9 feet. No seepage observed. No caving observed.

Depth (ft.)	Materials Encountered
Test Pit 7	
0 – 6.5	Soft to medium stiff, dry to moist, light brown and white, SILT and fine SAND (fill).
7 – 12	Medium stiff, moist, dark blue-gray, SILT with some gravel and a slight hydrocarbon-like odor (fill).
	Refusal on concrete and rebar at 12 feet. No seepage observed. Moderate caving from 7 feet to 12 feet.
Test Pit 8	
0 – 3	Loose, dry to moist, black blast SAND with trace concrete debris (fill).
3 – 5	Medium stiff, moist, light brown, SILT with scattered chunks of black slag-like material and some gravel (fill).
5 – 11	Medium stiff, moist, dark blue-gray SILT with some gravel and trace fine sand. Slight organic and possible hydrocarbon-like odor (fill).
11 – 16	Medium dense, wet grading to saturated, dark blue-gray, silty fine SAND (fill).
16 – 20	Medium stiff, saturated SILT with some gravel; abundant rusted nails, pipe, etc (fill).
	Terminated at 20 feet. Light seepage at 16 feet. Minor caving from 16 to 20 feet.
Test Pit 9	
0 – 1	Soft, moist, brown, gravelly silty SAND with abundant rootlets (fill).
1 – 5.5	Medium stiff, dry to moist, light brown SILT with scattered lenses of white and black blast sand and some concrete chunks up to 1 - 2 feet in the long direction (fill).
5.5 – 20	Medium stiff, moist grading to wet, blue and brown silty SAND and sandy SILT with occasional roots and woody debris. Organic and charred wood odor (fill).
	Terminated at 20 feet. No seepage observed. No caving observed.

Depth (ft.)	Materials Encountered
Test Pit 10	
0 – 2	Loose, dry, gravelly SAND with some silt and trace brick debris (fill).
2 – 2.5	Loose, dry, white, blast SAND (fill).
2.5 – 15	Medium stiff, moist, blue-gray, gravelly SILT with trace to some fine sand, abundant charred wood, rebar, concrete and brick (debris) from 2.5 feet to 10 feet (fill).
15 – 18	Medium stiff, moist to wet, blue-gray, silty fine SAND (dredge fill?)
	Terminated at 18 feet due to interference with debris in upper 10 feet.
	No seepage observed. Extreme caving from 0 - 10 feet. Moderate caving from 10 - 20 feet.
Test Pit 11	
0 – 3	Soft to medium stiff, dry, brown SILT with a 6-inch thick lense of black blast sand at 2.5 feet. Abundant brick and concrete debris; rusted piping from surface to 3 feet in old utility corridor; also large slab and foundation elements including a timber pile.
3 – 10	Medium stiff, moist, brown, silty SAND with trace gravel and rootlets; old pipe at 4 feet (fill).
10 – 12	Loose, to medium stiff, moist to wet, green-gray, fine SAND (dredge fill?).
12 – 16.5	Soft, wet, green-gray, clayey SILT with trace fine SAND (dredge fill?).
	Terminated at 16.5 feet due to interference with pipe and foundation elements in upper 5 feet. No seepage observed. No caving observed.
Test Pit 12	
0 - 1	Two inches of ASPHALT over moist, brown GRAVEL.
1 – 8.5	Medium dense, moist, green and gray fine to medium SAND with scattered thin lenses of brown SILT (dredge fill?).
8.5 – 10	Medium stiff, moist, green-gray SILT with some clay and sand (dredge fill?).
10 – 14	Loose to medium dense, moist, dark gray, fine to medium SAND (dredge fill?).
	Terminated at 14 feet due to extreme caving. No seepage observed.

Depth (ft.)	Materials Encountered
Test Pit 13	
0 – 1	Three inches of ASPHALT over dense, moist, brown, silty GRAVEL.
1 – 15	Loose to medium dense, moist, green-gray, fine to medium SAND with trace to some silt and scattered thin lenses of moist, brown, SILT. Becomes dark gray at 10 feet (dredge fill?).
15 – 16	Stiff, moist to wet, brown SILT with some clay and sawdust (fill).
16 – 20	Stiff to very stiff, wet, green-gray SILT with some clay and fine sand.
	Terminated at 20 feet. Light seepage at 11 feet. Moderate caving from 5 - 15 feet.
Test Pit 14	
0 – 1	Two inches of ASPHALT over base coarse GRAVEL. Oily sheen seeping from gravel.
1 – 4.5	Stiff, moist, brown, SILT (fill).
4.5 – 10.5	Soft to medium stiff, moist grading to saturated, dark blue-gray SILT with some organics and large concrete debris at the basal contact (fill).
10.5 – 12	Loose, wet, dark brown, organics and woody debris. Timber pile and 2 - 3 inch metal pipe encountered at basal contact (fill).
12 – 19	Stiff, wet, gray-brown, SILT.
	Terminated at 19 feet. Light seepage at 1 foot and 12 feet. Moderate caving from 4.5 to 10.5 feet.
Test Pit 15	
0 – 1	Two inches of broken up ASPHALT over dry, brown, silty GRAVEL.
1 – 3.5	Stiff, moist, brown, SILT with trace woody debris (fill).
3.5 – 11	Medium stiff, wet, dark blue-gray, SILT with trace clay and fine sand (fill).
11 – 13	Loose, wet to saturated, dark brown ORGANICS and wood, brick and metal debris (fill).
13 – 20	Stiff, moist, light brown, SILT with trace clay.
	Terminated at 20 feet. Minor caving from 9 to 13 feet.

Light seepage at 13 feet.

Depth (ft.)	Materials Encountered
Test Pit 16	
0 – .5	Two inches of ASPHALT over CRUSHED ROCK.
.5 – 1.5	Dense, moist, brown, silty GRAVEL (fill).
1.5 – 10	Medium stiff, moist, dark greenish gray, SILT with some woody debris; Large flat concrete structure at 7 - 9 feet and 3-4" metal pipe at 8 feet.
	Refusal due to obstruction by pipe and concrete at 10 feet. No seepage observed. No caving observed.
Test Pit 17	
0 – 1	Two inches of ASPHALT over brown, silty GRAVEL.
1 – 6.5	Stiff, moist, brown and blue gray SILT. (2) 3" pipes at 2 feet. (1) 3/4" pipe at 4 feet. (1) 3" pipe at 4 feet. Some rounded gravel in pipe trenches.
	Refusal due to obstructions (pipe) at 6.5 feet. No seepage observed. No caving observed.
Test Pit 18	
0 – 1	Soft, dry, moist, brown, silty, TOPSOIL with abundant fine rootlets.
1 – 7	Very stiff, moist, light brown SILT with some gravel and trace fine SAND. Large concrete foundation elements and a 2-inch pipe and 6-inch pipe at 6 - 7 feet.
	Refused due to obstruction (pipe) at 7 feet. No seepage observed. No caving observed.
Test Pit 19	
0 – .5	Soft, moist, brown, silty TOPSOIL with abundant fine rootlets.
.5 – 4	Very stiff moist, light brown, gravelly SILT with trace fine organics, concrete and metal debris (fill).
4 – 8	Soft, moist, dark gray, organic-rich SILT with abundant woody debris. Three inch metal pipe at 7 feet.
	Terminated at 8 feet due to obstruction by (pipe). No seepage observed. No caving observed.

Depth (ft.)	Materials Encountered
Test Pit 20	
0 – 3	Very stiff, moist, tan SILT with some gravel and trace fine sand; cable, brick, etc (fill).
3 – 5	Loose, moist, dark brown, organic-rich SILT with abundant wood debris (fill).
5 – 14	Medium stiff, moist, green-gray SILT with trace clay and fine sand (dredge fill?).
14 – 19	Medium Dense, moist, green-gray, silty fine SAND (dredge fill?).
	Terminated at 19 feet. No seepage observed. No caving observed.

PROJECT: St. JOHNS WATER QUALITY LAB START CARD No.: 47353 WELL No.: MW-1

Elevation Reference: N / A
Groundwater Surface Elevation: N / A

Well Completed: October 6, 1993
Relative Casing Elevation: N / A

Boring Method: Hollow Stem Auger
Borehole Diameter: 8.25 in.

Depth (feet)	SOIL DESCRIPTION	Graphic Log	Continous Sample	Blow Counts	Volatile Readings ppm/%LEL	Ground Water	AS-BUILT DESIGN	ANALYSES
0	3 in. Asphalt cover, underlain by 3 / 4 in. minus FILL.						Flush Mounted Steel Monument with water-tight seal	
	Medium stiff, moist, gray-brown, silty fine SAND.		S1		0/0		Concrete Patch	
	Medium soft, moist, organic SILT (debris content up to 10 %, including wood, brick, and rock.		S2				Locking Cap	
5	Soft to medium stiff, moist, gray SILT, with some brown mottling.				0/0		Bentonite Seal	
							2 inch dia. sch.40 PVC Blank Casing	
10			S3		20/0			
					70/0			
	Very stiff, dry to moist, brown SILT, with some gray mottling below 12.5 ft.							
15			S4		40/0			
	Medium stiff, moist, brown, silty, slightly micaceous fine SAND.							
20	Micaceous, slightly silty, medium SAND lens.		S5					
	Medium stiff, moist, brown, silty, slightly micaceous fine SAND.							
	Medium soft, wet to saturated, gray, slightly silty, micaceous, medium SAND lens.				20/0			
25			S6			WD	PVC Screen (2 inch i.d. with 0.020-inch slots)	
							Silica Sand Filter Pack (# 8-12 sieve)	
	Medium soft, saturated, brown, micaceous, fine SAND.							
30			S7					

LEGEND

(S35) Sample Number

WD Encountered groundwater level While drilling

SW Measured static groundwater level

Groundwater Analysis (Sample No. Shown)

8015 / 8240 Soil Analysis (Test Method Shown)

RZA AGRA JOB No. 21-7197-00
CITY OF PORTLAND / B E S
Foot of N. Salem Street
Portland, Oregon

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7477 S.W. Tech Center Drive
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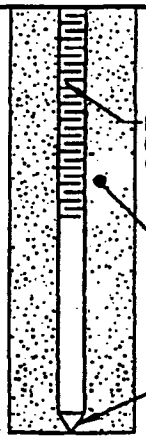
Phone (503) 639-3400 Fax (503) 620-7892

Drilling Started: 10 / 6 / 93 Drilling Completed: 10 / 6 / 93 Logged By: P.D.E.

PROJECT: St. JOHNS WATER QUALITY LAB START CARD No.: 47353 WELL No.: MW-1, Pg. 2

Elevation Reference: N / A
Groundwater Surface Elevation: N / A
Well Completed: October 6, 1993
Relative Casing Elevation: N / A
Boring Method: Hollow Stem Auger
Borehole Diameter: 8.25 in.

Depth (feet)	SOIL DESCRIPTION	Graphic Log	Continuous Sample	Blow Counts	Volatile Readings	Ground Water	AS-BUILT DESIGN	ANALYSES
30	Medium soft, saturated, brown, micaceous, fine SAND.				ppm/ %LEL			
	Soft, saturated, brown, slightly silty, micaceous, medium SAND.				200/ 0			
35			S8					
	Medium stiff, saturated, light brown, micaceous, very silty, fine SAND.							
40	BORING COMPLETED AT 40 FEET BELOW GROUND SURFACE. MW-1 INSTALLED.							
45								
50								
55								
60								



LEGEND

(S35) Sample Number

Encountered groundwater level While drilling (WD)

Measured static groundwater level (SW)

Groundwater Analysis (Sample No. Shown)

8015 / 8240 Soil Analysis (Test Method Shown)

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Drilling Started: 10 / 6 / 93 Drilling Completed: 10 / 6 / 93 Logged By: P.D.E.

PROJECT: St. JOHNS WATER QUALITY LAB START CARD No.: 47354 WELL No.: MW-2

Elevation Reference: N / A
Groundwater Surface Elevation: N / A

Well Completed: October 6, 1993
Relative Casing Elevation: N / A

Boring Method: Hollow Stem Auger
Borehole Diameter: 8.25 in.

Depth (feet)	SOIL DESCRIPTION	Graphic Log	Continous Sample	Blow Counts	Volatile Readings ppm/%LEL	Ground Water	AS-BUILT DESIGN	ANALYSES
0	3 in Asphalt cover, underlain by 3 / 4 in. minus FILL.						Flush Mounted Steel Monument with water-tight seal	
	Medium stiff, moist, gray, slightly micaceous SILT.		S9				Concrete Patch; Locking Cap; Bentonite Seal	
5			S10		60/0		2 inch dia. sch.40 PVC Blank Casing	
	Medium stiff, moist, black, organic plastic SILT lens.							
10	Medium stiff, moist, gray, slightly micaceous SILT.		S11					
	Medium soft, moist, gray, slightly silty, micaceous medium SAND.				40/0			
	Gray SILT lens.							
15	Gray, medium SAND.		S12					
	Gray SILT.				70/0			
20	Gray fine and medium SAND.		S13					
					70/0			
25							PVC Screen (2 inch i.d. with 0.020-inch slots)	
	SAND, becoming brown in color, SILT content increasing with depth.		S14		90/0	WD	Silica Sand Filter Pack (# 8-12 sieve)	
	Brown SILT, with fine sand.							
30			S15					

LEGEND

(S35) Sample Number

Encountered groundwater level While drilling (WD)

Measured static groundwater level (SW)

Groundwater Analysis (Sample No. Shown)

8015 / 8240 Soil Analysis (Test Method Shown)

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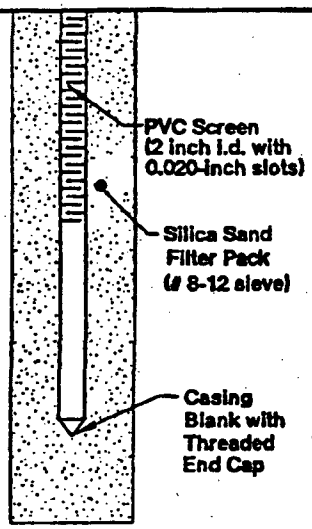
Drilling Started: 10 / 6 / 93 Drilling Completed: 10 / 6 / 93 Logged By: P.D.E.

PROJECT: St. JOHNS WATER QUALITY LAB START CARD No.: 47354 WELL No.: MW-2

Elevation Reference: N / A
Groundwater Surface Elevation: N / A
Well Completed: October 6, 1993
Relative Casing Elevation: N / A
Boring Method: Hollow Stem Auger
Borehole Diameter: 8.25 in.

Depth (feet)	SOIL DESCRIPTION	Graphic Log	Continous Sample	Blow Counts	Volatile Readings ppm / %LEL	Ground Water	AS-BUILT DESIGN	ANALYSES
30	Brown SILT, with fine sand.							
	Soft, saturated, brown, slightly silty, micaceous, medium SAND.				20/0		PVC Screen (2 inch i.d. with 0.020-inch slots)	
35					50/0		Silica Sand Filter Pack (# 8-12 sieve)	
40							Casing Blank with Threaded End Cap	
	BORING COMPLETED AT 42 FEET BELOW GROUND SURFACE. MW-2 INSTALLED.							
45								
50								
55								
60								



LEGEND

(S35) Sample Number

WD Encountered groundwater level While drilling

SW Measured static groundwater level

△ Groundwater Analysis (Sample No. Shown)

8015 / 8240 Soil Analysis (Test Method Shown)

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Drilling Started: 10 / 6 / 93 Drilling Completed: 10 / 6 / 93 Logged By: P.D.E.

PROJECT: St. JOHNS WATER QUALITY LAB START CARD No.: 47356 WELL No.: MW-3

Elevation Reference: N / A
Groundwater Surface Elevation: N / A
Well Completed: October 7, 1993
Relative Casing Elevation: N / A
Boring Method: Hollow Stem Auger
Borehole Diameter: 8.25 in.

Depth (feet)	SOIL DESCRIPTION	Graphic Log	Continuous Sample	Blow Counts	Volatile Readings ppm/%LEL	Ground Water	AS-BUILT DESIGN	ANALYSES
0	Medium stiff, moist, brown, very gravelly silt FILL.						Flush Mounted Steel Monument with water-tight seal	
	Soft, dry, brown, micaceous, very silty medium SAND.						Concrete Patch	
	Medium soft to stiff, dry, gray, organic SILT (wood fragment debris).		S16				Locking Cap	
							Bentonite Seal	
5	Loose, dry to moist, black to gray, silty coarse SAND, with some wood and red/white brick debris.		S17		60/0		2 inch dia. sch.40 PVC Blank Casing	
10	Few gravel-sized clasts at 10 ft. depth.		S18					
			S19		40/0			
	Medium soft, wet, gray, very silty, fine SAND, with slight organic odor.							
15					70/0			
20			S20					
					70/0			
	Medium stiff, wet, brown, very fine sandy SILT.							
25	Soft, saturated, gray, slightly micaceous medium SAND.		S21				PVC Screen (2 inch i.d. with 0.020-inch slots)	
					90/0		Silica Sand Filter Pack (# 8-12 sieve)	
	Medium stiff, saturated, brown, slightly micaceous SILT.							
30			S22					

LEGEND

(S35) Sample Number

Encountered groundwater level While drilling (WD)

Measured static groundwater level (SW)

Groundwater Analysis (Sample No. Shown)

8015 / 8240 Soil Analysis (Test Method Shown)

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Drilling Started: 10 / 7 / 93 Drilling Completed: 10 / 7 / 93 Logged By: P.D.E.

PROJECT: ST. JOHNS WATER QUALITY LAB START CARD No.: 47356 WELL No.: MW-3

Elevation Reference: N / A
Groundwater Surface Elevation: N / A
Well Completed: October 7, 1993
Relative Casing Elevation: N / A
Boring Method: Hollow Stem Auger
Borehole Diameter: 8.25 in.

Depth (feet)	SOIL DESCRIPTION	Graphic Log	Continuous Sample	Blow Counts	Volatile Readings ppm/%LEL	Ground Water	AS-BUILT DESIGN	ANALYSES
0	Medium stiff, moist, brown, very gravelly silt FILL.						Flush Mounted Steel Monument with water-tight seal	
	Soft, dry, brown, micaceous, very silty, medium SAND.						Concrete Patch	
	Medium soft to stiff, dry, gray, organic SILT (wood fragment debris).		S16				Locking Cap	
							Bentonite Seal	
5	Loose, dry to moist, black to gray, silty coarse SAND, with some wood and red/white brick debris.		S17		60%		2 inch dia. sch.40 PVC Blank Casing	
10	Few gravel-sized clasts at 10 ft. depth.		S18					
			S19		40%			
	Medium soft, wet, gray, very silty, fine SAND, with slight organic odor.							
15					70%			
20			S20					
					70%			
	Medium stiff, wet, brown, very fine sandy SILT.							
25	Soft, saturated, gray, slightly micaceous medium SAND.		S21				PVC Screen (2 inch i.d. with 0.020-inch slots)	
					90%		Silica Sand Filter Pack (# 8-12 sieve)	
	Medium stiff, saturated, brown, slightly micaceous SILT.							
30			S22					

LEGEND

(S35) Sample Number

Encountered groundwater level While drilling (WD)

Measured static groundwater level (SW)

Groundwater Analysis (Sample No. Shown)

8015 / 8240 Soil Analysis (Test Method Shown)

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Drilling Started: 10 / 7 / 93 Drilling Completed: 10 / 7 / 93 Logged By: P.D.E.

PROJECT: SL JOHNS WATER QUALITY LAB START CARD No.: 47356 WELL No.: MW-3, Pg. 2

Elevation Reference: N / A
Groundwater Surface Elevation: N / A
Well Completed: October 7, 1993
Relative Casing Elevation: N / A
Boring Method: Hollow Stem Auger
Borehole Diameter: 8.25 in.

Depth (feet)	SOIL DESCRIPTION	Graphic Log	Continous Sample	Blow Counts	Volatile Readings ppm/%LEL	Ground Water	AS-BUILT DESIGN	ANALYSES
30	Medium stiff, saturated, brown, slighly micaceous SILT.				20/0		PVC Screen (2 inch i.d. with 0.020-inch slots)	
	Soft, saturated, gray, silty fine SAND.							
35	Medium stiff, saturated, brown, fine sandy SILT.						Silica Sand Filter Pack (# 8-12 sieve)	
	Soft to medium stiff, brown, micaceous, silty, medium SAND.				50/0			
40	BORING COMPLETED AT 40 FEET BELOW GROUND SURFACE. MW-3 INSTALLED.						Casing Blank with Threaded End Cap	
45								
50								
55								
60								

LEGEND

(S35) Sample Number

Encountered groundwater level While drilling (WD)

Measured static groundwater level (SW)

Groundwater Analysis (Sample No. Shown)

8015 / 8240 Soil Analysis (Test Method Shown)

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Drilling Started: 10 / 7 / 93 Drilling Completed: 10 / 7 / 93 Logged By: P.D.E.

PROJECT: St. JOHNS WATER QUALITY LAB START CARD No.: 50010 WELL No.: MW-4

Elevation Reference: N / A
Groundwater Surface Elevation: N / A
Well Completed: October 7, 1993
Relative Casing Elevation: N / A
Boring Method: Hollow Stem Auger
Borehole Diameter: 8.25 in.

Depth (feet)	SOIL DESCRIPTION	Graphic Log	Continous Sample	Blow Counts	Volatile Readings ppm/%LEL	Ground Water	AS-BUILT DESIGN	ANALYSES
0	Medium stiff, dry, tan-brown, slightly gravelly silty SAND.						Flush Mounted Steel Monument with water-tight seal	
	Medium soft-medium stiff, moist, tan-red, silty micaceous fine SAND.				0/0		Concrete Patch; Locking Cap; Bentonite Seal	
5			S23					
	Medium-stiff, moist, red-tan, medium SAND.				0/0		2 Inch dia. sch.40 PVC Blank Casing	
10			S24					
	Medium stiff, moist, brown-gray, clayey SILT.							
	Medium stiff, moist, brown-red medium SAND.				20/0			
	Medium stiff, moist, gray-brown SILT.							
15			S25					
	Medium stiff, moist, dark gray, micaceous medium coarse SAND, intercalated with SILTS.		S26		0/0			
	Medium stiff, moist, mottled brown and black organic SILT (wood and organic debris).							
20	Medium stiff, moist-wet, dark gray, very fine sandy micaceous SILT.		S27					
	Medium stiff, wet, dark gray, silty micaceous medium SAND.				0/0	WD		
	Wet gray SILT.							
	Dark gray, saturated, medium SAND.							
	Dark gray SILT.							
25			S28					
	Gray medium SAND.						PVC Screen (2 inch i.d. with 0.020-inch slots)	
	Mottled brown SILT.				0/0			
	SILTS intercalated with medium-stiff, saturated, brown, slightly silty micaceous medium SAND.						Silica Sand Filter Pack (# 8-12 sieve)	
30			S29					

LEGEND

(S35) Sample Number

Encountered groundwater level While drilling (WD)

Measured static groundwater level (SW)

Groundwater Analysis (Sample No. Shown)

8015 / 8240 Soil Analysis (Test Method Shown)

CITY OF PORTLAND / B E S
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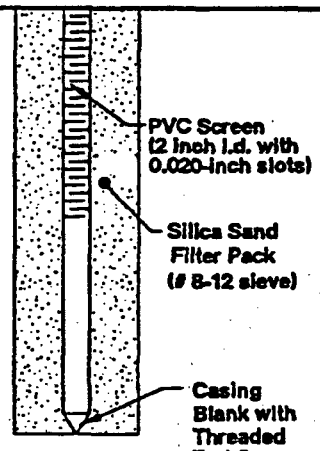
Drilling Started: 10 / 7 / 93 Drilling Completed: 10 / 7 / 93 Logged By: P.D.E.

PROJECT: St. JOHNS WATER QUALITY LAB START CARD No.: 50010 WELL No.: MW-4 , Pg. 2

Elevation Reference: N / A
Groundwater Surface Elevation: N / A
Well Completed: October 7, 1993
Relative Casing Elevation: N / A
Boring Method: Hollow Stem Auger
Borehole Diameter: 8.25 in.

Depth (feet)	SOIL DESCRIPTION	Graphic Log	Continous Sample	Blow Counts	Volatile Readings ppm/ %LEL	Ground Water	AS-BUILT DESIGN	ANALYSES
30	Intercalated SILTS and SANDS.							
	Medium stiff, saturated, brown, slightly silty micaceous SAND, coarsening downwards.							
35								
40	BORING COMPLETED AT 40 FEET BELOW GROUND SURFACE. MW-4 INSTALLED.							
45								
50								
55								
60								



LEGEND

(S35) Sample Number

Encountered groundwater level
WD While drilling

Measured static
SW groundwater level

Groundwater Analysis
(Sample No. Shown)

8015
8240
Soil Analysis
(Test Method Shown)

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7477 S.W. Tech Center Drive
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Phone (503) 639-3400 Fax (503) 620-7892

Drilling Started: 10 / 7 / 93 Drilling Completed: 10 / 7 / 93 Logged By: P.D.E.

PROJECT: ST. JOHNS WATER QUALITY LAB START CARD No.: 50009 WELL No.: MW-5

Elevation Reference: N / A
Groundwater Surface Elevation: N / A

Well Completed: October 7, 1993
Relative Casing Elevation: N / A

Boring Method: Hollow Stem Auger
Borehole Diameter: 8.25 in.

Depth (feet)	SOIL DESCRIPTION	Graphic Log	Continuous Sample	Blow Counts	Volatile Readings ppm/%LEL	Ground Water	AS-BUILT DESIGN	ANALYSES
0	Medium stiff, dry, tan-brown, slightly micaceous SILT. Becoming moister with depth.						Flush Mounted Steel Monument with water-tight seal; Concrete Patch; Locking Cap; Bentonite Seal	
					0/0			
5			S30					
					0/0		2 inch dia. sch.40 PVC Blank Casing	
10	Few angular basalt fragments (to 2 inches) encountered.		S31					
					20/0			
15	Soil becomes wet, gray mottling encountered, at 15-17 ft. depth.		S32					
	Soft, wet, gray and brown, organic SILT with wood and brick debris, slight organic odor.		S33		0/0			
20	Medium stiff, wet, gray, micaceous SILT.		S34					
	Medium stiff, wet, gray, fine to medium SAND.				0/0			
25	Medium stiff, wet, gray, slightly micaceous SILT.		S35					
	Soft, saturated, gray, silty, micaceous, medium SAND.					WD	PVC Screen (2 inch i.d. with 0.020-inch slots)	
	Medium stiff, wet, brown and gray mottled micaceous SILT.				0/0			
	Medium stiff, saturated, brown and red mottled, silty fine SAND.						Silica Sand Filter Pack (# 8-12 sieve)	
30								

LEGEND

- (S35) Sample Number
- Encountered groundwater level While drilling (WD)
- Measured static groundwater level (SW)
- Groundwater Analysis (Sample No. Shown)
- 8015 / 8240 Soil Analysis (Test Method Shown)

RZA AGRA JOB No. 21-7197-00
CITY OF PORTLAND / B E S
Foot of N. Salem Street
Portland, Oregon

RZA AGRA, Inc.
(Formerly Rittenhouse-Zeman & Associates, Inc.)
ENGINEERING & ENVIRONMENTAL SERVICES
7477 S.W. Tech Center Drive
Portland, Oregon 97223-8024
Phone (503) 639-3400 Fax (503) 620-7892

Drilling Started: 10 / 7 / 93 Drilling Completed: 10 / 7 / 93 Logged By: P.D.E.

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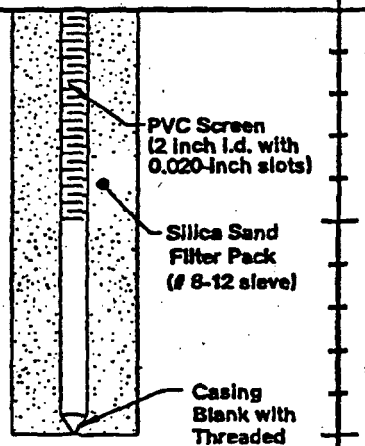
Well Completed: October 7, 1993
Relative Casing Elevation: N / A
Boring Method: Hollow Stem Auger
Borehole Diameter: 8.25 in.

Depth (feet)	SOIL DESCRIPTION	Graphic Log	Continous Sample	Blow Counts	Volatile Readings ppm/ %LEL	Ground Water	AS-BUILT DESIGN	ANALYSES
30	Soft to medium stiff, saturated, brown, silty to slightly silty, intercalated fine and medium SAND.							
35	Gray silty SAND.							
	Gray coarse SAND.							
40	BORING COMPLETED AT 40 FEET BELOW GROUND SURFACE. MW-5 INSTALLED.							
45								
50								
55								
60								



LEGEND

(S35) Sample Number

Encountered groundwater level
WD While drilling

Measured static groundwater level
SW

Groundwater Analysis (Sample No. Shown)

8015 / 8240 Soil Analysis (Test Method Shown)

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Drilling Started: 10 / 7 / 93 Drilling Completed: 10 / 7 / 93 Logged By: P.D.E.

Appendix C

Standard Field Protocols

1.0 SOIL SAMPLING PROCEDURES

1.1 CONTINUOUS CORING

Under relatively soft, cohesive soil conditions, continuous coring may be utilized in order to observe the lithology throughout the entire length of the boring. When using this method the bottom of the core barrel may be adjusted from one-half inch inside the augers to eight inches in front of the augers. The core barrel is advanced simultaneously with the rotating augers. This method of sample collection reduces sample disturbance. When collecting samples from continuous core, the following procedures should be followed:

Procedures

- Drilling equipment (drill rig, augers, rods, core barrel and other equipment utilized during the drilling operation) will be decontaminated by steam cleaning prior to drilling each boring.
- The recovered core barrel should be opened on a decontaminated surface.
- Measure from the top of the barrel to the depth at which sample is to be collected. A representative portion of the soils within the sampler will be transferred immediately to the appropriate sample containers with effort to avoid excessive disturbance and volatilization. Collect sample from soils that have not contacted the barrel walls.
- Transfer a representative portion of sample into a ziploc baggie in order to take a head space measurement according to the procedure described in Section 2.0.
- Describe the soils according to the RZA format outlined in Section 3.0.
- After collecting the sample, the core barrel will be decontaminated by high pressure steam cleaning. The decontaminated sampler will be isolated in a clean area following each decontamination.

1.2 COLLECTION FROM EXCAVATIONS, TEST PITS, AND GRAB SAMPLES

Another exploration technique utilized to collect subsurface soil samples is backhoe test pits. Test pits are utilized at sites where subsurface conditions prohibit drilling, or during UST decommissioning projects where a backhoe is being utilized for other purposes. The following procedures should be adhered to during excavation soil sampling operations:

- Sampling personnel will not enter a cavity deeper than four feet in order to collect a sample. In this case samples will be collected from the backhoe bucket.

- Samples collected from the backhoe bucket should be collected from soils that have not contacted the sides of the bucket. If possible, collect the sample from the teeth or front edge of the bucket, since the collection point in the excavation can be determined more accurately than mixed soil in the bucket. Soils should be collected from an area that has not been exposed to open air for an extended period of time; scrape off the top few inches of soils prior to collection.

- In the case of gross contamination of the backhoe bucket, the bucket should be decontaminated by steam cleaning or a wash with an alcanox solution and tap water rinse.

- When samples are collected from cavity sidewalls, the sampler or the backhoe bucket should first scrape away the soils that have been exposed to air.

- A representative portion of the soil should be transferred immediately into the appropriate sample containers.

- Soil samples collected from the ground surface, from trenches, shallow excavations, etc. may be collected with a shovel, a stainless steel spoon, or a hand auger. The equipment used to reach the depth of the sample should be decontaminated prior to collection of the sample. After removal of the gross soil particulate from the equipment, all the equipment should be decontaminated.

2.0 FIELD VOLATILE (HEAD SPACE) SCREENING

During drilling operations, concentrations of organic vapors within the boring and in the collected soil samples should be checked with a photoionization detector (PID) or combustible gas indicator (CGI).

2.1 SOIL SAMPLE VOLATILE SCREENING

In order to obtain a head space reading of a discreet soil sample, the following procedure should be followed.

- A representative portion of the sample will be placed into a one-liter, air-tight, polyethylene bag, and the bag will be sealed.

- Agitate the sample and break up any large pieces of soil in the closed bag. Allow the sample to equilibrate for as long as possible (depending on the speed of the drilling operation, and the frequency of sample collection). Place the sample in sunlight if possible.

- The probe of the PID or CGI is then inserted through the wall of the bag such that no outside air can enter the bag. The maximum volatile reading and average reading are then recorded. Care will be taken not to contaminate the instrument from overexposure to high volatile concentrations.

2.2 BOREHOLE VOLATILE SCREENING

In order to obtain a head space reading in the boring, the following procedure should be followed.

- Place the probe into the top of the augers or casing and the highest reading and average reading is recorded.

As a safety consideration, it should be noted that, the PID will not detect all explosive gases (such as methane). The CGI and PID will be calibrated with either hexane or isobutylene. A conversion table that relates the concentrations recorded by the CGI to many other gases that may be encountered during investigations should be in the field with the sampler.

3.0 SOIL DESCRIPTIONS

The RZA system of soil description utilizes the Unified Soil Classification System. Generally soils are described by the following modifiers:

- density (based on SPT blow counts or manual determination),
- moisture,
- color (including mottling, stringers, color changes),
- soil modifier,
- soil classification,
- other macroscopic characteristics such as sorting,
- stratification,
- percent varying grain sizes,
- sphericity and roundness of grains.
- major soil constituents will be capitalized with granular soils given relative size descriptions.

Each sample is described, using the modifiers provided above, on a standardized field boring log form. SPT blow counts, sample recovery, sample times, and the results of vapor screening are also recorded on the boring log form.

4.0 WELL DEVELOPMENT

Well development should accomplish the following objectives: 1) fine materials should be cleared from the well (both the filter pack and the groundwater in the casing; 2) removal of smeared formation mud on the sides of the bore hole from drilling augers; 3) removal of drilling fluids or surface contamination that may have been introduced during drilling; and 4) removal of water introduced into the boring to aid in drilling, cuttings removal, or monitoring well installation.

Procedures to follow when developing a well should include the following elements:

- Surge the well vigorously over the entire length of the well screen. The surging should break up accumulations of fine materials in the bottom of well casings and force water back and forth through the filter pack.

- Removal of the water may be accomplished by pumps or bailers. When pumping, surging can be taking place simultaneously. If removing water by hand bailing, surging and bailing should alternate.

  Check the conductivity, pH, and temperature of the water removed. These values should be checked after each volume of water has been removed from the well. A minimum of three successive readings for conductivity, pH, and temperature parameters should be stabilized within the following ranges:

  Temperature : +/- 0.5°C
  Conductivity: +/- 10% of scale range
  (0.0 through 1.999 millimhos/centimeter or 0.0 through 19.99 millimhos/centimeter)
  pH: +/- 0.1 pH unit

- The most obvious indication of well development is the clarity of the discharge water, but this can be a subjective judgement based on the experience of the developer. If turbidity levels of 5 or less cannot be achieved, contact the project manager.

- Regardless of the appearance of the discharge water, at least three well volumes of groundwater should be removed from the well. A well volume is calculated by adding the volume of water in the casing to the volume of water in the filter pack. Filter pack volume is calculated by multiplying the volume of water in the annulus between the casing and the borehole by (0.3). This value (0.3) allows for the space occupied by the sand (8-12 and 10-20 grain sizes) in the annulus.

5.0 GENERAL GROUNDWATER SAMPLING PROCEDURES

When sampling of a monitoring well network is performed, several tasks are involved. These tasks include: 1) the measurement of groundwater levels in each well; 2) purging of the wells; and 3) sampling of the wells. The procedures utilized in accomplishing each of these tasks is described below.

5.1 GROUNDWATER LEVEL MEASUREMENT

- Equipment operation should be verified prior to placement in wells. Before leaving office check batteries and place probe into beaker of water to verify precision of instrument.

- Unlock and remove the cap from the well casing, allow pressure to equalize.

- Take measurements from cleanest to most heavily contaminated wells if this information is available.

- Lower the sensor head into the well opening and gently reel out the measuring tape.

- Lower the sensor until a signal is obtained. Slightly raise and lower the sensor to lock in the loudest signal.

- Hold the tape at the point which corresponds to the survey mark on top of well casing, or the highest point on the casing if there is no survey mark. Take measurements from this point.

- If the instrument has a direct reading measuring tape, record the depth measurement at the survey mark. If the tape is marked at five foot intervals, use a tape measure or ruler to measure from the point on the tape held at the survey mark to the nearest increment marker.

- Do not reel exposed tape back into the instrument until it has been decontaminated. Rinse the probe and measuring tape with deionized (DI) water. Under conditions of noticeable contamination, wash probe and exposed tape with alcanox solution and rinse with distilled water. If significant visible or olfactory contamination is noted, rinse probe and tape with methanol followed by distilled water until clean. Dry the probe with paper towels and reel back into case.

5.2 PURGING WELLS

- Remove the locking device and the cap from the well casing.

- Wait a sufficient period of time for the pressure to equalize and allow the water level to approach an equilibrium state before continuing.

- Follow procedures for groundwater level measurement, and record depth to water, depth to product, and any product thicknesses.

  Using information on the total depth of the well, the diameter of the well casing, and the depth to water, calculate the amount of water in one casing volume. Values for two and four inch wells are:

  2-inch casing: 0.163 gal/foot
  4-inch casing: 0.653 gal/foot

- After tying a new nylon rope to the bailer, lower the bailer to the well bottom. Purge an amount of water from four to ten casing volumes from the well with a clean bailer or a pump. The total volume purged should be at least one well volume to allow for the removal of all the stagnant groundwater in the filter pack, as well as the groundwater in the casing. A well volume is calculated by adding the volume of water in the casing to the volume of water in the filter pack. Filter pack volume is calculated by multiplying the volume of water in the annulus between the casing and the borehole by (0.3). This value (0.3) allows for the space occupied by the sand (8-12 and 10-20 grain sizes) in the annulus. If recharge is fast, it may be necessary to remove more than the specified amount of purge water.

- In order to determine whether true formation water is filling the well, note the temperature, conductivity and pH at specific intervals. These values should be checked after each volume of water has been removed from the well. A minimum of three successive readings for all parameters should be stabilized within the following ranges:

  Temperature : +/- 0.5°C

Conductivity: +/- 10% of scale range (0.0 through 1.999 millimhos/centimeter or 0.0 through 19.99 millimhos/centimeter)

pH: +/- 0.1 pH unit

- Decontaminate all equipment inserted into the well with an alcanox solution and rinse with distilled water. If significant visible or olfactory contamination is noted, rinse equipment with methanol followed by distilled water until clean. Change bailer rope between wells.

5.3 SAMPLE COLLECTION EQUIPMENT

5.3.1 Bottom Fill Bailers

- Before sampling, follow procedures for purging wells and gather appropriate sample containers.
- Unwrap decontaminated bailer or disposable bailer and connect to nylon or polypropylene rope for lowering.
- Slowly lower the bailer until it contacts the water surface, then allow the bailer to sink and fill with a minimum of surface disturbance.
- Slowly raise the filled bailer to the surface. Avoid contact of the bailer line to the well casing and/or ground.
- Insert a bottom emptying device into the bailer and carefully fill each sample container. If the bailer being utilized does not have a bottom emptying device, carefully tip the bailer to allow a slow discharge from the top down the side of the sample bottle to minimize turbulence. When applicable, always fill volatile organic sample vials first, to zero headspace, then complete other samples.
- Repeat steps 1 through 5 until a sufficient sample volume is acquired.
- Label sample and follow procedures for preservation and transport of samples.
- Decontaminate bailer and set it on a clean surface. Decontaminate disposable bailers before disposing or returning to office for recycling.

5.4 GROUNDWATER SAMPLE COLLECTION STANDARD OPERATING PROCEDURES

Standard Operating Procedure #1

Volatile Organic Analytes

EPA Method 8010 and 8020: Halogenated and Aromatic Volatile Organics

Sample Collection:

Sampling devices: Stainless steel bailer, Teflon bailer, polyethylene disposable bailer, positive displacement pumps. Sample with as little aeration as possible. Sample must be free of air bubbles, no head space.

Samples are collected in three pre-cleaned, an possibly pre-acidified 40 ml clear glass VOA vials with Teflon-lined silicon septa, and lids. VOA's should be pre-acidified with approximately 0.10 ml of 50% hydrochloric acid (HCl), and labeled as such in the sample container storage area.

If pre-acidified VOAs are not available, samples should be acidified to pH<2 in the field. Acidification kits are available in the environmental storage area and should be taken into the field with the sample collector.

Maximum holding time before analysis: 14 days (acidified)
7 days (non-acidified)

Transport: Maintain at 4°C

Decon Procedure:

d1. Wash with Alcanox soap and tap water.

d2. Rinse with tap water.

d3. Rinse with deionized water.

d4. If sampling equipment is heavily contaminated, rinse with methanol followed by a deionized water rinse.

Standard Operating Procedure #2

Polychlorinated biphenyls (PCB's)

EPA Method 608 and 8040

Sample Collection:

Sample Devices: Stainless steel, Teflon, polyethylene disposable bailer, positive displacement pumps. Sample with as little aeration as possible. Samples must be free of air bubbles, no head space.

Samples are collected in one 1000 ml amber glass bottles with a Teflon liner and blue or green lid. A water sample should be taken in duplicate once every sampling session. Sample should be kept at 4°C but no other preservatives are required.

Maximum holding time before extraction: 7 days.

Transport: Maintain at 4°C

Decon Procedure:

d1. Wash with Alcanox soap and tap water.

d2. Rinse with tap water.

d3. Rinse with deionized water.

d4. If sampling equipment is heavily contaminated, rinse with methanol followed by a deionized water rinse.

ENVIRONMENTAL SITE INVESTIGATION
DISPOSAL OF BLACK SAND FILL

PROPOSED WATER POLLUTION CONTROL LABORATORY

ST. JOHNS AREA
PORTLAND, OREGON

PREPARED FOR:
BUREAU OF ENVIRONMENTAL SERVICES
CITY OF PORTLAND

21-07197

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MARCH, 1994

RZA AGRA, Inc.
Engineering & Environmental Services

AGRA
Earth & Environmental Group

RZA AGRA, Inc.

(Formerly: Rittenhouse-Zeman & Associates, Inc.)
Engineering & Environmental Services

7477 SW Tech Center Drive
Portland, Oregon 97223-8024
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FAX (503) 620-7892

March 10, 1994

21-07197

Randy Miller
Bureau of Environmental Services
City of Portland
1120 S.W. Fifth Avenue, Room 400
Portland, OR 97204-1972

RE: ENVIRONMENTAL SITE INVESTIGATION
DISPOSAL OF BLACK SAND FILL
PROPOSED WATER POLLUTION CONTROL LABORATORY
PORTLAND, OREGON

Dear Mr. Miller:

Enclosed is our report that summarizes the results of our Environmental Site Investigation for the proposed Water Pollution Control Laboratory in the St. Johns area of Portland, Oregon.

Our investigation included the excavation of twenty test pits and the installation of five monitoring wells. In addition, more than 2,000 cubic yards of black sand, fill, construction debris and organic material were removed from the site and properly recycled or disposed.

A release of PCB-containing oil that was identified during the investigation was characterized, excavated and closed under a separate phase. Details regarding this phase are summarized in a report titled, "Soil Removal and Remediation Report, Water Pollution Control Laboratory, Portland, Oregon," dated March 7, 1994.

Based on the results of our limited Environmental Site Investigation and removal activities, no environmental problems appear to exist on the site that preclude future construction activities.

AGRA
Earth & Environmental Group

OAL

RZA AGRA, INC.
7477 SW TECH CENTER DRIVE
PORTLAND, OR 97223

REVIEWED BY: DW

REVIEW DATE: 12/1/93

GERRY KOSCHAL
639-3400/ FAX 620-7892
JOB #7197

PCB ANALYSIS OF SOILS
BY SHAKEOUT* AND EPA 8080/8081

SAMPLE ID:	MP-4
OAL ID: 25-0173-	17774
SAMPLE DATE:	11/17/93
PCB SHAKEOUT PPM	0.07(1260)

MG/KG = PPM
ND = NONE DETECTED(<0.05 MG/KG)
NA = NOT ANALYZED
* THE SHAKEOUT PREP IS NOT AN EPA APPROVED PROCEDURE AND SHOULD BE USED FOR SCREENING PURPOSES ONLY.

OREGON ANALYTICAL LABORATORY
A Division of Portland General Electric
14855 S.W. Old Scholls Ferry Road
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Phone 503-644-5300 • Fax 503-671-1404

OAL

RZA AGRA, INC.
7477 SW TECH CENTER DRIVE
PORTLAND, OR 97223

REVIEWED BY: D. Miller
REVIEW DATE: 11/24/93

GERRY KOSCHAL
639-3400/ FAX 620-7892
JOB #7197

PCB ANALYSIS OF SOLIDS
BY EPA METHODS 3540 AND 8080/8081

SAMPLE ID:	SP-17D
OAL ID: 25-0173-	17677
SAMPLE DATE:	11/19/93
MATRIX:	SOIL
EXTRACTION DATE:	11/23/93
ANALYSIS DATE:	11/23/93
PCB MG/KG	0.25 (1260)
SURR.RECOVERY %	104.
ANALYST:	DM

MG/KG = PPM
ND = NONE DETECTED(<0.05 MG/KG)
NA = NOT ANALYZED
MI = MATRIX INTERFERENCE WITH SURROGATE RECOVERY
SURROGATE(S) USED: TETRACHLORO-M-XYLENE AND/OR DECACHLOROBIPHENYL

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Appendix C

Sampling Plan

RZA EMPLOYEE ADDENDUM ACKNOWLEDGMENT

This Site Health and Safety Plan Addendum has been prepared for RZA AGRA, Inc. (RZA) employees; contractors, subcontractors, and others are NOT specifically covered by this plan and are NOT to sign the acknowledgement below unless previously agreed by RZA AGRA Inc., the client, contractors, and/or subcontractors. This information shall be communicated and made available to all subcontractors and official site visitors for their personal health and safety; RZA welcomes all subcontractors and official site visitors to adopt this Site Health and Safety Plan as their own. Agreement to adopt this Site Health and Safety Plan by contractors, subcontractors or others includes agreement that the signatories, their employers, and agents shall indemnify and hold harmless, RZA AGRA, Inc. and their consultants, agents, and employees from any claims, damages, losses and expenses, direct and indirect, or consequential damages, including but not limited to fees and charges of attorneys and court and arbitration costs, arising out of or resulting from, the performance of the work by RZA AGRA, Inc. or claims against RZA AGRA, Inc. arising from the work of others, related to the hazards, hazardous conditions or materials named in this document or found to be present at the site. They further agree that the information in this document is based on the best available background information or previous investigation and is to be considered dynamic and will be changed or updated as necessary. Agreement to this indemnification and acknowledgement will be indicated by signature below.

I have read the attached Site Health and Safety Plan Addendum for this project. I have been further trained and briefed in site specific risks and general safety and health information, as necessary, by the on-site supervisor. I understand and agree to comply with these requirements and the indemnification and acknowledgement as explained above.

This Site Health and Safety Plan has been approved by: Denny Macomber Date: 10/25/93
Denny Macomber, CHS

This Site Health and Safety Plan has been accepted by: _____ Date: _____
Dave Roberston, SSO

Employee _____ Date _____ OSHA ____ Med.Surv. ____

Employee _____ Date _____ OSHA ____ Med.Surv. ____

Employee _____ Date _____ OSHA ____ Med.Surv. ____

Employee _____ Date _____ OSHA ____ Med.Surv. ____

Employee _____ Date _____ OSHA ____ Med.Surv. ____

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Employee _____ Date _____ OSHA ____ Med.Surv. ____

Employee _____ Date _____ OSHA ____ Med.Surv. ____

Employee _____ Date _____ OSHA ____ Med.Surv. ____

(Please check above if current with OSHA training and Medical Surveillance requirements. If necessary, the back of this page may be used for additional signatures. Employees should initial and date this form upon subsequent visits.)

instrument at all times. Should airborne contamination be detected above **5 ppm**, air-purifying respirators are required.

- Operations at locations where previous analysis has indicated the presence of contaminated liquids, soil, or vapor should be carried out in PPE that prevent exposure to the hazardous materials. PPE may include: full Level C (Appendix C) for skin protection from splashes of contaminated liquids and inhalation protection from airborne vapors; or modified Level C to D for situations that may not involve inhalation exposure. The SSO should monitor the air with a direct-reading instrument at all times to ensure that airborne contaminants are not present. Should airborne contamination be detected above **5 ppm**, air-purifying respirators are required.

The Site Safety Officer should check with the Project Manager or Director of Health and Safety prior to initiation of new phases of site work for any changes in recommended PPE.

4.0 PERSONAL PROTECTIVE EQUIPMENT - Modified Level D Personal Protective Equipment

1. **Chemical-resistant clothing** (Poly-coated Tyvek; two-piece chemical-splash suit; or other disposable chemical-resistant overalls; or rain gear suitable for decontamination). **WEARING TYVEK WILL BE MANDATORY BASED ON SITE CONDITIONS AND THE SSO'S DIRECTION.** Should potential contact with hazardous chemical contaminated soil, sludge, or water become likely, site workers **MUST** upgrade PPE to include chemical-resistant clothing.

2. **Boots/shoes, chemical-resistant, steel-toe and shank.**

3. **Hard hat.**

5. **Gloves, outer, chemical resistant.**

6. **Gloves, inner, chemical resistant.**

7. **Safety glasses with side shields, face shield, or chemical splash goggles.**

8 .**Hearing protection** while heavy equipment is in operation or other hearing hazards are present.

Initially, the Contamination Reduction Zone is considered to be a non-contaminated area. Two Contamination Reduction Corridors (decontamination stations) shall be established from the Exclusion Zone to the Support Zone, one for personnel and one for equipment. Contamination in the Contamination Reduction Zone should be kept as low as is reasonably possible. No contamination shall be allowed to pass into the Support Zone.

The boundary between the Support Zone and the Contamination Reduction Zone is the Contamination Control Line. Fencing, barricades, or other warning devices shall be erected on the perimeter of this zone to keep unauthorized personnel from entering and to demark the line beyond which contamination shall not pass. Access to the Contamination Reduction Zone from the Support Zone shall be through a control point. Personnel entering the Contamination Reduction Zone shall be wearing modified Level D PPE, unless the site SSO has upgraded the area to Level C PPE.

3.3.3 Work Zone 3: Support Zone

The Support Zone shall consist of the area of the site extending from the outer boundary of the Contamination Reduction Zone to the property boundary. Support personnel and equipment (command post, first aid, eyewash, etc.) will be located in this zone. Support personnel will be responsible for alerting the proper agency in the event of an emergency. All visitors and site personnel not currently required to be in Zone 1, will remain in Zone 3. Normal work clothes are appropriate for this zone.

Potentially contaminated personnel clothing, equipment, or other materials area not permitted in this zone. Personnel entering this zone requires the removal of any protective equipment worn in the Contamination Reduction Zone.

3.3 Sampling and Monitoring

Monitoring will be conducted at this site. Sample analysis indicates potential exposure to PCB contaminated soil and groundwater. To reduce risk of exposure, the Site Safety Officer should maintain a Level of Protection designed to reduce the chance of exposure to the hazardous substance present. The PPE may vary according to task or the presence of contamination.

- Sampling, maintenance, etc. from upgradient locations that previous analysis has shown to be free of groundwater or soil contamination, may be conducted in Level D PPE as outlined in the Site Health and Safety Plan, as minimum protection. The SSO should monitor the air with a direct-reading

- An observer is to posted in sight of the entrant, to monitor the entrant at all times and notify emergency personnel should rescue become necessary. **The observer is NOT to enter the cavity under any circumstances, nor to leave the area except to notify emergency personnel.**

Open excavations will be flagged when active work is not being done on or near the cavity or trench. For the protection of the general public, the site will be secured with fences (six-foot security) or barricades each day when site operations have been concluded.

3.2.1 Work Zone 1: Exclusion (Hot) Zone

The region encompassing the area of excavation, any excavated soil piles, and a minimum of thirty feet beyond (if possible) on all sides shall be designated Work Zone 1, and is an Exclusion (Hot) Zone. Only necessary site workers or authorized site visitors will be allowed in the Exclusion Zone. All site workers and authorized visitors must have read and signed both the Site Health and Safety Plan and this Addendum prior to entering the Exclusion Zone. Personnel shall limit their time in the Exclusion Zone to necessary work and leave immediately upon completion.

All personnel entering the Exclusion Zone shall be outfitted in the Level of Protection outlined in Section 4.0 of this document. Site workers authorized to be in this zone shall, at a minimum, have received 40 hours of Hazardous Waste Operations training according to 29 CFR 1910.120 and be current in required 8 hour annual update. They must also be current, as applicable based on their annual exposure, in a medical surveillance program as outlined 29 CFR 1910.120 (see Sec. 9.0 of the SHSP).

The Site Safety Officer shall be responsible for ensuring that only personnel meeting the above requirements gain access to the Exclusion Zone. Any contaminated equipment, materials, soil, or water will remain in the Exclusion Zone until properly decontaminated or other suitable disposition is arranged and/or agreed by the client. A decontamination station shall be set up in the Contamination Reduction Corridor at the boundary between the Contamination Reduction Zone and the Exclusion Zone. Decontamination procedures shall be according to the Decontamination Plan outlined in Section 8.0 of the SHSP.

3.2.2 Work Zone 2: Contamination Reduction Zone

Zone 2 is the Contamination Reduction Zone and is the transition area between the contaminated area and the clean zone. The Contamination Reduction Zone boundary shall be located by the Site Safety Officer in a manner such that no contaminated materials or equipment will pass beyond it to the Support Zone.

with Subpart P of 29 CFR Part 1926 to prevent accidental collapse. Personnel will maintain a distance equal to the depth of the excavation, away from all unshored or non-sloped cavity sideslopes. Should the RZA Site Safety Officer feel that contractor is not in accordance with these standards, the SSO should discuss this with the contractor, cease all RZA activities, and leave the work zone until the standards are met.

Site workers should proceed with great caution in the vicinity of any excavation, especially near the edges, due to the potential for slope failure and burial. The greatest stability will be found at the corners of the excavation, but caution is strongly advised during any approach. **RZA employees should avoid entry to an excavation for any reason.**

REMOVAL OF PCB CONTAINING TRANSFORMERS SHOULD BE DONE FROM SURFACE ONLY!!

TRENCHES ARE EXTREMELY DANGEROUS DUE TO INSTABILITY AND THE PRESENCE OF TOXIC VAPORS OR GASES!

Should entry be necessary, the following steps SHALL be followed:

- The cavity is to be properly sloped or shored in accordance with Subpart P of 29 CFR Part 1926.
- The cavity is then to be approved by a registered professional engineer for stability prior to entry.
- A stairway, ladder, ramp or other safe means of egress shall be placed in excavations greater than four feet.
- The atmosphere in the cavity is to be assessed for airborne contaminants and oxygen content. Entry is not permitted unless oxygen and hazardous vapor or gas levels are below the action levels outlined in this Health and Safety Plan.
- Oxygen, airborne contaminant and explosive levels, as necessary, are to be monitored in the breathing space of the entrant at all times while in the excavation.
- Emergency rescue equipment, such as breathing apparatus, a safety harness and line, or a basket stretcher, shall be readily available where hazardous atmospheric conditions exist or may reasonably expected to develop during work in the excavation.

backfilling of the trenches; 4) equipment deconning and containment of decon water, and; 5) preparation for soil and transformer disposal. The performance of these tasks will help clean up contaminated soil at the site. These tasks may be changed or be added to during the course of this project by the Site Safety Officer to accommodate any changes.

3.0 HAZARD ANALYSIS

The following table provides a summary of hazards and protective measures planned for each task, not already included in the original HASP for this project. All information in the original HASP, not superseded by this addendum, is to be reviewed and followed by site workers.

Physical Hazards

TASK	HAZARD	RISK	PREVENTION
Excavation	Heavy equipment	Medium	Watchfulness, communication safe distance
	Machinery noise	Low	Hearing protection
	Striking overhead or underground utilities	Low	– Utility locate, consult client
Trench-Installation/PCB Transformer removal	Fall hazard, Toxic atmosphere	Medium	Safe distance, barricades, flagging, watchfulness
	Trench work	Medium	Safe distance, barricades, flagging, watchfulness DO NOT ENTER!
	Chemical Hazards	Medium	PPE, Watchfulness, Extreme care
General Physical Hazards	Contaminated soil or ground water	Medium	Avoid direct contact, inhalation
	Uneven footing and debris	Medium	Watchfulness, proper footwear
	Heat stress/Cold exposure	Low	Watchfulness, monitoring

3.1 Excavation Procedures

RZA employees will not be responsible for any site excavation activities and will not operate any heavy machinery. Excavation will be carried out by a qualified contractor hired for the purpose. No RZA employee is to approach an excavation unless the contractor has shored or sloped the cavity in accordance

SITE HEALTH AND SAFETY PLAN ADDENDUM
APPROXIMATE 5-ACRE SITE, SOUTH OF THE ST JOHNS BRIDGE, PORTLAND, OREGON
RZA PROJECT # 21-7197-00

Date: October 25, 1993

From: Denny R. Macomber; Coordinator of Health and Safety

To: RZA AGRA, Inc. Site Personnel

Subject: Site Health and Safety Plan Addendum; Approximate 5-Acre Site, Portland, Oregon

---

This addendum to the Site Health and Safety Plan (HASP) for the approximate 5-Acre Site has been prepared in response to an additional phase to the project. The Site Safety Officer should ensure this information is communicated and made available to all RZA AGRA, Inc. employees; subcontractors; and authorized site visitors. RZA AGRA, Inc. personnel, thus communicated, shall signify their acknowledgement and understanding of the following information by signature on the attached Acknowledgement Agreement.

1.0 BACKGROUND

RZA conducted an initial subsurface investigation at the site in October, 1993 (see original Health and Safety Plan or RZA file). The purpose of the original investigation was to evaluate the quality of subsurface soil and groundwater related to previous site use. Analysis of samples collected during the original investigation indicated that subsurface soil and groundwater were contaminated with fuel hydrocarbons. And, as a result of CH2MH borings conducted onsite, groundwater recovered during the drilling operation from an isolated area along the southern portion of the site was found to contain PCBs.

Chemical Hazard	Quantity	Risk
Total Petroleum Hydrocarbons (Soil)	667 ppm	Low
PCBs (water)	1000 ppm	Moderate

The purpose of this investigation is to excavate PCB containing transformers and dispose of PCB contaminated soils.

2.0 SCOPE

The scope of work for the project will include: 1) excavation of trenches to 10 feet in depth or greater; 2) removal of PCB containing transformers; 3) segregating PCB contaminated soils; 4) soil sampling; 5)

RZA EMPLOYEE ACKNOWLEDGMENT

This Site Health and Safety Plan has been prepared for RZA AGRA, Inc. (RZA) employees; contractors, subcontractors, and others are NOT specifically covered by this plan and are NOT to sign the acknowledgement below unless previously agreed by RZA AGRA Inc., the client, contractors, and/or subcontractors. This information shall be communicated and made available to all subcontractors and official site visitors for their personal health and safety; RZA welcomes all subcontractors and official site visitors to adopt this Site Health and Safety Plan as their own. Agreement to adopt this Site Health and Safety Plan by contractors, subcontractors or others includes agreement that the signatories, their employers, and agents shall indemnify and hold harmless, RZA AGRA, Inc. and their consultants, agents, and employees from any claims, damages, losses and expenses, direct and indirect, or consequential damages, including but not limited to fees and charges of attorneys and court and arbitration costs, arising out of or resulting from, the performance of the work by RZA AGRA, Inc. or claims against RZA AGRA, Inc. arising from the work of others, related to the hazards, hazardous conditions or materials named in this document or found to be present at the site. They further agree that the information in this document is based on the best available background information or previous investigation and is to be considered dynamic and will be changed or updated as necessary. Agreement to this indemnification and acknowledgement will be indicated by signature below.

I have read the attached Site Health and Safety Plan for this project. I have been further trained and briefed in site specific risks and general safety and health information, as necessary, by the on-site supervisor. I understand and agree to comply with these requirements and the indemnification and acknowledgement as explained above.

This Site Health and Safety Plan has been approved by: Denny Macomber Date: 9/30/93
Denny Macomber, CHS

This Site Health and Safety Plan has been accepted by: _____ Date: _____
Paul Ecker, SPM

Employee _____ Date _____

Employee _____ Date _____

Employee _____ Date _____

Employee _____ Date _____

Employee _____ Date _____

Employee _____ Date _____

Employee _____ Date _____

Employee _____ Date _____

Employee _____ Date _____

Employee _____ Date _____

Employee _____ Date _____

Employee _____ Date _____

Employee _____ Date _____

(If necessary, the back of this page may be used for additional signatures. Employees should initial and date this form upon subsequent visits.)

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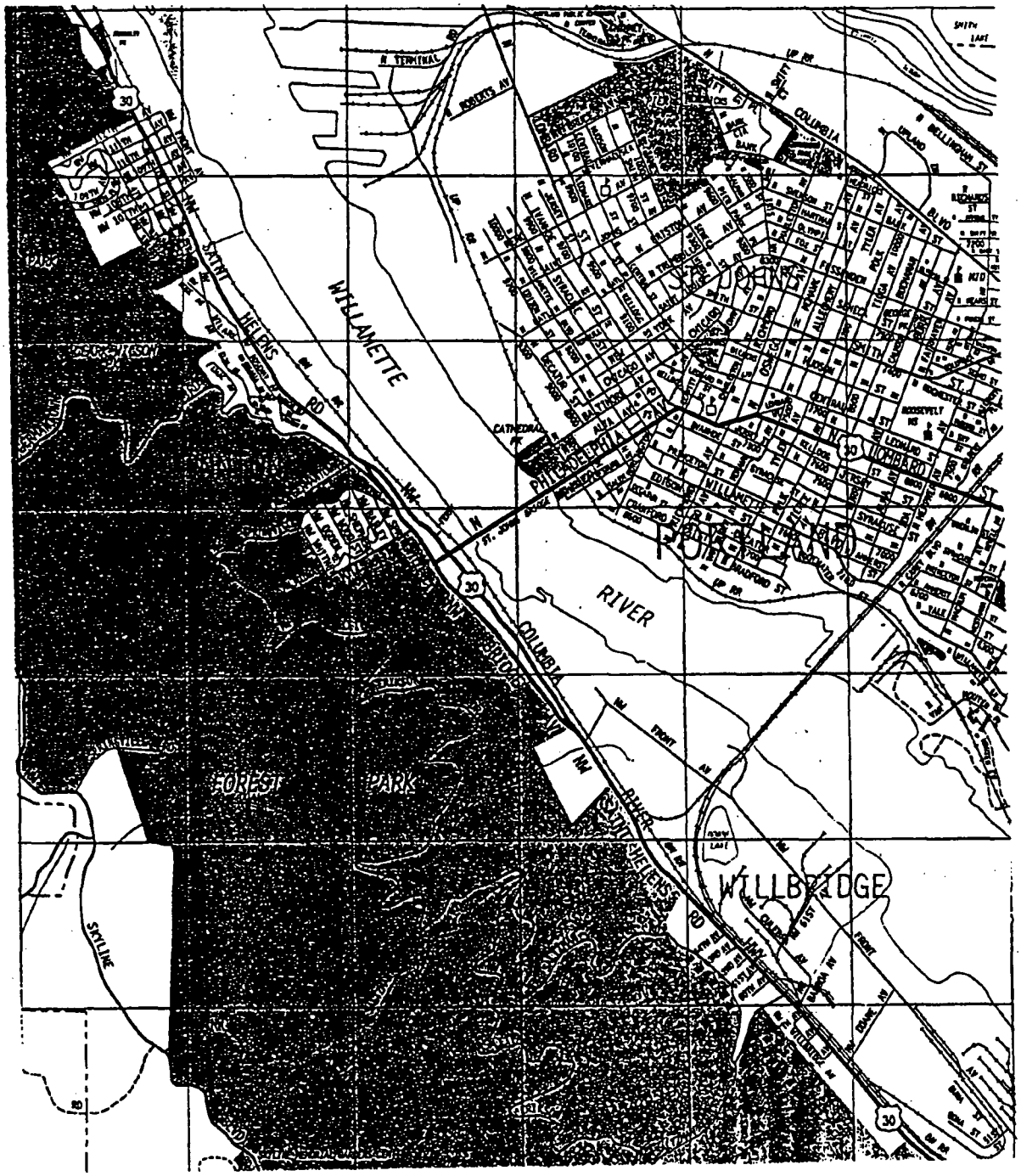
APPENDIX B

SITE PLAN



APPENDIX A.1
EXPOSURE RECORD

PROJECT NAME: _____
PROJECT NUMBER: _____
DATE(S): _____

Employee	Date	Hours of Exposure

Weather: Rainy ____ **Windy** ____ **Sunny** ____ **Cloudy** ____ **Other** _____ **Est. Air Temp.** _____

Brief description of site activities (include contact with or distance from contaminants and whether upwind or downwind from contaminated material): _____

List of potentially hazardous materials known or suspected on-site: _____

Protective clothing worn on-site: _____

Direct-reading instrument used: _____

Instrument Readings: (Ambient Air Only)	**Time**	**Readings (ppm, LEL, O_2, etc.)**

Additional information (include soil or water samples taken, sample numbers, head space readings, unusual events or symptoms of exposure - use back of sheet, if necessary): _____

APPENDIX A

ACCIDENT/INCIDENT REPORT FORM

(Use additional page if necessary)

Date: _____ Time: _____

Name: _____ Employer: _____

Site Name and Location: _____

Nature of Illness/Injury: _____

_____

Symptoms: _____

Action Taken: ___ Air and Rest ___ First Aid ___ Medical

Transported by: _____

Witnessed by: _____

Facility Treating (Hospital's name): _____

Treatment: _____

Comments: _____

_____

What was the person doing at the time of the accident/incident: _____

_____

_____

Personal Protection Equipment Worn: _____

_____

Cause of Accident/Incident: _____

_____

_____

_____

What Immediate action was taken to prevent recurrence: _____

_____

Additional Comments: _____

_____

_____

Employee's Signature: _____ Date: _____

Supervisor's Signature: _____ Date: _____

10.0 MEDICAL SURVEILLANCE REQUIREMENTS

All employees at this site are subject to the strict medical surveillance requirements for hazardous site workers as outlined in 29 CFR 1910.120 and detailed in the RZA AGRA, Inc. *Health and Safety Manual for Safe Work Practices*. Copies of evidence of a current physical exam for RZA AGRA, Inc. personnel are maintained at the offices of RZA AGRA, Inc. and available on request.

10.1 Exposure/Injury/Illness

Any employee at this site who becomes injured, ill, or develops signs or symptoms due to possible overexposure involving hazardous substances, will be required to seek medical attention within 24 hours; and to notify the Site Safety Officer, the Project Manager, and the Director, Health and Safety. A physicians written opinion will be required prior to the employees return to normal site activities.

The incident will be reported as soon as possible in written form on an RZA Accident/Incident Reporting form found in Appendix A. Should the accident result in death or a catastrophe (an accident in which five or more site workers seek or are sent to medical attention), **THE SSO MUST NOTIFY OREGON OSHA BY PHONE WITHIN 8 HOURS**. **SSO MUST notify Oregon OSHA by phone within 24 hours in the event of ANY accidents or injuries result in a hospital admission with medical treatment other than first aid.** Oregon OSHA phone number: Salem Office: 1-378-5729.

11.0 SPILL CONTAINMENT

Based on background information and previous investigations, a spill of hazardous wastes is not expected at this site. Contaminated soil, if encountered will be drummed or bermed on Visqueen until laboratory analysis is performed. Drums and handling of drums will be carried out by qualified personnel with proper equipment. RZA employees will ensure that:

1. Drums used meet appropriate DOT, OSHA, and EPA regulations;
2. Drums are inspected for integrity;
3. Drums are properly labeled with NFPA (4-part diamond) labels.

Should hazardous waste spill occur at any site, employees are to follow the RZA Standard Operating Procedures for spill containment.

8.0 TRAINING

8.1 Hazardous Waste Operations Training

All general RZA site workers, occasional RZA site workers, on-site RZA management and supervisors must be in compliance with training requirements in accordance with 29 CFR 1910.120 (e), before they will be permitted to engage in operations at this site. All properly trained employees shall have received a written certificate of successful completion of initial training and necessary annual updates. Copies of training certificates for RZA AGRA, Inc. personnel are maintained at offices of RZA AGRA, Inc. and will be available on request.

8.2 First Aid and CPR Training

The Site Safety Officer shall ensure that at least one site worker is trained and certified in the application of emergency first aid and CPR. The personnel trained in first aid and CPR for this site is: Paul Ecker.

9.0 DECONTAMINATION PLAN

Extensive decontamination procedures have been determined to be unnecessary for this project. However, should decontamination become necessary due to Personal Protection Level upgrade, the Site Safety Officer will devise a decontamination plan according to the procedures in the RZA AGRA, Inc. *Health and Safety Manual for Safe Work Practices.*

Decontamination for this project will consist of :

1. A wash tub (or equivalent) will be filled with potable water and detergent (e.g. Alconox). Persons leaving the Exclusion Zone will step into the detergent solution and scrub both boots and gloves (and rain gear, if worn). Upon completion of scrubbing, personnel will step into a similar tub filled with clean potable water and rinse gloves and boots thoroughly.

2. Personnel will then remove tape from around wrists and ankles and remove Tyvek coveralls. Tape and Tyvek will be discarded into a drum, or other container, located at the end of the CRZ.

Note: Step 2 will be done only if Tyvek or other protective clothing is worn.

9.1 Disposition of Decontamination Wastes

All equipment and solvents used for decontamination shall be decontaminated or disposed of properly according to local, state and federal regulations. Commercial laundries or cleaning establishments that decontaminate protective clothing or equipment shall be informed of the potentially harmful effects of exposures.

- Work areas, equipment testing areas, and decontamination areas and procedures will be established based on prevailing site conditions and are subject to change.
- Procedures for leaving contaminated areas will be planned and reviewed prior to going on site.
- Contact with contaminated or potentially contaminated material should be avoided. Efforts will be made to keep employee activity upwind of operations. Whenever possible, do not walk through puddles, mud or any discolored ground surface. Where appropriate, do not lean, sit, or place equipment on drums, containers, or on the ground.
- Proper decontamination procedures must be followed before leaving the site, unless medical emergencies dictate otherwise.
- No personnel will be admitted to the site by the Site Safety Officer without the proper safety equipment and requisite training.
- All RZA personnel must comply with the established safety procedures. Any staff member who does not comply with safety policy, as established by the Site Safety Officer or Project Manager will be immediately dismissed from the site.

7.0 MONITORING PLAN

This section explains the general concepts of an air monitoring program and specifies the surveillance activities that will be considered during the project completion. Both direct-reading instruments and passive air monitoring may be employed to estimate worker exposure. Passive badges may be worn when exposure of contaminated soils or ground water, resulting in an increase in airborne vapors near or above the PEL, is likely. Direct reading instruments will be employed during all phases of site work.

7.1 Passive Air Monitoring

Passive air monitoring through use of passive badges may be used to monitor employee exposure to airborne contaminants. Should they be required, the SSO should contact the Director of Health and Safety for proper sampling procedures.

7.2 Direct-reading Monitoring Instruments

Unlike air monitoring devices, which are used to collect samples for subsequent analysis in a laboratory, direct-reading instruments provide information at the time of monitoring, enabling rapid decision-making. Data obtained from the real-time monitors are used to assure proper selection of personnel protection equipment, engineering controls, and work practices. Overall, the instruments provide the user the capability to determine if site personnel are being exposed to concentrations which exceed exposure limits or action levels for specific hazardous materials.

Site control for this project will consist of:

A hotline will be established fifteen feet from the drilling equipment and should be marked with tape or other barricades, where practicable. The area inside this zone will be considered the Exclusion Zone. Exit from the Exclusion Zone into the Contamination Reduction Zone (CRZ) will be through a corridor established with tape adjacent to the hotline. The area outside of the CRZ will be the Support Zone. General access to the Exclusion Zone and the CRZ by the public or other unauthorized visitors should be restricted by either fencing, barricades, or flagging along the perimeter of the CRZ.

6.2 Standing Orders While On-site

Standing orders while on-site:

- Maintain professional conduct at all times.
- Workers shall obey all warning and instructional signs posted at the site.
- Smoking, eating, drinking, chewing gum or tobacco, or any practice that increases the probability of hand-to-mouth transfer and ingestion of material is prohibited in any area designated as contaminated.
- Workers shall not possess or use alcohol or drugs at the site or work at the site while under the influence of alcohol or drugs. Also while working at the site, workers shall not use prescription drugs that may affect their reflexes or actions.
- Firearms, ammunition, fireworks or explosives are prohibited.
- Long hair will be worn "up" inside the hard hat.
- Facial hair that interferes with a proper seal being created and maintained between the face and respirator is prohibited when respirator use is likely.
- Where appropriate the "buddy system" will be used and visual contact must be maintained at all times between buddies on site. Hand signals will be established and be consistent among all workers. During site operations, each worker should consider himself a safety backup to his partner(s) and make all personnel aware of dangerous situations that may develop.
- Disposable clothing will be used whenever possible to minimize the risk of cross-contamination.
- No unapproved work clothes or equipment will be allowed on site.
- No exchange of personal protective equipment will be allowed except in emergency situations involving a threat to health and safety.
- The number of personnel and amount of equipment in contaminated areas should be minimized, yet allow for effective site operations.

ACTION LEVEL	ACTION
0-30 ppm	Continue subsurface investigation in Level D with continuous monitoring with a direct reading instrument. If the threat of significant splash is possible, wear chemical resistant clothing, e.g., Saranex.
30-150 ppm	**Upgrade to Level C wearing an air-purifying respirator with organic vapor cartridges.**
>150 ppm	**Discontinue operation.** Provide additional ventilation to bring concentrations down to acceptable levels prior to resumption of activities.

Note:
Contact with organic materials (such as gasoline) in high concentrations could result in fire. Contact with some organic (e.g. glycerol, alcohol) could cause the formation of peroxides which could be unstable. *A direct reading instrument, is not able to distinguish individual volatile components and should not be relied upon for the detection of low PEL chemicals such as Benzene (PEL of 1 ppm).*

5.2.4 Cadmium - Oregon OSHA has established a separate action level for Cadmium dust or fumes of 2.5 $\mu g/m^3$. Should this level be reached, employers are required to implement medical surveillance for employees exposed above this action level for 30 or more working days a year. Site background and anticipated work indicate that site workers will not be exposed to airborne dust containing cadmium above the PEL for this project.

6.0 SITE CONTROL MEASURES

The following section defines measures and procedures for maintaining site control. Site control is an essential component in the implementation of the site health and safety program. A Site Map is attached in Appendix B for visual reference to Site Control boundaries.

6.1 Work Zone Definition

Intrusive activities will be conducted during this operation. Some of the activities will involve drilling and sampling. These activities may require the establishment of specific work zones to avoid accidents and/or unauthorized entry. Three work zones are recommended for this operation: Work Zone 1, the Exclusion (Hot) Zone; Work Zone 2, the Contamination Reduction Zone; and Work Zone 3, Support Zone. These zones are described in detail in the RZA AGRA, Inc. *Health and Safety Manual for Safe Work Practices* and indicated on the Site Plan located in Appendix B of the HASP.

5.2 Action Levels and Action

ACTION PLAN TABLES

5.2.1 Explosive Atmosphere

ACTION LEVEL	ACTION
<10% LEL	Continue subsurface investigation
10%-20% LEL	**Continue on-site monitoring with extreme caution** as higher levels are encountered
>20% LEL	**EXPLOSION HAZARD! WITHDRAW FROM AREA IMMEDIATELY!**

5.2.2 Oxygen

ACTION LEVEL	ACTION
<19.5%	**Do not enter without self-contained breathing apparatus (Level B protection, see Section 2.3).** Note: Combustible gas readings are not valid in atmospheres with <8.0% Oxygen
19.5% - 23%	Continue subsurface investigation with caution. Deviation from normal level may be due to presence of other substances.
>23%	**FIRE HAZARD POTENTIAL! Discontinue subsurface investigation. Consult a fire safety specialist.**

5.2.3 Organic gases and vapors (Gasoline): - Based on the assumption that all airborne organic vapor is BTEX as measured with a direct reading instrument. *Note: if halogenated volatiles {e.g. trichloroethylene (TCE) or tetrachloroethylene (PCE) are present, they will not be detected by a combustible gas indicator (Gastechtor). You must use a PID or FID for detection of halogenated volatiles.*

5.1.3 Reassessment of Protection Program - The Site Safety Officer may upgrade or downgrade the Level of Protection provided by PPE upon a change in site conditions or findings of subsurface investigations. When a significant change occurs, the hazards should be reassessed. Some indicators of the need for reassessment are:

- Contact with hazardous chemical contaminated soil, sludge or vapors becomes possible.
- Commencement of a new work phase, such as the start of any recommended subsurface investigation work.
- Change in job tasks during a work phase.
- Change of season or weather.
- When temperature extremes or individual medical considerations limit the effectiveness of PPE.
- Contaminants other than those previously identified are encountered.
- Change in ambient levels of contaminants.
- Change in work scope which affects the degree of contact with contaminants.

5.1.4 Exposure of Unknown Potentially Hazardous Waste (UPHW) - This investigation project involves intrusive activities wherein an unknown potentially hazardous waste could become exposed. Should this occur, the designated RZA Site Safety Officer (SSO) or involved employee should:

- Cease operations immediately;
- Evacuate the affected area immediately of all RZA personnel; and
- Notify the SSO of the situation.

The designated RZA Site Safety Officer should assume command of the situation and:

- Notify sub-contractors, contractors, other site visitors, or other potentially affected personnel of the potential hazard;
- Initiate site control measures to limit access to the affected area; and
- Notify the Project Manager, Director, Health and Safety, or other appropriate RZA key personnel of the potentially hazardous situation.
- See RZA AGRA's *Health and Safety Manual for Safe Work Practices* for procedures on re-entry.

5.0 ACTION PLAN

5.1 Personal Protection Equipment (PPE)

Site characterization analysis for this subsurface investigation indicates low to moderate risk of exposure to hazards associated with possible contact with hazardous chemical contaminated vapors, soil, sludge, or water. Therefore, Modified Level D PPE, as indicated below, is required during excavation and sampling phases of the project.

5.1.1 Modified Level D Personal Protective Equipment

1. Chemical-resistant clothing (Poly-coated Tyvek; two-piece chemical-splash suit; or other disposable chemical-resistant overalls; or rain gear suitable for decontamination). Wearing Tyvek will be discretionary based on site conditions and the SSO's direction. Should potential contact with hazardous chemical contaminated soil, sludge, or water become likely, site workers MUST upgrade PPE to include chemical-resistant clothing.
2. Boots/shoes, chemical-resistant, steel-toe and shank.
3. Hard hat.
5. Gloves, outer, chemical resistant.
6. Gloves, inner, chemical resistant.
7. Safety glasses with side shields, face shield, or chemical splash goggles.
8. Hearing protection while heavy equipment is in operation or other hearing hazards are present.

Should the Site Safety Officer reassess the situation to Level C, the personal protective equipment will be as indicated below.

5.1.2 Level C Personal Protection Equipment

Level C Protection will include all equipment listed above in Section 5.1.1 in addition to the following:

1. Air-purifying respirator, full-face, cartridge-equipped (MSHA/NIOSH approved).
2. Hooded chemical-resistant clothing (overalls; two-piece chemical-splash suit; disposable chemical-resistant overalls).
3. Boot-covers, disposable, chemical resistant*.
4. Escape mask*.
5. Face shield*.

* Optional, based on site conditions and SSO's direction.

4.2.1 Table of Chemical Hazards Part 2

POTENTIAL CHEMICAL HAZARDS

Potential Effects, Route of Entry, First Aid Treatment

CHEMICAL	ROUTE OF ENTRY	EYE IRRITANT	POTENTIAL EFFECTS	
			Acute	Chronic
Benzene	Inhalation Ingestion, Absorption	Medium	Eye, nose, and lung irritation, headache, nausea	Dermatitis, suspected carcinogen
Ethylbenzene	Inhalation Ingestion, Absorption	Severe	Eye, nose, throat, skin irritation, weakness, dizziness	Dermatitis
Toluene	Inhalation Contact	Medium	Eye, skin, and respiratory tract irritation. May also cause fatigue, weakness, headache.	Dermatitis. Possible liver and kidney damage.
Xylene	Inhalation Contact	Medium	Eye, nose, throat irritation Dizziness, drowsiness, nausea, vomiting.	Dermatitis, Reversible eye damage.
Tetraethyl lead	Inhalation Contact	Medium	Eye, nose, throat irritation. Dizziness, nausea, vomiting, loss of consciousness.	Dermatitis.
Polychlorinated Biphenyls (PCB)	Inhalation, Absorption	Medium	Eye, skin irritation: chloracne, contact dermatitis, excessive eye discharge, and swelling.	Liver damage, Suspected carcinogen.
Pentachlorophenol	Inhalation, Ingestion,	Severe Immediate	Inhalation-poisoning of circulatory system, heart failure. Headache, fatigue, vertigo, anorexia; pruritus, acne-form skin eruptions; jaundice, liver necrosis.	Damage to liver, kidneys, lungs, blood, central nervous system, may be fatal.
Asbestos	Inhalation Ingestion	Medium	Eye irritation	Labored breathing, interstitial fibrosis, restricted pulmonary function, finger clubbing, Carcinogen

4.2 Table of Chemical Hazards Part 1

POTENTIAL CHEMICAL HAZARDS

Exposure Standards, Recognition Qualities,
Flammable Limits

CHEMICAL	EXPOSURE STANDARDS (a)	IDLH (b)	RECOGNITION ODOR	QUALITIES Odor Threshold	% VOLUME LEL	UEL
Benzene	1 ppm	2000 ppm Ca (c)	Aromatic	2 ppm	1.3	7.1
Ethylbenzene	100 ppm	2000 ppm	Aromatic	?	1.0	6.7
Toluene	100 ppm	2000 ppm	Aromatic	10 ppm	1.2	7.0
Xylene	100 ppm	10000 ppm	Aromatic	20 ppm	1.1	7.0
Tetraethyl Lead	0.075 mg/m^3	40 mg/m^3	Aromatic	N.A.	1.8	?
Polychlorinated Biphenyl (PCB)	1 mg/m^3 (skin)	10 mg/m^3 Ca (3)	Mild	?.	NA	NA
Pentachlorophenol	0.5 mg/m^3	150 mg/m^3.	Benzene-like	N.A.	N.A.	N.A.
Asbestos	2 fibers/cc	Ca	None	N.A.	N.A.	N.A.

** PAH's exposure standards and regulations are included in Appendix E

(a) OSHA permissible exposure limits or ACGIH Threshold Limit Value based on an 8-hour time weighted average.

(b) IDLH - Immediately dangerous to life and health

(c) Ca - NIOSH Occupational Carcinogen

(d) N.E. - Not Established

of up to 2 hours for well installation, moving and decontamination, noise exposures are expected to be well below 85 dB for an 8 hour period. Blows to the drill stem during sample collection have not been found to exceed 115 dB, well under the impact limit of 140 dB. Although noise levels are expected to be below regulated levels, all personnel shall wear hearing protection during heavy equipment operation phases. The hearing protection shall have a protection rating of not less than 25 dB when worn properly.

4.1.6 Uneven Footing - The potential for uneven footing hazards will be minimized by personnel by examining the ground prior to stepping on it. Footholds will be tested. Unsafe or loose slopes will be avoided. Care will be taken to avoid stepping on random, sharp objects such as debris, tools, instruments, shovels, and heavy equipment parts and attachments. In addition, sturdy, steel-toed, steel-shanked boots will be worn by all field personnel.

4.1.7 Heat/Cold Stress Monitoring - For this drilling investigation, Level D PPE has been designated, and weather conditions are moderate. It is unlikely that heat or cold stress will be a problem at this site. In the event that PPE or weather conditions change, the SSO will hold a meeting to brief site workers on monitoring protocols for heat/cold stress. Site workers are directed to notify the SSO should they notice any problems or symptoms attributable to heat or cold.

Some of the work performed by RZA personnel and subcontractors is physically demanding. Depending upon the level of protective clothing and weather conditions, the potential for heat stress or hypothermia can be high, personnel will closely monitor themselves, other RZA personnel, and subcontractors for any early warning sings of heat stress or hypothermia.

Site workers should proceed with great caution in the vicinity of any excavation, especially near the edges, due to the potential for slope failure and burial. The greatest stability will be found at the corners of the excavation, but caution is strongly advised during any approach. **RZA employees should avoid entry to an excavation for any reason.**

SAMPLES SHOULD BE COLLECTED USING A BACKHOE ONLY!

Should entry be necessary, the following steps shall be followed:

- The cavity is to be properly sloped or shored in accordance with Subpart P of 29 CFR Part 1926.
- The cavity is then to be approved by a registered professional engineer for stability prior to entry.
- A stairway, ladder, ramp or other safe means of egress shall be placed in excavations greater than four feet.
- The atmosphere in the cavity is to be assessed for airborne contaminants and oxygen content. Entry is not permitted unless oxygen and hazardous vapor or gas levels are below the action levels outlined in this Health and Safety Plan.
- Oxygen, airborne contaminant and explosive levels, as necessary, are to be monitored in the breathing space of the entrant at all times while in the excavation.
- Emergency rescue equipment, such as breathing apparatus, a safety harness and line, or a basket stretcher, shall be readily available where hazardous atmospheric conditions exist or may reasonably expected to develop during work in the excavation.
- An observer is to posted in sight of the entrant, to monitor the entrant at all times and notify emergency personnel should rescue become necessary. **The observer is NOT to enter the cavity under any circumstances, nor to leave the area except to notify emergency personnel.**

Open excavations will be flagged when active work is not being done on or near the cavity or trench. For the protection of the general public, the site will be secured with fences (six-foot security) or barricades each day when site operations have been concluded.

4.1.5 Machinery Noise - Field personnel shall not be exposed to noise levels greater than 85 decibels (dBA) for an 8-hour time weighted average. Noise dosimeter analysis of drilling projects with similar equipment at similar sites indicate expected noise exposures of no more than 84 - 88 dB, assuming continuous operation of drilling equipment for an 8 hour period. In actual operation which includes breaks

4.1.1 Utility Location

This subsurface investigation involves activities that could expose personnel to hazards due to buried electrical lines, gas lines, or other underground utilities. In order to minimize these hazards, RZA has contacted the Utility Notification Center (UNC) for delineation of buried utilities. This has been logged by UNC with the site specific identification #_____ and RZA user identification #_____. The UNC can be contacted by phone at: 1-800-332-2344. All other hazards not delineated by the UNC are the responsibility of the client.

4.1.2 Equipment Operational Safety - RZA personnel will not operate any heavy equipment. The contractor for the drilling company will be responsible for picking operators and ensuring that they are qualified. All equipment will be inspected daily to assure that they are in good working order including, but not limited to, hydraulic hoses, belts, cables, chain links, and hoist hooks. All equipment will be turned off, locked up or otherwise secured at the close of the work period to prevent unauthorized use.

4.1.3 Drilling Equipment Safety - All drilling equipment subcontracted by RZA is expected to be in good working condition, with all required safety equipment. Responsibility for safety and maintenance of equipment shall rest with the subcontractor. RZA personnel will wear hard hats at drilling locations; maintain a safe distance from the operating equipment; wear hearing protection during active drilling; not operate any heavy machinery or assist the drilling contractor in the completion of their normal duties (i.e. unloading equipment, shoveling cutting, etc.). Field personnel will keep clear of the derrick radius; ensure that they remain facing the active drilling operations at all times; and maintain communications with the drilling crew. Additional safety procedures for work around drill rigs are located in the RZA AGRA, Inc. *Health and Safety Manual for Safe Work Practices.*

4.1.4 Excavation Procedures - RZA employees will not be responsible for any site excavation activities and will not operate any heavy machinery. Excavation will be carried out by a qualified contractor hired for the purpose. No RZA employee is to approach an excavation unless the contractor has shored or sloped the cavity in accordance with Subpart P of 29 CFR Part 1926 to prevent accidental collapse. Personnel will maintain a distance equal to the depth of the excavation, away from all unshored or non-sloped cavity sideslopes. Should the RZA Site Safety Officer feel that contractor is not in accordance with these standards, the SSO should discuss this with the contractor, cease all RZA activities, and leave the work zone until the standards are met.

3.3 Project Duration

This project will take 3 months to complete.

4.0 HAZARD ANALYSIS

The evaluation of hazards is based upon the knowledge of site background presented in Section 3.0 and anticipated risks posed by the specific operation. Hazards, hazardous conditions or materials may be present or encountered at the site that were not anticipated based on available background information during the preparation of this Site Health and Safety Plan. The information in this document is based on the best available background information or previous investigation, is to be considered dynamic and will be changed or updated as necessary.

Tables 4.1, 4.2, 4.3 and 4.4 provide a summary of hazards and protective measures planned for each task at the site.

4.1 Table of Physical Hazards

PHYSICAL HAZARDS

TASK	HAZARD	RISK	PREVENTION
Excavation/Drilling/ Sampling	Heavy equipment	Moderate	Watchfulness, communication safe distance
	Machinery noise	Moderate	Hearing protection
	Striking overhead or underground utilities	Low	Utility locate, consult client
General Physical Hazards	Fire/Explosion	Low	Monitoring watchfulness
	Hazardous chemicals	Low	Avoid direct contact or inhalation
	Asbestos	Low	Monitoring, PPE as necessary
	Uneven footing and debris	Low	Watchfulness, proper footwear
	Heat stress/hypothermia	Low	Watchfulness, monitoring
	Traffic	Low	Watchfulness, traffic vests, cones, barricades

RZA AGRA, Inc. (RZA) is under contract with City of Portland to perform a subsurface investigation/remedial services related to the proposed construction of a water pollution control laboratory at the site in Portland, Oregon. The property, tax lots R42580-6020, R42580-6900, and R42580-6620, is vacant. The site was previously part of the PDC St. John's Riverfront Development Project and is now owned by the City of Portland. The site is a 7.6 acre parcel located on the northeast bank of the Willamette River just south of Cathedral Park and the St. John's Bridge. Previous environmental studies of the site have identified types and locations of potential hazardous substances(TPH & potential Asbestos material). Field investigations were conducted to test soil and groundwater samples. Conclusions from the studies are as follows: 1.) the site, vacated in 1977-1978, had been in use since at least 1920 and occupied by sawmills and a wooden box factory; 2) hazardous materials may have been handled on-site as well as upgradient off-site. Potential on-site groundwater contamination exists; 3) approximately 500-600 cubic yards of spent sand-blasting sand may be present on site, and 4) low levels of groundwater contamination may be present. In addition there has recently been an indication that an asbestos steam pipe and boiler covering plant may have been located on the site.

The purpose of this investigation is to evaluate the quality of subsurface soil related to previous site use or releases in the area. The specific tasks that will be carried out for this project, and which require the preparation of this Site Health and Safety Plan include excavation, drilling,sampling, and soil removal.

3.1 Site Description

The site is located at the northeast bank of Willamette River just south of Cathedral Park and the St. John's Bridge, (tax lots R42580-6020, R42580-6900 & R42580-6620) in Portland, Oregon. The property under investigation is approximately 7.6 acres in size. The topography of the site is generally flat. Property use in the area is residential, industrial and commercial. The site is owned by the City of Portland.

3.2 Scope

The scope of work for the project will include: 1) drilling and sampling a number of borings; and 2) properly abandoning each of the borings. The performance of these tasks will help evaluate the quality of subsurface soil at the site. These tasks may be changed or be added to during the course of this project and this Site Health and Safety Plan may be modified by the Site Safety Officer to accommodate any changes.

- Determine RZA personnel protection levels and necessary clothing and equipment to ensure the safety of personnel. This information will be provided to RZA subcontractors and visitors, and appropriate compliance by these individuals will be expected.

- Evaluate weather and chemical hazard information and make any necessary modifications to RZA work plans and personnel protection levels to maintain RZA personnel safety.

- **THE SSO MUST NOTIFY OREGON OSHA BY PHONE WITHIN 8 HOURS IN THE EVENT OF DEATH OR CATASTROPHE AT THE WORK SITE.** *(an accident in which five or more site workers seek or are sent to medical attention).* **SSO MUST notify Oregon OSHA by phone within 24 hours in the event of ANY accidents or injuries result in a hospital admission with medical treatment other than first aid.** Salem Office: 1-378-5729.

2.5.1 Pre-entry Briefing - The Site Safety Officer will conduct a briefing with RZA employees, contractors and subcontractors prior to site entry and initiation of operations to ensure that employees are apprised of the contents of this Site Safety and Health Plan and general site safety including:

1. Emergency information including: location of nearest hospital, telephone, water, and fire extinguisher.
2. Use, care, maintenance and fitting of personal protective equipment including respirators, as necessary.
3. Safe places of refuge in an emergency.
4. Buddy system review, as necessary.
5. Emergency evacuation routes and procedures.
6. Site security and site control.

2.6 Personnel Requirements

The personnel requirements for this site will be one to two persons. During operations involving only one person, that person will function as Site Safety Officer and Site Project Manager. Should level of protection increase to Level C or above or involve Confined Space Entry, the SSO will cease work and leave the site until additional personnel arrive and a buddy system is established.

3.0 SITE CHARACTERIZATION

This Site Health and Safety Plan defines the hazards and methods to protect personnel from those hazards as identified in previous site work or background information. This Site Health and Safety Plan is dynamic and may be modified by the Site Safety Officer to encompass changes in work or other unanticipated events and hazards. For a thorough overview of available historical information concerning the site, see RZA Project File #7197-00.

2.2 Director, Health and Safety

John Martin is the Director of Health and Safety (DHS) for RZA AGRA, Inc. He is responsible for initiation, coordination, and monitoring of the RZA AGRA, Inc. Health and Safety Program. Mr. Martin shall be notified in the event of any site accidents or injuries and receive copies of all accident reports. Mr. Martin shall have final approval of all Site Health and Safety Plans and shall make occasional Site Safety Inspections to ensure that a high standard of site safety is maintained.

2.3 Health and Safety Coordinator

The Health and Safety Coordinator (HSC) shall be an OSHA knowledgeable employee or representative of RZA responsible for preparation of the Site Health and Safety Plan. The HSC shall work with the Project Manager and Site Safety Officer to ensure that site safety is maintained in accordance with T8 CCR Section 3203 and 1509; 29 CFR 1910.120 and all other regulations that may apply. The HSC shall make occasional Site Safety Inspections to ensure that a high standard of site safety is maintained. The Health and Safety Coordinator for the Portland office of RZA is Denny Macomber.

2.4 RZA Project Manager (Site Project Manager)

The Project Manager, as directed, has the responsibility and authority to direct all hazardous waste operations. These duties shall include, but, not be limited to, designation of the Site Safety Officer and for the initiation and implementation of the Site Safety and Health Plan. The Project Manager (PM) shall maintain communications with the Site Safety Officer while any RZA personnel are on-site. The Project Manager shall designate a qualified and knowledgeable RZA individual to act as Site Project Manager (SPM) in the absence of the Project Manager.

2.5 RZA Site Safety Officer

The Site Safety Officer will be the OSHA knowledgeable individual responsible for implementing and supervising compliance with the Site Health and Safety Plan and site control. In the absence of the Site Safety Officer these responsibilities shall fall to another individual knowledgeable in occupational health and safety acting on behalf of RZA. This individual will:

- Follow the procedures for safe work practices as outline in the RZA AGRA, Inc. *Health and Safety Manual for Safe Work Practices.*
- Conduct a pre-entry briefing prior to initiation of any site activities.

6. The Site Safety Officer will consider, as necessary, any other emergency measures outlined in the RZA Health and Safety Program, including evacuation, notification of general public in area, if necessary.

7. The incident will be reported as soon as possible in written form on an RZA Accident/Incident Reporting form found in Appendix A. Care should be taken to evaluate: what went wrong and why; how to avoid in the future; and possible adjustments in the standard operating procedures.

2.0 RZA SAFETY PERSONNEL

Director of Health and Safety ..... John Martin
Home: ..... (503) 591-8708
Coordinator of Health and Safety ..... Denny Macomber
Home: ..... (503) 735-0365
Work: ..... (503) 639-3400
Project Manager: ..... Gerald Koschal
Office: ..... (503) 639-3400
Home: ..... (503) 538-7011
Site Safety Officer: ..... Paul Ecker
Work: ..... (503) 639-3400

2.1 Reporting Structure

RZA employees are to report all health and safety related incidents, accidents, conflicts or problems to the Site Safety Officer (designated above, or the senior RZA person present). The Site Safety Officer is to report incidents/accidents or other serious site problems to the Project Manager and Health and Safety Coordinator/Director, Health and Safety. The following reporting structure should be followed:

Vice President/Manager of Portland Office:	Terry Craven
Director of Health and Safety	John Martin
Coordinator of Health and Safety	Denny Macomber
Senior Project Manager:	Doug Smith
Project Manager:	Gerald Koschal
Site Project Manager:	Paul Ecker
Site Safety Coordinator:	Paul Ecker

1.5 General First Aid

In all emergencies, document action taken and notify safety officer, project manager, SSC and client officials of occurrence of an emergency and actions taken.

Skin: Remove contaminated clothing immediately;wash with soap and water.

Inhalation: Remove to fresh air. Where necessary, call emergency medical help (ambulance, hospital, police) and follow medical emergency help procedures.

Eye Contact: Flush with eye wash or water at least 15 minutes. Follow emergency medical help procedures, if indicated. Contaminants may be absorbed through the eyes.

Ingestion: Obtain medical help if indicated.

Injuries: Administer first aid if necessary. Follow emergency medical procedures in Section 1.2, if necessary. Medical emergencies take precedence over decontamination.

1.6 Emergency Plan

It is not anticipated that the operations for this project will involve hazards that could necessitate instituting emergency response measures. Emergency incidents should be anticipated and prevented by maintaining vigilance and conducting safe operations. The priority of objectives in an emergency situation should be as follows: protection of personnel health and safety; protection of public safety; protection of environment; and protection of property. However, should conditions change and an emergency response is warranted, the following procedures should be followed.

1. The Site Safety Officer (SSO) will assume command unless and until superseded by police, fire or other emergency officials.
2. The SSO will assign personnel to specific functions they should follow during an emergency. This should be done during the pre-entry briefing and may be noted below. Functions suggested are: First-aid; Notify Emergency Services; Stage Safety Equipment; Regroup and take roll of site personnel; and Notify Project Manager.
3. All personnel in an IDLH area will move or be removed (if injured) to an area of refuge designated by the SSO.
4. First aid and CPR will be applied as necessary to any injured personnel.
5. The Site Safety Officer will consider if an upgrade of PPE is necessary based on changing action levels.

1.2 Emergency Procedures - Immediate

1. Remove injured party from contaminated or other unsafe zone, if possible without incurring additional injuries.

2. Apply emergency first aid to ensure breathing and reduce immediate threat to life.

3. Call 911: follow Oral Reporting Procedures below.

   If life threatening, request instructions from dispatcher; if not life threatening remove from contamination zone and consider the need for decontamination prior to transport.

4. If any contaminated material enters the eyes, immediately wash with clean water for 15 minutes.

5. Complete written accident/incident report using attached form. Send copies to RZA Project Manager and Director, Health and Safety.

1.3 Emergency Procedures - Secondary

1. Transport to hospital if possible, otherwise call ambulance (911).

2. Notify Project Manager, Director of Health & Safety and other key personnel.

3. Fill out Incident/Accident report in Appendix A.

1.4 Oral Reporting Procedures

Give this information when reporting an emergency:

1. Name, location, and phone number of person reporting.

2. Location of accident/incident, i.e., building number, facility name, etc.

3. How many persons need help.

4. Description of injuries.

5. Details of any chemicals or other contamination involved.

6. Summary of the accident including its suspected cause and the time it occurred.

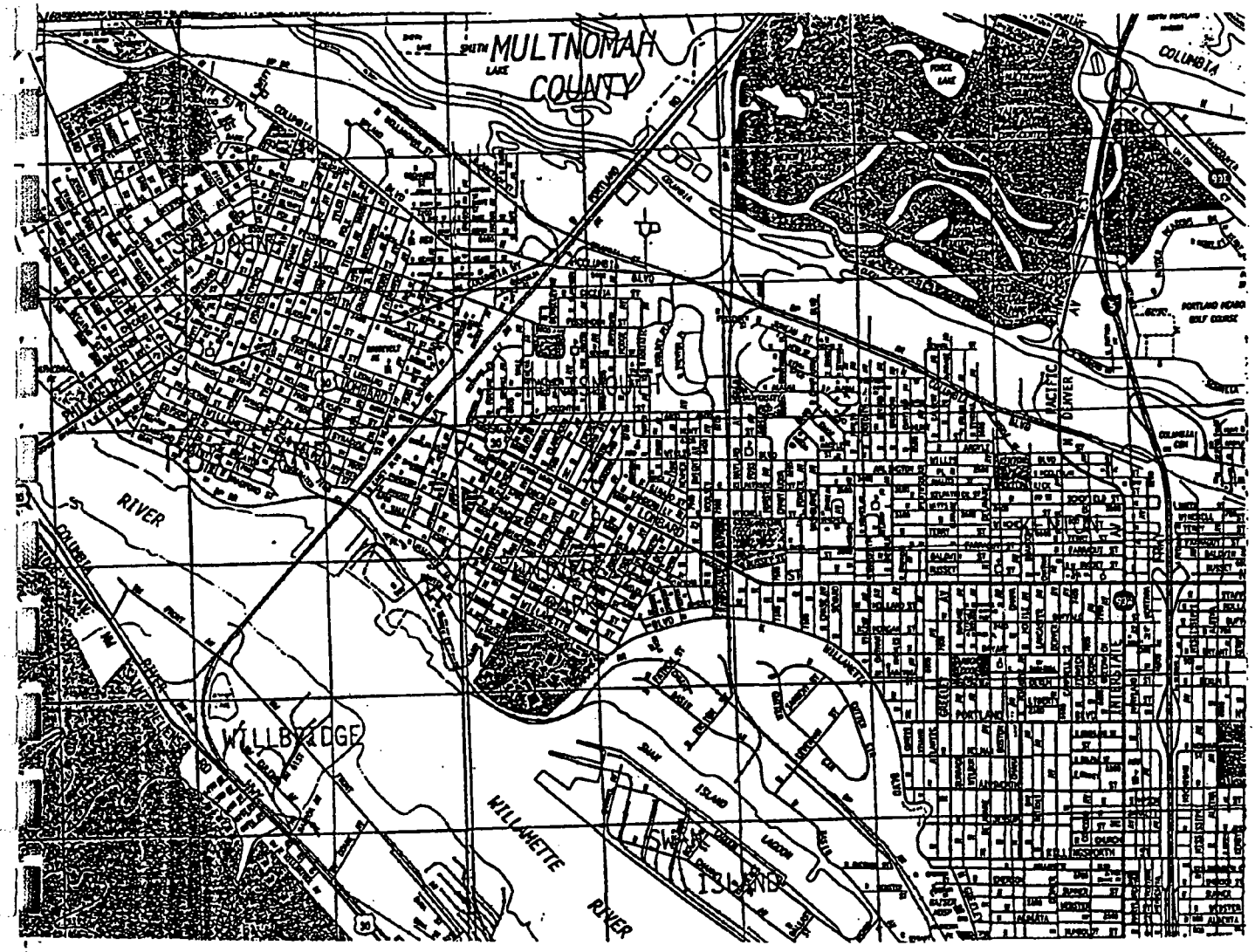
7. Summary of what is being done for the victim(s).

8. Do not hang up until the other party has done so.

Information will not be released under any circumstances to parties other than those listed above or bonafide emergency response facilities.

1.0 EMERGENCY/CONTINGENCY PLAN

1.1 Nearest Hospital: Kaiser Hospital
5055 N. Greeley Avenue, Portland, Oregon



EMERGENCY REFERENCE SHEET

Project Name:Water Pollution Control Laboratory
Project Location: Northeast bank of the Willamette River, south of Cathedral Park, Portland, Oregon
Project Number: 21-7197-00

SAFETY PERSONNEL - Portland RZA AGRA, Inc.:

Director, Health & Safety :	John Martin	(Office) (503) 639-3400
Project Manager:	Gerald Koschal	(Home) (503) 538-7011
Site Safety Coordinator:	Paul Ecker	(Office) (503) 639-3400

EMERGENCY NUMBERS:

Nearest Hospital ..... **Kaiser Hospital**

SEE HOSPITAL ROUTE MAP NEXT PAGE

Information: **285-9321**

Emergency Room: **285-9321**

Ambulance: **911**

Fire: **911**

Police: **911**

Client Contact Person (City of Portland) ..... Randy Miller

Work: ..... (503) 823-7187

Oregon OSHA Central (Salem): ..... (503) 378-3272

National Response Center: 1-800-424-8802

EPA Environmental Response Team: ..... (201) 321-6600

Utility Notification Center: ..... (800) 332-2344

Site Safety Coordinator, Project Manager and Director of Health and Safety are to be notified immediately if worker exposure, accidents or site conditions not anticipated in this document are encountered. In case of hazard exposure during and/or prior to a medical situation, the hospital and any emergency response personnel shall be notified that patient's clothing may be contaminated.

ACTION LEVELS:

Upgrade PPE Level to Level C:	30 ppm in Ambient Air (petroleum hydrocarbons)
Stop all work and exit work area:	10% LEL of gasoline in work area; or
	150 ppm in Ambient Air; or
	$O_2 < 19.5\%$; or $O_2 > 23.5\%$

Nearest Phone:	Telephone available at the building adjacent to the site
Nearest Water:	Water available at the building adjacent to the site

RZA AGRA, Inc

SITE HEALTH AND SAFETY PLAN

REMEDIAL SERVICES

WATER POLLUTION CONTROL LABORATORY

N.E. BANK OF THE WILLAMETTE RIVER NEAR CATHEDRAL PARK

PORTLAND, OREGON

RZA Project #7197-00

A COPY OF THIS SITE HEALTH AND SAFETY PLAN MUST BE KEPT AT THE SITE DURING ALL FIELD ACTIVITIES

Prepared For:

City of Portland

Bureau of Environmental Services

1120 SW Fifth Avenue, RM 400

Portland, Oregon 97204-1972

Prepared By:

RZA AGRA, Inc.

7477 SW Tech Center Drive

Portland, Oregon 97223-8024

Appendix B

Health and Safety Plan

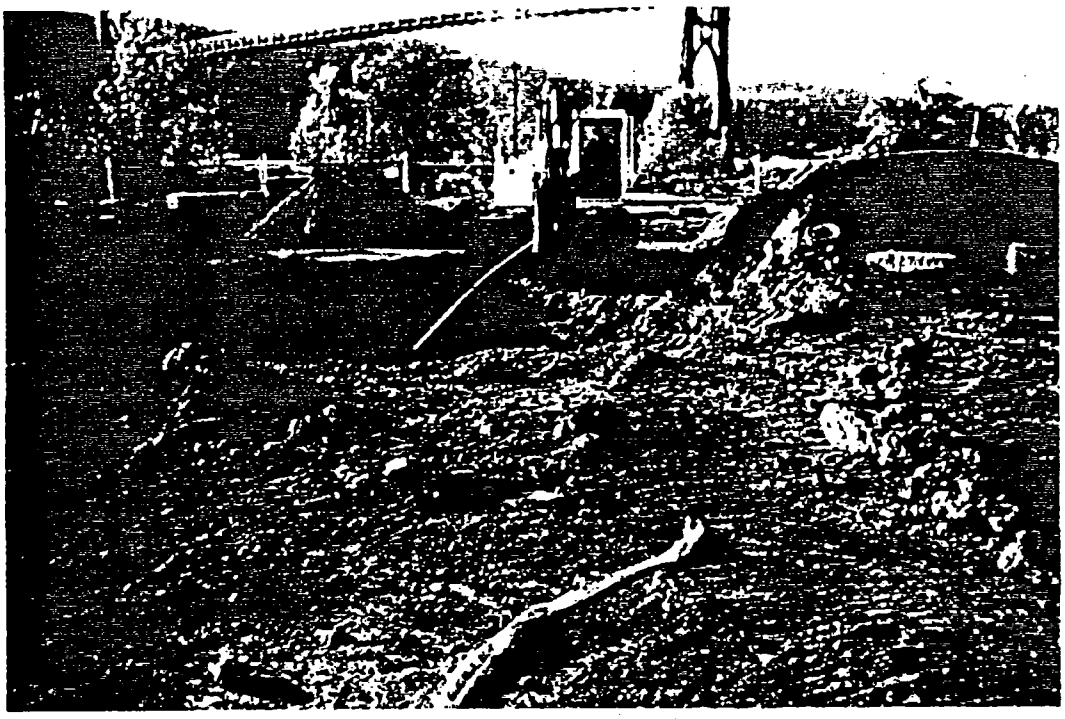


Photo 7 - Removing the conduit

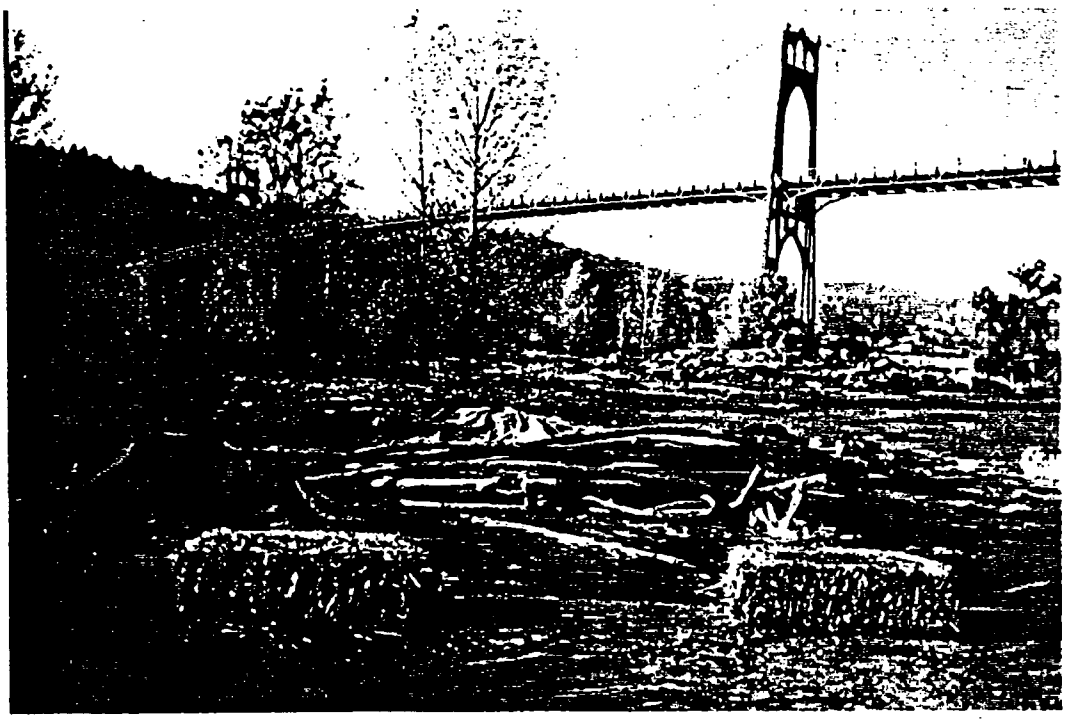


Photo 8 - Removed conduit

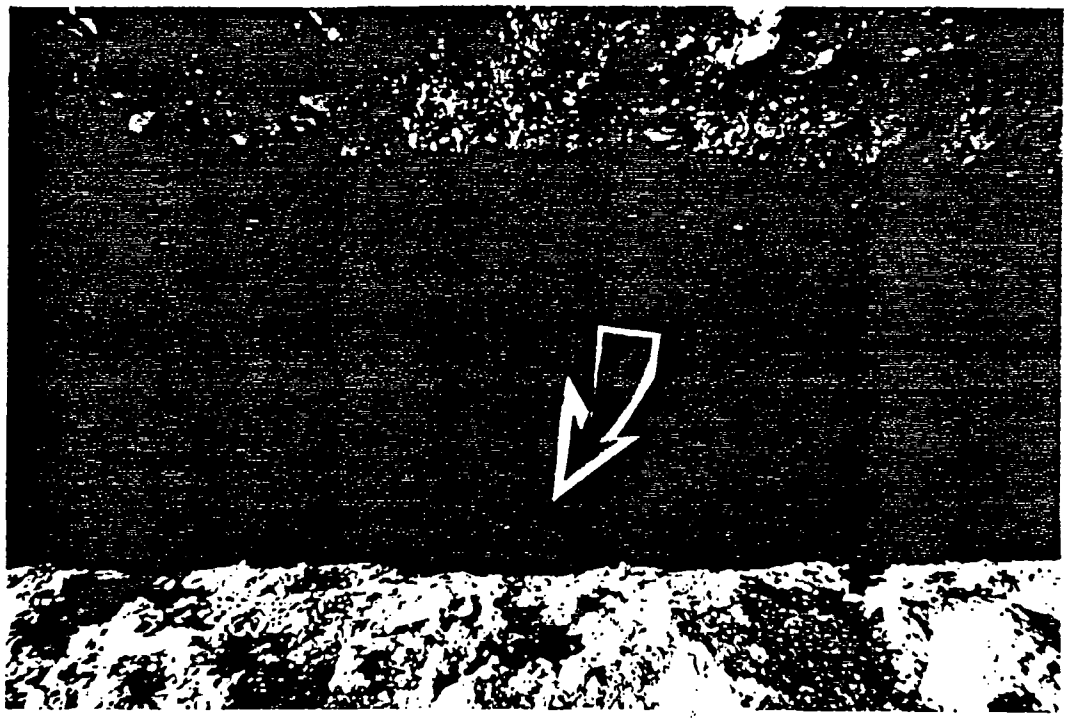


Photo 5 - Old release area, damaged pipe

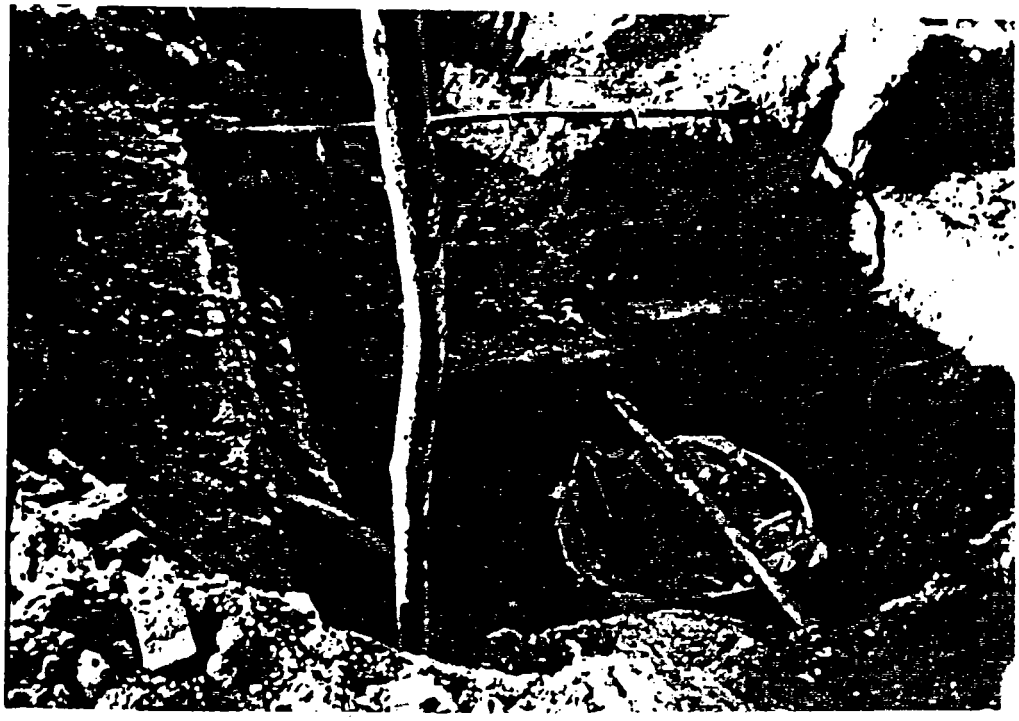
Photo 6 - Soil piles SP-1 "hot pile" and SP-2 "clean pile"

Photo 3

Piping
&
Concrete
Foundations

Photo 4

Containment
Area



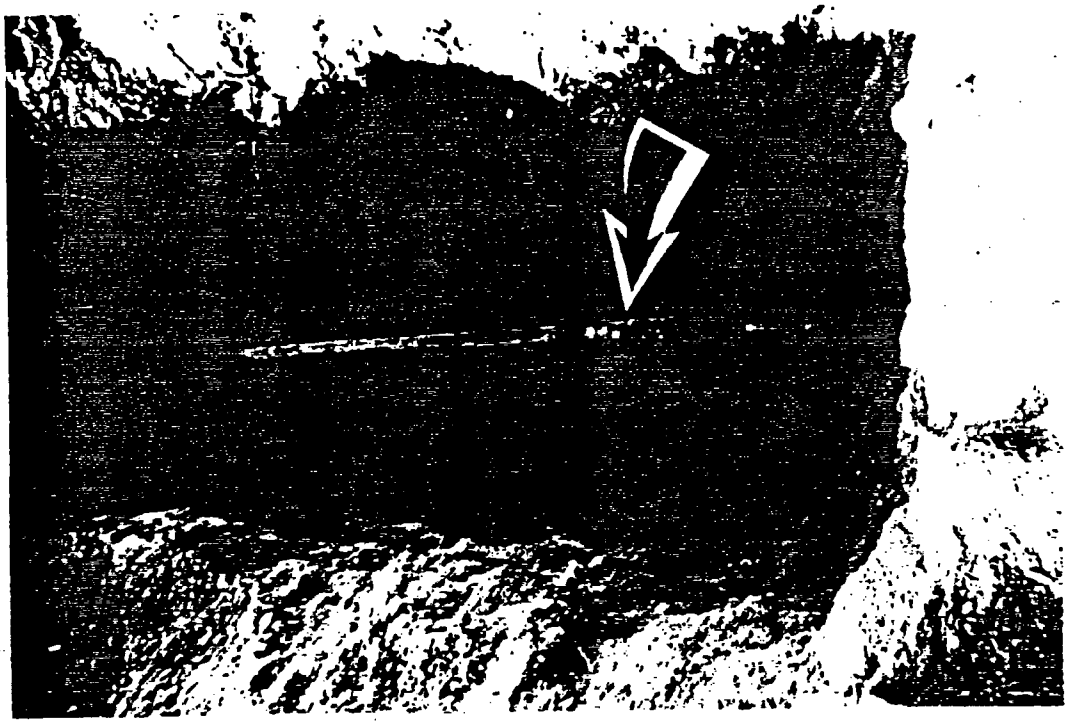
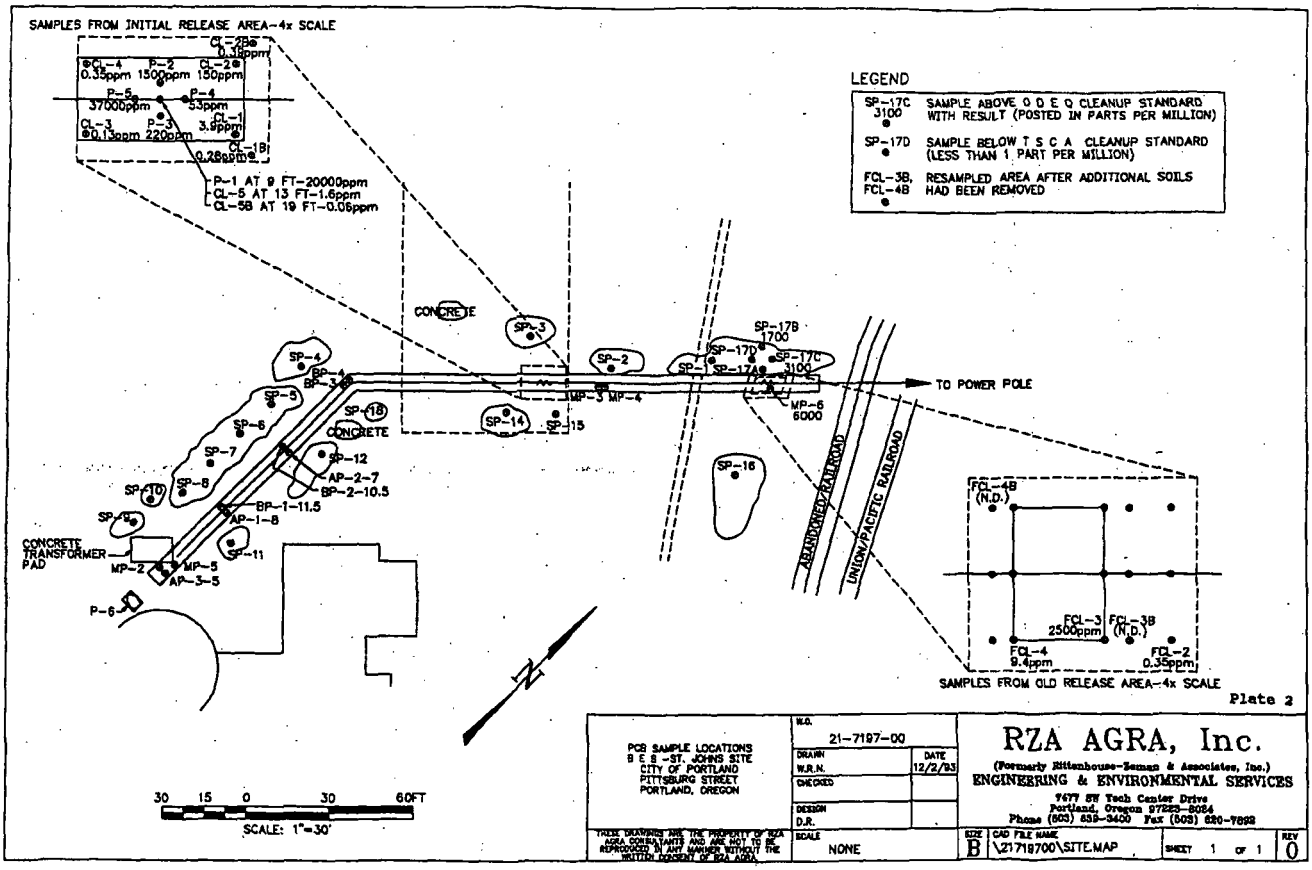


Photo 1 - Initial release area, damaged pipe

Photo 2 - Attaching a lead to the conduit piping

Appendix A

Photographs



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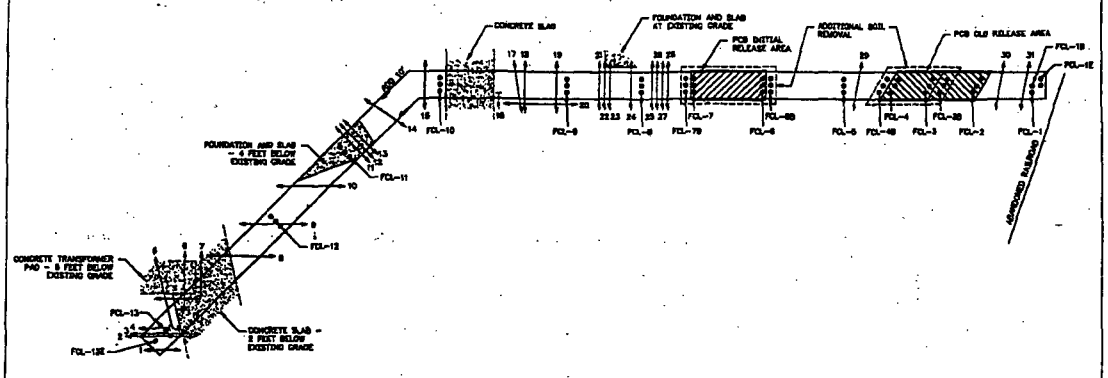

Plate 3

NOTES:

1. A COMPOSITE SAMPLE WAS DERIVED BY BLENDING THREE GRID SAMPLES AT EACH SAMPLE LOCATION.

PCB FINAL TRENCH CLOSURE SAMPLE AND PIPE LOCATIONS
S E S - ST. JOHNS SITE
CITY OF PORTLAND
PITTSBURG STREET
PORTLAND, OREGON

THIS DRAWING IS THE PROPERTY OF RZA AGRA, CONSULTANTS AND ARE BEST TO BE RETURNED UPON COMPLETION OF THE PROJECT FOR WHICH IT WAS PREPARED.

DRAWN	CRA/MC	DATE 2/16/94
CHECKED		
DESIGN		
SCALE	NONE	

RZA AGRA, Inc.
(Formerly Ettinger-Seman & Associates, Inc.)
ENGINEERING & ENVIRONMENTAL SERVICES
9777 SW Tech Center Drive
Portland, Oregon 97223-8084
Phone (503) 639-6400 Fax (503) 620-7868

SIZE	CAD FILE NAME	SHEET	REV
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Approximately 15 cubic yards of additional soil was excavated from those five areas and the locations were re-sampled. Analytical results indicated that all five samples fell below the TSCA PCB cleanup level of 1 ppm.

A total of 150 cubic yards of contaminated soil has been excavated from the vicinity of both release areas. Approximately 100 cubic yards of that soil is stored inside double-lined drop boxes. The remaining soil is stored on site in a secure containment area. There is an additional 350 linear feet of 3" electrical conduit that is presently stored on site. Both are pending disposal.

We appreciate the opportunity to assist you on this project. If you have any questions, please feel welcome to contact the undersignes.

RZA AGRA, Inc.

Denny Macomber, Hazardous Waste Specialist

Gerard Koschal, R.G., Senior Geologist

REGISTERED PROFESSIONAL
OREGON
GERARD KOSCHAL
#G 1015
GEOLOGIST

8.0 BACKFILL

All fill material was sampled and analyzed for PCBs, prior to use as backfill. Of the seventeen soil piles sampled, only one soil pile SP-17 exceeded the TSCA PCB cleanup level of 1 ppm. The contaminated material was later identified, segregated from the clean soils, and stored with the contaminated material.

9.0 STORAGE AND DISPOSAL

Five 20 cubic yard drop boxes were delivered to the site during the month of December by Chemical Waste Management. The drop boxes were double-lined and a portion of the contaminated soils were transferred to the drop boxes. Approximately 60 cubic yards of contaminated soil is stored on-site in a fenced, lined, and covered containment area pending disposal.

9.1 Waste Water Disposal

All decontamination water was stored on-site in a 500 gallon Baker tank. The waster was tested for the presence of PCBs. Analytical results indicated that low levels (20 ppb) of PCB contamination was present. RZA arranged for proper disposal. Spencer Environmental Services (Spencer) of Oregon City, Oregon, is permitted to accept this level of waste water. Spencer pumped out the 376 gallons of waste water and transported the water off-site for proper disposal.

9.2 PCB Piping Storage And Disposal

Approximately 350' linear feet of 3" electrical conduit piping is wrapped and contained in 10 mil plastic on-site (see Photo 8). The piping has been included into the waste profile information with Chemical Waste Management and is pending disposal.

10.0 CONCLUSIONS

A release of PCB containing oil was identified at the proposed Water Pollution Control Laboratory in the St John's area of Portland, Oregon. The source of the release was identified as a break in a 3" electrical conduit containing PCBs in insulation.

In addition to the initial release an old release was discovered during soil removal. The estimated total release for both areas was estimated at less than two gallons. The extent of contamination was limited to the immediate vicinity of the releases. Approximately 150 cubic yards of soil were impacted. Groundwater does not appear to have been impacted.

Fifteen closure samples were collected from selected grid locations along the trench at approximately ten feet in depth and at 30 foot intervals. Five of the fifteen samples exceeded the TSCA PCB cleanup level of 1 ppm.

FINAL CLOSURE SAMPLES

(Sample Date: December 13, 1993)

Sample ID#	Location/Depth	Concentration (PPM)
FCL-1	N. Sidewall, Center Below Piping Area, S. Sidewall (10 ft)	900 ppm
FCL-2	" "	0.31 ppm
FCL-3	" "	2,500 ppm
FCL-4	" "	9.4 ppm
FCL-5	" "	0.19 ppm
FCL-6	" "	9.8 ppm
FCL-7	" "	2.2 ppm
FCL-8	" "	N.D.
FCL-9	" "	N.D.
FCL-10	" "	N.D.
FCL-11	" "	N.D.
FCL-12	" "	N.D.
FCL-13	" "	N.D.
FCL-1E	East-end of Trench, Center Bottom	N.D.
FCL-13E	West-end of Trench, Center Bottom	N.D.
FCL-1B	N. Sidewall, Center Below Piping Area, S. Sidewall (15 ft)	0.31 ppm
FCL-3B	" "	N.D.
FCL-4B	" "	N.D
FCL-6B	" "	N.D
FCL-7B	" "	N.D.

Note: N.D. - Not Detected

Once the 3" electrical conduit piping had been removed and all suspected PCB contaminated soils excavated, final closure samples were systematically collected in the old release area and along the entire trench (see Plate 3). Samples were collected with a hand auger at a depth of approximately ten feet at thirty foot intervals along the trench. Three samples were collected at each site and were blended to perform composite samples. Composite samples were then analyzed for PCBs using EPA methods 3540 and 8080/8081. These samples were identified by the prefix "FCL-X." Closure sample locations are shown on Plate 3.

Five final closure samples exceeded the TSCA cleanup standard of 1 ppm for PCBs. These samples were associated with the release areas. Additional soils were removed from those contaminated areas and the area was re-sampled. These samples were identified by the prefix "FCL-XB." Analytical results indicated that all five samples were below the TSCA PCB cleanup standard of 1 ppm.

Final Sampling results are included in the table below.

5.10 Old Release

During the excavation of the pipe trench northeast of the release area, evidence of a second, older release was discovered at approximately a depth of 10 feet. A joint in the piping showed signs of historic damage (see Photo 5).

Based on our observations it appears a small release of PCBs oils occurred, probably during the site's demolition. Only slight traces of visibly contaminated soil was present around the piping. The soil beneath the piping revealed only minor surface staining.

A soil sample MP-6 was collected from beneath the release area and was sent to Oregon Analytical Laboratory for analysis. The analytical results indicated a PCB concentration of 6,200 ppm in the immediate vicinity of the damaged conduit, exceeding the TSCA cleanup standard (see Plate 2).

6.0 CLEANUP

Prior to removing the electrical conduit, approximately 75 cubic yards of soil was removed from the initial release area (see Photo 6). The soil was segregated into two soil piles (e.g. SP-1 and SP-2). Soil pile SP-1 represented the "hot pile" or soil that could have come into contact with PCB fluid during the time of the release. Soil pile SP-2 represented the "clean pile" or soil that most likely did not come into contact with the PCB fluid. Representative samples were then collected from both soil piles and were analyzed for PCB contamination. Analytical results indicated that soil pile SP-1 contained 800 ppm of PCBs, while SP-2 contained 0.13 ppm of PCBs. Soils from SP-2 did not exceed EPA's regulatory cleanup level for residential sites of 1 ppm. Soil pile SP-2, approximately 35 yards was used as backfill material.

The piping was removed from the trench in sections and placed in a bermed area for future disposal. The end of the pipe under the railroad track was sealed to prevent in future leakage.

Approximately 100 cubic yards of soil was removed from area of the old release and was stored inside a lined containment area.

7.0 CLOSURE/SAMPLING PLAN

RZA employed a sampling plan designed to characterize the degree of cleanup throughout the entire sampling areas (e.g. initial release area, old release area, and along the entire trench formerly containing the 3" electrical conduit piping). Our goal was to achieve site closure, by ensuring that adequate cleanup levels had been accomplished and that no areas exceeded the TSCA PCB cleanup level of 1 ppm. The sample plan is included in Appendix C.

5.7 Additional Soil Removal/Additional Preliminary Closure Samples

Approximately 15 cubic yards of additional soil was removed from those three areas mentioned above which exceeded the cleanup level. A second set of closure samples were later collected from areas CL- 1, CL-2, and CL-5. All three samples results were below the 1 ppm TSCA cleanup standard (see Plate 2).

5.8 Demolisher

RZA attempted to trace the pipe from the release area to its southwest. Extensive foundations were encountered. A concrete demolisher was brought in to break re-bar concrete foundations that crossed the electrical conduit.

5.9 Electrical Conduit

RZA continued to excavate along the conduit piping at a depth of approximately 10 feet toward the Willamette River to ensure that the pipe actually ended in the vicinity of what was once a concrete transformer pad. Visual evidence confirmed that the pipe southeast of the release zone had no releases Preliminary samples were collected from the removed soil to validate these observations. PCBs were not detected in these soil samples.

After the southern end of the pipe was located and no releases were identified excavation continued to the northeast of the release site. The piping was traced to the northeast property line. The piping appeared to continue under the railroad tracks and toward a telephone pole.

To remove the piping, a trench approximately three feet in width and ten feet in depth was excavated along the entire length of the pipe (see Photo 3). Three key areas were sloped in accordance with OSHA regulations in order to allow safe entry into the excavation and in order to allow the pipe to be cut into manageable sections (see Photos 4 and 7). Before cutting the conduit and as a precautionary measure to guard against additional PCB fluid leaking into the exposed trench, a secondary containment area was built below the pipe to collect any free-flowing fluids.

A pipe cutter wrench was used to cut the pipe. Inside the piping was a lead liner with heavy-gauge copper electrical wire wrapped in a fiber, wax-like insulation. No free liquid was identified in the pipe.

A sample of the insulation was analyzed for PCB content. The analysis indicated the insulation contained 17,000 ppm of PCB containing material.

5.5 PGE

PGE was contacted in an attempt to learn more about the electrical conduit piping and the standard protocol for disconnecting PCB containing transformer, practiced in the late 1970s.

PGE had no record that transformers had been removed from site. They, however, did indicate that the insulation may have used PCB containing material. If during the geotechnical subsurface exploration, the piping was exposed to heat or if previous site usage exposed the piping to heat, there was the possibility that the PCB liquid in the pipe could be due to the insulation liquefying.

5.6 Preliminary Sampling

A trenchbox was installed in the initial release area and a thorough inspection of the pipe revealed that the pipe had been hit by the drill rig and the piped had been sheared. No additional liquids were noted in the pipe. As a precautionary measure, waterproofing tape was applied around the piping to seal off the damaged area. Samples were then taken in the immediate vicinity of the release area to determine if contamination was present in the soils. The results of the preliminary sampling are listed below.

Sample ID#	Location	Concentrations (Aroclor 1260)
P-1	Beneath Puncture	20,000 ppm
P-2	1 ft North, Beneath Piping	1,500 ppm
P-3	1 ft South, Beneath Piping	220 ppm
P-4	2 ft East, Beneath Piping	53 ppm
P-5	2 ft West, Beneath Piping	37,000 ppm

The highest level was recorded at P-5, downgradient of the immediate release area.

Following the removal of approximately 75 cubic yards of soil at the initial release area, preliminary closure samples were taken. Analytical results indicated that three of the five closure samples exceeded EPA's cleanup standard of 1 ppm.

Sample ID#	Location	Concentrations (PPM)
CL-1	NE, Sidewall/5 ft	3.9 ppm
CL-2	SE, Sidewall/5 ft	150 ppm
CL-3	SW, Sidewall/5 ft	0.13 ppm
CL-4	NW, Sidewall/5 ft	0.35 ppm
CL-5	Center Bottom/5 ft	1.6 ppm

** CL-1, CL-3, and CL-5 exceeded EPA's cleanup Standard of 1 ppm.

Additional test pits were excavated to trace the direction of the pipe. Difficulty in tracing the conduit by test pitting occurred due to numerous pipes underground in the foundation.

5.1 Utility Locate Service

A utility locate service was contacted to locate the direction and ending points of the 3" electrical conduit piping. To accurately follow along the piping, a trenchbox was lowered into a clean excavation and a representative of RZA attached a lead to the conduit piping (see photo 2). The piping appeared to run northeast to southwest across the property with a major deviation to the east approximately thirty-five feet northeast of the release area. The piping appeared to end at the adjacent property line of Lampros Steel. The pipe extended to the southwest of the release area and then dog-legged to the south. The piping appeared to terminate in an area of several foundations.

5.2 Test pits

Three additional test pits were dug in the vicinity of the original release area and along the locators marking. The south end of the piping was identified, approximately 150 feet south of the original release area and fifty feet from the property boundary. The east end of the piping could not be located based on the piping projection.

5.3 Interviews

An employee at Lampros steel was asked if he knew of an old electrical conduit line running onto their property. He had no knowledge about such a pipe and suggested we talk to a man "who lives just up the street" who had actually worked on-site for Portland Lumber Mills prior to the operation shutting down. A representative of RZA was able to locate the wife of the former mill worker but was informed that the husband had passed on.

5.4 Aerial Photographs

A 1940s aerial photograph located on the wall at the US Bank Building in St Johns and several historical photographs viewed at the Oregon Historical Society indicated several pole-mounted electrical transformers located on the adjacent property and mounted along Pittsburg Street in various locations. Photographs viewed at the St John's Historical Society indicated that the Portland Lumber Mill site was built on a dock-like platform that covered most of the site. RZA believed that the piping must run in an northeast southwest direction and not bend to the east as the utility locate had indicated.

The southern end of the pipe was located in an area that was identified as a transformer pad on the Sandborn Fire Maps.

RZA's second task was to identify, characterize and contain the source of the release. This was accomplished by excavation an initial test pit in the vicinity of the release area. The source was source identified and additional contamination was present. Pre-closure samples was taken in order to determine the extent of contamination present. A combustible gas indicator was used to screen soils for possible elevated levels of petroleum bases products. The operation plan covered the possibility that drums or transformers might be discovered. RZA personnel were prepared to take the necessary precautions to avoid explosions or uncontrolled releases. A staging area was secured for the storage of drums.

The plan covered the possibility that electrical conduit piping was discovered. The pipe was visually inspected for leaks or damage which could have occurred during the previous subsurface exploration. RZA was prepared with the necessary absorbent material to further reduce the spreading of contamination if a leak was detected. RZA was also prepared to remove damaged pipe.

Follow this, RZA excavated the contaminated material and stored it in a lined containment area. Closure samples were taken to ensure that soils did not exceed the TSCA PCB cleanup standard of 1 ppm. RZA then arranged for storage and the proper disposal of the contaminated material.

4.7 Closure

According to TSCA regulations, RZA employed a grid system to delineate the boundaries of contamination. RZA will use a grid system for closure sampling if applicable. Following the excavation of any contaminated soils, closure samples were collected upgradient, along sidewalls, beneath the release area, and down gradient. Composite samples were collected from specific grid points to ensure the largest possible area is screened for residual contamination. (TSCA recommends composite samples for this very reason.) Following the removing of piping, composite samples were collected along the trenched area to ensure leakage had not occurred somewhere along the piping. Sampling was conducted in a manner consistent with general environmental practices outlined in the Sampling Plan included in Appendix C.

5.0 IDENTIFICATION AND CHARACTERIZATION OF RELEASE

On October 25, 1993, RZA set up the exclusion zones, the security fencing, and the decon area.

On October 26, C. Wark Trucking, Inc in Tualatin, Oregon, excavated soils to a depth of approximately ten feet in the vicinity of the former boring location and uncovered a damaged 3" electrical conduit pipe, suspected of containing PCB fluids (see Photo 1, Appendix A). RZA estimated that approximately one gallon of fluid was released into the soil in the immediate vicinity of the damaged pipe. An absorbent material was poured onto those areas showing signs of visible contamination.

4.3 Determination of Spill Boundaries/Post-cleanup Sampling

Post-cleanup sampling is outline in section 40 CFR 761.130 and is required to verify the level of cleanup under 761.125 has been reached. According to the regulations: "The responsible party may use any statistically valid, reproducible, sampling scheme (either random samples or grid samples) provided that the sampling area is the greater of (1) an area equal to the area cleaned plus an additional one 1- foot boundary, or (2) an area 20 percent larger than the original area of contamination; (3) The sampling scheme must ensure 95 % confidence against false positives; (4) The number of samples must be sufficient to ensure that areas of contamination of a radius of 2 feet or more within the sampling area will be detected, except that the minimum number of samples is 3 and the maximum number of samples is 40.

4.4 Health and Safety Plan

The Health and Safety Plan for this site was amended to include information on PCB containing material. The H & S plan is included in Appendix B.

4.5 Exclusion Zones/Equipment Decontamination

Included in the Health and Safety Plan specific guidelines outline the proper procedure in accordance with OSHA regulations 1910.120, which spell out protocol for hazardous waste operations including specific measures for setting up decontamination stations and exclusion zones and for proper equipment decontamination. These measures are employed in order to reduce the possibility of spreading contamination from the "hot zone" to non-sensitive areas of the site.

RZA was responsible for delineating three exclusion zones using caution tape and security fencing. No personnel was allowed access to the either of the three zones unless they were properly equipped with the correct personal protective equipment (PPE) and had received the necessary OSHA training.

Every piece of equipment that enters the exclusion zone was decontaminated after use. A decontamination station was set up employing secondary containment in order to collect all wash water. A hot pressure washer and detergent was used to decon the trackhoe bucket after each use. Personnel were required to triple rinse each piece of equipment, including PPE prior to exiting the decontamination zone.

All water was collected and stored on-site in a 500 gallon Baker tank.

4.6 Operation Plan

RZA's first task was to ensure site safety by establishing adequate exclusions zones. Prior to beginning each task, RZA employees and its subcontractors were wearing the appropriate PPE as outline in the amended H & S Plan.

Following the notification, RZA met with BES and it was decided that BES would notify the Oregon Department of Environmental Quality (ODEQ) about the release. Subsequently, RZA was asked to perform a subsurface investigation in accordance with TSCA regulations. This investigation included amending the current Health & Safety Plan and developing and Operation and Sampling Plan for the additional scope of work.

4.0 REGULATIONS

PCB releases fall under Toxic Substance Control Act (TSCA) which has established specific requirements for reporting PCB spills. According to Toxic Substance Control Act (TSCA) regulations (40 CFR 761.30 (a) (1) (iii) and 40 CFR 761.60d), PCB spills are viewed as improper disposal of PCBs. Although specific PCB cleanup requirements are not established in the TSCA regulations, each regional director is given authority to enforce adequate cleanup of PCB spills to protect human health and the environment. The reporting requirements apply mostly to users and manufacturers of PCB transformers or PCB containing hydralic systems; however, they also apply to sites where spills or releases of PCBs containing material in concentrations greater than 50 ppm have occurred.

The reporting requirements for PCB spill cleanup listed in 40 CFR 761.125 include:

- Spill Notification
- Proper storage and disposal of PCB contaminated debris
- Determination of spill boundaries in the absence of visible traces
- Post-cleanup Sampling and Documentation

4.1 Spill Notification

PCB spills involving 10 pounds or more by weight of PCBs must currently be reported to the National Response Center (1-800-424-8802). Where a spill directly contaminates surface water, sewers, or drinking water supplies, the responsible party shall notify EPA regional office and obtain guidance for appropriate cleanup measures in the shortest possible time after discovery, but in no case later than 24 hours after discovery. In this case, BES notified both the Oregon Department of Environmental Equality (ODEQ) and EPA as required by TSCA.

4.2 Storage and Disposal of Contaminated Debris

PCB storage and disposal regulations listed in 40 CFR 761.60 through 761.65 require responsible parties to dispose of debris containing PCBs in concentrations greater that 50 ppm at an EPA permitted chemical waste landfill.

The site is the former location of the Portland Lumber Mills which was demolished during the 1970's and comprised several mill buildings, including a boiler in the southwestern part of the site near the Willamette River, and a dock along the river bank. The boiler reportedly burned sawdust until the middle 1960s, when it was switched to natural gas. Dry kilns on-site were heated with steam generated rom the boiler, and later with natural gas.

Portland Development Commission reportedly bought the site from Brand S Corporation in the late 1970s. The site was vacant until 1988, when Lampros Steel rented the property from PDC to store new steel on it. During the intervening years, access to the site was uncontrolled and unknown persons dumped fill in an area approximately 100 to 300 feet in the southern part of the site and along the northwestern portion of the site as well. Lampros Steel apparently closed off access to the site using concrete slabs sometime in the late 1980s..

Currently the site consists of a 7.6 acre vacant parcel, being considered for redevelopment by the Bureau of Environmental Services in Portland, Oregon.

3.0 HISTORY OF RELEASE

On October 13, 1993, RZA was on site conducting a subsurface environmental investigation on the northern portion of the property. During a routine geotechnical subsurface investigation, another contractor of BES notified RZA personnel that a release had occurred in the southern portion of the site. While drilling the contractor intersected an object which broke releasing a liquid, an unknown substance. To secure the hole the contractor reportedly pumped drilling fluid containing the unknown substance into a 55 gallon drum and subsequently abandoned the boring, sealing the hole with bentonite.

RZA sampled the contents of the drum, noting the substance had a distinct moth-ball-like odor, and estimated that the contents of the drum contained less than one-half gallon of petroleum based product and ten gallons of drilling fluid (H_2O). The sample was submitted to OAL Laboratory located in Gresham, Oregon. The analytical results later indicated that the liquid material contained 1,000 ppm of PCBs (Aroclor 1260).

RZA had arranged for a security fence to be erected around the site. RZA notified the Bureau of Environmental Services that a release had occurred. RZA indicated that the source and the extent of the release was unknown and informed BES that the analytical results identified the unknown substance as PCBs containing oil.

1.0 INTRODUCTION

RZA AGRA, Inc. (RZA) was contracted by the Bureau of Environmental Services (BES) to identify, characterize, and remediate by excavation and removal a release of an unknown petroleum product later identified as PCB-containing oil at the proposed Water Pollution Control Laboratory, a 7.6 acre parcel owned by the City of Portland, located along the northeast bank of the Willamette River, south of Pittsburg Avenue and west of Burlington Avenue, in the St John's area of Portland, Oregon.

RZA's objectives were to: 1) identify the unknown substance; 2) investigate the vertical and lateral extent of the release; 3) Characterize the source of the release; 4) excavate any contaminated materials; and 5) arrange for the storage and disposal of all contaminated soils and debris.

The scope of this project included:

1) Amend the Health & Safety Plan to include information on PCBs,
2) Develop a Field Operation Plan
3) Research potential sources of the PCB-containing oil
4) Locate the release and characterize the impacted area
5) Pre-closure sampling
6) Excavate contaminated soils and debris and arrange for storage
7) Closure sampling
8) Backfill excavations
9) Prepare for disposal of contaminated materials

This report has been prepared for the exclusive use of the Bureau of Environmental Services, City of Portland and its agents, for the specific application to this project in accordance with generally accepted environmental engineering practices. No other warranty expressed or implied is made.

2.0 SITE DESCRIPTION AND BACKGROUND

The subject site is a rectangular shaped, partially vegetated, undeveloped lot located along the northeast bank of the Willamette River, south of Pittsburg Avenue and west of Burlington Avenue, in St John's, Oregon. The site is bounded by the Willamette River to the west, Cathedral Park to the north, Union Pacific Railroad tracks to the east, and Lampros Steel to the south. Property usage in the area is commercial and residential (see Plate 1).

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RZA AGRA, Inc.

(Formerly: Rittenhouse-Zeman & Associates, Inc.)
Engineering & Environmental Services

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February 17, 1994

21-07197

City of Portland
Bureau of Environmental Services
1120 S.W. Fifth Avenue, Room 400
Portland, OR 97204

Attn: Randy Miller

**SUBJECT: SOIL REMOVAL AND REMEDIATION EXCAVATION REPORT
WATER POLLUTION CONTROL LABORATORY
PORTLAND, OREGON**

Dear Mr. Miller:

RZA AGRA, Inc. (RZA) is pleased to submit this soil removal and remediation excavation report for the above referenced site. This report has been prepared to document the results of work conducted on the site from October 25, 1993 through January 1994.

Approximately 150 cubic yards of PCB contaminated soil was excavated from the two PCB release areas and is currently stored on site, pending disposal. An additional 350 linear feet of contaminated electrical conduit piping is also stored on site, pending disposal. A waste profile was submitted to Chemical Waste Management and has been approved for the disposal of both contaminated materials.

RZA would be pleased to assist you with the disposal.

If you have any questions regarding this report or if you require any additional information, please do not hesitate to contact the undersigned at (503) 639-3400.

Respectfully submitted,

RZA AGRA, Inc.

Denby Macomber, Hazardous Waste Specialist

Gerard Koschal, R.G., Senior Geologist

AGRA
Earth & Environmental Group

SOIL EXCAVATION AND REMEDIATION REPORT

7.6 ACRE PARCEL

PORTLAND, OREGON

PREPARED FOR:
BUREAU OF ENVIRONMENTAL SERVICES

21-07197

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FEBRUARY, 1994

RZA AGRA, Inc.
Engineering & Environmental Services

AGRA
Earth & Environmental Group

Standard Operating Procedure #2

Polychlorinated biphenyls (PCB's)

EPA Method 608 and 8040

Sample Collection:

Sample Devices: Stainless steel, Teflon, polyethylene disposable bailer, positive displacement pumps. Sample with as little aeration as possible. Samples must be free of air bubbles, no head space.

Samples are collected in one 1000 ml amber glass bottles with a Teflon liner and blue or green lid. A water sample should be taken in duplicate once every sampling session. Sample should be kept at 4°C but no other preservatives are required.

Maximum holding time before extraction: 7 days.

Transport: Maintain at 4°C

Decon Procedure:

d1. Wash with Alcanox soap and tap water.

d2. Rinse with tap water.

d3. Rinse with deionized water.

d4. If sampling equipment is heavily contaminated, rinse with methanol followed by a deionized water rinse.

5.4 GROUNDWATER SAMPLE COLLECTION STANDARD OPERATING PROCEDURES

Standard Operating Procedure #1

Volatile Organic Analytes

EPA Method 8010 and 8020: Halogenated and Aromatic Volatile Organics

Sample Collection:

Sampling devices: Stainless steel bailer, Teflon bailer, polyethylene disposable bailer, positive displacement pumps. Sample with as little aeration as possible. Sample must be free of air bubbles, no head space.

Samples are collected in three pre-cleaned, an possibly pre-acidified 40 ml clear glass VOA vials with Teflon-lined silicon septa, and lids. VOA's should be pre-acidified with approximately 0.10 ml of 50% hydrochloric acid (HCl), and labeled as such in the sample container storage area.

If pre-acidified VOAs are not available, samples should be acidified to pH<2 in the field. Acidification kits are available in the environmental storage area and should be taken into the field with the sample collector.

Maximum holding time before analysis: 14 days (acidified)
7 days (non-acidified)

Transport: Maintain at 4°C

Decon Procedure:

d1. Wash with Alcanox soap and tap water.

d2. Rinse with tap water.

d3. Rinse with deionized water.

d4. If sampling equipment is heavily contaminated, rinse with methanol followed by a deionized water rinse.

Conductivity: +/- 10% of scale range (0.0 through 1.999 millimhos/centimeter or 0.0 through 19.99 millimhos/centimeter)

pH: +/- 0.1 pH unit

- Decontaminate all equipment inserted into the well with an alcanox solution and rinse with distilled water. If significant visible or olfactory contamination is noted, rinse equipment with methanol followed by distilled water until clean. Change bailer rope between wells.

5.3 SAMPLE COLLECTION EQUIPMENT

5.3.1 Bottom Fill Bailers

- Before sampling, follow procedures for purging wells and gather appropriate sample containers.
- Unwrap decontaminated bailer or disposable bailer and connect to nylon or polypropylene rope for lowering.
- Slowly lower the bailer until it contacts the water surface, then allow the bailer to sink and fill with a minimum of surface disturbance.
- Slowly raise the filled bailer to the surface. Avoid contact of the bailer line to the well casing and/or ground.
- Insert a bottom emptying device into the bailer and carefully fill each sample container. If the bailer being utilized does not have a bottom emptying device, carefully tip the bailer to allow a slow discharge from the top down the side of the sample bottle to minimize turbulence. When applicable, always fill volatile organic sample vials first, to zero headspace, then complete other samples.
- Repeat steps 1 through 5 until a sufficient sample volume is acquired.
- Label sample and follow procedures for preservation and transport of samples.
- Decontaminate bailer and set it on a clean surface. Decontaminate disposable bailers before disposing or returning to office for recycling.

- Do not reel exposed tape back into the instrument until it has been decontaminated. Rinse the probe and measuring tape with deionized (DI) water. Under conditions of noticeable contamination, wash probe and exposed tape with alcanox solution and rinse with distilled water. If significant visible or olfactory contamination is noted, rinse probe and tape with methanol followed by distilled water until clean. Dry the probe with paper towels and reel back into case.

5.2 PURGING WELLS

- Remove the locking device and the cap from the well casing.

- Wait a sufficient period of time for the pressure to equalize and allow the water level to approach an equilibrium state before continuing.

- Follow procedures for groundwater level measurement, and record depth to water, depth to product, and any product thicknesses.

  Using information on the total depth of the well, the diameter of the well casing, and the depth to water, calculate the amount of water in one casing volume. Values for two and four inch wells are:

  2-inch casing: 0.163 gal/foot
  4-inch casing: 0.653 gal/foot

- After tying a new nylon rope to the bailer, lower the bailer to the well bottom. Purge an amount of water from four to ten casing volumes from the well with a clean bailer or a pump. The total volume purged should be at least one well volume to allow for the removal of all the stagnant groundwater in the filter pack, as well as the groundwater in the casing. A well volume is calculated by adding the volume of water in the casing to the volume of water in the filter pack. Filter pack volume is calculated by multiplying the volume of water in the annulus between the casing and the borehole by (0.3). This value (0.3) allows for the space occupied by the sand (8-12 and 10-20 grain sizes) in the annulus. If recharge is fast, it may be necessary to remove more than the specified amount of purge water.

- In order to determine whether true formation water is filling the well, note the temperature, conductivity and pH at specific intervals. These values should be checked after each volume of water has been removed from the well. A minimum of three successive readings for all parameters should be stabilized within the following ranges:

  Temperature : +/- 0.5°C

- Regardless of the appearance of the discharge water, at least three well volumes of groundwater should be removed from the well. A well volume is calculated by adding the volume of water in the casing to the volume of water in the filter pack. Filter pack volume is calculated by multiplying the volume of water in the annulus between the casing and the borehole by (0.3). This value (0.3) allows for the space occupied by the sand (8-12 and 10-20 grain sizes) in the annulus.

5.0 GENERAL GROUNDWATER SAMPLING PROCEDURES

When sampling of a monitoring well network is performed, several tasks are involved. These tasks include: 1) the measurement of groundwater levels in each well; 2) purging of the wells; and 3) sampling of the wells. The procedures utilized in accomplishing each of these tasks is described below.

5.1 GROUNDWATER LEVEL MEASUREMENT

- Equipment operation should be verified prior to placement in wells. Before leaving office check batteries and place probe into beaker of water to verify precision of instrument.

- Unlock and remove the cap from the well casing, allow pressure to equalize.

- Take measurements from cleanest to most heavily contaminated wells if this information is available.

- Lower the sensor head into the well opening and gently reel out the measuring tape.

- Lower the sensor until a signal is obtained. Slightly raise and lower the sensor to lock in the loudest signal.

- Hold the tape at the point which corresponds to the survey mark on top of well casing, or the highest point on the casing if there is no survey mark. Take measurements from this point.

- If the instrument has a direct reading measuring tape, record the depth measurement at the survey mark. If the tape is marked at five foot intervals, use a tape measure or ruler to measure from the point on the tape held at the survey mark to the nearest increment marker.

Each sample is described, using the modifiers provided above, on a standardized field boring log form. SPT blow counts, sample recovery, sample times, and the results of vapor screening are also recorded on the boring log form.

4.0 WELL DEVELOPMENT

Well development should accomplish the following objectives: 1) fine materials should be cleared from the well (both the filter pack and the groundwater in the casing; 2) removal of smeared formation mud on the sides of the bore hole from drilling augers; 3) removal of drilling fluids or surface contamination that may have been introduced during drilling; and 4) removal of water introduced into the boring to aid in drilling, cuttings removal, or monitoring well installation.

Procedures to follow when developing a well should include the following elements:

- Surge the well vigorously over the entire length of the well screen. The surging should break up accumulations of fine materials in the bottom of well casings and force water back and forth through the filter pack.

- Removal of the water may be accomplished by pumps or bailers. When pumping, surging can be taking place simultaneously. If removing water by hand bailing, surging and bailing should alternate.

  Check the conductivity, pH, and temperature of the water removed. These values should be checked after each volume of water has been removed from the well. A minimum of three successive readings for conductivity, pH, and temperature parameters should be stabilized within the following ranges:

  Temperature : +/- 0.5°C
  Conductivity: +/- 10% of scale range
  (0.0 through 1.999 millimhos/centimeter or 0.0 through 19.99 millimhos/centimeter)
  pH: +/- 0.1 pH unit

- The most obvious indication of well development is the clarity of the discharge water, but this can be a subjective judgement based on the experience of the developer. If turbidity levels of 5 or less cannot be achieved, contact the project manager.

- The probe of the PID or CGI is then inserted through the wall of the bag such that no outside air can enter the bag. The maximum volatile reading and average reading are then recorded. Care will be taken not to contaminate the instrument from overexposure to high volatile concentrations.

2.2 BOREHOLE VOLATILE SCREENING

In order to obtain a head space reading in the boring, the following procedure should be followed.

- Place the probe into the top of the augers or casing and the highest reading and average reading is recorded.

As a safety consideration, it should be noted that, the PID will not detect all explosive gases (such as methane). The CGI and PID will be calibrated with either hexane or isobutylene. A conversion table that relates the concentrations recorded by the CGI to many other gases that may be encountered during investigations should be in the field with the sampler.

3.0 SOIL DESCRIPTIONS

The RZA system of soil description utilizes the Unified Soil Classification System. Generally soils are described by the following modifiers:

- density (based on SPT blow counts or manual determination),
- moisture,
- color (including mottling, stringers, color changes),
- soil modifier,
- soil classification,
- other macroscopic characteristics such as sorting,
- stratification,
- percent varying grain sizes,
- sphericity and roundness of grains.
- major soil constituents will be capitalized with granular soils given relative size descriptions.

- Samples collected from the backhoe bucket should be collected from soils that have not contacted the sides of the bucket. If possible, collect the sample from the teeth or front edge of the bucket, since the collection point in the excavation can be determined more accurately than mixed soil in the bucket. Soils should be collected from an area that has not been exposed to open air for an extended period of time; scrape off the top few inches of soils prior to collection.

- In the case of gross contamination of the backhoe bucket, the bucket should be decontaminated by steam cleaning or a wash with an alcanox solution and tap water rinse.

- When samples are collected from cavity sidewalls, the sampler or the backhoe bucket should first scrape away the soils that have been exposed to air.

- A representative portion of the soil should be transferred immediately into the appropriate sample containers.

- Soil samples collected from the ground surface, from trenches, shallow excavations, etc. may be collected with a shovel, a stainless steel spoon, or a hand auger. The equipment used to reach the depth of the sample should be decontaminated prior to collection of the sample. After removal of the gross soil particulate from the equipment, all the equipment should be decontaminated.

2.0 FIELD VOLATILE (HEAD SPACE) SCREENING

During drilling operations, concentrations of organic vapors within the boring and in the collected soil samples should be checked with a photoionization detector (PID) or combustible gas indicator (CGI).

2.1 SOIL SAMPLE VOLATILE SCREENING

In order to obtain a head space reading of a discreet soil sample, the following procedure should be followed.

- A representative portion of the sample will be placed into a one-liter, air-tight, polyethylene bag, and the bag will be sealed.

- Agitate the sample and break up any large pieces of soil in the closed bag. Allow the sample to equilibrate for as long as possible (depending on the speed of the drilling operation, and the frequency of sample collection). Place the sample in sunlight if possible.

1.0 SOIL SAMPLING PROCEDURES

1.1 CONTINUOUS CORING

Under relatively soft, cohesive soil conditions, continuous coring may be utilized in order to observe the lithology throughout the entire length of the boring. When using this method the bottom of the core barrel may be adjusted from one-half inch inside the augers to eight inches in front of the augers. The core barrel is advanced simultaneously with the rotating augers. This method of sample collection reduces sample disturbance. When collecting samples from continuous core, the following procedures should be followed:

Procedures

- Drilling equipment (drill rig, augers, rods, core barrel and other equipment utilized during the drilling operation) will be decontaminated by steam cleaning prior to drilling each boring.

- The recovered core barrel should be opened on a decontaminated surface.

- Measure from the top of the barrel to the depth at which sample is to be collected. A representative portion of the soils within the sampler will be transferred immediately to the appropriate sample containers with effort to avoid excessive disturbance and volatilization. Collect sample from soils that have not contacted the barrel walls.

- Transfer a representative portion of sample into a ziploc baggie in order to take a head space measurement according to the procedure described in Section 2.0.

- Describe the soils according to the RZA format outlined in Section 3.0.

- After collecting the sample, the core barrel will be decontaminated by high pressure steam cleaning. The decontaminated sampler will be isolated in a clean area following each decontamination.

1.2 COLLECTION FROM EXCAVATIONS, TEST PITS, AND GRAB SAMPLES

Another exploration technique utilized to collect subsurface soil samples is backhoe test pits. Test pits are utilized at sites where subsurface conditions prohibit drilling, or during UST decommissioning projects where a backhoe is being utilized for other purposes. The following procedures should be adhered to during excavation soil sampling operations:

- Sampling personnel will not enter a cavity deeper than four feet in order to collect a sample. In this case samples will be collected from the backhoe bucket.

Appendix C

Standard Field Protocols

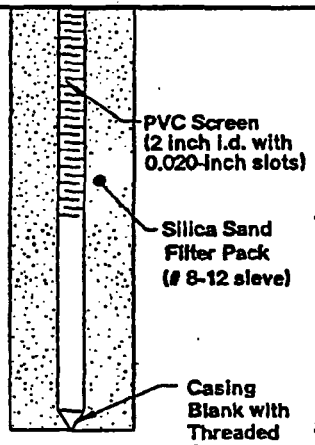
PROJECT: St. JOHNS WATER QUALITY LAB START CARD No.: 50009 WELL No.: MW-5

Elevation Reference: N / A
Groundwater Surface Elevation: N / A

Well Completed: October 7, 1993
Relative Casing Elevation: N / A

Boring Method: Hollow Stem Auger
Borehole Diameter: 8.25 in.

Depth (feet)	SOIL DESCRIPTION	Graphic Log	Continous Sample	Blow Counts	Volatile Readings ppm/%LEL	Ground Water	AS-BUILT DESIGN	ANALYSES
30	Soft to medium stiff, saturated, brown, silty to slightly silty, intercalated fine and medium SAND.							
35	Gray silty SAND.							
	Gray coarse SAND.							
40	BORING COMPLETED AT 40 FEET BELOW GROUND SURFACE. MW-5 INSTALLED.							
45								
50								
55								
60								



LEGEND

(S35) Sample Number

Encountered groundwater level
WD While drilling

Measured static
SW groundwater level

Groundwater Analysis
(Sample No. Shown)

8015
8240
Soil Analysis
(Test Method Shown)

RZA AGRA JOB No. 21-7197-00
CITY OF PORTLAND / B E S
Foot of N. Salem Street
Portland, Oregon

RZA AGRA, Inc.
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ENGINEERING & ENVIRONMENTAL SERVICES
7477 S.W. Tech Center Drive
Portland, Oregon 97223-8024
Phone (503) 639-3400 Fax (503) 620-7892

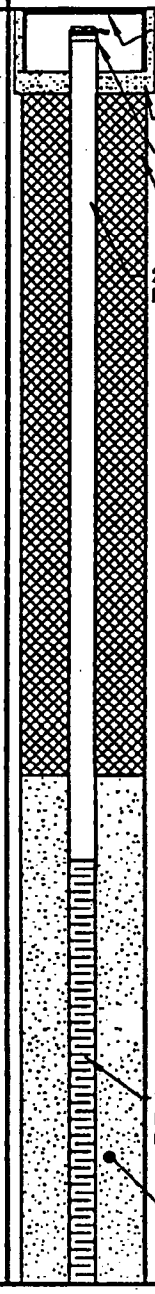
Drilling Started: 10 / 7 / 93 Drilling Completed: 10 / 7 / 93 Logged By: P.D.E.

PROJECT: St. JOHNS WATER QUALITY LAB START CARD No.: 50009 WELL No.: MW-5

Elevation Reference: N / A
Groundwater Surface Elevation: N / A
Well Completed: October 7, 1993
Relative Casing Elevation: N / A
Boring Method: Hollow Stem Auger
Borehole Diameter: 8.25 in.

Depth (feet)	SOIL DESCRIPTION	Graphic Log	Continous Sample	Blow Counts	Volatile Readings ppm/%LEL	Ground Water
0	Medium stiff, dry, tan-brown, slightly micaceous SILT. Becoming moister with depth.				0/0	
5			S30		0/0	
10	Few angular basalt fragments (to 2 inches) encountered.		S31		20/0	
15	Soil becomes wet, gray mottling encountered, at 15-17 ft. depth.		S32			
	Soft, wet, gray and brown, organic SILT with wood and brick debris, slight organic odor.		S33		0/0	
20	Medium stiff, wet, gray, micaceous SILT.		S34			
	Medium stiff, wet, gray, fine to medium SAND.				0/0	
25	Medium stiff, wet, gray, slightly micaceous SILT.		S35			
	Soft, saturated, gray, silty, micaceous, medium SAND.					WD
	Medium stiff, wet, brown and gray mottled micaceous SILT.				0/0	
	Medium stiff, saturated, brown and red mottled, silty fine SAND.					
30						

AS-BUILT DESIGN



ANALYSES

LEGEND

S35 Sample Number

WD Encountered groundwater level While drilling

SW Measured static groundwater level

Groundwater Analysis (Sample No. Shown)

8015 / 8240 Soil Analysis (Test Method Shown)

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Drilling Started: 10 / 7 / 93 Drilling Completed: 10 / 7 / 93 Logged By: P.D.E.

PROJECT: St. JOHNS WATER QUALITY LAB START CARD No.: 50010 WELL No.: MW-4 , Pg. 2

Elevation Reference: N / A
Groundwater Surface Elevation: N / A
Well Completed: October 7, 1993
Relative Casing Elevation: N / A
Boring Method: Hollow Stem Auger
Borehole Diameter: 8.25 in.

Depth (feet)	SOIL DESCRIPTION	Graphic Log	Continous Sample	Blow Counts	Volatile Readings ppm/%LEL	Ground Water	AS-BUILT DESIGN	ANALYSES
30	Intercalated SILTS and SANDS.							
	Medium stiff, saturated, brown, slightly silty micaceous SAND, coarsening downwards.						PVC Screen (2 inch i.d. with 0.020-inch slots)	
35							Silica Sand Filter Pack (# 8-12 sieve)	
							Casing Blank with Threaded End Cap	
40	BORING COMPLETED AT 40 FEET BELOW GROUND SURFACE. MW-4 INSTALLED.							
45								
50								
55								
60								

LEGEND

(S35) Sample Number

Encountered groundwater level While drilling (WD)

Measured static groundwater level (SW)

Groundwater Analysis (Sample No. Shown)

8015 / 8240 Soil Analysis (Test Method Shown)

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Drilling Started: 10 / 7 / 93 Drilling Completed: 10 / 7 / 93 Logged By: P.D.E.

PROJECT: St. JOHNS WATER QUALITY LAB START CARD No.: 50010 WELL No.: MW-4

Elevation Reference: N / A
Groundwater Surface Elevation: N / A

Well Completed: October 7, 1993
Relative Casing Elevation: N / A

Boring Method: Hollow Stem Auger
Borehole Diameter: 8.25 in.

Depth (feet)	SOIL DESCRIPTION	Graphic Log	Continous Sample	Blow Counts	Volatile Readings ppm/%LEL	Ground Water	AS-BUILT DESIGN	ANALYSES
0	Medium stiff, dry, tan-brown, slightly gravelly silty SAND.						Flush Mounted Steel Monument with water-tight seal	
	Medium soft-medium stiff, moist, tan-red, silty micaceous fine SAND.				0/0		Concrete Patch; Locking Cap; Bentonite Seal	
5			S23					
	Medium-stiff, moist, red-tan, medium SAND.				0/0		2 inch dia. sch.40 PVC Blank Casing	
10			S24					
	Medium stiff, moist, brown-gray, clayey SILT.							
	Medium stiff, moist, brown-red medium SAND.				20/0			
	Medium stiff, moist, gray-brown SILT.							
15			S25					
	Medium stiff, moist, dark gray, micaceous medium coarse SAND, intercalated with SILTS.		S26		0/0			
	Medium stiff, moist, mottled brown and black organic SILT (wood and organic debris).							
20	Medium stiff, moist-wet, dark gray, very fine sandy micaceous SILT.		S27					
	Medium stiff, wet, dark gray, silty micaceous medium SAND.				0/0			
	Wet gray SILT.					WD		
	Dark gray, saturated, medium SAND.							
	Dark gray SILT.							
25			S28					
	Gray medium SAND.						PVC Screen (2 inch i.d. with 0.020-inch slots)	
	Mottled brown SILT.				0/0			
	SILTS intercalated with medium-stiff, saturated, brown, slightly silty micaceous medium SAND.						Silica Sand Filter Pack (# 8-12 sieve)	
30			S29					

LEGEND

(S35) Sample Number

WD Encountered groundwater level While drilling

SW Measured static groundwater level

Groundwater Analysis (Sample No. Shown)

8015 / 8240 Soil Analysis (Test Method Shown)

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Drilling Started: 10 / 7 / 93 Drilling Completed: 10 / 7 / 93 Logged By: P.D.E.

PROJECT: ST. JOHNS WATER QUALITY LAB START CARD No.: 47356 WELL No.: MW-3 , Pg. 2

Elevation Reference: N / A
Groundwater Surface Elevation: N / A
Well Completed: October 7, 1993
Relative Casing Elevation: N / A
Boring Method: Hollow Stem Auger
Borehole Diameter: 8.25 in.

Depth (feet)	SOIL DESCRIPTION	Graphic Log	Continous Sample	Blow Counts	Volatile Readings ppm/%LEL	Ground Water	AS-BUILT DESIGN	ANALYSES
30	Medium stiff, saturated, brown, slighty micaceous SILT.				20/0		PVC Screen (2 inch i.d. with 0.020-inch slots)	
	Soft, saturated, gray, silty fine SAND.							
35	Medium stiff, saturated, brown, fine sandy SILT.						Silica Sand Filter Pack (# 8-12 sieve)	
	Soft to medium stiff, brown, micaceous, silty, medium SAND.				50/0		Casing Blank with Threaded End Cap	
40	BORING COMPLETED AT 40 FEET BELOW GROUND SURFACE. MW-3 INSTALLED.							
45								
50								
55								
60								

LEGEND

(S35) Sample Number

Encountered groundwater level While drilling (WD)

Measured static groundwater level (SW)

Groundwater Analysis (Sample No. Shown)

8015 / 8240 Soil Analysis (Test Method Shown)

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Drilling Started: 10 / 7 / 93 Drilling Completed: 10 / 7 / 93 Logged By: P.D.E.

PROJECT: St. JOHNS WATER QUALITY LAB START CARD No.: 47356 WELL No.: MW-3

Elevation Reference: N / A
Groundwater Surface Elevation: N / A
Well Completed: October 7, 1993
Relative Casing Elevation: N / A
Boring Method: Hollow Stem Auger
Borehole Diameter: 8.25 in.

Depth (feet)	SOIL DESCRIPTION	Graphic Log	Continous Sample	Blow Counts	Volatile Readings	Ground Water	AS-BUILT DESIGN	ANALYSES
0	Medium stiff, moist, brown, very gravelly silt FILL.				ppm/ %LEL		Flush Mounted Steel Monument with water-tight seal	
	Soft, dry, brown, micaceous, very silty, medium SAND.						Concrete Patch	
	Medium soft to stiff, dry, gray, organic SILT (wood fragment debris).		S16				Locking Cap	
							Bentonite Seal	
5	Loose, dry to moist, black to gray, silty coarse SAND, with some wood and red/white brick debris.		S17		60/0		2 inch dia. sch.40 PVC Blank Casing	
10	Few gravel-sized clasts at 10 ft. depth.		S18					
			S19		40/0			
	Medium soft, wet, gray, very silty, fine SAND, with slight organic odor.							
15					70/0			
20			S20					
					70/0			
	Medium stiff, wet, brown, very fine sandy SILT.							
25	Soft, saturated, gray, slightly micaceous medium SAND.		S21				PVC Screen (2 inch i.d. with 0.020-inch slots)	
					90/0		Silica Sand Filter Pack (# 8-12 sieve)	
	Medium stiff, saturated, brown, slightly micaceous SILT.							
30			S22					

LEGEND

(S35) Sample Number

Encountered groundwater level While drilling (WD)

Measured static groundwater level (SW)

Groundwater Analysis (Sample No. Shown)

8015 / 8240 Soil Analysis (Test Method Shown)

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Drilling Started: 10 / 7 / 93 Drilling Completed: 10 / 7 / 93 Logged By: P.D.E.

PROJECT: St. JOHNS WATER QUALITY LAB START CARD No.: 47356 WELL No.: MW-3

Elevation Reference: N / A
Groundwater Surface Elevation: N / A
Well Completed: October 7, 1993
Relative Casing Elevation: N / A
Boring Method: Hollow Stem Auger
Borehole Diameter: 8.25 in.

Depth (feet)	SOIL DESCRIPTION	Graphic Log	Continous Sample	Blow Counts	Volatile Readings ppm/%LEL	Ground Water	AS-BUILT DESIGN	ANALYSES
0	Medium stiff, moist, brown, very gravelly silt FILL.						Flush Mounted Steel Monument with water-tight seal; Concrete Patch; Locking Cap; Bentonite Seal	
	Soft, dry, brown, micaceous, very silty, medium SAND.							
	Medium soft to stiff, dry, gray, organic SILT (wood fragment debris).		S16					
5	Loose, dry to moist, black to gray, silty coarse SAND, with some wood and red/white brick debris.		S17		60/0		2 inch dia. sch.40 PVC Blank Casing	
10	Few gravel-sized clasts at 10 ft. depth.		S18					
			S19		40/0			
	Medium soft, wet, gray, very silty, fine SAND, with slight organic odor.							
15					70/0			
20			S20					
					70/0			
	Medium stiff, wet, brown, very fine sandy SILT.							
25	Soft, saturated, gray, slighty micaceous medium SAND.		S21				PVC Screen (2 inch i.d. with 0.020-inch slots); Silica Sand Filter Pack (# 8-12 sieve)	
					90/0			
	Medium stiff, saturated, brown, slighty micaceous SILT.							
30			S22					

LEGEND

(S35) Sample Number

Encountered groundwater level While drilling (WD)

Measured static groundwater level (SW)

Groundwater Analysis (Sample No. Shown)

8015 / 8240 Soil Analysis (Test Method Shown)

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Drilling Started: 10 / 7 / 93 Drilling Completed: 10 / 7 / 93 Logged By: P.D.E.

PROJECT: St. JOHNS WATER QUALITY LAB START CARD No.: 47354 WELL No.: MW-2

Elevation Reference: N / A
Groundwater Surface Elevation: N / A

Well Completed: October 6, 1993
Relative Casing Elevation: N / A

Boring Method: Hollow Stem Auger
Borehole Diameter: 8.25 in.

Depth (feet)	SOIL DESCRIPTION	Graphic Log	Continous Sample	Blow Counts	Volatile Readings	Ground Water	AS-BUILT DESIGN	ANALYSES
30	Brown SILT, with fine sand.				ppm / %LEL			
	Soft, saturated, brown, slightly silty, micaceous, medium SAND.				20/0		PVC Screen (2 inch i.d. with 0.020-inch slots)	
35					50/0		Silica Sand Filter Pack (# 8-12 sieve)	
40							Casing Blank with Threaded End Cap	
	BORING COMPLETED AT 42 FEET BELOW GROUND SURFACE. MW-2 INSTALLED.							
45								
50								
55								
60								

LEGEND

(S35) Sample Number

WD Encountered groundwater level While drilling

SW Measured static groundwater level

△ Groundwater Analysis (Sample No. Shown)

8015 / 8240 Soil Analysis (Test Method Shown)

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Drilling Started: 10 / 6 / 93 Drilling Completed: 10 / 6 / 93 Logged By: P.D.E.

PROJECT: St. JOHNS WATER QUALITY LAB START CARD No.: 47354 WELL No.: MW-2

Elevation Reference: N / A
Groundwater Surface Elevation: N / A
Well Completed: October 6, 1993
Relative Casing Elevation: N / A
Boring Method: Hollow Stem Auger
Borehole Diameter: 8.25 in.

Depth (feet)	SOIL DESCRIPTION	Graphic Log	Continuous Sample	Blow Counts	Volatile Readings ppm/%LEL	Ground Water	AS-BUILT DESIGN	ANALYSES
0	3 in Asphalt cover, underlain by 3 / 4 in. minus FILL.						Flush Mounted Steel Monument with water-tight seal	
	Medium stiff, moist, gray, slightly micaceous SILT.		S9				Concrete Patch	
							Locking Cap	
							Bentonite Seal	
5			S10					
					60/0		2 inch dia. sch.40 PVC Blank Casing	
	Medium stiff, moist, black, organic plastic SILT lens.							
10	Medium stiff, moist, gray, slightly micaceous SILT.		S11					
	Medium soft, moist, gray, slightly silty, micaceous medium SAND.				40/0			
	Gray SILT lens.							
15	Gray, medium SAND.		S12					
	Gray SILT.				70/0			
20			S13					
	Gray fine and medium SAND.				70/0			
25							PVC Screen (2 inch i.d. with 0.020-inch slots)	
	SAND, becoming brown in color, SILT content increasing with depth.		S14		90/0	WD	Silica Sand Filter Pack (# 8-12 sieve)	
	Brown SILT, with fine sand.							
30			S15					

LEGEND

(S35) Sample Number

Encountered groundwater level While drilling (WD)

Measured static groundwater level (SW)

Groundwater Analysis (Sample No. Shown)

8015 / 8240 Soil Analysis (Test Method Shown)

RZA AGRA JOB No. 21-7197-00
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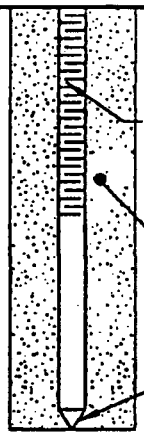
Drilling Started: 10 / 6 / 93 Drilling Completed: 10 / 6 / 93 Logged By: P.D.E.

PROJECT: St. JOHNS WATER QUALITY LAB START CARD No.: 47353 WELL No.: MW-1, Pg. 2

Elevation Reference: N / A
Groundwater Surface Elevation: N / A
Well Completed: October 6, 1993
Relative Casing Elevation: N / A
Boring Method: Hollow Stem Auger
Borehole Diameter: 8.25 in.

Depth (feet)	SOIL DESCRIPTION	Graphic Log	Continous Sample	Blow Counts	Volatile Readings	Ground Water	AS-BUILT DESIGN	ANALYSES
30	Medium soft, saturated, brown, micaceous, fine SAND.				ppm/ %LEL			
	Soft, saturated, brown, slightly silty, micaceous, medium SAND.				200/ 0			
35			S8					
	Medium stiff, saturated, light brown, micaceous, very silty, fine SAND.							
40	BORING COMPLETED AT 40 FEET BELOW GROUND SURFACE. MW-1 INSTALLED.							
45								
50								
55								
60								



LEGEND

(S35) Sample Number

Encountered groundwater level While drilling (WD)

Measured static groundwater level (SW)

Groundwater Analysis (Sample No. Shown)

8015 / 8240 Soil Analysis (Test Method Shown)

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Drilling Started: 10 / 6 / 93 Drilling Completed: 10 / 6 / 93 Logged By: P.D.E.

PROJECT: St. JOHNS WATER QUALITY LAB START CARD No.: 47353 WELL No.: MW-1

Elevation Reference: N / A
Groundwater Surface Elevation: N / A
Well Completed: October 6, 1993
Relative Casing Elevation: N / A
Boring Method: Hollow Stem Auger
Borehole Diameter: 8.25 in.

Depth (feet)	SOIL DESCRIPTION	Graphic Log	Continous Sample	Blow Counts	Volatile Readings ppm/%LEL	Ground Water	AS-BUILT DESIGN	ANALYSES
0	3 in. Asphalt cover, underlain by 3 / 4 in. minus FILL.						Flush Mounted Steel Monument with water-tight seal	
	Medium stiff, moist, gray-brown, silty fine SAND.		S1		0/0		Concrete Patch	
	Medium soft, moist, organic SILT (debris content up to 10 %, including wood, brick, and rock.		S2				Locking Cap	
5	Soft to medium stiff, moist, gray SILT, with some brown mottling.				0/0		Bentonite Seal	
							2 inch dia. sch.40 PVC Blank Casing	
10			S3		20/0			
					70/0			
	Very stiff, dry to moist, brown SILT, with some gray mottling below 12.5 ft.							
15			S4		40/0			
	Medium stiff, moist, brown, silty, slightly micaceous fine SAND.							
20	Micaceous, slightly silty, medium SAND lens.		S5					
	Medium stiff, moist, brown, silty, slightly micaceous fine SAND.							
	Medium soft, wet to saturated, gray, slightly silty, micaceous, medium SAND lens.				20/0			
25			S6			WD	PVC Screen (2 inch i.d. with 0.020-inch slots)	
							Silica Sand Filter Pack (# 8-12 sieve)	
	Medium soft, saturated, brown, micaceous, fine SAND.							
30			S7					

LEGEND

(S35) Sample Number

WD Encountered groundwater level While drilling

SW Measured static groundwater level

Groundwater Analysis (Sample No. Shown)

8015 8240 Soil Analysis (Test Method Shown)

RZA AGRA JOB No. 21-7197-00
CITY OF PORTLAND / B E S
Foot of N. Salem Street
Portland, Oregon

RZA AGRA, Inc.
(Formerly Rittenhouse-Zeman & Associates, Inc.)
ENGINEERING & ENVIRONMENTAL SERVICES
7477 S.W. Tech Center Drive
Portland, Oregon 97223-8024
Phone (503) 639-3400 Fax (503) 620-7892

Drilling Started: 10 / 6 / 93 Drilling Completed: 10 / 6 / 93 Logged By: P.D.E.

Depth (ft.)	Materials Encountered
Test Pit 20	
0 – 3	Very stiff, moist, tan SILT with some gravel and trace fine sand; cable, brick, etc (fill).
3 – 5	Loose, moist, dark brown, organic-rich SILT with abundant wood debris (fill).
5 – 14	Medium stiff, moist, green-gray SILT with trace clay and fine sand (dredge fill?).
14 – 19	Medium Dense, moist, green-gray, silty fine SAND (dredge fill?).
	Terminated at 19 feet. No seepage observed. No caving observed.

We appreciate the opportunity to have served you on this project. If you have any questions or desire further information, please feel free to contact the undersigned.

Sincerely,

RZA AGRA, Inc.

Denny Macomber,
Hazardous Waste Specialist

Gerard Koschal, R.G.,
Senior Geologist

Charles T. Esler,
Seinior Environmental Scientist

AGRA
Earth & Environmental Group

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0.0 SUMMARY

The proposed site for the Bureau of Environmental Services Water Pollution Control Laboratory is located on the east bank of the Willamette River south of the St. Johns Bridge. The purpose of this investigation was to assess conditions at the site and provide remedial services to assure that the construction of the project could proceed.

Our scope included the characterization, removal and disposal of blast sand fill and debris from the site, the excavation of twenty test pits to characterize the fill material on the site, and the installation of a monitoring well network for the site.

The black sand, which was used sand blast grit, was characterized and segregated for disposal. A volume of 2,113 cubic yards of black sand, fill, and debris were disposed of at the St. Johns Landfill, the Hillsboro Landfill and the Durham Pit.

The results of our investigation indicate that no major environmental problems are present at the site that would delay construction of the laboratory. Three areas of potential concern were identified during the subsurface investigation. Our investigation indicates that none of these areas of concern appear to represent evidence of a reportable release.

Based on the nature and source of the fill material used on the site and the industrial usage of the site, several minor areas of impacted soil may be encountered during construction activities. If encountered, these localized areas should be assessed and addressed following the appropriate ODEQ guidelines.

An electrical conduit enclosing cable with PCB-containing insulation was located during the investigation. The conduit and impacted soils were excavated and are scheduled to be removed from the site to a permitted hazardous waste disposal facility. Closure sampling of the excavation indicates that the impacted soils have been removed. Documentation of the excavation and removal of this material is presented in a separate report.

The site appears to be an environmentally constructible site. No further environmental investigations are recommended that could delay the construction of the site.

The preceding summary is intended for introductory and reference use. A complete reading of our report is recommended.

1.0 INTRODUCTION

The purpose of this Environmental Site Investigation was to assess the environmental conditions at the site of the proposed Water Pollution Control Laboratory in the St. Johns area of Portland, Oregon, and provide remedial services to assure that construction of the project could proceed. The scope of work includes:

- Prepare a Health and Safety Plan for the field operations.
- A physical reconnaissance of the site and observation of surrounding properties for unusual land colorations, physical irregularities, and noticeable refuse piles.
- A review of available historical data pertaining to site and adjacent property use, including but not limited to; conversations with individuals familiar with the property, City of Portland records, and historical aerial photographs.
- The excavation of twenty test pits to an approximate depth of twenty feet. Ten pits would be located on the western portion of the site and ten pits located on the eastern portion of the site.
- The advancing of five auger borings to groundwater and the installation of monitoring wells in the borings.
- The characterization of the type and extent of the black sand fill by the excavation of shallow trenches.
- The collection of surface and subsurface soils from surface, borings and testpits.
- The analysis of selected soil samples to screen for the presence of fuel hydrocarbons, polychlorinated biphenyls- PCBs, and volatile organic compounds.
- The excavation, removal and proper disposal of the black sand fill and other fill material regulated by ODEQ as solid waste.
- Preparation of a Project Report summarizing all investigation and remedial activities.

This report has been prepared for the exclusive use of Bureau of Environmental Services, City of Portland and their agents, for specific application to the referenced scope of services in accordance with generally accepted environmental practices. No other warranty, expressed or implied is made. In the event that changes in nature, design or layout of the existing site and nearby properties are made, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed or verified in writing.

2.0 SITE DESCRIPTION

The approximately 7.6 acre site is located on east bank of the Willamette River, south of the St. Johns Bridge in the St. Johns area of Portland, Oregon (Figure 1).

Most of the site is located on a bench overlooking the Willamette River. The site is currently vacant. Foundations from previous structures are present on the northwestern and southwestern portions of the site. Asphalt pavement covers the northeastern portion of the

site. Prior to our investigation the non-paved portions of the site were overgrown with blackberry bushes. Construction debris and uncontrolled fill material have been dumped on the site.

The site is bounded on the northwest by N. Pittsburg Avenue, on the northeast by the Union Pacific Railroad tracks (Bradford St.), on the southeast by the yard for Lampros Steel (N. Burlington Avenue) and on the southwest by the Willamette River (Figure 2).

The proposed development of the site includes a 50,000 square foot Water Pollution Control Laboratory on the southeastern portion and a storm water detention facility on the northwestern portion of the site.

3.0 SITE HISTORY

Previous site investigation reports, historical aerial photographs, city records and interviews with individuals familiar with the site revealed a history of industrial usage until the 1970s. The structures on the site were demolished in the 1970s. The site is currently vacant. Vicinity usage has been industrial, commercial, residential and recreational.

The Coast Veneer Box Company was located on the northwest portion of the site, adjacent to N. Pittsburg Avenue. This facility manufactured fruit boxes from at the mid-1930s until the early 1970s. Based on a geotechnical investigation, the facility had been demolished by 1973.

The Portland Lumber Mill was located on the southeastern portion of the site from the mid-1930s until the late 1970s. The structures had been demolished by 1978 when the Rittenhouse-Zeman & Associates geotechnical report investigation was conducted.

A combined sewer overflow (CSO) line traverses the site along the Salem Street easement.

The Portland Development Commission purchased the land in the late-1970s as part of a proposed residential development in the St.Johns area.

4.0 PREVIOUS INVESTIGATIONS

Several previous geotechnical and environmental investigations have been conducted at or adjacent to the subject site.

A subsurface investigation was conducted in 1973 by Shannon and Wilson for Brand-S Corporation, the owner of the property at that time. The investigation concerned the fill activities in the Coast Veneer area of the site and the embankment along the Willamette River. The potential source of the fill material was an area south of Richmond Street or dredge material from the Willamette River adjacent to the site.

A subsurface geotechnical investigation was conducted in 1978 by Rittenhouse-Zeman & Associates for the Portland Development Commission. The Portland Lumber Mill had been demolished by this time. Included in the investigation were one boring and one test pit, which were located in the Coast Veneer area of the site.

Emcon Northwest conducted an Environmental Survey of the adjacent Lampros Steel property in 1988. The black sand fill, found on the subject site, was also identified on the adjacent property. The black sand was spent sandblast grit that had been used to clean petroleum tanks. The fill was placed in 1977-1978. The winter rains flushed oil out of the fill and washed into the river. After a request by the Coast Guard the owner stopped the placement of the fill. Analyses indicated that the sands did contain petroleum products, but was not an EPA characteristic hazardous waste.

Emcon Northwest conducted an Environmental Survey of the subject site in 1989 for a potential buyer. The results of their subsurface investigation indicated that approximately 600 cubic yards of black sand fill was present on the subject site. The black sand was not a characteristic hazardous waste but did contain some petroleum product. Groundwater was collected from four on-site borings. Slightly elevated levels of 2,4-dimethylphenol was detected in one sample. The boring (T-4) was located in the southeast corner of the site near the river.

The Bureau of Environmental Services (BES) conducted a sampling survey on the subject site in 1993 to determine if the black sands and other uncontrolled fill were hazardous wastes. Analyses conducted indicated that the black sand was not a characteristic hazardous waste.

5.0 SURFICIAL FILL CHARACTERIZATION AND REMOVAL

The original grade at the site appears to have been similar to the grade of the present Cathedral Park northwest of the site. The original grade gently sloped from the Union Pacific Rail Road (UPRR) tracks to the river. The site has been filled to the present grade by various fill episodes.

Based on a review of historic photographs, the Portland Lumber Mill was once located on a elevated deck at the level of the UPRR tracks. This deck extended from the UPRR tracks to above the river supported by timber piling. The volume below the deck appears to have been filled over the years to the present grade. The source of the fill material is not known. Based on this and previous investigations this fill material consisted of dredge material, construction debris, clinkers and ash.

At least four episodes of fill placement can be defined on the subject site.

Pre-1970s fill placement that brought the site to the grade of the pavement for the Portland Lumber Mill.

The placement of fill in the early-1970s in the foundation of the Coast Veneer facility and along the bank of the Willamette River.

The placement of the black sand fill in the Coast Veneer area and in isolated piles on the southern portion of the site.

The uncontrolled placement of piles of construction and other debris.

The purpose of this phase of the investigation was to characterize the black sand and uncontrolled fill materials and to determine the most cost efficient disposal option for the materials.

5.1 REGULATORY REVIEW - DISPOSAL OF BLACK SAND FILL

The Oregon Department of Environmental Quality (ODEQ) regulates the disposal of solid and hazardous wastes. Solid waste is defined in 40 CFR Section 261.2. Certain construction debris and other clean fill are not considered a solid waste and are not regulated by ODEQ. The determination of the type of waste is made based on the source of the material and the impact the material can have on the environment.

Hazardous waste is defined by the US EPA in 40 CFR Section 261.3. A listed hazardous waste is a waste that is derived from one of the listed processes or contains a certain level of a listed hazardous material. A characteristic hazardous waste is a waste that displays certain hazardous characteristics, such as, toxicity, reactivity, corrosivity or flammability. EPA hazardous wastes must be handled and disposed according to EPA regulations. Most oil and petroleum products are not EPA listed hazardous wastes.

The State of Oregon administers the EPA Hazardous Waste Program. In Oregon, oil and petroleum products are included with EPA Hazardous substances for spill and release reporting and requirements for remedial activities (OAR 340-108, OAR 340-122). Soils impacted by petroleum products must be disposed according to ODEQ guidelines.

Solid waste in Oregon is also regulated by ODEQ. Solid wastes are wastes from specific sources and are defined in OAR 340-93. Solid waste must be disposed according to ODEQ regulations. Spent sandblast grit or sand is a listed ODEQ solid waste. This material can be recycled, disposed at a permitted landfill, or if determined to be inert, used as fill material. The process to determine if a solid waste is inert involves a ODEQ permit.

Clean fill is defined in OAR-340-93-030 (10) as material consisting of soil, rock, concrete, brick, building block, tile, or asphalt paving, which do not contain contaminants which could adversely impact the waters of the State or public health. This term does not include putrescible wastes, construction and demolition wastes and industrial solid waste. The disposal of clean fill is not formally regulated by ODEQ.

The previous Emcon Northwest investigations identified the black sand as waste sandblast grit. This "knowledge of process" makes the black sand a solid waste. The Emcon Northwest and

the BES investigation determined that the black sand did not meet the definition of a EPA listed or characteristic hazardous waste. Some of the black sand contained levels of petroleum product that exceeded the ODEQ guidelines for an inert waste.

Based on this information, RZA AGRA choose excavation and disposal at a permitted landfill as the most prudent option for the removal of the black sand.

ODEQ solid waste permits consider levels greater than 100 ppm TPH for diesel and heavier hydrocarbons as petroleum contaminated soils. Soils with levels greater than 100 ppm TPH must be treated prior to disposal or disposed only at permitted landfills. In the Portland area, the Hillsboro Landfill accepts petroleum contaminated soils with levels greater than 100 ppm.

RZA AGRA's approach was to segregate the black sand based on TPH content. Black sand with levels of TPH greater than 100 ppm would be transported to either the Hillsboro Landfill for disposal or to Oregon Hydrocarbon for thermal treatment. The final destination would be based on cost.

For sand with TPH levels less than 100 ppm, the disposal options included disposal at Hillsboro Landfill or use as cover material at St. Johns Landfill or Hillsboro Landfill. The destination would be based on acceptance by the facility and cost.

5.2 FIELD METHODS

A Health and Safety plan was prepared for the field operations. All field operations were conducted following the procedures outlined in the Standard Field Protocols (Appendix C).

A utility locate survey was conducted by Maintenance NW, Portland, Oregon. Due to the past use of the site, an abundance of underground pipes were identified.

The southern portion of the site had been overgrown with blackberry bushes. The first field task was to remove the blackberry bushes to gain access to the site. Excavation and transportation services for the project were provided by C. Wark Trucking, Tualatin, Oregon. The brush was segregated for disposal.

A security fence was placed along the perimeter of two sides of the site. This fence was attached to an existing fence and limited access to the site.

Black Sand Fill

Five trenches were excavated across the black sand and uncontrolled fill area. Location of the trenches are shown on Plate 1. The purpose of the trenches was to determine the volume of the black sand and to provide a sampling grid for the area. The fill material was logged and thirty samples were collected from the trench system. In addition, one sample was collected from the black sand horizon in test pit TP-3. Each sample was placed in airtight, teflon sealed

containers, and transported on ice to RZA AGRA's Environmental Laboratory for chemical analysis.

The black sand was concentrated as a layer up to six feet thick in the area of the former Coast Veneer facility, trenches T-1 through T-4. Several isolated areas of black sand were identified near the southern portion of the site near the old foundation of the Portland Lumber buildings. The uncontrolled fill piles were tested with trench T-5. This material was placed on the old asphalt pavement surface and consisted primarily of sand and soil.

5.3 QUANTITATIVE ANALYSIS

Samples were identified by trench number and a consecutive sample number. Nineteen samples, based on visual evidence, were submitted to RZA AGRA's Environmental Laboratory in Portland, Oregon, for analysis for total petroleum hydrocarbons (TPH) by EPA Method 418.1 Modified. One sample (T2-10) was submitted to Hughes Analytical Laboratory , Gresham, Oregon, for analysis for TCLP-8 metals by EPA Method 1311, 6010, 7000, PCB by EPA Method 8080, and volatile organics by EPA Method 8240. Laboratory results and chain-of-custody documentation are presented in Appendix A.

SAMPLE #	Depth	TPH (ppm)
T1-1	12"	74.7
T1-3	36'	16.6
T1-5	24"	129
T1-6	8"	61.4
TP3-16	12"	667
T2-9	24"	41.0
T2-10	24"	380
T2-11	36"	24.0
T2-14	60"	17.6
T3-17	12"	15.0
T3-21	12"	12.3
T3-23	12"	17.3
T3-24	36"	33.0
T4-25	12"	28.6
T4-26	48"	134
T4-27	36"	62.7
T5-28	40"	32.3
T5-29	12"	15.3
T5-30	12"	25.0

No volatile organics compounds, leachable metals or PCBs were detected above regulatory limits in sample T2-10, which had a TPH level of 380 ppm.

Four of the 19 submitted samples reported levels of greater than 100 ppm TPH. Three of the samples were black sand, while the fourth sample consisted of white sand. The impacted

black sands could be visibly separated from the lesser impacted black sand. The black and white sand was segregated into two areas, impacted and non-impacted, based on the 100 ppm TPH criteria. The elevated black and white sand fill with clorated TPH levels was removed for disposal.

5.4 DISPOSAL

Copies of the analytical data was submitted to the Hillsboro Landfill and the St. Johns Landfill for approval for disposal. St. Johns Landfill accepted the clean black sand and clean fill as cover material with no tipping fee. The Hillsboro Landfill accepted the clean black sand and clean fill as cover material with no tipping fee. No large rocks or organic material was accepted as cover material. The Hillsboro Landfill accepted the briar and wood debris for recycling at a fee of $5.84/cubic yard. The Hillsboro Landfill accepted the impacted black sand and other construction debris for a tipping fee of $59.04/cubic yard. The Durham Pit accepted clean asphalt and concrete for recycling at a tipping fee of $2.50/cubic yard.

A summary of the disposal activities includes:

AMOUNT (cubic yards)	MATERIAL	DESTINATION
1446	Black Sand/Clean Fill	St. Johns Landfill
242	Clean Fill	Hillsboro Landfill
144	Briar/Wood	Hillsboro Landfill
27	Dirty Black Sand	Hillsboro Landfill
254	Asphalt/ Concrete	Durham Pit
2113	Total Cubic Yards Removed	

6.0 SUBSURFACE INVESTIGATION

Our subsurface exploration consisted of advancing five borings and excavating twenty test pits. A two inch-diameter monitoring well was installed in each of the borings. The purpose of the test pit investigation was to define the near-surface lithology of the site and to screen the subsurface for the presence of contamination that would have to be remediated prior to construction activities. The purpose of the monitoring wells was to provide a network of wells that could be used to provide baseline and future shallow groundwater quality data for the site.

6.1 REGULATORY REVIEW - PETROLEUM PRODUCT IMPACTED SOILS

The reporting requirements and remediation of soils impacted by petroleum products is based on the source of the contamination, the type of contamination and the level of impact. Soils impacted by any release from a underground storage tank system (UST) or underground heating oil tank system are regulated by OAR 340-122-205. Soil cleanup levels have been established by ODEQ. Soils impacted by petroleum products from other sources, such as, above ground storage tank systems or spills from vehicles, are regulated by OAR 340-108 and OAR 340-122.

Soils cleanup levels are determined by the amount released and the hazardous constituents in the petroleum product.

The reporting requirements for a release of petroleum product is described in OAR 340-108-010. The reportable quantity for a release of petroleum products that remain on site and do not enter a surface waterway or groundwater is one barrel (42 gallons). No reporting requirement exists for historic, small releases of petroleum products that are not from a UST and are not a threat to public health or the environment.

Total petroleum hydrocarbon (TPH) analysis is used as an indicator of the level of impact at sites with releases of petroleum products. Except in the case of a release from a UST system that does not impact the groundwater, TPH is not regulated and no cleanup levels are established. However, the levels of the constituents of the petroleum product (BETX and PAHs) are regulated.

For a release of petroleum products from a UST system that does not impact groundwater, cleanup levels have been established in OAR 340-122-250 through OAR 340-122-360. The cleanup levels are based on an evaluation matrix which rates the site. The matrix is based on precipitation, depth to groundwater and use of the groundwater. The proposed site would rank as a Level 2 site with cleanup levels of 80 ppm for gasoline and 500 ppm for diesel and heavier oils.

As a guideline to measure the impact from petroleum product releases at the subject site, the Matrix Level 2 cleanup levels were used. If TPH levels greater than 500 ppm were encountered, further evaluation was conducted to determine the extent of the impact and to investigate if the impacted soils constitute a reportable release.

6.2 TEST PITS

The test pits were scheduled to be excavated to a depth of twenty feet or refusal. Excavation activities were conducted by C. Wark trucking, Tualatin, Oregon. Ten of the test pits (TP-1 through TP-10) were located on the northwestern portion of the property, northwest of the CSO. A stormwater detention facility was planned for this area. Ten test pits (TP-11 through TP-20) were located over the remainder of the site. Concurrently with the RZA AGRA investigation, a separate subsurface geotechnical exploration was conducted by CH2M Hill C. Borings and test pits were advanced during that exploration. The test pits and borings were not observed by or inspected by RZA AGRA personnel. All test pit locations are shown on Plate 1. RZA AGRA test pit logs are presented in Appendix B.

Samples were classified in the field by a geologist from RZA AGRA. Representative portions of each sample were collected, placed in airtight, teflon-sealed containers, and transported to RZA AGRA's in-house laboratory for quantitative analyses.

Petroleum odors, as noted on the test pit logs, are subjective information provided at the time of sampling. Detection of petroleum odors is dependant on the olfactory sensitivity of the person classifying the sample, as well as other factors, including air and sample temperature, wind velocity, the length of time the sample is out of the boring, product type and product degradation. Because these limitations are not readily quantifiable, and no test standards exist, olfactory observations should be taken as general subjective information. It is our understanding that humans may be able to detect petroleum product odor in the range of one part per million (ppm).

All excavated materials were placed back into the test pits. No compaction testing of the backfill material was conducted.

6.3 MONITORING WELLS

The borings were drilled by Crisman Drilling, Portland, Oregon using a CME truck-mounted drilling rig with hollow stem auger and continuous core sampling. Augers and sampling equipment were decontaminated between holes with a steam cleaner.

The five environmental borings (MW-1 through MW-5) were drilled to depths ranging from of approximately 40 to 42 feet. Boring locations are presented on Plate 1. Soil samples were collected continuously using a casing advancer in each of the borings. This sampling, combined with the logging of drilling character, provided the basis for our geologic characterization of the site.

Samples were classified in the field by a geologist from RZA AGRA. Representative portions of each sample were collected, placed in airtight, teflon-sealed containers, and transported to RZA AGRA's Environmental Laboratory. Geologic boring logs are presented in Appendix B.

In addition, borehole and recovered samples were field-screened with a combustible gas indicator (Gastech model 1314) for volatile hydrocarbons, measured in parts per million (ppm) and Lower Explosive Limit (LEL). All drill cuttings were placed in drums. Since no evidence of contamination was identified, the cuttings were later used as backfill on-site.

Surveying the well elevations was to be conducted by others. No well elevation data is available.

6.4 PIPING TRENCH EXCAVATION

During a geotechnical exploration on the site by another contractor, a release of PCB-containing material was identified. RZA AGRA characterized and remediated the release, removing all the impacted soils. The remediation is presented in a separate report. During the release characterization, a trench approximately 10 feet in depth was excavated across the site. The location of the trench is shown on Plate 1.

6.5 SUBSURFACE CONDITIONS

In general, soils on the site consist of 10-20 feet of fill material overlying native silts and sands deposited by the Willamette River.

6.5.1 Non-native Fill

The nature of the fill material varies over the site, consisting of dredge spoils, construction debris, wood, clinkers and ash. A thin layer of spent blast sand covered the northwest portion of the site. Most of this blast sand has been removed from the site.

The fill in the northeastern portion of the site primarily consists of dredge spoils. Toward the river, the fill material includes more brick and demolition debris. Clinkers and ash are more abundant near the location of the old boiler, in the southern corner of the property.

An episode of fill placement was conducted in the early 1970s in the area of the former Coast Veneer facility and along the river bank. One source of this fill material may have been dredge spoils from activities adjacent to the site. The fill material from this episode appears to contain more organic material and displays a slight organic odor. This fill material appears to be fairly extensive over the former Coast Veneer area.

6.5.2 Foundations and Pipes

Concrete foundations, piling and pipes are present in the shallow subsurface over most of the site. The foundations and utility pipes were not removed during demolition activities at the site. Many of the foundations are placed on piling. Any construction activity will probably have to remove a portion of these features.

Figure 3 presents the pipes and foundation encountered during the trench excavation.

6.5.3 Field Volatile Screening

Petroleum-like odors were noted in four areas on the site.

1. Petroleum odors were noted in a layer of fill material extending over a portion of the area of the former Coast Veneer facility. Soil samples of the identified horizon were submitted for analysis for TPH by EPA Method 418.1 from test pits TP-2 (TP-2-5), TP-5 (TP-5-6), TP-6 (TP-6-5), and TP-8 (TP-8-10). Samples from the horizon below the impacted layer were submitted from test pits TP-5 (TP-5-12) and TP-8 (TP-8-20).

2. An visual discoloration was noted in the gravel base course in a test pit (TP-14) near the UPRR tracks. Similar impacted gravels were noted in a nearby CH2M Hill test pit. A sample of the base course material was submitted for analysis for TPH by EPA method 418.1 from test pit TP-14 (TP-14-1).

3. Petroleum odors were noted in samples from a CH2M Hill geotech boring. Soil samples from the 15 and 20 foot depths (CH2-B4-15 and CH2-B4-20) were

submitted for analysis for TPH by EPA Method 418.1. An RZA AGRA test pit was located near the boring. No evidence of contamination was noted in the excavation.

4. Petroleum odors were noted in the trench excavation near the dogleg of the trench. Sample TP-23-6 was submitted for analysis of volatile organic compounds by EPA Method 8010/8020.

In addition samples were submitted for analysis for TPH from two horizons in test pit TP-12 (TP-12-12 and TP-12-15).

6.6 GROUNDWATER

Shallow groundwater was encountered within sands of the Willamette River sediments at a depth of 20-26 feet. No odors or petroleum product sheen was noted during development and sampling. Groundwater samples from each monitoring well were submitted for analysis for PCBs by EPA Method 608 and chlorinated phenolics by EPA Method 8040.

7.0 QUANTITATIVE ANALYSES

Laboratory analyses for this project were carried out at RZA AGRA's Environmental Laboratory, Portland Oregon and Hughes Analytical Laboratory, Gresham, Oregon. Soil samples were identified by the test pit number and by the successively recorded sample number corresponding to depth as noted on the test pit logs. Groundwater samples were identified by the well number.

All laboratory analytical results and chain-of-custody forms are included in Appendix A

7.1 SOIL ANALYSES

Soil sample test results are described below. Sample locations are identified on Plate 1. Samples were chosen based on the visual or olfactory evidence of impact.

7.1.1 Total Petroleum Hydrocarbons (EPA Method 418.1, modified)

Eleven soil samples were submitted for analysis by infra-red (IR) to quantify TPH concentration.

SAMPLE #	Depth	TPH (ppm)
TP-2-5	5'	16.6
TP-5-6	6'	120
TP-5-12	12'	ND
TP-6-5	5'	28.5
TP-8-10	10'	12.6
TP-8-20	20'	19.3
TP-12-12	12'	6.6
TP-12-15	15'	ND
TP-14-1	1'	116
CH2-B4-15	15'	ND
CH2-B4-20	20'	534

7.1.2 Volatile Organic Compounds (EPA Method 8010/8020)

One sample, TP-23-6, was submitted for analysis by gas chromatography to determine the concentrations of volatile organic compounds by EPA Method 8010/8020.

No halogenated volatile compounds were detected in this sample. Ethylbenzene and xylenes were detected at levels well below ODEQ reference levels.

Three potential areas of concern were identified in the subsurface investigation. These areas include:

1. The fill in the area of the Coast Veneer facility exhibited a slight degraded petroleum product odor.

2. The samples from the depth of 15 and 20 feet in CH2M Hill's boring B-4 exhibited a petroleum product odor.

3. A petroleum product odor was noted in the base course material in the area of RZA AGRA test pit TP-14 and CH2M Hill test pit TP-5.

Coast Veneer Fill Area

The soil sampling survey indicates that all petroleum product concerns appear to be minor and all but one area below the ODEQ Matrix Level II reference standards (500 ppm).

The analyses of the fill material in the Coast Veneer area (TP-2-5, TP-5-6, TP-5-12, TP-6-5, TP-8-10, TP-8-20) indicate TPH levels well below the Matrix Level 2 cleanup levels. No source for the low levels of impact were identified. The fill material consists of silts which may have been dredge material. The impacted soils do not appear to represent a reportable release. No further action concerning these soils is recommended.

CH2M Hill Boring

The levels of TPH in the CH2M Hill boring B-4 are slightly above Matrix Level 2 standards. During drilling of boring B4, impacted soils were noted in fill material from the depth of 15 to 20 feet. No visual or olfactory evidence of impacted soils was noted for depths deeper than 20 feet. Analysis of the sample from a depth of 15 feet (CH2-B4-15) indicated TPH below detection levels (4 ppm). The analysis of thew sample from a depth of 20 feet indicated TPH at of 534 ppm.

To define the extent of soil impact, RZA AGRA excavated a test pit near the boring. Test pit TP-20 did not intersect the impacted soil. No visual or olfactory evidence of impacted soils was noted in the test pit. The area of impact appears limited. The source of the impact appears to be the fill material itself and not an external source. Neither groundwater nor surface water appear to be affected by the impacted soil. The impacted soil does not appear to represent a reportable release.

Test Pit TP-14 Area

The analysis of the impacted base course material from RZA AGRA test pit TP-14 indicated a TPH level below Matrix Level 2 standards. The impact was confined to the base course material and does not appear to represent a reportable release. During construction the base course material can be segregated and used in new pavement material or as a base course material.

7.2 GROUNDWATER SAMPLES

7.2.1 Polychlorinated biphenyls, PCBs (EPA Method 608)

Five water samples were analyzed for the presence of PCBs.

No PCBs were detected in any of the analyzed samples.

SAMPLE	RESULT
MW-1	ND
MW-2	ND
MW-3	ND
MW-4	ND
MW-5	ND

7.2.2 Chlorinated Phenolics (EPA Method 8040)

Five water samples were analyzed for the presence of pentachlorophenol and 2,4,5-Trichlorophenol.

Pentachlorophenol was detected in one of the analyzed samples.

SAMPLE	PENTACHLOROPHENOL	TRICHLOROPHENOL
MW-1	ND	ND
MW-2	ND	ND
MW-3	ND	ND
MW-4	ND	ND
MW-5	18 ppb	ND

The presence of the low levels of pentachlorophenol may be due to matrix interference by the sediment in the sample. The area of monitoring well MW-5 is fill material placed in the early 1970s. The area appeared to be part of the river in a 1963 air photo. This part of the river was covered by the deck of the Portland Lumber Company which may have been supported by treated timber piling.

8.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the our Environmental Site Investigation and disposal activities, no environmental impacts exist at the site that would significantly alter the construction plans for the site.

During our investigation, 2,113 cubic yards of spent blast sand, fill, and debris were characterized, removed from the site and disposed properly.

Three areas of potential concern were identified during the subsurface investigation. The fill in the Coast Veneer area displayed a slight, degrade petroleum product odor. Analysis of soil samples indicate TPH levels lower than the Matrix Level 2 standards.

Fill material at a depth from 15 to 20 feet in a boring displayed petroleum product odor. TPH levels in the 20 foot samples were slightly elevated above the Matrix level 2 standards. Further investigation indicated that no visual evidence of impacted soils were identified in an adjacent test pit. Since the extent of soil impact appears limited and groundwater does not appear to be impacted, the presence of petroleum hydrocarbons does not appear to represent evidence of a reportable release.

Impacted soils in test pit TP-14 were confined to the base course material. TPH levels were below Matrix Level 2 standards. This soil does not appear to represent evidence of a reportable release.

An electrical conduit enclosing cable with PCB-containing insulation was located during the investigation. The conduit and impacted soils were excavated and are scheduled to be removed from the site to a hazardous waste disposal facility. Closure sampling of the excavation indicates that the impacted soils have been removed. Documentation of the excavation and removal of this material is presented in a separate report.

Based on the amount of fill at the site, isolated pockets of contaminated fill may be encountered during construction. The areal extent of these pockets does not appear to be extensive. If impacted soil is encountered during construction, the soil should be assessed and remediated following ODEQ guidelines.

Based on our limited investigation the site currently does not appear to contain any environmental contamination concerns that would delay construction of the proposed laboratory. No further environmental investigations are recommended.

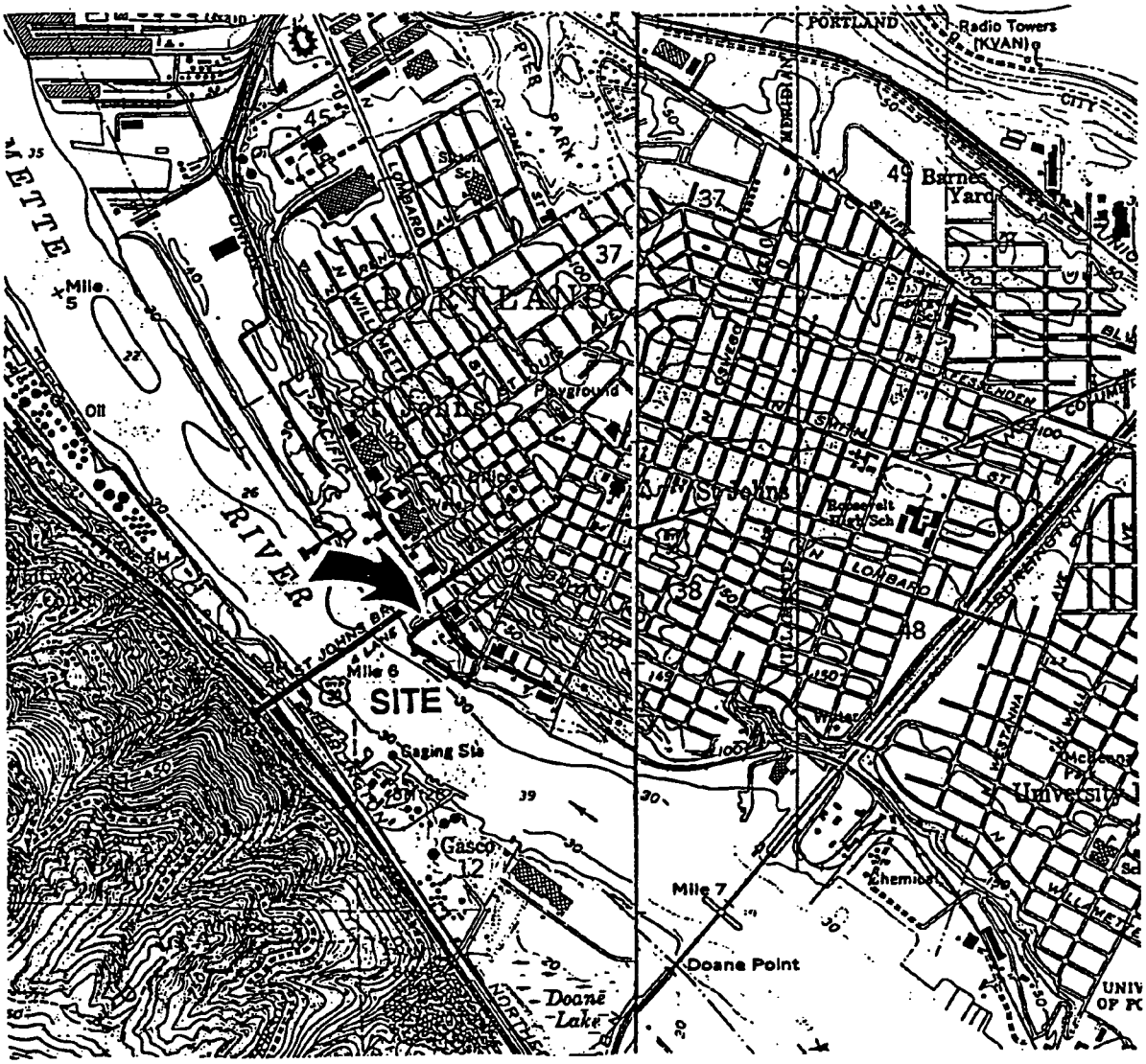
We appreciate the opportunity to have served you on this project. If you have any questions or desire further information, please feel free to contact the undersigned.

RZA AGRA, Inc.

Denny Macomber,
Hazardous Waste Specialist

Gerard Koschal, R.G.,
Senior Geologist

Charles T. Esler,
Senior Environmental Scientist



SCALE 1:24 000

1 ½ 0 1 MILE

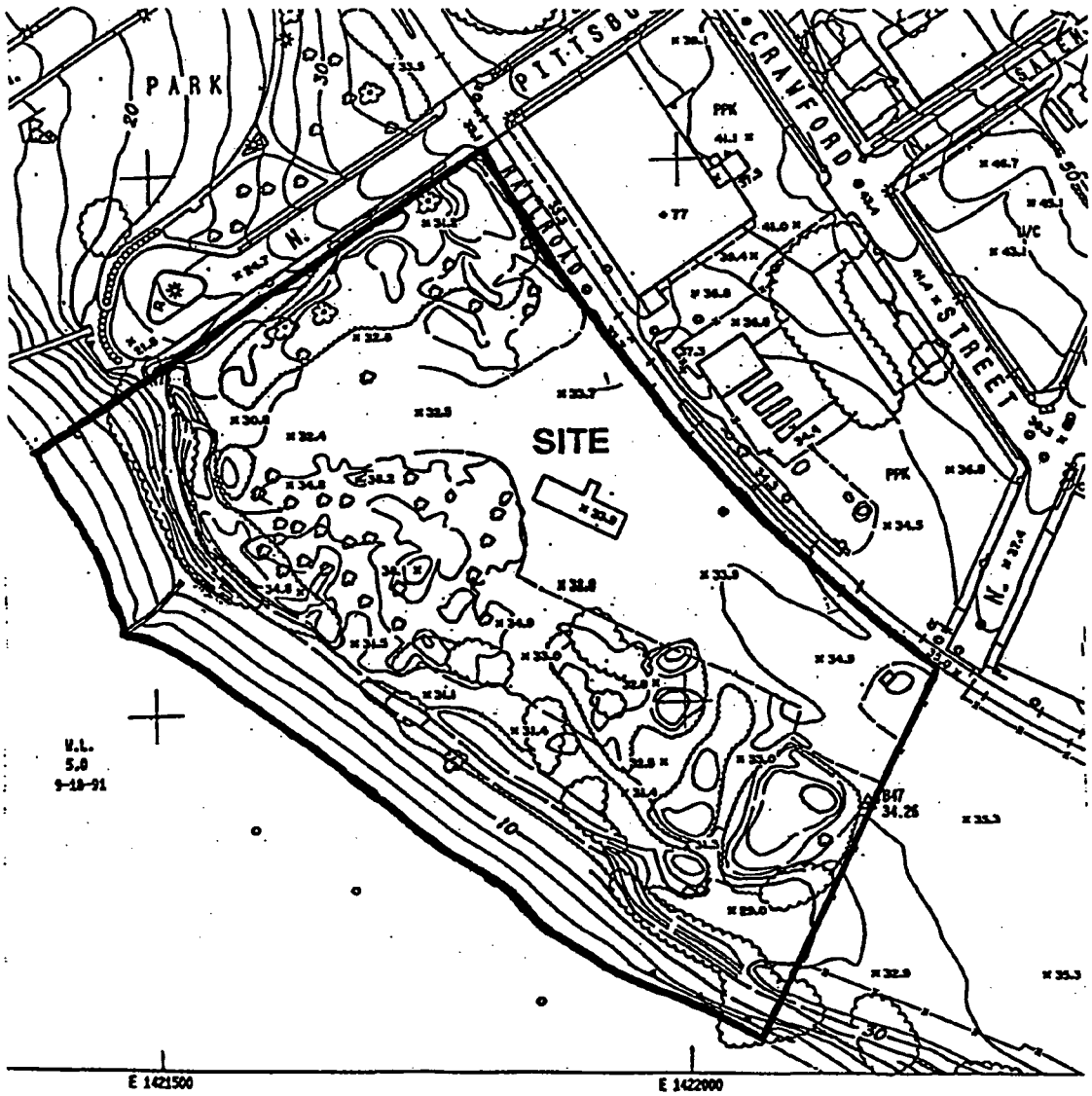
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

N

RZA AGRA, Inc. ENGINEERING & ENVIRONMENTAL SERVICES 7477 S.W. Tech Center Drive Portland, Oregon 97223-8024 Phone (503) 639-3400 Fax (503) 620-7892	W.O. 21-07197-00 DESIGN na DRAWN DATE 2/17/94 SCALE 1:24,000	FIGURE 1: SITE LOCATION MAP BUREAU OF ENVIRONMENTAL SERVICES WATER POLLUTION CONTROL LABORATORY ST. JOHNS BRIDGE AREA PORTLAND, OREGON Source: USGS 7.5' Portland, OR Quadrangle

THESE DRAWINGS ARE THE PROPERTY OF RZA AGRA CONSULTANTS AND ARE NOT TO BE REPRODUCED IN ANY MANNER EXCEPT WITH THE WRITTEN CONSENT OF RZA AGRA.



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W.O. 21-07197-00
DESIGN na
DRAWN
DATE 2/17/94
SCALE

FIGURE 2: SITE VICINITY MAP
BUREAU OF ENVIRONMENTAL SERVICES
WATER POLLUTION CONTROL LABORATORY
ST. JOHNS BRIDGE AREA
PORTLAND, OREGON

THESE DRAWINGS ARE THE PROPERTY OF RZA AGRA CONSULTANTS AND ARE NOT TO BE REPRODUCED IN ANY MANNER EXCEPT WITH THE WRITTEN CONSENT OF RZA AGRA.

Appendix A

Quantitative Analysis
Chain-of-Custody

RZA AGRA, Inc.

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Engineering & Environmental Services

7477 SW Tech Center Drive
Portland, Oregon 97223-8024
(503) 639-3400
FAX (503) 620-7892

Client: City of Portland
Project No.: 7197-00
Project Manager: Gerry Koschal
Sample Matrix: Soil

Service Request No.: OR930189
Report Date: 10/13/93
Report No.: 5061
C.O.C. No.: 3750, 3751

Total Petroleum Hydrocarbons by IR
EPA Method 418.1 Modified
mg/kg(ppm)

Sample Name	Lab Code	Sample Date	Date Extracted	Date Analyzed	Method Detection Limit	Result
T1-1	0189-1	10/11	10/13	10/13	4.00	74.7
T2-3	0189-2	10/11	10/13	10/13	4.00	16.6
T1-5	0189-3	10/11	10/13	10/13	4.00	129
T1-6	0189-4	10/11	10/13	10/13	4.00	61.4
TP3-16	0189-5	10/11	10/13	10/13	4.00	667
T2-9	0189-6	10/11	10/13	10/13	4.00	41.0
T2-10	0189-7	10/11	10/13	10/13	4.00	380
T2-11	0189-8	10/11	10/13	10/13	4.00	24.0
T2-14	0189-9	10/11	10/13	10/13	4.00	17.6
T3-17	0189-10	10/11	10/13	10/13	4.00	15.0
T3-21	0189-11	10/11	10/13	10/13	4.00	12.3
T3-23	0189-12	10/11	10/13	10/13	4.00	17.3
T3-24	0189-13	10/11	10/13	10/13	4.00	33.0
LAB BLANK	10-13SBK		10/13	10/13	4.00	ND

ND Not Detected

Signature of Chemist

Laboratory Manager

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Earth & Environmental Group

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Engineering & Environmental Services

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Portland, Oregon 97223-8024
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Client City of Portland
Project No. 7197-00
Project Manager Gerry Koschal
Sample Matrix Soil

Service Request No.: OR930189
Report Date: 10/14/93
Report No.: 5061qc
C.O.C. No.: 3750, 3751

Quality Assurance Data Report
Total Petroleum Hydrocarbons by IR
EPA Method 418.1 Modified
mg/kg (ppm)

Sample Name	Lab Code	Method Detection Limit	Sample Result	Dup. Sample Result	RPD	Spike Level	Spiked Result	% Recovery	% Recovery Acceptance Limits
T1-1	0189-1	4.00	74.70	69.4	5.19	200	256	91.9	75-125

RPD Relative Percent Difference

Signature of Chemist

Laboratory Manager

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Engineering & Environmental Services

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FAX (503) 620-7892

Client: City of Portland
Project No.: 7197-00
Project Manager: Gerry Koschal
Sample Matrix: Soil

Service Request No.: OR930191
Report Date: 10/14/93
Report No.: 5062
C.O.C. No.: 3752

Total Petroleum Hydrocarbons by IR
EPA Method 418.1 Modified
mg/kg (ppm)

Sample Name	Lab Code	Sample Date	Date Extracted	Date Analyzed	Method Detection Limit	Result
T4-25	0191-1	10/14	10/14	10/14	4.00	28.6
T4-26	0191-2	10/14	10/14	10/14	4.00	134
T4-27	0191-3	10/14	10/14	10/14	4.00	62.7
T5-28	0191-4	10/14	10/14	10/14	4.00	32.3
T5-29	0191-5	10/14	10/14	10/14	4.00	15.3
T5-30	0191-6	10/14	10/14	10/14	4.00	25.0
LAB BLANK	10-14SBK	10/14	10/14	10/14	4.00	ND

ND Not Detected

Signature of Chemist

Sean Stanley
Laboratory Manager

EPA418.1mod.

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Engineering & Environmental Services

7477 SW Tech Center Drive
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(503) 639-3400
FAX (503) 620-7892

Client City of Portland
Project No. 7197-00
Project Manager Gerry Koschal
Sample Matrix Soil

Service Request No.: OR930189
Report Date: 10/14/93
Report No.: 5062qc
C.O.C. No.: 3752

Quality Assurance Data Report
Total Petroleum Hydrocarbons by IR
EPA Method 418.1 Modified
mg/kg (ppm)

Sample Name	Lab Code	Method Detection Limit	Sample Result	Dup. Sample Result	RPD	Spike Level	Spiked Result	% Recovery	% Recovery Acceptance Limits
Blank Spike	10-14blk spk	4.00	ND	NA	NA	200	204	102	75-125

ND Not Detected
NA Not Applicable
RPD Relative Percent Difference

Signature of Chemist

Laboratory Manager

AGRA
Earth & Environmental Group

HUGHES
ANALYTICAL LABORATORY

October 27, 1993

Mr. Gerry Koschal
RZA AGRA, Inc.
7477 SW Tech Center Drive
Portland, OR 97223

Dear Mr. Koschal:

Enclosed is the lab report for your samples which were received on October 19, 1993. The Hughes Report # is 93-0438 and the Client Project is 7197, City of Portland BES St. Johns.

One soil sample was received under a chain of custody. The sample was received in containers consistent with U.S. EPA (United States Environmental Protection Agency) protocol.

Standard Quality Assurance/Quality Control (QA/QC) procedures were performed as stated in "EPA Test Methods for Evaluating Solid Waste (SW-846)", 3rd Edition and "Standard Methods for the Examination of Water and Wastewater", 17th Edition. The EPA laboratory protocols followed include sample holding times, laboratory method blanks, laboratory matrix spikes, replicate samples and calibration standards. There were no significant variations from these protocols that would invalidate the analytical data.

Test methods may include minor modifications of detection limits or lists of parameters for the published methods. Solid samples are reported on a wet weight basis unless otherwise noted.

Compounds not detected are listed under results as ND.

Sincerely,

Kim Hughes

Kim Hughes
Lab Director

21920 N.E. Glisan ▪ Gresham, Oregon 97030 ▪ (503) 669-3745 ▪ FAX (503) 669-4165

HUGHES ANALYTICAL LABORATORY

HUGHES REPORT #: 93-0438
CLIENT: RZA AGRA, Inc.
DATE: October 27, 1993
ITEMS: One Soil Sample

CLIENT JOB: 7197 BES
St. Johns

METHOD: TCLP Metals
per EPA 1311,3005,6010,7000 series
Results in mg/L (ppm)

Extraction: 10/21/93
Analysis: 10/25/93

ANALYTE	T2-10	DETECTION LIMIT	REGULATORY LIMIT
Arsenic	ND	0.5	5.0
Barium	2.0	0.5	100.0
Cadmium	ND	0.05	1.0
Chromium	0.09	0.05	5.0
Lead	2.0	0.5	5.0
Mercury	ND	0.0002	0.2
Selenium	ND	0.7	1.0
Silver	ND	0.5	5.0

METHOD: PCB Analysis per EPA 8080
Results in mg/Kg (ppm)
Dry Weight Basis

Extraction: 10/25/93
Analysis: 10/25/93

SAMPLE I.D.	AROCLOR	PCB	SURROGATE RECOVERY, %
T2-10	1260	0.24	104
T2-10 replicate	1260	0.17	102
Lab Blank	--	ND	114
Detection Limit		0.05	

ND = Not Detected

HUGHES ANALYTICAL LABORATORY

HUGHES REPORT #: 93-0438
CLIENT: RZA AGRA, Inc.
DATE: October 27, 1993
ITEMS: One Soil Sample

CLIENT JOB: 7197 BES
St. Johns

METHOD: VOLATILE ORGANIC COMPOUNDS
per EPA 8240
Results in ug/Kg (ppb)

Extraction: 10/22/93
Analysis: 10/25/93

DESCRIPTION	T2-10	LAB BLANK	DETECTION LIMIT
ACETONE	ND	ND	1000
ACROLEIN	ND	ND	1000
ACRYLONITRILE	ND	ND	1000
ALLYL CHLORIDE	ND	ND	50
BENZENE	ND	ND	50
BROMODICHLOROMETHANE	ND	ND	25
BROMOFORM	ND	ND	25
BROMOMETHANE	ND	ND	50
2-BUTANONE	ND	ND	1000
CARBON DISULFIDE	ND	ND	25
CARBON TETRACHLORIDE	ND	ND	25
CHLOROBENZENE	ND	ND	25
CHLOROETHANE	ND	ND	25
2-CHLOROETHYL VINYL ETHER	ND	ND	500
CHLOROFORM	ND	ND	25
CHLOROMETHANE	ND	ND	50
DIBROMOCHLOROMETHANE	ND	ND	25
1,2-DIBROMOETHANE	ND	ND	25
DIBROMOMETHANE	ND	ND	25
1,2-DICHLOROBENZENE	ND	ND	50
1,3-DICHLOROBENZENE	ND	ND	50
1,4-DICHLOROBENZENE	ND	ND	50
1,4-DICHLORO-2-BUTENE	ND	ND	50
DICHLORODIFLUOROMETHANE	ND	ND	250
1,1-DICHLOROETHANE	ND	ND	25
1,2-DICHLOROETHANE	ND	ND	25
1,1-DICHLOROETHENE	ND	ND	25
trans-1,2-DICHLOROETHENE	ND	ND	25
1,2-DICHLOROPROPANE	ND	ND	25
cis-1,3-DICHLOROPROPENE	ND	ND	25

ND = Not Detected

HUGHES ANALYTICAL LABORATORY

HUGHES REPORT #: 93-0437
CLIENT: RZA AGRA, Inc.
DATE: October 27, 1993
ITEMS: One Soil Sample

CLIENT JOB: 6764-01 PDC
South Waterfront

METHOD: VOLATILE ORGANIC COMPOUNDS (Continued)
per EPA 8240
Results in ug/Kg (ppb)

Extraction: 10/22/93
Analysis: 10/25/93

DESCRIPTION	T2-10	LAB BLANK	DETECTION LIMIT
trans-1,3-DICHLOROPROPENE	ND	ND	25
ETHYLMETHACRYLATE	ND	ND	250
ETHYLBENZENE	ND	ND	25
2-HEXANONE	ND	ND	250
IODOMETHANE	ND	ND	50
METHACRYLONITRILE	ND	ND	250
METHYL ISOBUTYL KETONE	ND	ND	250
METHYLENE CHLORIDE	ND	ND	500
METHYLMETHACRYLATE	ND	ND	250
PENTACHLOROETHANE	ND	ND	25
STYRENE	ND	ND	25
1,1,1,2-TETRACHLOROETHANE	ND	ND	25
1,1,2,2-TETRACHLOROETHANE	ND	ND	25
TETRACHLOROETHENE	ND	ND	25
TOLUENE	ND	ND	25
1,1,1-TRICHLOROETHANE	ND	ND	25
1,1,2-TRICHLOROETHANE	ND	ND	25
TRICHLOROETHENE	ND	ND	25
TRICHLOROFLUOROMETHANE	ND	ND	25
VINYL CHLORIDE	ND	ND	50
TOTAL XYLENES	ND	ND	50

Surrogate Recovery, %			Acceptance Limits
d4-1,2-Dichloroethane	82.5	87.3	74-121
d8-Toluene	82.1	87.9	70-121
Bromofluorobenzene	87.4	93.6	81-117

ND = Not Detected

RZA AGRA, Inc.

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Portland, Oregon 97223-8024
(503) 639-3400
FAX (503) 620-7892

Client: City of Portland
Project No.: 7197
ject Manager: Gerry Koschal
ample Matrix: Soil

Service Request No.: OR930188
Report Date: 10/18/93
Report No.: 5067
C.O.C. No.: 87

Total Petroleum Hydrocarbons - Diesel Range
ODEQ Method TPH-D
mg/kg (ppm)

Sample Name	Lab Code	Sample Date	Analysis Date	Method Detection Limit	Concentration	Surrogate Recovery 2-Fluorobiphenyl
TP-2-5	0188-1	10/12/93	10/15/93	12.50	16.6	147
TP-5-6	0188-2	10/12/93	10/15/93	12.50	120	*
TP-5-12	0188-3	10/12/93	10/15/93	12.50	ND	135
TP-6-5	0188-4	10/12/93	10/15/93	12.50	28.5	*
LAB BLANK	10-15SBKD	-	10/15/93	12.50	ND	137

* Surrogate recovery can not be reported due to target and non-target peaks within the retention time window of the surrogate.

ODEQ Acceptance Criteria 50%-150%

ND Not Detected

Signature of Chemist

Laboratory Manager

ODEQTPHD.XLS

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(503) 639-3400
FAX (503) 620-7892

Client City of Portland
Project No. 7197-00
Project Manager Gerry Koschal
Sample Matrix Soil

Service Request No.: OR930188
Report Date: 10/18/93
Report No.: 5067qc
C.O.C. No.: 87

Quality Assurance Data Report
Diesel Range Organic Compounds
ODEQ Method WTPH-D
mg/kg(ppm)

Sample Name	Lab Code	Sample Result	Dup. Result	RPD	Spike Level	Spiked Result	% Recovery	% Rec. Acceptance Criteria	% Surrogate Recovery
Blank Spike	10-15blk spk	38.0	-	-	50.0	-	75.9	75.0-125	79.5

WDOE Acceptance Criteria: 50-150

Signature of Chemist

Laboratory Manager

AGRA
Earth & Environmental Group

'outfall 49'

DESIGNED BY: PJ	SCALE : AS SHOWN
DRAWN BY : RAW	DATE : 04/13/94
CHECKED BY :	FILE :
PROJECT NO.: 4024100201-4003	

centurywest
ENGINEERING CORPORATION

BUREAU OF ENVIRONMENTAL SERVICES CITY OF PORTLAND

AERIAL PHOTOGRAPH
1977

CRAW00018018

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Engineering & Environmental Services

7477 SW Tech Center Drive
Portland, Oregon 97223-8024
(503) 639-3400
FAX (503) 620-7892

Client	**BES- St Johns**	**Service Request No.:**	**OR930196**
Project No.	**Gerry Koschal**	**eport Date:**	**10/19/93**
Project Manager	**7197-00**	**Report No.:**	**5070qc**
Sample Matrix	**Soil**	**C.O.C. No.:**	**126**

Quality Assurance Data Report
Total Petroleum Hydrocarbons by IR
EPA Method 418.1 Modified
mg/kg (ppm)

Sample Name	Lab Code	Sample Result	Dup. Result	RPD	Spike Level	Spiked Result	% Recovery	% Rec. Acceptance Criteria
Blank Spike	10-18sbk spk	101	-	-	100	-	101	75.0%-125%

Sean Gourley For Brian Hong
Signature of Chemist

Sean Gourley
Laboratory Manager

AGRA
Earth & Environmental Group

RZA AGRA, Inc.

(Formerly: Rittenhouse-Zeman & Associates, Inc.)
Engineering & Environmental Services

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Portland, Oregon 97223-8024
(503) 639-3400
FAX (503) 620-7892

Client: City of Portland
Project No.: 7197-00
Project Manager: Gerry Koschal
Sample Matrix: Soil

Service Request No.: OR930192
Report Date: 10/14/93
Report No.: 5063
C.O.C. No.: 139

Total Petroleum Hydrocarbons by IR
EPA Method 418.1 Modified
mg/kg (ppm)

Sample Name	Lab Code	Sample Date	Date Extracted	Date Analyzed	Method Detection Limit	Result
TP-8-10	0192-1	10/14	10/14	10/14	4.00	12.6
TP-8-20	0192-2	10/14	10/14	10/14	4.00	19.3
LAB BLANK	10-14SBK	10/14	10/14	10/14	4.00	ND

ND Not Detected

Signature of Chemist

Sean Tormley

Laboratory Manager

EPA418.1mod.

AGRA
Earth & Environmental Group

RZA AGRA, Inc.

(Formerly: Rittenhouse-Zeman & Associates, Inc.)
Engineering & Environmental Services

7477 SW Tech Center Drive
Portland, Oregon 97223-8024
(503) 639-3400
FAX (503) 620-7892

Client	**City of Portland**	**Service Request No.:**	**OR930192**
Project No.	**7197-00**	**Report Date:**	**10/14/93**
Project Manager	**Gerry Koschal**	**Report No.:**	**5063QC**
Sample Matrix	**Soil**	**C.O.C. No.:**	**0139**

Quality Assurance Data Report
Total Petroleum Hydrocarbons by IR
EPA Method 418.1 Modified
mg/kg (ppm)

Sample Name	Lab Code	Method Detection Limit	Sample Result	Dup. Sample Result	RPD	Spike Level	Spiked Result	% Recovery	% Recovery Acceptance Limits
TP-8-10	0192-1	4.00	12.6	8.27	29.9	200	210	99.8	75-125

RPD Relative Percent Difference

Signature of Chemist

Sean T. Sormley

Laboratory Manager

AGRA
Earth & Environmental Group

RZA AGRA, Inc.

(Formerly: Rittenhouse-Zeman & Associates, Inc.)
Engineering & Environmental Services

7477 SW Tech Center Drive
Portland, Oregon 97223-8024
(503) 639-3400
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Client: City of Portland
Project No.: 21-07197-00
Project Manager: Gerry Koschal
Sample Matrix: Soil

Service Request No.: OR930215
Report Date: 11/8/93
Report No.: 5129
C.O.C. No.: 0173

Volatile Organic Compounds
EPA Methods 8010/8020
mg/kg(ppm)

Sample Name:	TP-23-6	Lab Blank	**Detection**
Lab Code:	0215-2	0215-MB	**Limit**
Bromodichloromethane	ND	ND	0.05
Bromoform	ND	ND	0.05
Bromomethane	ND	ND	0.10
Carbon Tetrachloride	ND	ND	0.05
Chlorobenzene	ND	ND	0.05
Chloroethane	ND	ND	0.10
2-Chloroethylvinyl ether	ND	ND	0.05
Chloroform	ND	ND	0.05
Chloromethane	ND	ND	0.10
Dibromochloromethane	ND	ND	0.05
1,2-Dibromoethane	ND	ND	0.05
1,2-Dichlorobenzene	ND	ND	0.05
1,3-Dichlorobenzene	ND	ND	0.05
1,4-Dichlorobenzene	ND	ND	0.05
1,1-Dichloroethane	ND	ND	0.05
1,2-Dichloroethane	ND	ND	0.05
1,1-Dichloroethene	ND	ND	0.05
C-1,2-Dichloroethene	ND	ND	0.05
T-1,2-Dichloroethene	ND	ND	0.05
1,2-Dichloropropane	ND	ND	0.05
C-1,3-Dichloropropene	ND	ND	0.05
T-1,3-Dichloropropene	ND	ND	0.05
Methylene Chloride	0.12(a)	0.15(a)	0.05
1,1,2,2-Tetrachloroethane	ND	ND	0.05
Tetrachloroethene (PCE)	ND	ND	0.05
1,1,1-Trichloroethane (TCA)	ND	ND	0.05
1,1,2-Trichloroethane	ND	ND	0.05
Trichloroethene (TCE)	ND	ND	0.05
Trichlorofluoromethane	ND	ND	0.05
Vinyl Chloride	ND	ND	0.10
Benzene	ND	ND	0.05
Ethylbenzene	0.47	ND	0.05
Toluene	ND	ND	0.05
m/p-Xylene	1.50	ND	0.05
o-Xylene	0.16	ND	0.05
Sample Date:	10/26/93	11/4/93	
Analysis Date:	11/5/93	11/5/93	

ND Not Detected
(a) Estimated value because the analyte is also found in the associated method blank.

AGRA
Earth & Environmental Group

RZA AGRA, Inc.

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Engineering & Environmental Services

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FAX (503) 620-7892

Volatile Organic Compounds
EPA Methods 8010/8020

Surrogate Recoveries:			
Sample Name:	TP-23-6	Lab Blank	Control
Lab Code:	0215-2	0215-MB	Limits
Bromochloromethane:	101	84.1	72.7%-132%
1,4 - Dichlorobutane:	74.0	81.0	51.4%-133%
a,a,a - Trifluorotoluene:	104	106	77.7%-123%

Signature of Chemist

Laboratory Manager

801020.xls

AGRA
Earth & Environmental Group

HUGHES
ANALYTICAL LABORATORY

November 3, 1993

Mr. Gerry Koschal
RZA AGRA, Inc.
7477 SW Tech Center Drive
Portland, OR 97223

Dear Mr. Koschal:

Enclosed is the lab report for your samples which were received on October 20, 1993. The Hughes Report # is 93-0445 and the Client Project is 7197, BES St. Johns.

Five water samples were received under a chain of custody. The samples were received in containers consistent with U.S. EPA (United States Environmental Protection Agency) protocol.

Standard Quality Assurance/Quality Control (QA/QC) procedures were performed as stated in "EPA Test Methods for Evaluating Solid Waste (SW-846)", 3rd Edition and "Standard Methods for the Examination of Water and Wastewater", 17th Edition. The EPA laboratory protocols followed include sample holding times, laboratory method blanks, laboratory matrix spikes, replicate samples and calibration standards. There were no significant variations from these protocols that would invalidate the analytical data.

Test methods may include minor modifications of detection limits or lists of parameters for the published methods. Solid samples are reported on a wet weight basis unless otherwise noted.

Compounds not detected are listed under results as ND.

Sincerely,

Kim Hughes

Kim Hughes
Lab Director

21920 N.E. Glisan ▪ Gresham, Oregon 97030 ▪ (503) 669-3745 ▪ FAX (503) 669-4165

HUGHES ANALYTICAL LABORATORY

HUGHES REPORT #: 93-0434
CLIENT: RZA AGRA, Inc.
DATE: November 3, 1993
ITEMS: Five Water Samples

CLIENT JOB: 7197 BES
St. Johns

METHOD: PCB Analysis per EPA 608
Results in ug/L (ppb)

Extraction: 10/22/93
Analysis: 10/25/93

SAMPLE I.D.	AROCLOR	PCB	SURROGATE RECOVERY, %
MW-1	---	ND	89.4
MW-2	---	ND	95.5
MW-3	---	ND	96.0
MW-4	---	ND	103
MW-5	---	ND	95.4
Lab Blank	---	ND	100
Detection Limit		1.0	

ND = Not Detected

HUGHES ANALYTICAL LABORATORY

HUGHES REPORT #: 93-0434
CLIENT: RZA AGRA, Inc.
DATE: November 3, 1993
ITEMS: Five Water Samples

CLIENT JOB: 7197 BES
St. Johns

METHOD: Chlorinated Phenolics per EPA Method 8040 Results in ug/L (ppb)

Extraction: 10/22/93
Analysis: 10/26/93
11/01/93

SAMPLE I.D.	PENTACHLORO-PHENOL	2,4,5-TRICHLORO-PHENOL	SURROGATE RECOVERY, %
MW-1	ND	ND	43.7
MW-2	ND	ND	50.0
MW-3	ND	ND	59.7
MW-4	ND	ND	69.0
MW-5	18	ND	65.1
Lab Blank	ND	ND	61.6
Detection Limit	10	5	

ND = Not Detected

RZA
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7409 S.W. Tech Center Drive, Suite 135
Portland, Oregon 97223-8024
(503) 639-3400 FAX: (503) 620-7892

3751

CHAIN-OF-CUSTODY RECORD / LABORATORY ANALYSES REQUEST

PROJECT: BES JOB #: 7197-00
CLIENT: City of Portland
PROJ. MANAGER: Gary K PHONE #: 639-3400
SITE ADDRESS: Pitt Cyns / St John's Bridge St Helens, Oregon
SAMPLER'S NAME: Denny M PHONE #: 639-3400
SAMPLER'S SIGNATURE: [signature]

ANALYSIS REQUESTED: (Circle, Check Box, or Write Preferred Method in Box) OTHER: (Write In)

SAMPLE ID #	DATE	TIME	PRESERV.	MATRIX	Halogenated Volatiles EPA 601 EPA 8010	Aromatics (BTX&E) EPA 602 EPA 8020	Fuel Scan/TPH by GC EPA 602-mod/8015-mod.	Volatile Organ. Compnds	GC Fingerprint	Penta/Tetra-chlorophenol EPA 604 EPA 8040	Tot. Petrol. Hydrocarbons EPA 413.1, 418.1 / TLC	Total Metals ICP AA Other	EP-TOX Metals	Purgeable Organics EPA 624	Base/Neut.Acids EPA 625 EPA 8270	pH Cond. Alk Color	NO3/NO2 N-NO3 NH3-N	Ca Mg Na K Fe Cl SO4	TOX TOC TDS COD	TPH			# of Containers	Sample Preparation	Detection Limits Desired
1. T3-22	10/11/93		Ice	Soil																+			1		
2. T3-23																							1		
3. T3-24																							1		
4.																									
5.																									
6.																									
7.																									
8.																									
9.																									
10.																									

RELINQUISHED BY RZA:	RELINQUISHED BY:	RELINQUISHED BY:	LABORATORY:	SAMPLE RECEIPT:
Signature: [signature]	Signature: [signature]	Signature:		
Printed Name: Denny Macomber	Printed Name: Dave Robertson	Printed Name:	Shipping I.D. #:	Total # Containers:
Firm: RZA AGRA, Inc.	Firm: RZA AGRA	Firm:	Carrier:	Condition of Containers?
Date/Time: 10/12/93 6:00P	Date/Time: 10/13/93	Date/Time:	DOT Designation:	Condition of Seals?
RECEIVED BY:	**RECEIVED BY:**	**RECEIVED BY:**	**SPECIAL INSTRUCTIONS/COMMENTS:**	
Signature: [signature]	Signature: Sean Gormley	Signature:	Lab Project: OR530189	
Printed Name: Dave Robertson	Printed Name: Sean Gormley	Printed Name:		
Firm: RZA AGRA	Firm: RZA AGRA	Firm:		
Date/Time: 10/12/93 6:00P	Date/Time: 10/13/93 7:30	Date/Time:		

DISTRIBUTION: WHITE-return to RZA; YELLOW-lab; PINK-retained by RZA.

PAGE____ OF ____.

CRAW00018027

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3750

CHAIN-OF-CUSTODY RECORD / LABORATORY ANALYSES REQUEST

PROJECT: BES St Johns JOB #: 7197-00
CLIENT: City of Pdx
PROJ. MANAGER: Gerry K PHONE #: 639-3400
SITE ADDRESS: Pittsburg/St Johns Bridge St Helens OREGON
SAMPLER'S NAME: Denny M PHONE #: 639-3400
SAMPLER'S SIGNATURE: [signature]

ANALYSIS REQUESTED: (Circle, Check Box, or Write Preferred Method in Box) OTHER: (Write in)

SAMPLE ID #	DATE	TIME	PRESERV.	MATRIX	Halogenated Volatiles EPA 601 EPA 8010	Aromatics (BTX&E) EPA 602 EPA 8020	Fuel Scan/TPH by GC EPA 602-mod/8015-mod	Volatile Organ. Compnds	GC Fingerprint	Penta/tetra-chlorophenol EPA 604	Tot. Petrol. Hydrocarbons EPA 413.1. 418.1 / TLC	Total Metals ICP AA Other	EP-TOX Metals	Purgeable Organics EPA 624 8240	Base/Neut.Acids EPA 625 8270	pH Cond. Alk Color	NO3/NO2 N-NO3 NH3-N	Ca Mg Na K Fe Cl SO4	TOX TOC TDS COD	X TPH			# of Containers	Sample Preparation	Detection Limits Desired
1. T2-2	10/11/93		ice	Soil																X			1		
T2-3 2. T2-12																							1		
3. T2-5																							1		
T1-6 4. T1-16																							1		
5. TP3-16																							1		
6. T2-9																							1		
7. T2-10																							1		
8. T2-11																							1		
9. T2-14																							1		
10. T3-17																							1		

RELINQUISHED BY RZA:	RELINQUISHED BY:	RELINQUISHED BY:	LABORATORY:	SAMPLE RECEIPT:
Signature: [signature]	Signature: [signature]	Signature:		
Printed Name: Denny Macomber	Printed Name: Dave Roberson	Printed Name:	Shipping I.D. #:	Total # Containers:
Firm: RZA AGRA, Inc	Firm: RZA AGRA	Firm:	Carrier:	Condition of Containers?
Date/Time: 10/12/93	Date/Time: 10/13/93	Date/Time:	DOT Designation:	Condition of Seals?
RECEIVED BY:	**RECEIVED BY:**	**RECEIVED BY:**	**SPECIAL INSTRUCTIONS/COMMENTS:**	
Signature: [signature]	Signature:	Signature: [signature]	Lab Project: OR930185	
Printed Name: Dave Roberson	Printed Name:	Printed Name: Jean Gomboli		
Firm: RZA AGRA	Firm:	Firm: RZA AGRA		
Date/Time: 10/12/93	Date/Time:	Date/Time: 10/13/93 7:30		

DISTRIBUTION: WHITE-return to RZA; YELLOW-lab; PINK-retained by RZA.

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3752

CHAIN-OF-CUSTODY RECORD / LABORATORY ANALYSES REQUEST

PROJECT: BES/St Johns JOB #: 7199
CLIENT: City of Portland
PROJ. MANAGER: Gerry K. PHONE #: 639-3400
SITE ADDRESS: St John's Bridge/Pittsburg St
SAMPLER'S NAME: Kenny M PHONE #: 639-3400
SAMPLER'S SIGNATURE:

ANALYSIS REQUESTED: (Circle, Check Box, or Write Preferred Method in Box) OTHER: (Write in)

SAMPLE ID #	DATE	TIME	PRESERV.	MATRIX	Halogenated Volatiles EPA 601 EPA 8010	Aromatics (BTX&E) EPA 602 EPA 8020	Fuel Scan/TPH by GC EPA 602-mod/8015-mod.	Volatile Organ. Compnds	GC Fingerprint	Penta/Ketra-chlorophenol EPA 604 EPA 8040	Tot. Petrol. Hydrocarbons EPA 413.1, 418.1 / TLC	Total Metals ICP AA Other	EP-TOX Metals	Purgeable Organics EPA 624 8240	Base/Neut.Acids EPA 625 8270	pH Cond. Alk Color	NO3/NO2 N-NO3 NH3-N	Ca Mg Na K Fe Cl SO4	TOX TOC TDS COD	TPH-418.1			# of Containers	Sample Preparation	Detection Limits Desired
1. T4-25	10/13/93	9:40	Ice	Soil																X			1		
2. T4-26		9:50																					1		
3. T4-27		10:10																					1		
4. T5-28		15:55																					1		
5. T5-29		16:00																					1		
6. T5-30		16:10																					1		
7.																									
8. ~~[illegible]~~		~~[illegible]~~	~~[illegible]~~	~~[illegible]~~																					
9.																									
10.																									

RELINQUISHED BY RZA:	RELINQUISHED BY:	RELINQUISHED BY:	LABORATORY:	SAMPLE RECEIPT:
Signature: Kenny Macomber	Signature:	Signature:		
Printed Name: Kenny Macomber	Printed Name: DAVE ROBERTSON	Printed Name:	Shipping I.D. #:	Total # Containers:
Firm: RZA AGRA	Firm: RZA AGRA	Firm:	Carrier:	Condition of Containers?
Date/Time: 10/13/93 16:00P	Date/Time: 10/14/93 8:00	Date/Time:	DOT Designation:	Condition of Seals?
RECEIVED BY:	**RECEIVED BY:**	**RECEIVED BY:**	**SPECIAL INSTRUCTIONS/COMMENTS:**	
Signature:	Signature:	Signature: Jean Gormley	OR93~~0162~~ 0191	
Printed Name: DAVE ROBERTSON	Printed Name:	Printed Name: Jean Gormley		
Firm: RZA AGRA	Firm:	Firm: RZA AGRA Inc.		
Date/Time: 10/13/93 16:00P	Date/Time:	Date/Time: 10/14/93 8:00		

DISTRIBUTION: WHITE-return to RZA; YELLOW-lab; PINK-retained by RZA.

PAGE_____ OF _____.

CRAW00018029

93-0453

0152

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Engineering & Environmental Services
7477 SW Tech Center Drive • Portland, OR 97223-8024
(503) 639-3400 • FAX (503) 620-7892

Chain-of-Custody Record / Laboratory Analyses Request

Project: BES - ST Johns Job #: 7197
Client: City of Portland
Project Manager: Gerri Koschal Phone #: 639-3400
Sampler's Name: Penny Mccombs Phone #: ↓
Sampler's Signature: —

Analysis Requested: (Circle, Check Box, or Write Preferred Method in Box)

	Sample I.D. #	Date	Time	Preserv.	Matrix	Halogenated Volatiles EPA 601 EPA 8010	Volatile Aromatics EPA 602 EPA 8020	BTXE or BTXE / TPH-G	WA. TPH-G or OR. TPH-G	WA. TPH-D or OR. TPH-D	Fuel Scan / TPH by GC 8015-modified	GC Fingerprint / HCID	WA. 418.1 Modified or OR. 418.1 Modified	GC / MS Volatiles 8240	GC / MS Semi Volatiles	Total Metals ICP AA Other	TC LP Metals	pH Cond. Alk. Color	8080/8085	# of Containers	Comments
01	T2-10	10/18/93	10:00	Cool	S									X			X		X		
2.																					
3.																					
4.																					
5.																					
6.																					
7.																					
8.																					
9.																					
10.																					

Relinquished by (RZA)	Relinquished by:	Relinquished by:	Laboratory:	Sample Receipt:
Signature: Jean Gosnley	Signature:	Signature:	Hughes Analytical Lab	
Printed Name: Jean Gosnley	Printed Name:	Printed Name:	Shipping I.D.#	Total # Containers:
Firm: RZA AGRA, Inc	Firm:	Firm:	Carrier: Courier	Condition of Containers:
Date/Time: 10/19/93	Date/Time:	Date/Time:	DOT Designation:	Condition of Seals:
Received by:	**Received by:**	**Received by:**	**Special Instructions/Comments:**	
Signature: Jenni Hughes	Signature:	Signature:	Original COC is 0150	
Printed Name: Jenni Hughes	Printed Name:	Printed Name:		
Firm: Hughes Analytical	Firm:	Firm:		
Date/Time: 10-19-93 10:35	Date/Time:	Date/Time:		

DISTRIBUTION: WHITE & PINK returned to project manager, YELLOW - lab.

Page ____ of ____

SERVICE REQUEST #: _____

CRAW00018030

RZA AGRA, Inc.
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Engineering & Environmental Services
7477 SW Tech Center Drive • Portland, OR 97223-8024
(503) 639-3400 • FAX (503) 620-7892

Chain-of-Custody Record / Laboratory Analyses Request

Project: BES ST. JOHNS Job #: 7197-00
Client: CITY OF PORTLAND
Project Manager: KOSCHAL Phone #:
Sampler's Name: ROBERTSON/[redacted] Phone #:
Sampler's Signature: [signature]

Analysis Requested: (Circle, Check Box, or Write Preferred Method in Box)

Sample I.D. #	Date	Time	Preserv.	Matrix	Halogenated Volatiles EPA 601 EPA 8010	Volatile Aromatics EPA 602 EPA 8020	BTXE or BTXE / TPH-G	WA. TPH-G or OR. TPH-G	WA. TPH-D or OR. TPH-D	Fuel Scan / TPH by GC 8015-modified	GC Fingerprint / HCID	WA. 418.1 Modified or OR. 418.1 Modified	GC / MS Volatiles	GC / MS Semi Volatiles	Total Metals ICP AA Other	TC LP Metals	pH Cond. Alk Color			# of Containers	Comments
1. TP-B-10	10/13/93	4:25	CHILL	SOIL						[redacted]		X									
2. TP-B-20	"	4:45	↓	↓						[redacted]		X									
3.																					
4.																					
5.																					
6.																					
7.																					
8.																					
9.																					
10.																					

Relinquished by RZA:	Relinquished by:	Relinquished by:	Laboratory:	Sample Receipt:
Signature:	Signature:	Signature:		
Printed Name:	Printed Name:	Printed Name:	Shipping I.D.#	Total # Containers:
Firm:	Firm:	Firm:	Carrier:	Condition of Containers:
Date/Time:	Date/Time:	Date/Time:	DOT Designation:	Condition of Seals:

Received by:	Received by:	Received by:	Special Instructions/Comments:
Signature: [signature]	Signature:	Signature:	OR930192
Printed Name: Jean Gormley	Printed Name:	Printed Name:	
Firm: RZA AGRA	Firm:	Firm:	
Date/Time: 10/14/93	Date/Time:	Date/Time:	

DISTRIBUTION: WHITE & PINK returned to project manager, YELLOW - lab.

Page ____ of ____.

SERVICE REQUEST #: _____

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(503) 639-3400 • FAX (503) 620-7892

UT26

Chain-of-Custody Record / Laboratory Analyses Request

Project: BES - ST JOHNS Job #: 7197-00
Client: CITY OF PORTLAND
Project Manager: G. KOSCHAL Phone #:
Sampler's Name: D. ROBERTSON Phone #:
Sampler's Signature: [signature]

Analysis Requested: (Circle, Check Box, or Write Preferred Method in Box)

Sample I.D. #	Date	Time	Preserv.	Matrix	Halogenated Volatiles EPA 601 EPA 8010	Volatile Aromatics EPA 602 EPA 8020	BTXE or BTXE / TPH-G	WA. TPH-G or OR. TPH-G	WA. TPH-D or OR. TPH-D	Fuel Scan / TPH by GC 8015-modified	GC Fingerprint / HCID	WA. 418.1 Modified or OR. 418.1 Modified	GC / MS Volatiles	GC / MS Semi Volatiles	Total Metals ICP AA Other	TC LP Metals	pH Cond. Alk Color			# of Containers	Comments
1 CH2B4-15	10/15	11:00	CHILL	SOIL								X								1	
2 CH2B4-20	"	11:00																		1	
3 TP-12-12	10/14	11:05																		2	
4 TP-12-15		11:20																		2	
5 TP-14-1		2:00																		1	
6.																					
7.																					
8.																					
9.																					
10.																					

Relinquished by RZA:	Relinquished by:	Relinquished by:	Laboratory:	Sample Receipt:
Signature: [signature]	Signature:	Signature:		
Printed Name: DAVE ROBERTSON	Printed Name:	Printed Name:	Shipping I.D.#	Total # Containers:
Firm: RZA AGRA	Firm:	Firm:	Carrier:	Condition of Containers:
Date/Time: 10/15/93 3:20P	Date/Time:	Date/Time:	DOT Designation:	Condition of Seals:
Received by:	**Received by:**	**Received by:**	**Special Instructions/Comments:**	
Signature: [signature]	Signature:	Signature:		
Printed Name: Jean Gormley	Printed Name:	Printed Name:		
Firm: RZA AGRA, Inc.	Firm:	Firm:		
Date/Time: 10/15/93 15:20	Date/Time:	Date/Time:		

DISTRIBUTION: WHITE & PINK returned to project manager, YELLOW - lab.

Page ____ of ____.
SERVICE REQUEST #: Q530195

CRAW00018032

RZA AGRA, Inc.
(Formerly: Rittenhouse-Zeman & Associates, Inc.)
Engineering & Environmental Services
7477 SW Tech Center Drive • Portland, OR 97223-8024
(503) 639-3400 • FAX (503) 620-7892

Chain-of-Custody Record / Laboratory Analyses Request

Project: BES ST John Job #: 7197
Client: (BES) City of Portland
Project Manager: Gerry Koschal Phone #: 639-3400
Sampler's Name: Denny Macomber Phone #: 639-3400
Sampler's Signature: Denny Macomber

Analysis Requested: (Circle, Check Box, or Write Preferred Method in Box)

Sample I.D. #	Date	Time	Preserv.	Matrix	Halogenated Volatiles EPA 601 EPA 8010	Volatile Aromatics EPA 602 EPA 8020	BTXE or BTXE / TPH-G	WA. TPH-G or OR. TPH-G	WA. TPH-D or OR. TPH-D	Fuel Scan / TPH by GC 8015-modified	GC Fingerprint / HCID	WA. 418.1 Modified or OR. 418.1 Modified	GC / MS Volatiles	GC / MS Semi Volatiles	Total Metals ICP AA Other	TC LP Metals	pH Cond. Alk Color	8080/PCB'S	8040*	# of Containers	Comments
01 1. MW-1	10/15/93	9:30	ice	H_2O														X	X	3	
02 2. MW-2		10:10																X	X	3	
03 3. MW-3		11:20																X	X	3	
04 4. MW-4		12:10																X	X	3	
05 5. MW-5		13:20																X	X	3	
6.																					
7.																					
8.																					
9.																					
10.																					

Relinquished by RZA:	Relinquished by:	Relinquished by:	Laboratory:	Sample Receipt:
Signature: Denny Macomber	Signature: Jean Gormley	Signature:		
Printed Name: Denny Macomber	Printed Name: Jean Gormley	Printed Name:	Shipping I.D.#	Total # Containers:
Firm: RZA AGRA Inc.	Firm: RZA AGRA, Inc.	Firm:	Carrier:	Condition of Containers:
Date/Time: 10/15/93 @ 16:00	Date/Time: 10/20/93	Date/Time:	DOT Designation:	Condition of Seals:

Received by:	Received by:	Received by:	Special Instructions/Comments:
Signature: Jean Gormley	Signature: Jenni Hughes	Signature:	* 8040 = Pentachlorophenol 2,4,5-Trichlorophenol
Printed Name: Jean Gormley	Printed Name: Jenni Hughes	Printed Name:	
Firm: RZA AGRA	Firm: Hughes Analytical	Firm:	Note: Extraction Holding Times are up Friday
Date/Time: 10/15/93 16:00	Date/Time: 10-20-93 3:30	Date/Time:	

DISTRIBUTION: WHITE & PINK returned to project manager, YELLOW - lab.

Page ____ of ____.

SERVICE REQUEST #: _____

CRAW00018033

Appendix B

Test Pit Logs
Boring Logs

TEST PIT LOGS

Depth (ft.)	Materials Encountered
Test Pit 1	
0 – 5.5	Soft to medium stiff, moist, light brown, SILT with trace to some fine sand and scattered concrete chunks. (fill)
5.5 – 12	Medium stiff to stiff, moist grading to wet, brown, SILT with trace fine sand.
12 – 20	Medium dense, wet, gray-brown fine SAND grading from silty to trace sand at 18 feet.
	Terminated at 20 feet. No seepage observed. No caving observed.
Test Pit 2	
0 – 2	Loose, dry, black, green and white, blast SAND with some gravel and misc. debris (fill).
2 – 4	Soft, moist, gray-brown, SILT with areas of black discoloration and wood fragments (slight hydrocarbon-like odor) (fill).
10 – 11	Large concrete debris or foundation elements.
	Refusal on concrete at 11 feet. No seepage observed. No caving observed.
Test Pit 3	
0 – 3	Soft, dry to moist, tan to white, SILT with abundant brick and concrete debris (fill).
3 – 7.5	Loose, moist, black, blast sand (fill).
7.5 – 13	Medium stiff, moist, light brown, SILT with trace to some clay; grades to some fine sand, and no clay at 10 feet.
13 – 19	Medium dense, moist to wet, gray-brown, fine SAND grading from silty to some silt.
	Terminated at 19 feet. No seepage observed. No caving observed.

Depth (ft.)	Materials Encountered
Test Pit 4	
0 – 4	Soft to medium stiff, dry to moist, tan, SILT with scattered rootlets to 1.5 feet and some gravel (fill).
4 – 9	Medium stiff, moist, lightly rust mottled, light brown, SILT with trace clay and fine sand.
9 – 20	Medium dense, moist, fine SAND grading from silty to some silt at 12 feet.
	Terminated at 20 feet. No seepage observed. No caving observed.
Test Pit 5	
0 – 4	Loose to medium dense, dry to moist, black, blast SAND and tan gravelly SILT with brick and concrete debris (fill).
4 – 9	Medium stiff, moist, green-gray, SILT; some black discoloration and a slight hydrocarbon-like odor (fill).
9 – 13	Stiff, moist, lightly rust mottled, light brown SILT with trace clay.
13 – 19	Medium dense, moist grading to wet, gray-brown, fine SAND, silty grading to some silt at 16 feet.
19 – 20	Medium stiff, wet, gray, SILT with trace fine sand.
	Terminated at 20 feet. Light seepage at 9 feet. No caving observed.
Test Pit 6	
0 – 2	Soft, dry, tan and gray gravelly SILT and blast SAND (fill).
2 – 4	Soft to medium stiff, moist, light brown, gravelly SILT (fill).
4 – 7.5	Soft to medium stiff, moist, dark gray-green, gravelly SILT. Slight hydrocarbon-like odor (fill).
7.5 – 9	Large flat concrete object - possibly slab and foundation. Adjacent soils consist of medium stiff, wet, black, SILT, GRAVEL and CHARRED WOOD DEBRIS (fill).
	Refusal on (foundation elements?) at 9 feet. No seepage observed. No caving observed.

Depth (ft.)	Materials Encountered
Test Pit 7	
0 – 6.5	Soft to medium stiff, dry to moist, light brown and white, SILT and fine SAND (fill).
7 – 12	Medium stiff, moist, dark blue-gray, SILT with some gravel and a slight hydrocarbon-like odor (fill).
	Refusal on concrete and rebar at 12 feet. No seepage observed. Moderate caving from 7 feet to 12 feet.
Test Pit 8	
0 – 3	Loose, dry to moist, black blast SAND with trace concrete debris (fill).
3 – 5	Medium stiff, moist, light brown, SILT with scattered chunks of black slag-like material and some gravel (fill).
5 – 11	Medium stiff, moist, dark blue-gray SILT with some gravel and trace fine sand. Slight organic and possible hydrocarbon-like odor (fill).
11 – 16	Medium dense, wet grading to saturated, dark blue-gray, silty fine SAND (fill).
16 – 20	Medium stiff, saturated SILT with some gravel; abundant rusted nails, pipe, etc (fill).
	Terminated at 20 feet. Light seepage at 16 feet. Minor caving from 16 to 20 feet.
Test Pit 9	
0 – 1	Soft, moist, brown, gravelly silty SAND with abundant rootlets (fill).
1 – 5.5	Medium stiff, dry to moist, light brown SILT with scattered lenses of white and black blast sand and some concrete chunks up to 1 - 2 feet in the long direction (fill).
5.5 – 20	Medium stiff, moist grading to wet, blue and brown silty SAND and sandy SILT with occasional roots and woody debris. Organic and charred wood odor (fill).
	Terminated at 20 feet. No seepage observed. No caving observed.

Depth (ft.)	Materials Encountered
Test Pit 10	
0 – 2	Loose, dry, gravelly SAND with some silt and trace brick debris (fill).
2 – 2.5	Loose, dry, white, blast SAND (fill).
2.5 – 15	Medium stiff, moist, blue-gray, gravelly SILT with trace to some fine sand, abundant charred wood, rebar, concrete and brick (debris) from 2.5 feet to 10 feet (fill).
15 – 18	Medium stiff, moist to wet, blue-gray, silty fine SAND (dredge fill?)
	Terminated at 18 feet due to interference with debris in upper 10 feet.
	No seepage observed. Extreme caving from 0 - 10 feet. Moderate caving from 10 - 20 feet.
Test Pit 11	
0 – 3	Soft to medium stiff, dry, brown SILT with a 6-inch thick lense of black blast sand at 2.5 feet. Abundant brick and concrete debris; rusted piping from surface to 3 feet in old utility corridor; also large slab and foundation elements including a timber pile.
3 – 10	Medium stiff, moist, brown, silty SAND with trace gravel and rootlets; old pipe at 4 feet (fill).
10 – 12	Loose, to medium stiff, moist to wet, green-gray, fine SAND (dredge fill?).
12 – 16.5	Soft, wet, green-gray, clayey SILT with trace fine SAND (dredge fill?).
	Terminated at 16.5 feet due to interference with pipe and foundation elements in upper 5 feet. No seepage observed. No caving observed.
Test Pit 12	
0 - 1	Two inches of ASPHALT over moist, brown GRAVEL.
1 – 8.5	Medium dense, moist, green and gray fine to medium SAND with scattered thin lenses of brown SILT (dredge fill?).
8.5 – 10	Medium stiff, moist, green-gray SILT with some clay and sand (dredge fill?).
10 – 14	Loose to medium dense, moist, dark gray, fine to medium SAND (dredge fill?).
	Terminated at 14 feet due to extreme caving. No seepage observed.

Depth (ft.)	Materials Encountered
Test Pit 13	
0 – 1	Three inches of ASPHALT over dense, moist, brown, silty GRAVEL.
1 – 15	Loose to medium dense, moist, green-gray, fine to medium SAND with trace to some silt and scattered thin lenses of moist, brown, SILT. Becomes dark gray at 10 feet (dredge fill?).
15 – 16	Stiff, moist to wet, brown SILT with some clay and sawdust (fill).
16 – 20	Stiff to very stiff, wet, green-gray SILT with some clay and fine sand.
	Terminated at 20 feet. Light seepage at 11 feet. *Moderate caving from 5 - 15 feet.*
Test Pit 14	
0 – 1	Two inches of ASPHALT over base coarse GRAVEL. Oily sheen seeping from gravel.
1 – 4.5	Stiff, moist, brown, SILT (fill).
4.5 – 10.5	Soft to medium stiff, moist grading to saturated, dark blue-gray SILT with some organics and large concrete debris at the basal contact (fill).
10.5 – 12	Loose, wet, dark brown, organics and woody debris. Timber pile and 2 - 3 inch metal pipe encountered at basal contact (fill).
12 – 19	Stiff, wet, gray-brown, SILT.
	Terminated at 19 feet. Light seepage at 1 foot and 12 feet. Moderate caving from 4.5 to 10.5 feet.
Test Pit 15	
0 – 1	Two inches of broken up ASPHALT over dry, brown, silty GRAVEL.
1 – 3.5	Stiff, moist, brown, SILT with trace woody debris (fill).
3.5 – 11	Medium stiff, wet, dark blue-gray, SILT with trace clay and fine sand (fill).
11 – 13	Loose, wet to saturated, dark brown ORGANICS and wood, brick and metal debris (fill).
13 – 20	Stiff, moist, light brown, SILT with trace clay.
	Terminated at 20 feet. Minor caving from 9 to 13 feet.

Light seepage at 13 feet.

Depth (ft.)	Materials Encountered
Test Pit 16	
0 – .5	Two inches of ASPHALT over CRUSHED ROCK.
.5 – 1.5	Dense, moist, brown, silty GRAVEL (fill).
1.5 – 10	Medium stiff, moist, dark greenish gray, SILT with some woody debris; Large flat concrete structure at 7 - 9 feet and 3-4" metal pipe at 8 feet.
	Refusal due to obstruction by pipe and concrete at 10 feet. No seepage observed. No caving observed.
Test Pit 17	
0 – 1	Two inches of ASPHALT over brown, silty GRAVEL.
1 – 6.5	Stiff, moist, brown and blue gray SILT. (2) 3" pipes at 2 feet. (1) 3/4" pipe at 4 feet. (1) 3" pipe at 4 feet. Some rounded gravel in pipe trenches.
	Refusal due to obstructions (pipe) at 6.5 feet. No seepage observed. No caving observed.
Test Pit 18	
0 – 1	Soft, dry, moist, brown, silty, TOPSOIL with abundant fine rootlets.
1 – 7	Very stiff, moist, light brown SILT with some gravel and trace fine SAND. Large concrete foundation elements and a 2-inch pipe and 6-inch pipe at 6 - 7 feet.
	Refused due to obstruction (pipe) at 7 feet. No seepage observed. No caving observed.
Test Pit 19	
0 – .5	Soft, moist, brown, silty TOPSOIL with abundant fine rootlets.
.5 – 4	Very stiff moist, light brown, gravelly SILT with trace fine organics, concrete and metal debris (fill).
4 – 8	Soft, moist, dark gray, organic-rich SILT with abundant woody debris. Three inch metal pipe at 7 feet.
	Terminated at 8 feet due to obstruction by (pipe). No seepage observed. No caving observed.

SOIL EXCAVATION AND REMEDIATION REPORT

7.6 ACRE PARCEL

PORTLAND, OREGON

PREPARED FOR:
BUREAU OF ENVIRONMENTAL SERVICES

21-07197

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FEBRUARY, 1994

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Engineering & Environmental Services

AGRA
Earth & Environmental Group

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February 17, 1994

21-07197

City of Portland
Bureau of Environmental Services
1120 S.W. Fifth Avenue, Room 400
Portland, OR 97204

Attn: Randy Miller

**SUBJECT: SOIL REMOVAL AND REMEDIATION EXCAVATION REPORT
WATER POLLUTION CONTROL LABORATORY
PORTLAND, OREGON**

Dear Mr. Miller:

RZA AGRA, Inc. (RZA) is pleased to submit this soil removal and remediation excavation report for the above referenced site. This report has been prepared to document the results of work conducted on the site from October 25, 1993 through January 1994.

Approximately 150 cubic yards of PCB contaminated soil was excavated from the two PCB release areas and is currently stored on site, pending disposal. An additional 350 linear feet of contaminated electrical conduit piping is also stored on site, pending disposal. A waste profile was submitted to Chemical Waste Management and has been approved for the disposal of both contaminated materials.

RZA would be pleased to assist you with the disposal.

If you have any questions regarding this report or if you require any additional information, please do not hesitate to contact the undersigned at (503) 639-3400.

Respectfully submitted,

RZA AGRA, Inc.

Denny Macomber, Hazardous Waste Specialist

Gerard Koschal, R.G., Senior Geologist

AGRA
Earth & Environmental Group

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1.0 INTRODUCTION

RZA AGRA, Inc. (RZA) was contracted by the Bureau of Environmental Services (BES) to identify, characterize, and remediate by excavation and removal a release of an unknown petroleum product later identified as PCB-containing oil at the proposed Water Pollution Control Laboratory, a 7.6 acre parcel owned by the City of Portland, located along the northeast bank of the Willamette River, south of Pittsburg Avenue and west of Burlington Avenue, in the St John's area of Portland, Oregon.

RZA's objectives were to: 1) identify the unknown substance; 2) investigate the vertical and lateral extent of the release; 3) Characterize the source of the release; 4) excavate any contaminated materials; and 5) arrange for the storage and disposal of all contaminated soils and debris.

The scope of this project included:

1) Amend the Health & Safety Plan to include information on PCBs,
2) Develop a Field Operation Plan
3) Research potential sources of the PCB-containing oil
4) Locate the release and characterize the impacted area
5) Pre-closure sampling
6) Excavate contaminated soils and debris and arrange for storage
7) Closure sampling
8) Backfill excavations
9) Prepare for disposal of contaminated materials

This report has been prepared for the exclusive use of the Bureau of Environmental Services, City of Portland and its agents, for the specific application to this project in accordance with generally accepted environmental engineering practices. No other warranty expressed or implied is made.

2.0 SITE DESCRIPTION AND BACKGROUND

The subject site is a rectangular shaped, partially vegetated, undeveloped lot located along the northeast bank of the Willamette River, south of Pittsburg Avenue and west of Burlington Avenue, in St John's, Oregon. The site is bounded by the Willamette River to the west, Cathedral Park to the north, Union Pacific Railroad tracks to the east, and Lampros Steel to the south. Property usage in the area is commercial and residential (see Plate 1).

The site is the former location of the Portland Lumber Mills which was demolished during the 1970's and comprised several mill buildings, including a boiler in the southwestern part of the site near the Willamette River, and a dock along the river bank. The boiler reportedly burned sawdust until the middle 1960s, when it was switched to natural gas. Dry kilns on-site were heated with steam generated rom the boiler, and later with natural gas.

Portland Development Commission reportedly bought the site from Brand S Corporation in the late 1970s. The site was vacant until 1988, when Lampros Steel rented the property from PDC to store new steel on it. During the intervening years, access to the site was uncontrolled and unknown persons dumped fill in an area approximately 100 to 300 feet in the southern part of the site and along the northwestern portion of the site as well. Lampros Steel apparently closed off access to the site using concrete slabs sometime in the late 1980s..

Currently the site consists of a 7.6 acre vacant parcel, being considered for redevelopment by the Bureau of Environmental Services in Portland, Oregon.

3.0 HISTORY OF RELEASE

On October 13, 1993, RZA was on site conducting a subsurface environmental investigation on the northern portion of the property. During a routine geotechnical subsurface investigation, another contractor of BES notified RZA personnel that a release had occurred in the southern portion of the site. While drilling the contractor intersected an object which broke releasing a liquid, an unknown substance. To secure the hole the contractor reportedly pumped drilling fluid containing the unknown substance into a 55 gallon drum and subsequently abandoned the boring, sealing the hole with bentonite.

RZA sampled the contents of the drum, noting the substance had a distinct moth-ball-like odor, and estimated that the contents of the drum contained less than one-half gallon of petroleum based product and ten gallons of drilling fluid (H_2O). The sample was submitted to OAL Laboratory located in Gresham, Oregon. The analytical results later indicated that the liquid material contained 1,000 ppm of PCBs (Aroclor 1260).

RZA had arranged for a security fence to be erected around the site. RZA notified the Bureau of Environmental Services that a release had occurred. RZA indicated that the source and the extent of the release was unknown and informed BES that the analytical results identified the unknown substance as PCBs containing oil.

Following the notification, RZA met with BES and it was decided that BES would notify the Oregon Department of Environmental Quality (ODEQ) about the release. Subsequently, RZA was asked to perform a subsurface investigation in accordance with TSCA regulations. This investigation included amending the current Health & Safety Plan and developing and Operation and Sampling Plan for the additional scope of work.

4.0 REGULATIONS

PCB releases fall under Toxic Substance Control Act (TSCA) which has established specific requirements for reporting PCB spills. According to Toxic Substance Control Act (TSCA) regulations (40 CFR 761.30 (a) (1) (iii) and 40 CFR 761.60d), PCB spills are viewed as improper disposal of PCBs. Although specific PCB cleanup requirements are not established in the TSCA regulations, each regional director is given authority to enforce adequate cleanup of PCB spills to protect human health and the environment. The reporting requirements apply mostly to users and manufacturers of PCB transformers or PCB containing hydralic systems; however, they also apply to sites where spills or releases of PCBs containing material in concentrations greater than 50 ppm have occurred.

The reporting requirements for PCB spill cleanup listed in 40 CFR 761.125 include:

- Spill Notification
- Proper storage and disposal of PCB contaminated debris
- Determination of spill boundaries in the absence of visible traces
- Post-cleanup Sampling and Documentation

4.1 Spill Notification

PCB spills involving 10 pounds or more by weight of PCBs must currently be reported to the National Response Center (1-800-424-8802). Where a spill directly contaminates surface water, sewers, or drinking water supplies, the responsible party shall notify EPA regional office and obtain guidance for appropriate cleanup measures in the shortest possible time after discovery, but in no case later than 24 hours after discovery. In this case, BES notified both the Oregon Department of Environmental Equality (ODEQ) and EPA as required by TSCA.

4.2 Storage and Disposal of Contaminated Debris

PCB storage and disposal regulations listed in 40 CFR 761.60 through 761.65 require responsible parties to dispose of debris containing PCBs in concentrations greater that 50 ppm at an EPA permitted chemical waste landfill.

4.3 Determination of Spill Boundaries/Post-cleanup Sampling

Post-cleanup sampling is outline in section 40 CFR 761.130 and is required to verify the level of cleanup under 761.125 has been reached. According to the regulations: "The responsible party may use any statistically valid, reproducible, sampling scheme (either random samples or grid samples) provided that the sampling area is the greater of (1) an area equal to the area cleaned plus an additional one 1- foot boundary, or (2) an area 20 percent larger than the original area of contamination; (3) The sampling scheme must ensure 95 % confidence against false positives; (4) The number of samples must be sufficient to ensure that areas of contamination of a radius of 2 feet or more within the sampling area will be detected, except that the minimum number of samples is 3 and the maximum number of samples is 40.

4.4 Health and Safety Plan

The Health and Safety Plan for this site was amended to include information on PCB containing material. The H & S plan is included in Appendix B.

4.5 Exclusion Zones/Equipment Decontamination

Included in the Health and Safety Plan specific guidelines outline the proper procedure in accordance with OSHA regulations 1910.120, which spell out protocol for hazardous waste operations including specific measures for setting up decontamination stations and exclusion zones and for proper equipment decontamination. These measures are employed in order to reduce the possibility of spreading contamination from the "hot zone" to non-sensitive areas of the site.

RZA was responsible for delineating three exclusion zones using caution tape and security fencing. No personnel was allowed access to the either of the three zones unless they were properly equipped with the correct personal protective equipment (PPE) and had received the necessary OSHA training.

Every piece of equipment that enters the exclusion zone was decontaminated after use. A decontamination station was set up employing secondary containment in order to collect all wash water. A hot pressure washer and detergent was used to decon the trackhoe bucket after each use. Personnel were required to triple rinse each piece of equipment, including PPE prior to exiting the decontamination zone.

All water was collected and stored on-site in a 500 gallon Baker tank.

4.6 Operation Plan

RZA's first task was to ensure site safety by establishing adequate exclusions zones. Prior to beginning each task, RZA employees and its subcontractors were wearing the appropriate PPE as outline in the amended H & S Plan.

RZA's second task was to identify, characterize and contain the source of the release. This was accomplished by excavation an initial test pit in the vicinity of the release area. The source was source identified and additional contamination was present. Pre-closure samples was taken in order to determine the extent of contamination present. A combustible gas indicator was used to screen soils for possible elevated levels of petroleum bases products. The operation plan covered the possibility that drums or transformers might be discovered. RZA personnel were prepared to take the necessary precautions to avoid explosions or uncontrolled releases. A staging area was secured for the storage of drums.

The plan covered the possibility that electrical conduit piping was discovered. The pipe was visually inspected for leaks or damage which could have occurred during the previous subsurface exploration. RZA was prepared with the necessary absorbent material to further reduce the spreading of contamination if a leak was detected. RZA was also prepared to remove damaged pipe.

Follow this, RZA excavated the contaminated material and stored it in a lined containment area. Closure samples were taken to ensure that soils did not exceed the TSCA PCB cleanup standard of 1 ppm. RZA then arranged for storage and the proper disposal of the contaminated material.

4.7 Closure

According to TSCA regulations, RZA employed a grid system to delineate the boundaries of contamination. RZA will use a grid system for closure sampling if applicable. Following the excavation of any contaminated soils, closure samples were collected upgradient, along sidewalls, beneath the release area, and down gradient. Composite samples were collected from specific grid points to ensure the largest possible area is screened for residual contamination. (TSCA recommends composite samples for this very reason.) Following the removing of piping, composite samples were collected along the trenched area to ensure leakage had not occurred somewhere along the piping. Sampling was conducted in a manner consistent with general environmental practices outlined in the Sampling Plan included in Appendix C.

5.0 IDENTIFICATION AND CHARACTERIZATION OF RELEASE

On October 25, 1993, RZA set up the exclusion zones, the security fencing, and the decon area.

On October 26, C. Wark Trucking, Inc in Tualatin, Oregon, excavated soils to a depth of approximately ten feet in the vicinity of the former boring location and uncovered a damaged 3" electrical conduit pipe, suspected of containing PCB fluids (see Photo 1, Appendix A). RZA estimated that approximately one gallon of fluid was released into the soil in the immediate vicinity of the damaged pipe. An absorbent material was poured onto those areas showing signs of visible contamination.

Additional test pits were excavated to trace the direction of the pipe. Difficulty in tracing the conduit by test pitting occurred due to numerous pipes underground in the foundation.

5.1 Utility Locate Service

A utility locate service was contacted to locate the direction and ending points of the 3" electrical conduit piping. To accurately follow along the piping, a trenchbox was lowered into a clean excavation and a representative of RZA attached a lead to the conduit piping (see photo 2). The piping appeared to run northeast to southwest across the property with a major deviation to the east approximately thirty-five feet northeast of the release area. The piping appeared to end at the adjacent property line of Lampros Steel. The pipe extended to the southwest of the release area and then dog-legged to the south. The piping appeared to terminate in an area of several foundations.

5.2 Test pits

Three additional test pits were dug in the vicinity of the original release area and along the locators marking. The south end of the piping was identified, approximately 150 feet south of the original release area and fifty feet from the property boundary. The east end of the piping could not be located based on the piping projection.

5.3 Interviews

An employee at Lampros steel was asked if he knew of an old electrical conduit line running onto their property. He had no knowledge about such a pipe and suggested we talk to a man "who lives just up the street" who had actually worked on-site for Portland Lumber Mills prior to the operation shutting down. A representative of RZA was able to locate the wife of the former mill worker but was informed that the husband had passed on.

5.4 Aerial Photographs

A 1940s aerial photograph located on the wall at the US Bank Building in St Johns and several historical photographs viewed at the Oregon Historical Society indicated several pole-mounted electrical transformers located on the adjacent property and mounted along Pittsburg Street in various locations. Photographs viewed at the St John's Historical Society indicated that the Portland Lumber Mill site was built on a dock-like platform that covered most of the site. RZA believed that the piping must run in an northeast southwest direction and not bend to the east as the utility locate had indicated.

The southern end of the pipe was located in an area that was identified as a transformer pad on the Sandborn Fire Maps.

5.5 PGE

PGE was contacted in an attempt to learn more about the electrical conduit piping and the standard protocol for disconnecting PCB containing transformer, practiced in the late 1970s.

PGE had no record that transformers had been removed from site. They, however, did indicate that the insulation may have used PCB containing material. If during the geotechnical subsurface exploration, the piping was exposed to heat or if previous site usage exposed the piping to heat, there was the possibility that the PCB liquid in the pipe could be due to the insulation liquefying.

5.6 Preliminary Sampling

A trenchbox was installed in the initial release area and a thorough inspection of the pipe revealed that the pipe had been hit by the drill rig and the piped had been sheared. No additional liquids were noted in the pipe. As a precautionary measure, waterproofing tape was applied around the piping to seal off the damaged area. Samples were then taken in the immediate vicinity of the release area to determine if contamination was present in the soils. The results of the preliminary sampling are listed below.

Sample ID#	Location	Concentrations (Aroclor 1260)
P-1	Beneath Puncture	20,000 ppm
P-2	1 ft North, Beneath Piping	1,500 ppm
P-3	1 ft South, Beneath Piping	220 ppm
P-4	2 ft East, Beneath Piping	53 ppm
P-5	2 ft West, Beneath Piping	37,000 ppm

The highest level was recorded at P-5, downgradient of the immediate release area.

Following the removal of approximately 75 cubic yards of soil at the initial release area, preliminary closure samples were taken. Analytical results indicated that three of the five closure samples exceeded EPA's cleanup standard of 1 ppm.

Sample ID#	Location	Concentrations (PPM)
CL-1	NE, Sidewall/5 ft	3.9 ppm
CL-2	SE, Sidewall/5 ft	150 ppm
CL-3	SW, Sidewall/5 ft	0.13 ppm
CL-4	NW, Sidewall/5 ft	0.35 ppm
CL-5	Center Bottom/5 ft	1.6 ppm

** CL-1, CL-3, and CL-5 exceeded EPA's cleanup Standard of 1 ppm.

5.7 Additional Soil Removal/Additional Preliminary Closure Samples

Approximately 15 cubic yards of additional soil was removed from those three areas mentioned above which exceeded the cleanup level. A second set of closure samples were later collected from areas CL- 1, CL-2, and CL-5. All three samples results were below the 1 ppm TSCA cleanup standard (see Plate 2).

5.8 Demolisher

RZA attempted to trace the pipe from the release area to its southwest. Extensive foundations were encountered. A concrete demolisher was brought in to break re-bar concrete foundations that crossed the electrical conduit.

5.9 Electrical Conduit

RZA continued to excavate along the conduit piping at a depth of approximately 10 feet toward the Willamette River to ensure that the pipe actually ended in the vicinity of what was once a concrete transformer pad. Visual evidence confirmed that the pipe southeast of the release zone had no releases Preliminary samples were collected from the removed soil to validate these observations. PCBs were not detected in these soil samples.

After the southern end of the pipe was located and no releases were identified excavation continued to the northeast of the release site. The piping was traced to the northeast property line. The piping appeared to continue under the railroad tracks and toward a telephone pole.

To remove the piping, a trench approximately three feet in width and ten feet in depth was excavated along the entire length of the pipe (see Photo 3). Three key areas were sloped in accordance with OSHA regulations in order to allow safe entry into the excavation and in order to allow the pipe to be cut into manageable sections (see Photos 4 and 7). Before cutting the conduit and as a precautionary measure to guard against additional PCB fluid leaking into the exposed trench, a secondary containment area was built below the pipe to collect any free-flowing fluids.

A pipe cutter wrench was used to cut the pipe. Inside the piping was a lead liner with heavy-gauge copper electrical wire wrapped in a fiber, wax-like insulation. No free liquid was identified in the pipe.

A sample of the insulation was analyzed for PCB content. The analysis indicated the insulation contained 17,000 ppm of PCB containing material.

5.10 Old Release

During the excavation of the pipe trench northeast of the release area, evidence of a second, older release was discovered at approximately a depth of 10 feet. A joint in the piping showed signs of historic damage (see Photo 5).

Based on our observations it appears a small release of PCBs oils occurred, probably during the site's demolition. Only slight traces of visibly contaminated soil was present around the piping. The soil beneath the piping revealed only minor surface staining.

A soil sample MP-6 was collected from beneath the release area and was sent to Oregon Analytical Laboratory for analysis. The analytical results indicated a PCB concentration of 6,200 ppm in the immediate vicinity of the damaged conduit, exceeding the TSCA cleanup standard (see Plate 2).

6.0 CLEANUP

Prior to removing the electrical conduit, approximately 75 cubic yards of soil was removed from the initial release area (see Photo 6). The soil was segregated into two soil piles (e.g. SP-1 and SP-2). Soil pile SP-1 represented the "hot pile" or soil that could have come into contact with PCB fluid during the time of the release. Soil pile SP-2 represented the "clean pile" or soil that most likely did not come into contact with the PCB fluid. Representative samples were then collected from both soil piles and were analyzed for PCB contamination. Analytical results indicated that soil pile SP-1 contained 800 ppm of PCBs, while SP-2 contained 0.13 ppm of PCBs. Soils from SP-2 did not exceed EPA's regulatory cleanup level for residential sites of 1 ppm. Soil pile SP-2, approximately 35 yards was used as backfill material.

The piping was removed from the trench in sections and placed in a bermed area for future disposal. The end of the pipe under the railroad track was sealed to prevent in future leakage.

Approximately 100 cubic yards of soil was removed from area of the old release and was stored inside a lined containment area.

7.0 CLOSURE/SAMPLING PLAN

RZA employed a sampling plan designed to characterize the degree of cleanup throughout the entire sampling areas (e.g. initial release area, old release area, and along the entire trench formerly containing the 3" electrical conduit piping). Our goal was to achieve site closure, by ensuring that adequate cleanup levels had been accomplished and that no areas exceeded the TSCA PCB cleanup level of 1 ppm. The sample plan is included in Appendix C.

Once the 3" electrical conduit piping had been removed and all suspected PCB contaminated soils excavated, final closure samples were systematically collected in the old release area and along the entire trench (see Plate 3). Samples were collected with a hand auger at a depth of approximately ten feet at thirty foot intervals along the trench. Three samples were collected at each site and were blended to perform composite samples. Composite samples were then analyzed for PCBs using EPA methods 3540 and 8080/8081. These samples were identified by the prefix "FCL-X." Closure sample locations are shown on Plate 3.

Five final closure samples exceeded the TSCA cleanup standard of 1 ppm for PCBs. These samples were associated with the release areas. Additional soils were removed from those contaminated areas and the area was re-sampled. These samples were identified by the prefix "FCL-XB." Analytical results indicated that all five samples were below the TSCA PCB cleanup standard of 1 ppm.

Final Sampling results are included in the table below.

FINAL CLOSURE SAMPLES

(Sample Date: December 13, 1993)

Sample ID#	Location/Depth	Concentration (PPM)
FCL-1	N. Sidewall, Center Below Piping Area, S. Sidewall (10 ft)	900 ppm
FCL-2	" "	0.31 ppm
FCL-3	" "	2,500 ppm
FCL-4	" "	9.4 ppm
FCL-5	" "	0.19 ppm
FCL-6	" "	9.8 ppm
FCL-7	" "	2.2 ppm
FCL-8	" "	N.D.
FCL-9	" "	N.D.
FCL-10	" "	N.D.
FCL-11	" "	N.D.
FCL-12	" "	N.D.
FCL-13	" "	N.D.
FCL-1E	East-end of Trench, Center Bottom	N.D.
FCL-13E	West-end of Trench, Center Bottom	N.D.
FCL-1B	N. Sidewall, Center Below Piping Area, S. Sidewall (15 ft)	0.31 ppm
FCL-3B	" "	N.D.
FCL-4B	" "	N.D
FCL-6B	" "	N.D
FCL-7B	" "	N.D.

Note: N.D. - Not Detected

8.0 BACKFILL

All fill material was sampled and analyzed for PCBs, prior to use as backfill. Of the seventeen soil piles sampled, only one soil pile SP-17 exceeded the TSCA PCB cleanup level of 1 ppm. The contaminated material was later identified, segregated from the clean soils, and stored with the contaminated material.

9.0 STORAGE AND DISPOSAL

Five 20 cubic yard drop boxes were delivered to the site during the month of December by Chemical Waste Management. The drop boxes were double-lined and a portion of the contaminated soils were transferred to the drop boxes. Approximately 60 cubic yards of contaminated soil is stored on-site in a fenced, lined, and covered containment area pending disposal.

9.1 Waste Water Disposal

All decontamination water was stored on-site in a 500 gallon Baker tank. The waster was tested for the presence of PCBs. Analytical results indicated that low levels (20 ppb) of PCB contamination was present. RZA arranged for proper disposal. Spencer Environmental Services (Spencer) of Oregon City, Oregon, is permitted to accept this level of waste water. Spencer pumped out the 376 gallons of waste water and transported the water off-site for proper disposal.

9.2 PCB Piping Storage And Disposal

Approximately 350' linear feet of 3" electrical conduit piping is wrapped and contained in 10 mil plastic on-site (see Photo 8). The piping has been included into the waste profile information with Chemical Waste Management and is pending disposal.

10.0 CONCLUSIONS

A release of PCB containing oil was identified at the proposed Water Pollution Control Laboratory in the St John's area of Portland, Oregon. The source of the release was identified as a break in a 3" electrical conduit containing PCBs in insulation.

In addition to the initial release an old release was discovered during soil removal. The estimated total release for both areas was estimated at less than two gallons. The extent of contamination was limited to the immediate vicinity of the releases. Approximately 150 cubic yards of soil were impacted. Groundwater does not appear to have been impacted.

Fifteen closure samples were collected from selected grid locations along the trench at approximately ten feet in depth and at 30 foot intervals. Five of the fifteen samples exceeded the TSCA PCB cleanup level of 1 ppm.

Approximately 15 cubic yards of additional soil was excavated from those five areas and the locations were re-sampled. Analytical results indicated that all five samples fell below the TSCA PCB cleanup level of 1 ppm.

A total of 150 cubic yards of contaminated soil has been excavated from the vicinity of both release areas. Approximately 100 cubic yards of that soil is stored inside double-lined drop boxes. The remaining soil is stored on site in a secure containment area. There is an additional 350 linear feet of 3" electrical conduit that is presently stored on site. Both are pending disposal.

We appreciate the opportunity to assist you on this project. If you have any questions, please feel welcome to contact the undersignes.

RZA AGRA, Inc.

Denny Macomber, Hazardous Waste Specialist

Gerard Koschal, R.G., Senior Geologist

REGISTERED PROFESSIONAL
OREGON
GERARD KOSCHAL
#G 1015
GEOLOGIST

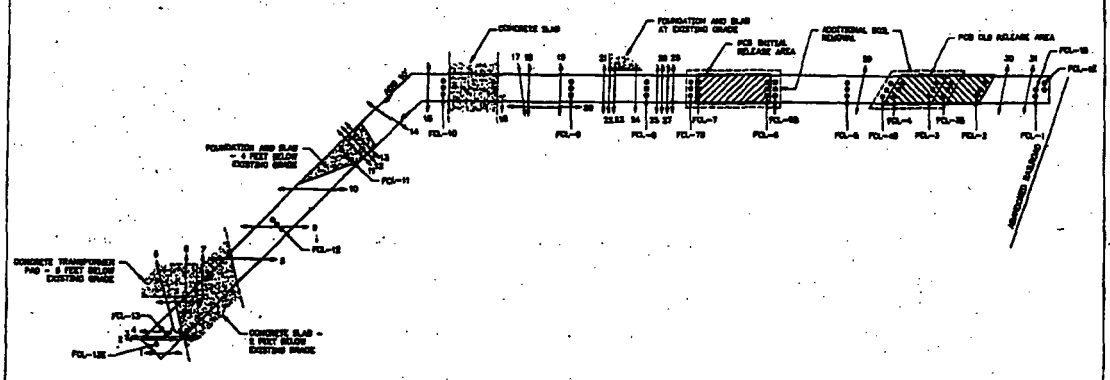


Plate 3

NOTES:

1. A COMPOSITE SAMPLE WAS MADE BY BLENDING THREE GRID SAMPLES AT EACH SAMPLE LOCATION.

PCB FINAL TRENCH CLOSURE SAMPLE PCB/PCB LOCATIONS
T 1 S - 31, 32N R1E
CITY OF PORTLAND
FITZHUGH STREET
PORTLAND, OREGON

DRAWN CRA/MC DATE 2/15/94
CHECKED
REVIEWED
SCALE NONE

RZA AGRA, Inc.
(Formerly Shannon-Gunson & Associates, Inc.)
ENGINEERING & ENVIRONMENTAL SERVICES
Very of North Greater Drive
Portland, Oregon 97232-2024
Phone (503) 665-5200 Fax (503) 665-7020

SIZE C AND FILE NAME FINAL.MAP SHEET 1 OF 1 REV 0

CRAW00018079

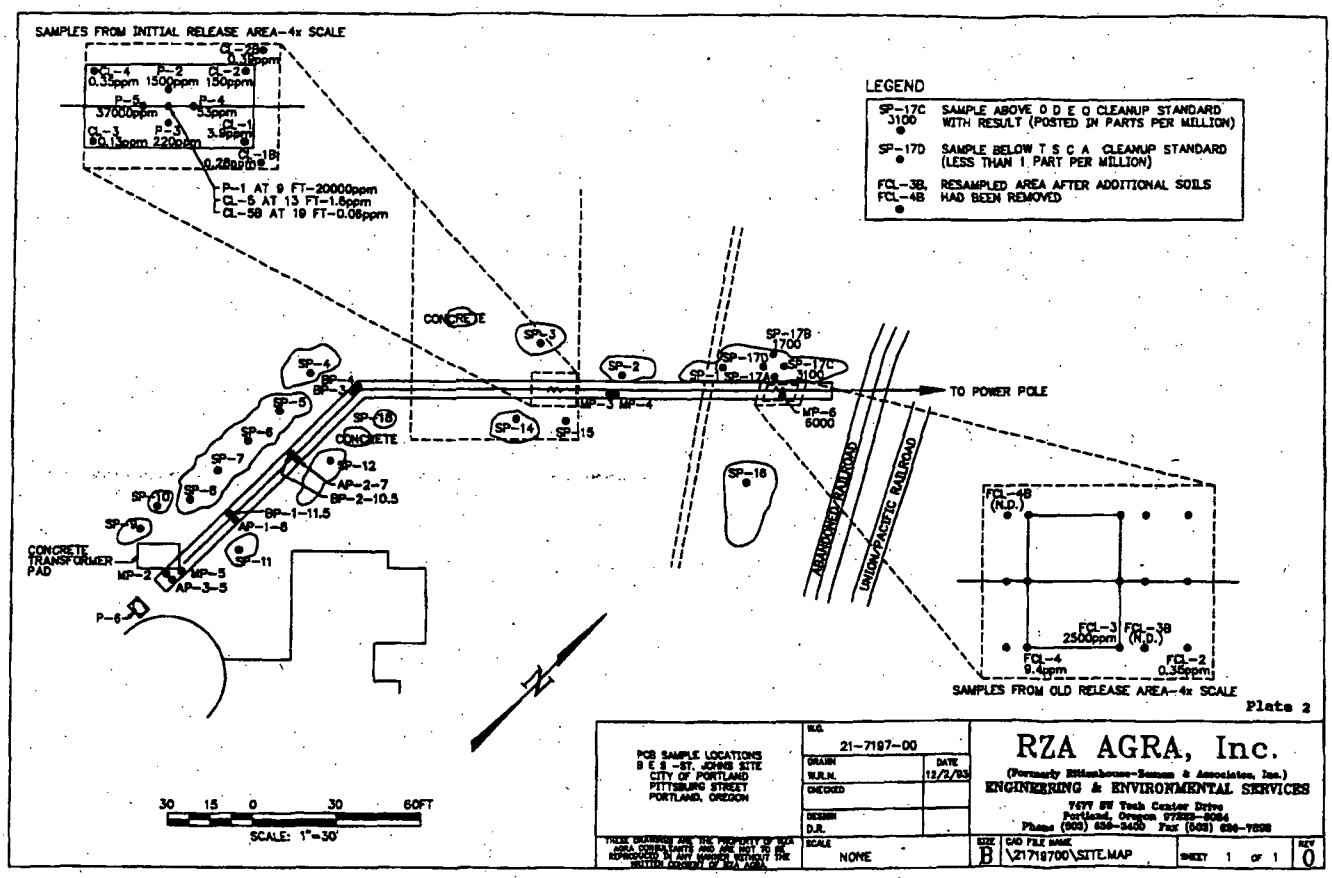


Plate 2

PCB SAMPLE LOCATIONS
B E S -ST. JOHNS SITE
CITY OF PORTLAND
PITTSBURG STREET
PORTLAND, OREGON

W.O. 21-7197-00
DRAWN W.R.N. DATE 12/2/93
CHECKED
DESIGN D.R.
SCALE NONE

THESE DRAWINGS ARE THE PROPERTY OF RZA AGRA, INC. AND ARE NOT TO BE REPRODUCED IN ANY MANNER WITHOUT THE WRITTEN CONSENT OF RZA AGRA.

RZA AGRA, Inc.
(Formerly Ettinghouse-Sumner & Associates, Inc.)
ENGINEERING & ENVIRONMENTAL SERVICES
7477 SW Tech Center Drive
Portland, Oregon 97223-8064
Phone (503) 639-3400 Fax (503) 639-7838

SIZE B CAD FILE NAME \21719700\SITE.MAP SHEET 1 OF 1 REV 0

CRAW00018080

Appendix A

Photographs

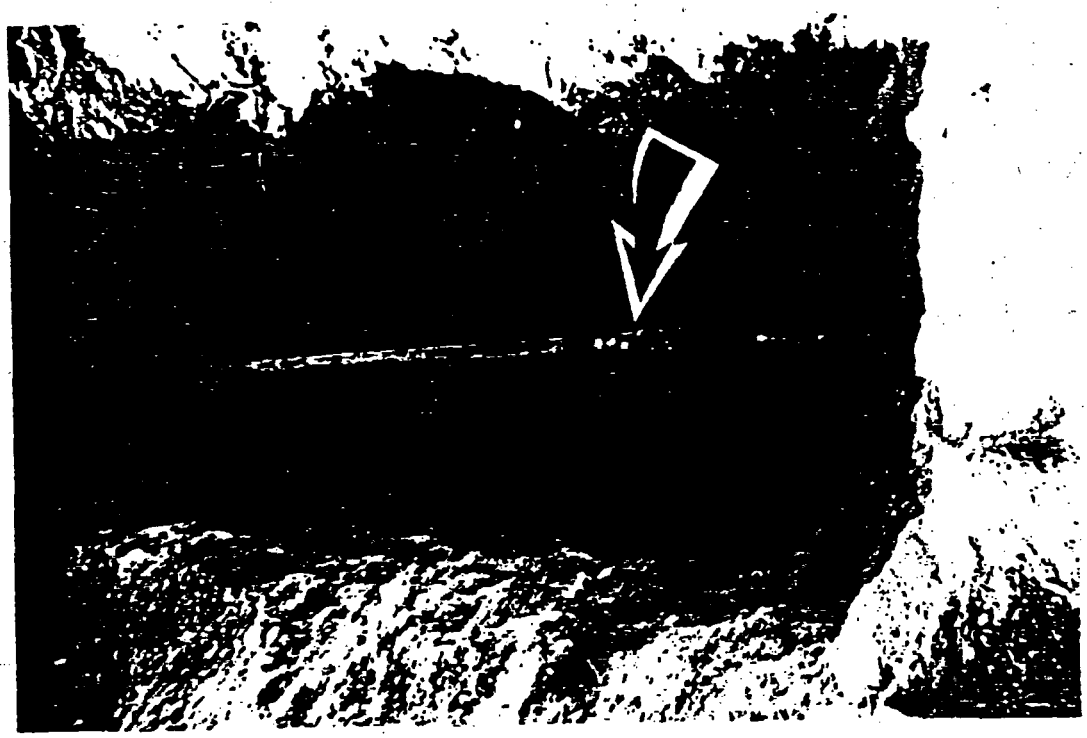


Photo 1 - Initial release area, damaged pipe

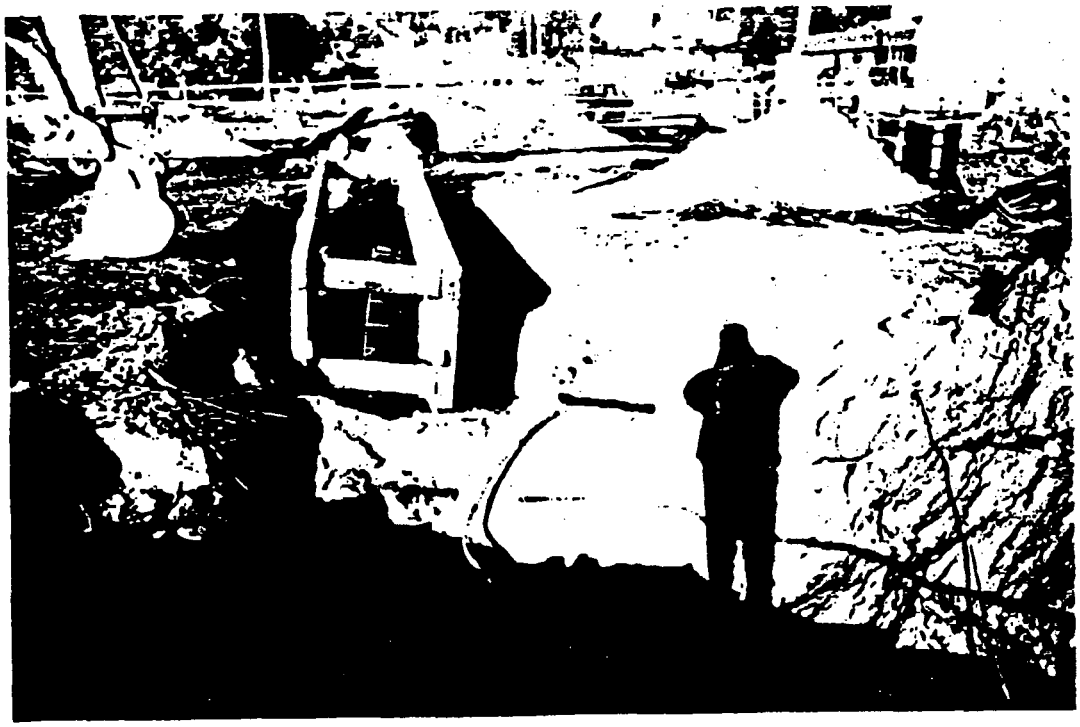


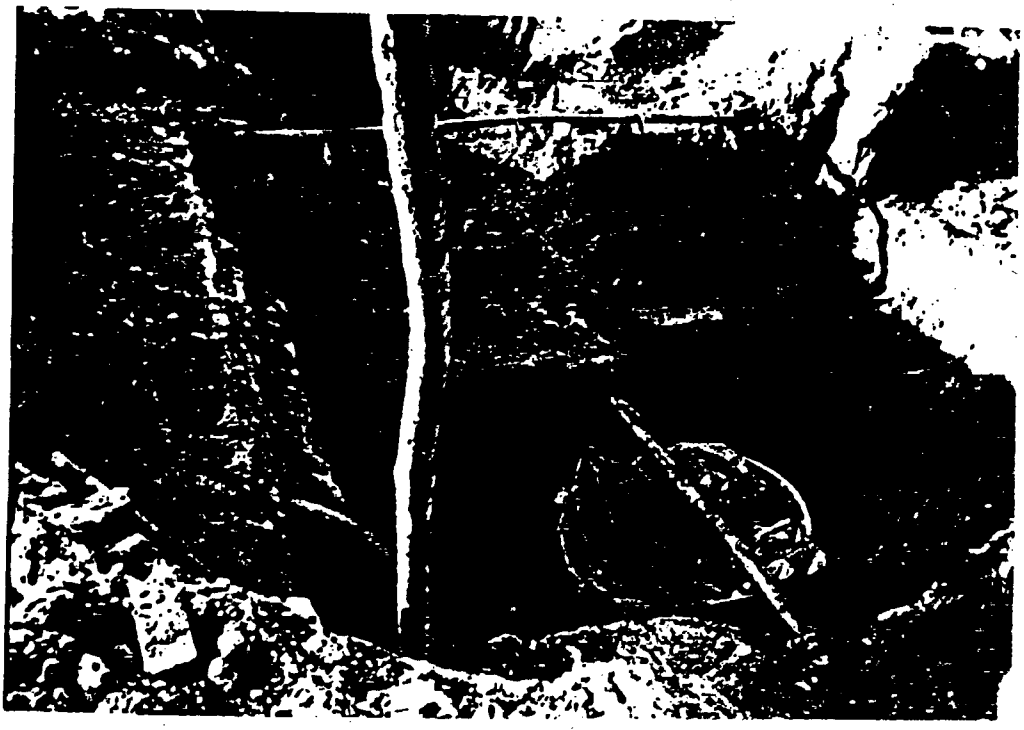
Photo 2 - Attaching a lead to the conduit piping

Photo 3

Piping
&
Concrete
Foundations

Photo 4

Containment
Area



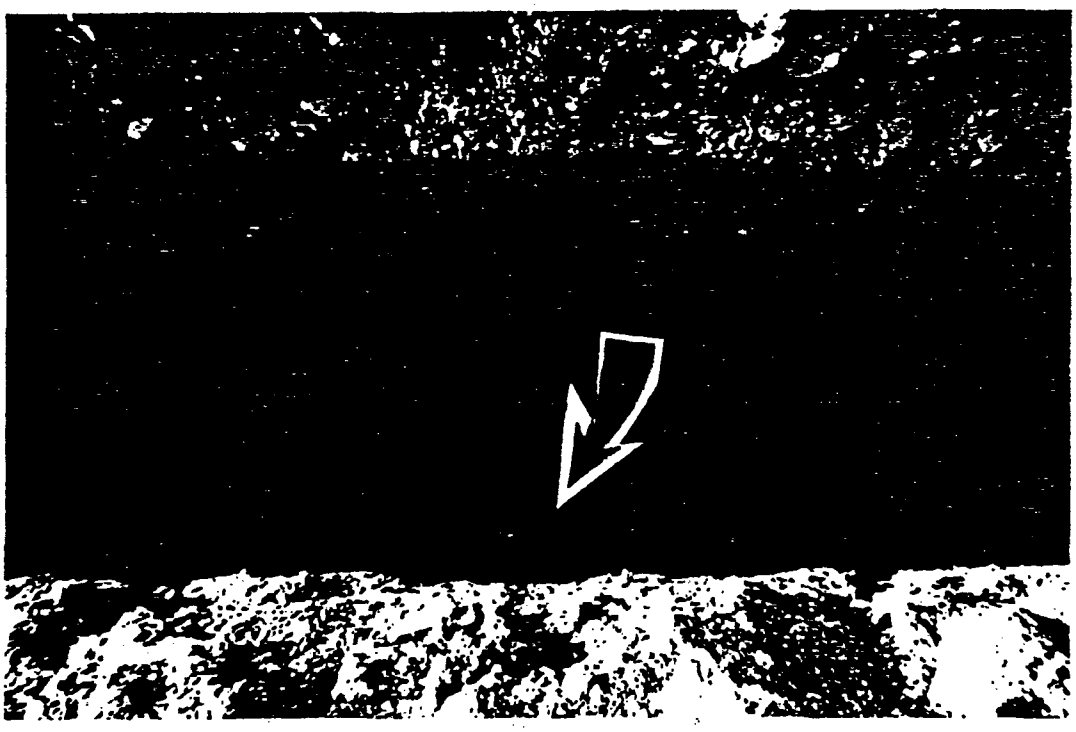


Photo 5 - Old release area, damaged pipe

Photo 6 - Soil piles SP-1 "hot pile" and SP-2 "clean pile"

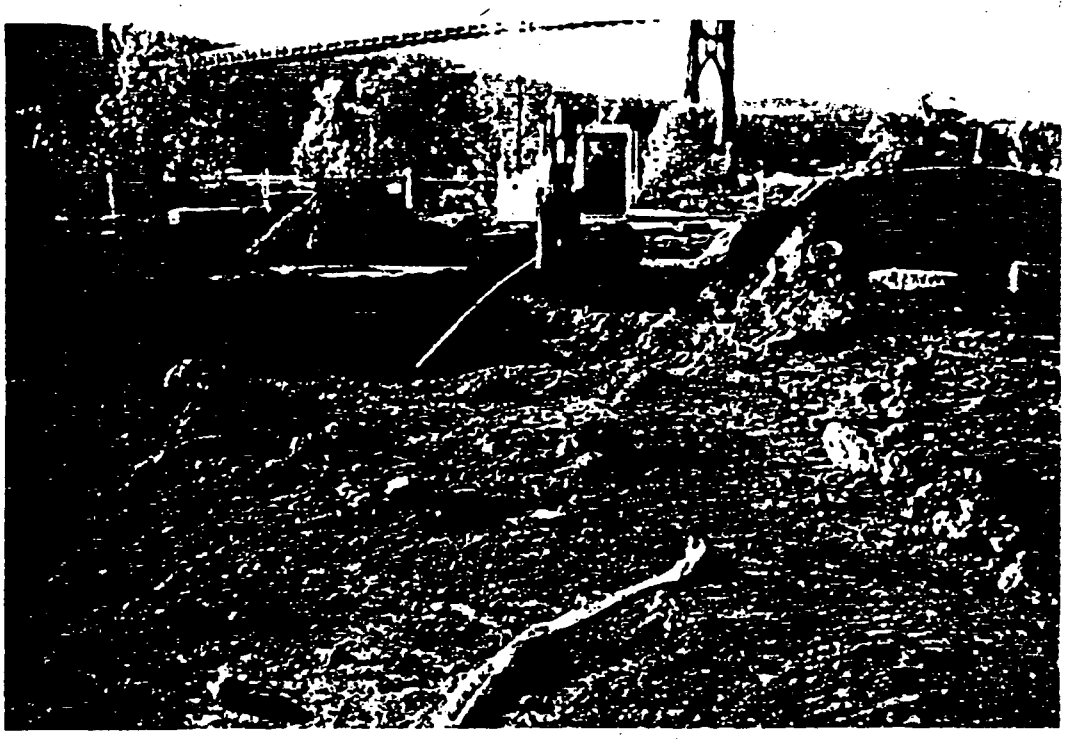


Photo 7 - Removing the conduit

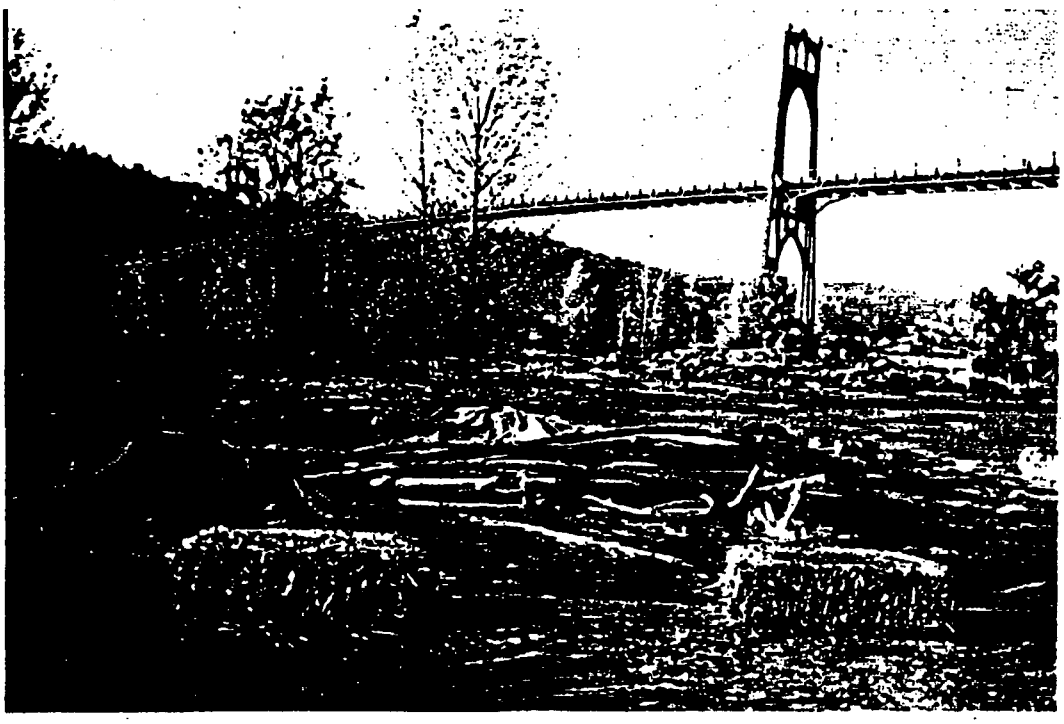


Photo 8 - Removed conduit

Appendix B

Health and Safety Plan

RZA AGRA, Inc

SITE HEALTH AND SAFETY PLAN

REMEDIAL SERVICES

WATER POLLUTION CONTROL LABORATORY

N.E. BANK OF THE WILLAMETTE RIVER NEAR CATHEDRAL PARK

PORTLAND, OREGON

RZA Project #7197-00

A COPY OF THIS SITE HEALTH AND SAFETY PLAN MUST BE KEPT AT THE SITE DURING ALL FIELD ACTIVITIES

Prepared For:

City of Portland

Bureau of Environmental Services

1120 SW Fifth Avenue, RM 400

Portland, Oregon 97204-1972

Prepared By:

RZA AGRA, Inc.

7477 SW Tech Center Drive

Portland, Oregon 97223-8024

EMERGENCY REFERENCE SHEET

Project Name:Water Pollution Control Laboratory
Project Location: Northeast bank of the Willamette River, south of Cathedral Park, Portland, Oregon
Project Number: 21-7197-00

SAFETY PERSONNEL - Portland RZA AGRA, Inc.:

Director, Health & Safety :	John Martin	(Office) (503) 639-3400
Project Manager:	Gerald Koschal	(Home) (503) 538-7011
Site Safety Coordinator:	Paul Ecker	(Office) (503) 639-3400

EMERGENCY NUMBERS:

Nearest Hospital ..... Kaiser Hospital

SEE HOSPITAL ROUTE MAP NEXT PAGE

Information: 285-9321

Emergency Room: 285-9321

Ambulance: 911

Fire: 911

Police: 911

Client Contact Person (City of Portland) ..... Randy Miller

Work: ..... (503) 823-7187

Oregon OSHA Central (Salem): ..... (503) 378-3272

National Response Center: 1-800-424-8802

EPA Environmental Response Team: ..... (201) 321-6600

Utility Notification Center: ..... (800) 332-2344

Site Safety Coordinator, Project Manager and Director of Health and Safety are to be notified immediately if worker exposure, accidents or site conditions not anticipated in this document are encountered. In case of hazard exposure during and/or prior to a medical situation, the hospital and any emergency response personnel shall be notified that patient's clothing may be contaminated.

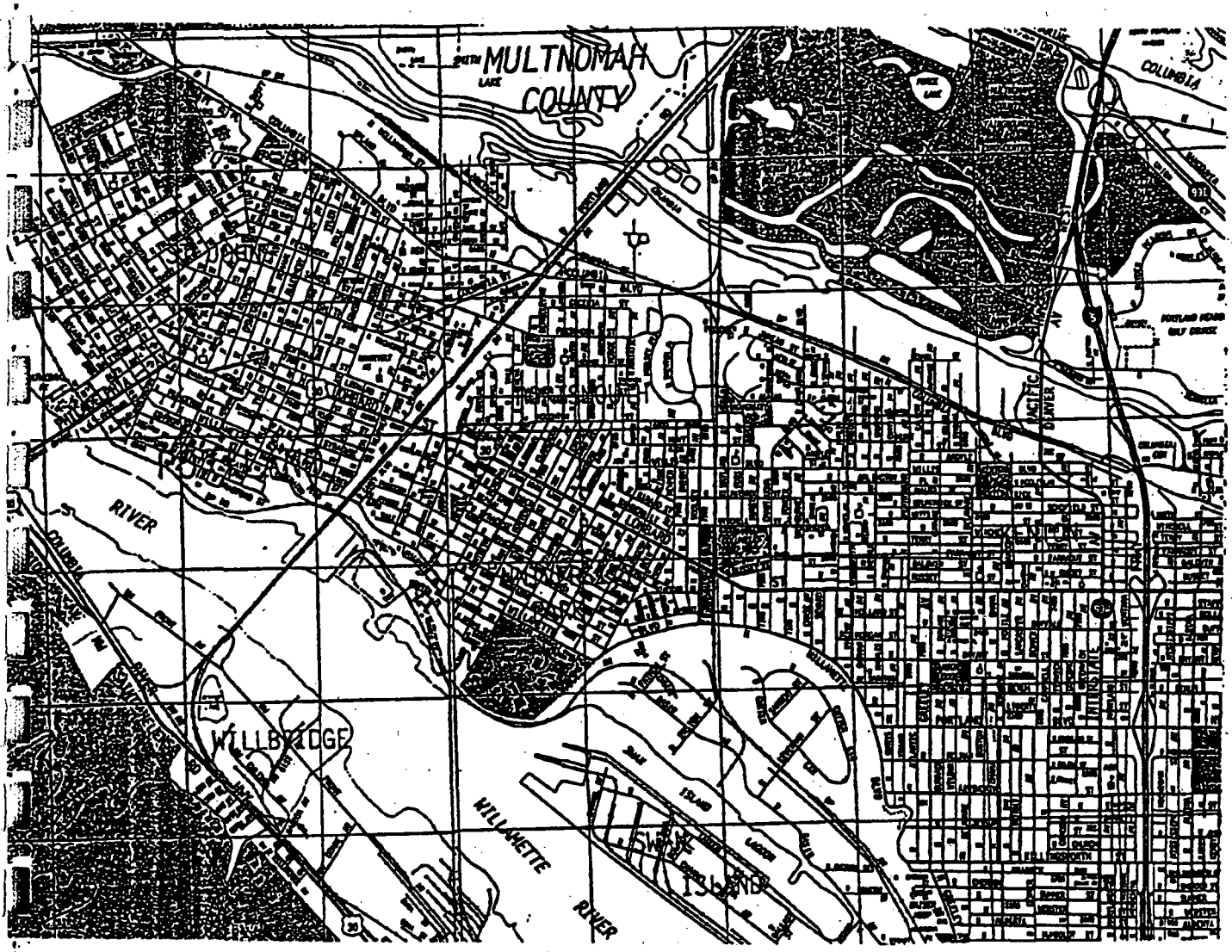
ACTION LEVELS:

Upgrade PPE Level to Level C:	30 ppm in Ambient Air (petroleum hydrocarbons)
Stop all work and exit work area:	10% LEL of gasoline in work area; or
	150 ppm in Ambient Air; or
	$O_2 < 19.5\%$; or $O_2 > 23.5\%$

Nearest Phone:	Telephone available at the building adjacent to the site
Nearest Water:	Water available at the building adjacent to the site

1.0 EMERGENCY/CONTINGENCY PLAN

1.1 Nearest Hospital: Kaiser Hospital
5055 N. Greeley Avenue, Portland, Oregon



1.2 Emergency Procedures - Immediate

1. Remove injured party from contaminated or other unsafe zone, if possible without incurring additional injuries.

2. Apply emergency first aid to ensure breathing and reduce immediate threat to life.

3. Call 911: follow Oral Reporting Procedures below.

   If life threatening, request instructions from dispatcher; if not life threatening remove from contamination zone and consider the need for decontamination prior to transport.

4. If any contaminated material enters the eyes, immediately wash with clean water for 15 minutes.

5. Complete written accident/incident report using attached form. Send copies to RZA Project Manager and Director, Health and Safety.

1.3 Emergency Procedures - Secondary

1. Transport to hospital if possible, otherwise call ambulance (911).

2. Notify Project Manager, Director of Health & Safety and other key personnel.

3. Fill out Incident/Accident report in Appendix A.

1.4 Oral Reporting Procedures

Give this information when reporting an emergency:

1. Name, location, and phone number of person reporting.

2. Location of accident/incident, i.e., building number, facility name, etc.

3. How many persons need help.

4. Description of injuries.

5. Details of any chemicals or other contamination involved.

6. Summary of the accident including its suspected cause and the time it occurred.

7. Summary of what is being done for the victim(s).

8. Do not hang up until the other party has done so.

Information will not be released under any circumstances to parties other than those listed above or bonafide emergency response facilities.

1.5 General First Aid

In all emergencies, document action taken and notify safety officer, project manager, SSC and client officials of occurrence of an emergency and actions taken.

Skin: Remove contaminated clothing immediately;wash with soap and water.

Inhalation: Remove to fresh air. Where necessary, call emergency medical help (ambulance, hospital, police) and follow medical emergency help procedures.

Eye Contact: Flush with eye wash or water at least 15 minutes. Follow emergency medical help procedures, if indicated. Contaminants may be absorbed through the eyes.

Ingestion: Obtain medical help if indicated.

Injuries: Administer first aid if necessary. Follow emergency medical procedures in Section 1.2, if necessary. Medical emergencies take precedence over decontamination.

1.6 Emergency Plan

It is not anticipated that the operations for this project will involve hazards that could necessitate instituting emergency response measures. Emergency incidents should be anticipated and prevented by maintaining vigilance and conducting safe operations. The priority of objectives in an emergency situation should be as follows: protection of personnel health and safety; protection of public safety; protection of environment; and protection of property. However, should conditions change and an emergency response is warranted, the following procedures should be followed.

1. The Site Safety Officer (SSO) will assume command unless and until superseded by police, fire or other emergency officials.
2. The SSO will assign personnel to specific functions they should follow during an emergency. This should be done during the pre-entry briefing and may be noted below. Functions suggested are: First-aid; Notify Emergency Services; Stage Safety Equipment; Regroup and take roll of site personnel; and Notify Project Manager.
3. All personnel in an IDLH area will move or be removed (if injured) to an area of refuge designated by the SSO.
4. First aid and CPR will be applied as necessary to any injured personnel.
5. The Site Safety Officer will consider if an upgrade of PPE is necessary based on changing action levels.

6. The Site Safety Officer will consider, as necessary, any other emergency measures outlined in the RZA Health and Safety Program, including evacuation, notification of general public in area, if necessary.

7. The incident will be reported as soon as possible in written form on an RZA Accident/Incident Reporting form found in Appendix A. Care should be taken to evaluate: what went wrong and why; how to avoid in the future; and possible adjustments in the standard operating procedures.

2.0 RZA SAFETY PERSONNEL

Director of Health and Safety ..... John Martin
Home: ..... (503) 591-8708
Coordinator of Health and Safety ..... Denny Macomber
Home: ..... (503) 735-0365
Work: ..... (503) 639-3400
Project Manager: ..... Gerald Koschal
Office: ..... (503) 639-3400
Home: ..... (503) 538-7011
Site Safety Officer: ..... Paul Ecker
Work: ..... (503) 639-3400

2.1 Reporting Structure

RZA employees are to report all health and safety related incidents, accidents, conflicts or problems to the Site Safety Officer (designated above, or the senior RZA person present). The Site Safety Officer is to report incidents/accidents or other serious site problems to the Project Manager and Health and Safety Coordinator/Director, Health and Safety. The following reporting structure should be followed:

Vice President/Manager of Portland Office:	Terry Craven
Director of Health and Safety	John Martin
Coordinator of Health and Safety	Denny Macomber
Senior Project Manager:	Doug Smith
Project Manager:	Gerald Koschal
Site Project Manager:	Paul Ecker
Site Safety Coordinator:	Paul Ecker

2.2 Director, Health and Safety

John Martin is the Director of Health and Safety (DHS) for RZA AGRA, Inc. He is responsible for initiation, coordination, and monitoring of the RZA AGRA, Inc. Health and Safety Program. Mr. Martin shall be notified in the event of any site accidents or injuries and receive copies of all accident reports. Mr. Martin shall have final approval of all Site Health and Safety Plans and shall make occasional Site Safety Inspections to ensure that a high standard of site safety is maintained.

2.3 Health and Safety Coordinator

The Health and Safety Coordinator (HSC) shall be an OSHA knowledgeable employee or representative of RZA responsible for preparation of the Site Health and Safety Plan. The HSC shall work with the Project Manager and Site Safety Officer to ensure that site safety is maintained in accordance with T8 CCR Section 3203 and 1509; 29 CFR 1910.120 and all other regulations that may apply. The HSC shall make occasional Site Safety Inspections to ensure that a high standard of site safety is maintained. The Health and Safety Coordinator for the Portland office of RZA is Denny Macomber.

2.4 RZA Project Manager (Site Project Manager)

The Project Manager, as directed, has the responsibility and authority to direct all hazardous waste operations. These duties shall include, but, not be limited to, designation of the Site Safety Officer and for the initiation and implementation of the Site Safety and Health Plan. The Project Manager (PM) shall maintain communications with the Site Safety Officer while any RZA personnel are on-site. The Project Manager shall designate a qualified and knowledgeable RZA individual to act as Site Project Manager (SPM) in the absence of the Project Manager.

2.5 RZA Site Safety Officer

The Site Safety Officer will be the OSHA knowledgeable individual responsible for implementing and supervising compliance with the Site Health and Safety Plan and site control. In the absence of the Site Safety Officer these responsibilities shall fall to another individual knowledgeable in occupational health and safety acting on behalf of RZA. This individual will:

- Follow the procedures for safe work practices as outline in the RZA AGRA, Inc. *Health and Safety Manual for Safe Work Practices.*
- Conduct a pre-entry briefing prior to initiation of any site activities.

- Determine RZA personnel protection levels and necessary clothing and equipment to ensure the safety of personnel. This information will be provided to RZA subcontractors and visitors, and appropriate compliance by these individuals will be expected.

- Evaluate weather and chemical hazard information and make any necessary modifications to RZA work plans and personnel protection levels to maintain RZA personnel safety.

- **THE SSO MUST NOTIFY OREGON OSHA BY PHONE WITHIN 8 HOURS IN THE EVENT OF DEATH OR CATASTROPHE AT THE WORK SITE.** ***(an accident in which five or more site workers seek or are sent to medical attention).*** **SSO MUST notify Oregon OSHA by phone within 24 hours in the event of ANY accidents or injuries result in a hospital admission with medical treatment other than first aid. Salem Office: 1-378-5729.**

2.5.1 Pre-entry Briefing - The Site Safety Officer will conduct a briefing with RZA employees, contractors and subcontractors prior to site entry and initiation of operations to ensure that employees are apprised of the contents of this Site Safety and Health Plan and general site safety including:

1. Emergency information including: location of nearest hospital, telephone, water, and fire extinguisher.
2. Use, care, maintenance and fitting of personal protective equipment including respirators, as necessary.
3. Safe places of refuge in an emergency.
4. Buddy system review, as necessary.
5. Emergency evacuation routes and procedures.
6. Site security and site control.

2.6 Personnel Requirements

The personnel requirements for this site will be one to two persons. During operations involving only one person, that person will function as Site Safety Officer and Site Project Manager. Should level of protection increase to Level C or above or involve Confined Space Entry, the SSO will cease work and leave the site until additional personnel arrive and a buddy system is established.

3.0 SITE CHARACTERIZATION

This Site Health and Safety Plan defines the hazards and methods to protect personnel from those hazards as identified in previous site work or background information. This Site Health and Safety Plan is dynamic and may be modified by the Site Safety Officer to encompass changes in work or other unanticipated events and hazards. For a thorough overview of available historical information concerning the site, see RZA Project File #7197-00.

RZA AGRA, Inc. (RZA) is under contract with City of Portland to perform a subsurface investigation/remedial services related to the proposed construction of a water pollution control laboratory at the site in Portland, Oregon. The property, tax lots R42580-6020, R42580-6900, and R42580-6620, is vacant. The site was previously part of the PDC St. John's Riverfront Development Project and is now owned by the City of Portland. The site is a 7.6 acre parcel located on the northeast bank of the Willamette River just south of Cathedral Park and the St. John's Bridge. Previous environmental studies of the site have identified types and locations of potential hazardous substances(TPH & potential Asbestos material). Field investigations were conducted to test soil and groundwater samples. Conclusions from the studies are as follows: 1.) the site, vacated in 1977-1978, had been in use since at least 1920 and occupied by sawmills and a wooden box factory; 2) hazardous materials may have been handled on-site as well as upgradient off-site. Potential on-site groundwater contamination exists; 3) approximately 500-600 cubic yards of spent sand-blasting sand may be present on site, and 4) low levels of groundwater contamination may be present. In addition there has recently been an indication that an asbestos steam pipe and boiler covering plant may have been located on the site.

The purpose of this investigation is to evaluate the quality of subsurface soil related to previous site use or releases in the area. The specific tasks that will be carried out for this project, and which require the preparation of this Site Health and Safety Plan include excavation, drilling,sampling, and soil removal.

3.1 Site Description

The site is located at the northeast bank of Willamette River just south of Cathedral Park and the St. John's Bridge, (tax lots R42580-6020, R42580-6900 & R42580-6620) in Portland, Oregon. The property under investigation is approximately 7.6 acres in size. The topography of the site is generally flat. Property use in the area is residential, industrial and commercial. The site is owned by the City of Portland.

3.2 Scope

The scope of work for the project will include: 1) drilling and sampling a number of borings; and 2) properly abandoning each of the borings. The performance of these tasks will help evaluate the quality of subsurface soil at the site. These tasks may be changed or be added to during the course of this project and this Site Health and Safety Plan may be modified by the Site Safety Officer to accommodate any changes.

3.3 Project Duration

This project will take 3 months to complete.

4.0 HAZARD ANALYSIS

The evaluation of hazards is based upon the knowledge of site background presented in Section 3.0 and anticipated risks posed by the specific operation. Hazards, hazardous conditions or materials may be present or encountered at the site that were not anticipated based on available background information during the preparation of this Site Health and Safety Plan. The information in this document is based on the best available background information or previous investigation, is to be considered dynamic and will be changed or updated as necessary.

Tables 4.1, 4.2, 4.3 and 4.4 provide a summary of hazards and protective measures planned for each task at the site.

4.1 Table of Physical Hazards

PHYSICAL HAZARDS

TASK	HAZARD	RISK	PREVENTION
Excavation/Drilling/ Sampling	Heavy equipment	Moderate	Watchfulness, communication safe distance
	Machinery noise	Moderate	Hearing protection
	Striking overhead or underground utilities	Low	Utility locate, consult client
General Physical Hazards	Fire/Explosion	Low	Monitoring watchfulness
	Hazardous chemicals	Low	Avoid direct contact or inhalation
	Asbestos	Low	Monitoring, PPE as necessary
	Uneven footing and debris	Low	Watchfulness, proper footwear
	Heat stress/hypothermia	Low	Watchfulness, monitoring
	Traffic	Low	Watchfulness, traffic vests, cones, barricades

4.1.1 Utility Location

This subsurface investigation involves activities that could expose personnel to hazards due to buried electrical lines, gas lines, or other underground utilities. In order to minimize these hazards, RZA has contacted the Utility Notification Center (UNC) for delineation of buried utilities. This has been logged by UNC with the site specific identification #_____ and RZA user identification #_____. The UNC can be contacted by phone at: 1-800-332-2344. All other hazards not delineated by the UNC are the responsibility of the client.

4.1.2 Equipment Operational Safety - RZA personnel will not operate any heavy equipment. The contractor for the drilling company will be responsible for picking operators and ensuring that they are qualified. All equipment will be inspected daily to assure that they are in good working order including, but not limited to, hydraulic hoses, belts, cables, chain links, and hoist hooks. All equipment will be turned off, locked up or otherwise secured at the close of the work period to prevent unauthorized use.

4.1.3 Drilling Equipment Safety - All drilling equipment subcontracted by RZA is expected to be in good working condition, with all required safety equipment. Responsibility for safety and maintenance of equipment shall rest with the subcontractor. RZA personnel will wear hard hats at drilling locations; maintain a safe distance from the operating equipment; wear hearing protection during active drilling; not operate any heavy machinery or assist the drilling contractor in the completion of their normal duties (i.e. unloading equipment, shoveling cutting, etc.). Field personnel will keep clear of the derrick radius; ensure that they remain facing the active drilling operations at all times; and maintain communications with the drilling crew. Additional safety procedures for work around drill rigs are located in the RZA AGRA, Inc. *Health and Safety Manual for Safe Work Practices.*

4.1.4 Excavation Procedures - RZA employees will not be responsible for any site excavation activities and will not operate any heavy machinery. Excavation will be carried out by a qualified contractor hired for the purpose. No RZA employee is to approach an excavation unless the contractor has shored or sloped the cavity in accordance with Subpart P of 29 CFR Part 1926 to prevent accidental collapse. Personnel will maintain a distance equal to the depth of the excavation, away from all unshored or non-sloped cavity sideslopes. Should the RZA Site Safety Officer feel that contractor is not in accordance with these standards, the SSO should discuss this with the contractor, cease all RZA activities, and leave the work zone until the standards are met.

Site workers should proceed with great caution in the vicinity of any excavation, especially near the edges, due to the potential for slope failure and burial. The greatest stability will be found at the corners of the excavation, but caution is strongly advised during any approach. **RZA employees should avoid entry to an excavation for any reason.**

SAMPLES SHOULD BE COLLECTED USING A BACKHOE ONLY!

Should entry be necessary, the following steps shall be followed:

- The cavity is to be properly sloped or shored in accordance with Subpart P of 29 CFR Part 1926.
- The cavity is then to be approved by a registered professional engineer for stability prior to entry.
- A stairway, ladder, ramp or other safe means of egress shall be placed in excavations greater than four feet.
- The atmosphere in the cavity is to be assessed for airborne contaminants and oxygen content. Entry is not permitted unless oxygen and hazardous vapor or gas levels are below the action levels outlined in this Health and Safety Plan.
- Oxygen, airborne contaminant and explosive levels, as necessary, are to be monitored in the breathing space of the entrant at all times while in the excavation.
- Emergency rescue equipment, such as breathing apparatus, a safety harness and line, or a basket stretcher, shall be readily available where hazardous atmospheric conditions exist or may reasonably expected to develop during work in the excavation.
- An observer is to posted in sight of the entrant, to monitor the entrant at all times and notify emergency personnel should rescue become necessary. **The observer is NOT to enter the cavity under any circumstances, nor to leave the area except to notify emergency personnel.**

Open excavations will be flagged when active work is not being done on or near the cavity or trench. For the protection of the general public, the site will be secured with fences (six-foot security) or barricades each day when site operations have been concluded.

4.1.5 Machinery Noise - Field personnel shall not be exposed to noise levels greater than 85 decibels (dBA) for an 8-hour time weighted average. Noise dosimeter analysis of drilling projects with similar equipment at similar sites indicate expected noise exposures of no more than 84 - 88 dB, assuming continuous operation of drilling equipment for an 8 hour period. In actual operation which includes breaks

of up to 2 hours for well installation, moving and decontamination, noise exposures are expected to be well below 85 dB for an 8 hour period. Blows to the drill stem during sample collection have not been found to exceed 115 dB, well under the impact limit of 140 dB. Although noise levels are expected to be below regulated levels, all personnel shall wear hearing protection during heavy equipment operation phases. The hearing protection shall have a protection rating of not less than 25 dB when worn properly.

4.1.6 Uneven Footing - The potential for uneven footing hazards will be minimized by personnel by examining the ground prior to stepping on it. Footholds will be tested. Unsafe or loose slopes will be avoided. Care will be taken to avoid stepping on random, sharp objects such as debris, tools, instruments, shovels, and heavy equipment parts and attachments. In addition, sturdy, steel-toed, steel-shanked boots will be worn by all field personnel.

4.1.7 Heat/Cold Stress Monitoring - For this drilling investigation, Level D PPE has been designated, and weather conditions are moderate. It is unlikely that heat or cold stress will be a problem at this site. In the event that PPE or weather conditions change, the SSO will hold a meeting to brief site workers on monitoring protocols for heat/cold stress. Site workers are directed to notify the SSO should they notice any problems or symptoms attributable to heat or cold.

Some of the work performed by RZA personnel and subcontractors is physically demanding. Depending upon the level of protective clothing and weather conditions, the potential for heat stress or hypothermia can be high, personnel will closely monitor themselves, other RZA personnel, and subcontractors for any early warning sings of heat stress or hypothermia.

4.2 Table of Chemical Hazards Part 1

POTENTIAL CHEMICAL HAZARDS

Exposure Standards, Recognition Qualities,
Flammable Limits

CHEMICAL	EXPOSURE STANDARDS (a)	IDLH (b)	RECOGNITION ODOR	QUALITIES Odor Threshold	% VOLUME LEL	% VOLUME UEL
Benzene	1 ppm	2000 ppm Ca (c)	Aromatic	2 ppm	1.3	7.1
Ethylbenzene	100 ppm	2000 ppm	Aromatic	?	1.0	6.7
Toluene	100 ppm	2000 ppm	Aromatic	10 ppm	1.2	7.0
Xylene	100 ppm	10000 ppm	Aromatic	20 ppm	1.1	7.0
Tetraethyl Lead	0.075 mg/m^3	40 mg/m^3	Aromatic	N.A.	1.8	?
Polychlorinated Biphenyl (PCB)	1 mg/m^3 (ppm)	10 mg/m^3 Ca (3)	Mild	?.	NA	NA
Pentachlorophenol	0.5 mg/m^3	150 mg/m^3.	Benzene-like	N.A.	N.A.	N.A.
Asbestos	2 fibers/cc	Ca	None	N.A.	N.A.	N.A.

** PAH's exposure standards and regulations are included in Appendix E

(a) OSHA permissible exposure limits or ACGIH Threshold Limit Value based on an 8-hour time weighted average.

(b) IDLH - Immediately dangerous to life and health

(c) Ca - NIOSH Occupational Carcinogen

(d) N.E. - Not Established

4.2.1 Table of Chemical Hazards Part 2

POTENTIAL CHEMICAL HAZARDS

Potential Effects, Route of Entry, First Aid Treatment

CHEMICAL	ROUTE OF ENTRY	EYE IRRITANT	POTENTIAL EFFECTS	
			Acute	Chronic
Benzene	Inhalation Ingestion, Absorption	Medium	Eye, nose, and lung irritation, headache, nausea	Dermatitis, suspected carcinogen
Ethylbenzene	Inhalation Ingestion, Absorption	Severe	Eye, nose, throat, skin irritation, weakness, dizziness	Dermatitis
Toluene	Inhalation Contact	Medium	Eye, skin, and respiratory tract irritation. May also cause fatigue, weakness, headache.	Dermatitis. Possible liver and kidney damage.
Xylene	Inhalation Contact	Medium	Eye, nose, throat irritation Dizziness, drowsiness, nausea, vomiting.	Dermatitis, Reversible eye damage.
Tetraethyl lead	Inhalation Contact	Medium	Eye, nose, throat irritation. Dizziness, nausea, vomiting, loss of consciousness.	Dermatitis.
Polychlorinated Biphenyls (PCB)	Inhalation, Absorption	Medium	Eye, skin irritation: chloracne, contact dermatitis, excessive eye discharge, and swelling.	Liver damage, Suspected carcinogen.
Pentachlorophenol	Inhalation, Ingestion,	Severe Immediate	Inhalation-poisoning of circulatory system, heart failure. Headache, fatigue, vertigo, anorexia; pruritus, acne-form skin eruptions; jaundice, liver necrosis.	Damage to liver, kidneys, lungs, blood, central nervous system, may be fatal.
Asbestos	Inhalation Ingestion	Medium	Eye irritation	Labored breathing, interstitial fibrosis, restricted pulmonary function, finger clubbing, Carcinogen

5.0 ACTION PLAN

5.1 Personal Protection Equipment (PPE)

Site characterization analysis for this subsurface investigation indicates low to moderate risk of exposure to hazards associated with possible contact with hazardous chemical contaminated vapors, soil, sludge, or water. Therefore, Modified Level D PPE, as indicated below, is required during excavation and sampling phases of the project.

5.1.1 Modified Level D Personal Protective Equipment

1. Chemical-resistant clothing (Poly-coated Tyvek; two-piece chemical-splash suit; or other disposable chemical-resistant overalls; or rain gear suitable for decontamination). Wearing Tyvek will be discretionary based on site conditions and the SSO's direction. Should potential contact with hazardous chemical contaminated soil, sludge, or water become likely, site workers MUST upgrade PPE to include chemical-resistant clothing.
2. Boots/shoes, chemical-resistant, steel-toe and shank.
3. Hard hat.
5. Gloves, outer, chemical resistant.
6. Gloves, inner, chemical resistant.
7. Safety glasses with side shields, face shield, or chemical splash goggles.
8. Hearing protection while heavy equipment is in operation or other hearing hazards are present.

Should the Site Safety Officer reassess the situation to Level C, the personal protective equipment will be as indicated below.

5.1.2 Level C Personal Protection Equipment

Level C Protection will include all equipment listed above in Section 5.1.1 in addition to the following:

1. Air-purifying respirator, full-face, cartridge-equipped (MSHA/NIOSH approved).
2. Hooded chemical-resistant clothing (overalls; two-piece chemical-splash suit; disposable chemical-resistant overalls).
3. Boot-covers, disposable, chemical resistant*.
4. Escape mask*.
5. Face shield*.

* Optional, based on site conditions and SSO's direction.

5.1.3 Reassessment of Protection Program - The Site Safety Officer may upgrade or downgrade the Level of Protection provided by PPE upon a change in site conditions or findings of subsurface investigations. When a significant change occurs, the hazards should be reassessed. Some indicators of the need for reassessment are:

- Contact with hazardous chemical contaminated soil, sludge or vapors becomes possible.
- Commencement of a new work phase, such as the start of any recommended subsurface investigation work.
- Change in job tasks during a work phase.
- Change of season or weather.
- When temperature extremes or individual medical considerations limit the effectiveness of PPE.
- Contaminants other than those previously identified are encountered.
- Change in ambient levels of contaminants.
- Change in work scope which affects the degree of contact with contaminants.

5.1.4 Exposure of Unknown Potentially Hazardous Waste (UPHW) - This investigation project involves intrusive activities wherein an unknown potentially hazardous waste could become exposed. Should this occur, the designated RZA Site Safety Officer (SSO) or involved employee should:

- Cease operations immediately;
- Evacuate the affected area immediately of all RZA personnel; and
- Notify the SSO of the situation.

The designated RZA Site Safety Officer should assume command of the situation and:

- Notify sub-contractors, contractors, other site visitors, or other potentially affected personnel of the potential hazard;
- Initiate site control measures to limit access to the affected area; and
- Notify the Project Manager, Director, Health and Safety, or other appropriate RZA key personnel of the potentially hazardous situation.
- See RZA AGRA's *Health and Safety Manual for Safe Work Practices* for procedures on re-entry.

5.2 Action Levels and Action

ACTION PLAN TABLES

5.2.1 Explosive Atmosphere

ACTION LEVEL	ACTION
<10% LEL	Continue subsurface investigation
10%-20% LEL	Continue on-site monitoring with extreme caution as higher levels are encountered
>20% LEL	EXPLOSION HAZARD! WITHDRAW FROM AREA IMMEDIATELY!

5.2.2 Oxygen

ACTION LEVEL	ACTION
<19.5%	Do not enter without self-contained breathing apparatus (Level B protection, see Section 2.3). Note: Combustible gas readings are not valid in atmospheres with <8.0% Oxygen
19.5% - 23%	Continue subsurface investigation with caution. Deviation from normal level may be due to presence of other substances.
>23%	FIRE HAZARD POTENTIAL! Discontinue subsurface investigation. Consult a fire safety specialist.

5.2.3 Organic gases and vapors (Gasoline): - Based on the assumption that all airborne organic vapor is BTEX as measured with a direct reading instrument. *Note: If halogenated volatiles (e.g. trichloroethylene (TCE) or tetrachloroethylene (PCE) are present, they will not be detected by a combustible gas indicator (Gastechtor). You must use a PID or FID for detection of halogenated volatiles.*

ACTION LEVEL	ACTION
0-30 ppm	Continue subsurface investigation in Level D with continuous monitoring with a direct reading instrument. If the threat of significant splash is possible, wear chemical resistant clothing, e.g., Saranex.
30-150 ppm	Upgrade to Level C wearing an air-purifying respirator with organic vapor cartridges.
>150 ppm	Discontinue operation. Provide additional ventilation to bring concentrations down to acceptable levels prior to resumption of activities.

Note:
Contact with organic materials (such as gasoline) in high concentrations could result in fire. Contact with some organic (e.g. glycerol, alcohol) could cause the formation of peroxides which could be unstable. *A direct reading instrument, is not able to distinguish individual volatile components and should not be relied upon for the detection of low PEL chemicals such as Benzene (PEL of 1 ppm).*

5.2.4 Cadmium - Oregon OSHA has established a separate action level for Cadmium dust or fumes of 2.5 $\mu g/m^3$. Should this level be reached, employers are required to implement medical surveillance for employees exposed above this action level for 30 or more working days a year. Site background and anticipated work indicate that site workers will not be exposed to airborne dust containing cadmium above the PEL for this project.

6.0 SITE CONTROL MEASURES

The following section defines measures and procedures for maintaining site control. Site control is an essential component in the implementation of the site health and safety program. A Site Map is attached in Appendix B for visual reference to Site Control boundaries.

6.1 Work Zone Definition

Intrusive activities will be conducted during this operation. Some of the activities will involve drilling and sampling. These activities may require the establishment of specific work zones to avoid accidents and/or unauthorized entry. Three work zones are recommended for this operation: Work Zone 1, the Exclusion (Hot) Zone; Work Zone 2, the Contamination Reduction Zone; and Work Zone 3, Support Zone. These zones are described in detail in the RZA AGRA, Inc. *Health and Safety Manual for Safe Work Practices* and indicated on the Site Plan located in Appendix B of the HASP.

Site control for this project will consist of:

A hotline will be established fifteen feet from the drilling equipment and should be marked with tape or other barricades, where practicable. The area inside this zone will be considered the Exclusion Zone. Exit from the Exclusion Zone into the Contamination Reduction Zone (CRZ) will be through a corridor established with tape adjacent to the hotline. The area outside of the CRZ will be the Support Zone. General access to the Exclusion Zone and the CRZ by the public or other unauthorized visitors should be restricted by either fencing, barricades, or flagging along the perimeter of the CRZ.

6.2 Standing Orders While On-site

Standing orders while on-site:

- Maintain professional conduct at all times.
- Workers shall obey all warning and instructional signs posted at the site.
- Smoking, eating, drinking, chewing gum or tobacco, or any practice that increases the probability of hand-to-mouth transfer and ingestion of material is prohibited in any area designated as contaminated.
- Workers shall not possess or use alcohol or drugs at the site or work at the site while under the influence of alcohol or drugs. Also while working at the site, workers shall not use prescription drugs that may affect their reflexes or actions.
- Firearms, ammunition, fireworks or explosives are prohibited.
- Long hair will be worn "up" inside the hard hat.
- Facial hair that interferes with a proper seal being created and maintained between the face and respirator is prohibited when respirator use is likely.
- Where appropriate the "buddy system" will be used and visual contact must be maintained at all times between buddies on site. Hand signals will be established and be consistent among all workers. During site operations, each worker should consider himself a safety backup to his partner(s) and make all personnel aware of dangerous situations that may develop.
- Disposable clothing will be used whenever possible to minimize the risk of cross-contamination.
- No unapproved work clothes or equipment will be allowed on site.
- No exchange of personal protective equipment will be allowed except in emergency situations involving a threat to health and safety.
- The number of personnel and amount of equipment in contaminated areas should be minimized, yet allow for effective site operations.

- Work areas, equipment testing areas, and decontamination areas and procedures will be established based on prevailing site conditions and are subject to change.
- Procedures for leaving contaminated areas will be planned and reviewed prior to going on site.
- Contact with contaminated or potentially contaminated material should be avoided. Efforts will be made to keep employee activity upwind of operations. Whenever possible, do not walk through puddles, mud or any discolored ground surface. Where appropriate, do not lean, sit, or place equipment on drums, containers, or on the ground.
- Proper decontamination procedures must be followed before leaving the site, unless medical emergencies dictate otherwise.
- No personnel will be admitted to the site by the Site Safety Officer without the proper safety equipment and requisite training.
- All RZA personnel must comply with the established safety procedures. Any staff member who does not comply with safety policy, as established by the Site Safety Officer or Project Manager will be immediately dismissed from the site.

7.0 MONITORING PLAN

This section explains the general concepts of an air monitoring program and specifies the surveillance activities that will be considered during the project completion. Both direct-reading instruments and passive air monitoring may be employed to estimate worker exposure. Passive badges may be worn when exposure of contaminated soils or ground water, resulting in an increase in airborne vapors near or above the PEL, is likely. Direct reading instruments will be employed during all phases of site work.

7.1 Passive Air Monitoring

Passive air monitoring through use of passive badges may be used to monitor employee exposure to airborne contaminants. Should they be required, the SSO should contact the Director of Health and Safety for proper sampling procedures.

7.2 Direct-reading Monitoring Instruments

Unlike air monitoring devices, which are used to collect samples for subsequent analysis in a laboratory, direct-reading instruments provide information at the time of monitoring, enabling rapid decision-making. Data obtained from the real-time monitors are used to assure proper selection of personnel protection equipment, engineering controls, and work practices. Overall, the instruments provide the user the capability to determine if site personnel are being exposed to concentrations which exceed exposure limits or action levels for specific hazardous materials.

8.0 TRAINING

8.1 Hazardous Waste Operations Training

All general RZA site workers, occasional RZA site workers, on-site RZA management and supervisors must be in compliance with training requirements in accordance with 29 CFR 1910.120 (e), before they will be permitted to engage in operations at this site. All properly trained employees shall have received a written certificate of successful completion of initial training and necessary annual updates. Copies of training certificates for RZA AGRA, Inc. personnel are maintained at offices of RZA AGRA, Inc. and will be available on request.

8.2 First Aid and CPR Training

The Site Safety Officer shall ensure that at least one site worker is trained and certified in the application of emergency first aid and CPR. The personnel trained in first aid and CPR for this site is: Paul Ecker.

9.0 DECONTAMINATION PLAN

Extensive decontamination procedures have been determined to be unnecessary for this project. However, should decontamination become necessary due to Personal Protection Level upgrade, the Site Safety Officer will devise a decontamination plan according to the procedures in the RZA AGRA, Inc. *Health and Safety Manual for Safe Work Practices.*

Decontamination for this project will consist of :

1. A wash tub (or equivalent) will be filled with potable water and detergent (e.g. Alconox). Persons leaving the Exclusion Zone will step into the detergent solution and scrub both boots and gloves (and rain gear, if worn). Upon completion of scrubbing, personnel will step into a similar tub filled with clean potable water and rinse gloves and boots thoroughly.

2. Personnel will then remove tape from around wrists and ankles and remove Tyvek coveralls. Tape and Tyvek will be discarded into a drum, or other container, located at the end of the CRZ.

Note: Step 2 will be done only if Tyvek or other protective clothing is worn.

9.1 Disposition of Decontamination Wastes

All equipment and solvents used for decontamination shall be decontaminated or disposed of properly according to local, state and federal regulations. Commercial laundries or cleaning establishments that decontaminate protective clothing or equipment shall be informed of the potentially harmful effects of exposures.

10.0 MEDICAL SURVEILLANCE REQUIREMENTS

All employees at this site are subject to the strict medical surveillance requirements for hazardous site workers as outlined in 29 CFR 1910.120 and detailed in the RZA AGRA, Inc. *Health and Safety Manual for Safe Work Practices*. Copies of evidence of a current physical exam for RZA AGRA, Inc. personnel are maintained at the offices of RZA AGRA, Inc. and available on request.

10.1 Exposure/Injury/Illness

Any employee at this site who becomes injured, ill, or develops signs or symptoms due to possible overexposure involving hazardous substances, will be required to seek medical attention within 24 hours; and to notify the Site Safety Officer, the Project Manager, and the Director, Health and Safety. A physicians written opinion will be required prior to the employees return to normal site activities.

The incident will be reported as soon as possible in written form on an RZA Accident/Incident Reporting form found in Appendix A. Should the accident result in death or a catastrophe (an accident in which five or more site workers seek or are sent to medical attention), THE SSO MUST NOTIFY OREGON OSHA BY PHONE WITHIN 8 HOURS. SSO MUST notify Oregon OSHA by phone within 24 hours in the event of ANY accidents or injuries result in a hospital admission with medical treatment other than first aid. Oregon OSHA phone number: Salem Office: 1-378-5729.

11.0 SPILL CONTAINMENT

Based on background information and previous investigations, a spill of hazardous wastes is not expected at this site. Contaminated soil, if encountered will be drummed or bermed on Visqueen until laboratory analysis is performed. Drums and handling of drums will be carried out by qualified personnel with proper equipment. RZA employees will ensure that:

1. Drums used meet appropriate DOT, OSHA, and EPA regulations;
2. Drums are inspected for integrity;
3. Drums are properly labeled with NFPA (4-part diamond) labels.

Should hazardous waste spill occur at any site, employees are to follow the RZA Standard Operating Procedures for spill containment.

APPENDIX A

ACCIDENT/INCIDENT REPORT FORM

(Use additional page if necessary)

Date: _____ Time: _____

Name: _____ Employer: _____

Site Name and Location: _____

Nature of Illness/Injury: _____

_____

Symptoms: _____

Action Taken: ___ Air and Rest ___ First Aid ___ Medical

Transported by: _____

Witnessed by: _____

Facility Treating (Hospital's name): _____

Treatment: _____

Comments: _____

_____

What was the person doing at the time of the accident/incident: _____

_____

_____

Personal Protection Equipment Worn: _____

_____

Cause of Accident/Incident: _____

_____

_____

_____

What Immediate action was taken to prevent recurrence: _____

_____

Additional Comments: _____

_____

_____

Employee's Signature: _____ Date: _____

Supervisor's Signature: _____ Date: _____

APPENDIX A.1
EXPOSURE RECORD

PROJECT NAME: _____
PROJECT NUMBER: _____
DATE(S): _____

Employee	Date	Hours of Exposure

Weather: Rainy ____ Windy ____ Sunny ____ Cloudy ____ Other _____ Est. Air Temp. _____

Brief description of site activities (include contact with or distance from contaminants and whether upwind or downwind from contaminated material): _____

List of potentially hazardous materials known or suspected on-site: _____

Protective clothing worn on-site: _____

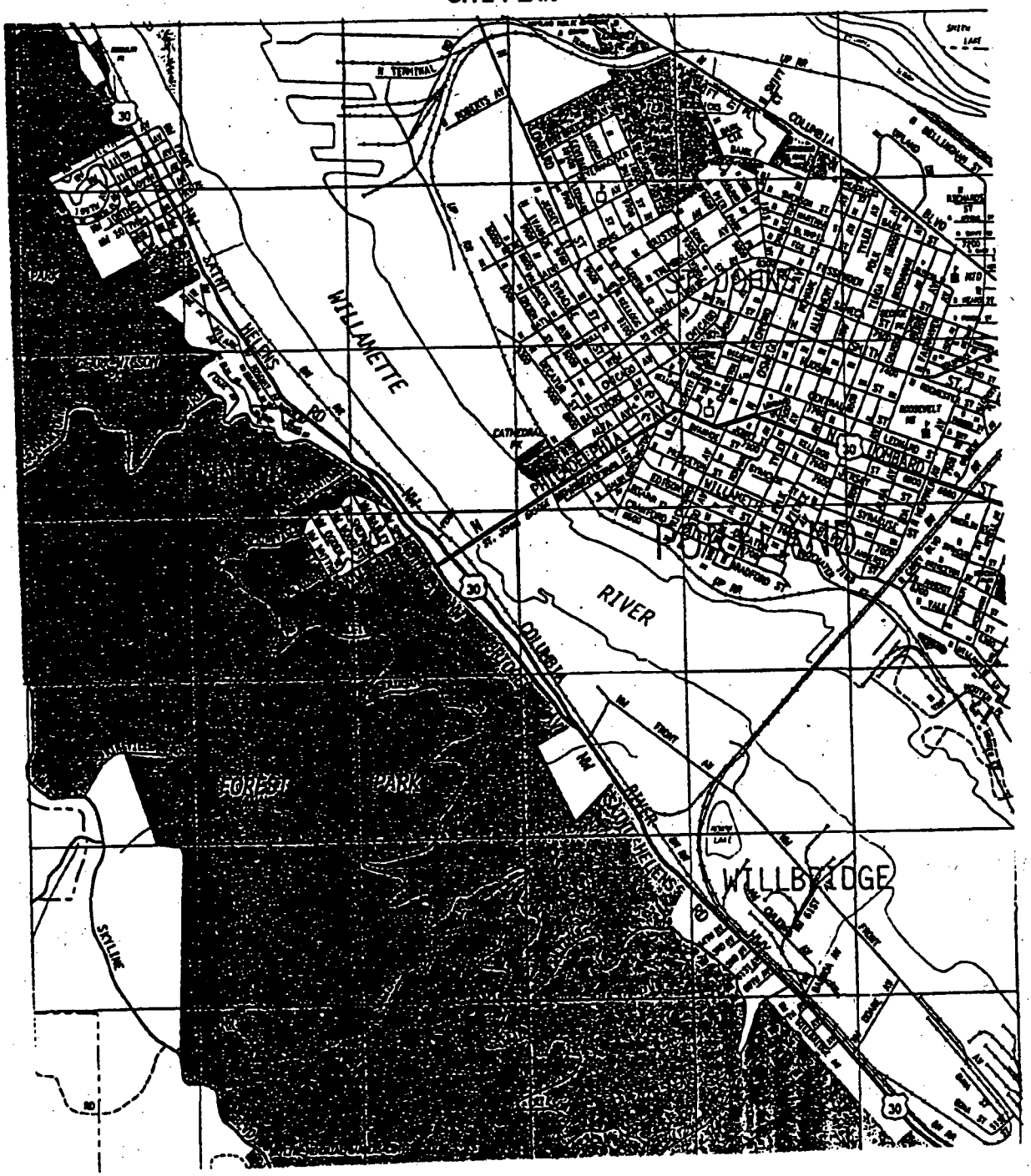
Direct-reading instrument used: _____

Instrument Readings: (Ambient Air Only)	Time	Readings (ppm, LEL, O_2, etc.)

Additional information (include soil or water samples taken, sample numbers, head space readings, unusual events or symptoms of exposure - use back of sheet, if necessary): _____

APPENDIX B

SITE PLAN



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RZA EMPLOYEE ACKNOWLEDGMENT

This Site Health and Safety Plan has been prepared for RZA AGRA, Inc. (RZA) employees; contractors, subcontractors, and others are NOT specifically covered by this plan and are NOT to sign the acknowledgement below unless previously agreed by RZA AGRA Inc., the client, contractors, and/or subcontractors. This information shall be communicated and made available to all subcontractors and official site visitors for their personal health and safety; RZA welcomes all subcontractors and official site visitors to adopt this Site Health and Safety Plan as their own. Agreement to adopt this Site Health and Safety Plan by contractors, subcontractors or others includes agreement that the signatories, their employers, and agents shall indemnify and hold harmless, RZA AGRA, Inc. and their consultants, agents, and employees from any claims, damages, losses and expenses, direct and indirect, or consequential damages, including but not limited to fees and charges of attorneys and court and arbitration costs, arising out of or resulting from, the performance of the work by RZA AGRA, Inc. or claims against RZA AGRA, Inc. arising from the work of others, related to the hazards, hazardous conditions or materials named in this document or found to be present at the site. They further agree that the information in this document is based on the best available background information or previous investigation and is to be considered dynamic and will be changed or updated as necessary. Agreement to this indemnification and acknowledgement will be indicated by signature below.

I have read the attached Site Health and Safety Plan for this project. I have been further trained and briefed in site specific risks and general safety and health information, as necessary, by the on-site supervisor. I understand and agree to comply with these requirements and the indemnification and acknowledgement as explained above.

This Site Health and Safety Plan has been approved by: Denny Macomber Date: 9/30/93
Denny Macomber, CHS

This Site Health and Safety Plan has been accepted by: _____ Date: _____
Paul Ecker, SPM

Employee _____ Date _____

Employee _____ Date _____

Employee _____ Date _____

Employee _____ Date _____

Employee _____ Date _____

Employee _____ Date _____

Employee _____ Date _____

Employee _____ Date _____

Employee _____ Date _____

Employee _____ Date _____

Employee _____ Date _____

Employee _____ Date _____

Employee _____ Date _____

(If necessary, the back of this page may be used for additional signatures. Employees should initial and date this form upon subsequent visits.)

SITE HEALTH AND SAFETY PLAN ADDENDUM
APPROXIMATE 5-ACRE SITE, SOUTH OF THE ST JOHNS BRIDGE, PORTLAND, OREGON
RZA PROJECT # 21-7197-00

Date: October 25, 1993

From: Denny R. Macomber; Coordinator of Health and Safety

To: RZA AGRA, Inc. Site Personnel

Subject: Site Health and Safety Plan Addendum; Approximate 5-Acre Site, Portland, Oregon

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This addendum to the Site Health and Safety Plan (HASP) for the approximate 5-Acre Site has been prepared in response to an additional phase to the project. The Site Safety Officer should ensure this information is communicated and made available to all RZA AGRA, Inc. employees; subcontractors; and authorized site visitors. RZA AGRA, Inc. personnel, thus communicated, shall signify their acknowledgement and understanding of the following information by signature on the attached Acknowledgement Agreement.

1.0 BACKGROUND

RZA conducted an initial subsurface investigation at the site in October, 1993 (see original Health and Safety Plan or RZA file). The purpose of the original investigation was to evaluate the quality of subsurface soil and groundwater related to previous site use. Analysis of samples collected during the original investigation indicated that subsurface soil and groundwater were contaminated with fuel hydrocarbons. And, as a result of CH2MH borings conducted onsite, groundwater recovered during the drilling operation from an isolated area along the southern portion of the site was found to contain PCBs.

Chemical Hazard	Quantity	Risk
Total Petroleum Hydrocarbons (Soil)	667 ppm	Low
PCBs (water)	1000 ppm	Moderate

The purpose of this investigation is to excavate PCB containing transformers and dispose of PCB contaminated soils.

2.0 SCOPE

The scope of work for the project will include: 1) excavation of trenches to 10 feet in depth or greater; 2) removal of PCB containing transformers; 3) segregating PCB contaminated soils; 4) soil sampling; 5)

backfilling of the trenches; 4) equipment deconning and containment of decon water, and; 5) preparation for soil and transformer disposal. The performance of these tasks will help clean up contaminated soil at the site. These tasks may be changed or be added to during the course of this project by the Site Safety Officer to accommodate any changes.

3.0 HAZARD ANALYSIS

The following table provides a summary of hazards and protective measures planned for each task, not already included in the original HASP for this project. All information in the original HASP, not superseded by this addendum, is to be reviewed and followed by site workers.

Physical Hazards

TASK	HAZARD	RISK	PREVENTION
Excavation	Heavy equipment	Medium	Watchfulness, communication safe distance
	Machinery noise	Low	Hearing protection
	Striking overhead or underground utilities	Low	– Utility locate, consult client
Trench-Installation/PCB Transformer removal	Fall hazard, Toxic atmosphere	Medium	Safe distance, barricades, flagging, watchfulness
	Trench work	Medium	Safe distance, barricades, flagging, watchfulness DO NOT ENTER!
	Chemical Hazards	Medium	PPE, Watchfulness, Extreme care
General Physical Hazards	Contaminated soil or ground water	Medium	Avoid direct contact, inhalation
	Uneven footing and debris	Medium	Watchfulness, proper footwear
	Heat stress/Cold exposure	Low	Watchfulness, monitoring

3.1 Excavation Procedures

RZA employees will not be responsible for any site excavation activities and will not operate any heavy machinery. Excavation will be carried out by a qualified contractor hired for the purpose. No RZA employee is to approach an excavation unless the contractor has shored or sloped the cavity in accordance

with Subpart P of 29 CFR Part 1926 to prevent accidental collapse. Personnel will maintain a distance equal to the depth of the excavation, away from all unshored or non-sloped cavity sideslopes. Should the RZA Site Safety Officer feel that contractor is not in accordance with these standards, the SSO should discuss this with the contractor, cease all RZA activities, and leave the work zone until the standards are met.

Site workers should proceed with great caution in the vicinity of any excavation, especially near the edges, due to the potential for slope failure and burial. The greatest stability will be found at the corners of the excavation, but caution is strongly advised during any approach. RZA employees should avoid entry to an excavation for any reason.

REMOVAL OF PCB CONTAINING TRANSFORMERS SHOULD BE DONE FROM SURFACE ONLY!!

TRENCHES ARE EXTREMELY DANGEROUS DUE TO INSTABILITY AND THE PRESENCE OF TOXIC VAPORS OR GASES!

Should entry be necessary, the following steps SHALL be followed:

- The cavity is to be properly sloped or shored in accordance with Subpart P of 29 CFR Part 1926.
- The cavity is then to be approved by a registered professional engineer for stability prior to entry.
- A stairway, ladder, ramp or other safe means of egress shall be placed in excavations greater than four feet.
- The atmosphere in the cavity is to be assessed for airborne contaminants and oxygen content. Entry is not permitted unless oxygen and hazardous vapor or gas levels are below the action levels outlined in this Health and Safety Plan.
- Oxygen, airborne contaminant and explosive levels, as necessary, are to be monitored in the breathing space of the entrant at all times while in the excavation.
- Emergency rescue equipment, such as breathing apparatus, a safety harness and line, or a basket stretcher, shall be readily available where hazardous atmospheric conditions exist or may reasonably expected to develop during work in the excavation.

- An observer is to posted in sight of the entrant, to monitor the entrant at all times and notify emergency personnel should rescue become necessary. The observer is NOT to enter the cavity under any circumstances, nor to leave the area except to notify emergency personnel.

Open excavations will be flagged when active work is not being done on or near the cavity or trench. For the protection of the general public, the site will be secured with fences (six-foot security) or barricades each day when site operations have been concluded.

3.2.1 Work Zone 1: Exclusion (Hot) Zone

The region encompassing the area of excavation, any excavated soil piles, and a minimum of thirty feet beyond (if possible) on all sides shall be designated Work Zone 1, and is an Exclusion (Hot) Zone. Only necessary site workers or authorized site visitors will be allowed in the Exclusion Zone. All site workers and authorized visitors must have read and signed both the Site Health and Safety Plan and this Addendum prior to entering the Exclusion Zone. Personnel shall limit their time in the Exclusion Zone to necessary work and leave immediately upon completion.

All personnel entering the Exclusion Zone shall be outfitted in the Level of Protection outlined in Section 4.0 of this document. Site workers authorized to be in this zone shall, at a minimum, have received 40 hours of Hazardous Waste Operations training according to 29 CFR 1910.120 and be current in required 8 hour annual update. They must also be current, as applicable based on their annual exposure, in a medical surveillance program as outlined 29 CFR 1910.120 (see Sec. 9.0 of the SHSP).

The Site Safety Officer shall be responsible for ensuring that only personnel meeting the above requirements gain access to the Exclusion Zone. Any contaminated equipment, materials, soil, or water will remain in the Exclusion Zone until properly decontaminated or other suitable disposition is arranged and/or agreed by the client. A decontamination station shall be set up in the Contamination Reduction Corridor at the boundary between the Contamination Reduction Zone and the Exclusion Zone. Decontamination procedures shall be according to the Decontamination Plan outlined in Section 8.0 of the SHSP.

3.2.2 Work Zone 2: Contamination Reduction Zone

Zone 2 is the Contamination Reduction Zone and is the transition area between the contaminated area and the clean zone. The Contamination Reduction Zone boundary shall be located by the Site Safety Officer in a manner such that no contaminated materials or equipment will pass beyond it to the Support Zone.

Initially, the Contamination Reduction Zone is considered to be a non-contaminated area. Two Contamination Reduction Corridors (decontamination stations) shall be established from the Exclusion Zone to the Support Zone, one for personnel and one for equipment. Contamination in the Contamination Reduction Zone should be kept as low as is reasonably possible. No contamination shall be allowed to pass into the Support Zone.

The boundary between the Support Zone and the Contamination Reduction Zone is the Contamination Control Line. Fencing, barricades, or other warning devices shall be erected on the perimeter of this zone to keep unauthorized personnel from entering and to demark the line beyond which contamination shall not pass. Access to the Contamination Reduction Zone from the Support Zone shall be through a control point. Personnel entering the Contamination Reduction Zone shall be wearing modified Level D PPE, unless the site SSO has upgraded the area to Level C PPE.

3.3.3 Work Zone 3: Support Zone

The Support Zone shall consist of the area of the site extending from the outer boundary of the Contamination Reduction Zone to the property boundary. Support personnel and equipment (command post, first aid, eyewash, etc.) will be located in this zone. Support personnel will be responsible for alerting the proper agency in the event of an emergency. All visitors and site personnel not currently required to be in Zone 1, will remain in Zone 3. Normal work clothes are appropriate for this zone.

Potentially contaminated personnel clothing, equipment, or other materials area not permitted in this zone. Personnel entering this zone requires the removal of any protective equipment worn in the Contamination Reduction Zone.

3.3 Sampling and Monitoring

Monitoring will be conducted at this site. Sample analysis indicates potential exposure to PCB contaminated soil and groundwater. To reduce risk of exposure, the Site Safety Officer should maintain a Level of Protection designed to reduce the chance of exposure to the hazardous substance present. The PPE may vary according to task or the presence of contamination.

- Sampling, maintenance, etc. from upgradient locations that previous analysis has shown to be free of groundwater or soil contamination, may be conducted in Level D PPE as outlined in the Site Health and Safety Plan, as minimum protection. The SSO should monitor the air with a direct-reading

instrument at all times. Should airborne contamination be detected above 5 ppm, air-purifying respirators are required.

- Operations at locations where previous analysis has indicated the presence of contaminated liquids, soil, or vapor should be carried out in PPE that prevent exposure to the hazardous materials. PPE may include: full Level C (Appendix C) for skin protection from splashes of contaminated liquids and inhalation protection from airborne vapors; or modified Level C to D for situations that may not involve inhalation exposure. The SSO should monitor the air with a direct-reading instrument at all times to ensure that airborne contaminants are not present. Should airborne contamination be detected above 5 ppm, air-purifying respirators are required.

The Site Safety Officer should check with the Project Manager or Director of Health and Safety prior to initiation of new phases of site work for any changes in recommended PPE.

4.0 PERSONAL PROTECTIVE EQUIPMENT - Modified Level D Personal Protective Equipment

1. Chemical-resistant clothing (Poly-coated Tyvek; two-piece chemical-splash suit; or other disposable chemical-resistant overalls; or rain gear suitable for decontamination). WEARING TYVEK WILL BE MANDATORY BASED ON SITE CONDITIONS AND THE SSO'S DIRECTION. Should potential contact with hazardous chemical contaminated soil, sludge, or water become likely, site workers MUST upgrade PPE to include chemical-resistant clothing.

2. Boots/shoes, chemical-resistant, steel-toe and shank.

3. Hard hat.

5. Gloves, outer, chemical resistant.

6. Gloves, inner, chemical resistant.

7. Safety glasses with side shields, face shield, or chemical splash goggles.

8 .Hearing protection while heavy equipment is in operation or other hearing hazards are present.

RZA EMPLOYEE ADDENDUM ACKNOWLEDGMENT

This Site Health and Safety Plan Addendum has been prepared for RZA AGRA, Inc. (RZA) employees; contractors, subcontractors, and others are NOT specifically covered by this plan and are NOT to sign the acknowledgement below unless previously agreed by RZA AGRA Inc., the client, contractors, and/or subcontractors. This information shall be communicated and made available to all subcontractors and official site visitors for their personal health and safety; RZA welcomes all subcontractors and official site visitors to adopt this Site Health and Safety Plan as their own. Agreement to adopt this Site Health and Safety Plan by contractors, subcontractors or others includes agreement that the signatories, their employers, and agents shall indemnify and hold harmless, RZA AGRA, Inc. and their consultants, agents, and employees from any claims, damages, losses and expenses, direct and indirect, or consequential damages, including but not limited to fees and charges of attorneys and court and arbitration costs, arising out of or resulting from, the performance of the work by RZA AGRA, Inc. or claims against RZA AGRA, Inc. arising from the work of others, related to the hazards, hazardous conditions or materials named in this document or found to be present at the site. They further agree that the information in this document is based on the best available background information or previous investigation and is to be considered dynamic and will be changed or updated as necessary. Agreement to this indemnification and acknowledgement will be indicated by signature below.

I have read the attached Site Health and Safety Plan Addendum for this project. I have been further trained and briefed in site specific risks and general safety and health information, as necessary, by the on-site supervisor. I understand and agree to comply with these requirements and the indemnification and acknowledgement as explained above.

This Site Health and Safety Plan has been approved by: _____ Date: 10/25/93
Denny Macomber, CHS

This Site Health and Safety Plan has been accepted by: _____ Date: _____
Dave Roberston, SSO

Employee _____ Date _____ OSHA ____ Med.Surv. ____

Employee _____ Date _____ OSHA ____ Med.Surv. ____

Employee _____ Date _____ OSHA ____ Med.Surv. ____

Employee _____ Date _____ OSHA ____ Med.Surv. ____

Employee _____ Date _____ OSHA ____ Med.Surv. ____

Employee _____ Date _____ OSHA ____ Med.Surv. ____

Employee _____ Date _____ OSHA ____ Med.Surv. ____

Employee _____ Date _____ OSHA ____ Med.Surv. ____

Employee _____ Date _____ OSHA ____ Med.Surv. ____

Employee _____ Date _____ OSHA ____ Med.Surv. ____

Employee _____ Date _____ OSHA ____ Med.Surv. ____

(Please check above if current with OSHA training and Medical Surveillance requirements. If necessary, the back of this page may be used for additional signatures. Employees should initial and date this form upon subsequent visits.)

Appendix C

Sampling Plan

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2.0 Sampling Objectives 1

3.0 SAMPLING LOCATION AND FREQUENCY 1
3.1 Soil Samples 2

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5.0 SAMPLE HANDLING AND ANALYSIS 3
5.1 Field Sampling Operations 3
5.2 Laboratory Operations 4

OAL

RZA AGRA, INC.
7477 SW TECH CENTER DRIVE
PORTLAND, OR 97223

REVIEWED BY: D. Miller
REVIEW DATE: 11/24/93

GERRY KOSCHAL
639-3400/ FAX 620-7892
JOB #7197

PCB ANALYSIS OF SOLIDS
BY EPA METHODS 3540 AND 8080/8081

SAMPLE ID:	SP-17D
OAL ID: 25-0173-	17677
SAMPLE DATE:	11/19/93
MATRIX:	SOIL
EXTRACTION DATE:	11/23/93
ANALYSIS DATE:	11/23/93
PCB MG/KG	0.25 (1260)
SURR.RECOVERY %	104.
ANALYST:	DM

MG/KG = PPM
ND = NONE DETECTED(<0.05 MG/KG)
NA = NOT ANALYZED
MI = MATRIX INTERFERENCE WITH SURROGATE RECOVERY
SURROGATE(S) USED: TETRACHLORO-M-XYLENE AND/OR DECACHLOROBIPHENYL

OREGON ANALYTICAL LABORATORY
A Division of Portland General Electric
14855 S.W. Old Scholls Ferry Road
Beaverton, OR 97007
Phone 503-644-5300 • Fax 503-671-1404

OAL

RZA AGRA, INC.
7477 SW TECH CENTER DRIVE
PORTLAND, OR 97223

REVIEWED BY: DW

REVIEW DATE: 12/1/93

GERRY KOSCHAL
639-3400/ FAX 620-7892
JOB #7197

PCB ANALYSIS OF SOILS
BY SHAKEOUT* AND EPA 8080/8081

SAMPLE ID:	MP-4
OAL ID: 25-0173-	17774
SAMPLE DATE:	11/17/93
PCB SHAKEOUT PPM	0.07(1260)

MG/KG = PPM
ND = NONE DETECTED(<0.05 MG/KG)
NA = NOT ANALYZED
* THE SHAKEOUT PREP IS NOT AN EPA APPROVED PROCEDURE AND SHOULD BE USED FOR SCREENING PURPOSES ONLY.

OREGON ANALYTICAL LABORATORY
A Division of Portland General Electric
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7477 SW TECH CENTER DRIVE
PORTLAND, OR 97223

REVIEWED BY: DMP

REVIEW DATE: 12/9/93

GERRY KOSCHAL
639-3400/ FAX 620-7892
JOB #7197

PCB ANALYSIS OF SOLIDS
BY EPA METHODS 3580 AND 8080/8081

SAMPLE ID:		IN-1
OAL ID: 25-0173-		17822
SAMPLE DATE:		11/24/93
PCB	MG/KG	17000. (1260)

MG/KG = PPM
ND = NONE DETECTED(<0.5 MG/KG)
NA = NOT ANALYZED

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RZA AGRA, INC.
7477 SW TECH CENTER DRIVE
PORTLAND, OR 97223

REVIEWED BY: Copy DW
REVIEW DATE: 2/15/94

G.K.KOSCHAL
639-3400/ FAX 620-7892
JOB #7197

PCB ANALYSIS OF SOLIDS
BY EPA METHODS 3540 AND 8080/8081

SAMPLE ID:	FCL-1	FCL-2	FCL-3	FCL-4	FCL-5
OAL ID: 25-0173-	18648	18649	18650	18651	18652
SAMPLE DATE:	12/13/93	12/13/93	12/13/93	12/13/93	12/13/93
MATRIX:	SOIL	SOIL	SOIL	SOIL	SOIL
EXTRACTION DATE:	12/15/93	12/15/93	12/15/93	12/15/93	12/15/93
ANALYSIS DATE:	12/15/93	12/15/93	12/15/93	12/15/93	12/15/93
PCB MG/KG	900.	0.31	2,500.	9.4	0.19
SURR.RECOVERY %	96.	95.	96.	98.	98.
ANALYST:	CN	CN	CN	CN	CN

MG/KG = PPM
ND = NONE DETECTED(<0.05 MG/KG)
NA = NOT ANALYZED
MI = MATRIX INTERFERENCE WITH SURROGATE RECOVERY
SURROGATE(S) USED: TETRACHLORO-M-XYLENE AND/OR DECACHLOROBIPHENYL

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RZA AGRA, INC.
7477 SW TECH CENTER DRIVE
PORTLAND, OR 97223

REVIEWED BY: Cory DAP
REVIEW DATE: 2/15/94

G.K.KOSCHAL
639-3400/ FAX 620-7892
JOB #7197

PCB ANALYSIS OF SOLIDS
BY EPA METHODS 3540 AND 8080/8081

SAMPLE ID:	FCL-6	FCL-7	FCL-8	FCL-9	FCL-10
OAL ID: 25-0173-	18653	18654	18655	18656	18657
SAMPLE DATE:	12/13/93	12/13/93	12/13/93	12/13/93	12/13/93
MATRIX:	SOIL	SOIL	SOIL	SOIL	SOIL
EXTRACTION DATE:	12/15/93	12/15/93	12/15/93	12/15/93	12/15/93
ANALYSIS DATE:	12/15/93	12/15/93	12/15/93	12/15/93	12/15/93
PCB MG/KG	9.8	2.2	ND	ND	ND
SURR.RECOVERY %	96.	97.	98.	99.	97.
ANALYST:	CN	CN	CN	CN	CN

MG/KG = PPM
ND = NONE DETECTED(<0.05 MG/KG)
NA = NOT ANALYZED
MI = MATRIX INTERFERENCE WITH SURROGATE RECOVERY
SURROGATE(S) USED: TETRACHLORO-M-XYLENE AND/OR DECACHLOROBIPHENYL

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RZA AGRA, INC.
7477 SW TECH CENTER DRIVE
PORTLAND, OR 97223

REVIEWED BY: copy DLN
REVIEW DATE: 2/15/94

G.K.KOSCHAL
639-3400/ FAX 620-7892
JOB #7197

PCB ANALYSIS OF SOLIDS
BY EPA METHODS 3540 AND 8080/8081

SAMPLE ID:	FCL-11	FCL-12	FCL-13	FCL-13E	FCL-1E
OAL ID: 25-0173-	18658	18659	18660	18661	18662
SAMPLE DATE:	12/14/93	12/14/93	12/14/93	12/14/93	12/14/93
MATRIX:	SOIL	SOIL	SOIL	SOIL	SOIL
EXTRACTION DATE:	12/15/93	12/15/93	12/15/93	12/15/93	12/15/93
ANALYSIS DATE:	12/15/93	12/15/93	12/15/93	12/15/93	12/15/93
PCB MG/KG	ND	ND	ND	ND	ND
SURR.RECOVERY %	93.	96.	87.	89.	98.
ANALYST:	CN	CN	CN	CN	CN

MG/KG = PPM
ND = NONE DETECTED(<0.05 MG/KG)
NA = NOT ANALYZED
MI = MATRIX INTERFERENCE WITH SURROGATE RECOVERY
SURROGATE(S) USED: TETRACHLORO-M-XYLENE AND/OR DECACHLOROBIPHENYL

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Beaverton, OR 97007
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RZA AGRA, INC.
7477 SW TECH CENTER DRIVE
PORTLAND, OR 97223

REVIEWED BY: Copy DM
REVIEW DATE: 2/15/94

GERRY KOSCHAL
639-3400/ FAX 620-7892
JOB #7197

PCB ANALYSIS OF SOLIDS
BY EPA METHODS 3540 AND 8080/8081

SAMPLE ID:	FCL-1B	FCL-3B	FCL-4B	FCL-6B	FCL-7B
OAL ID: 25-0173-	18904	18905	18906	18907	18908
SAMPLE DATE:	12/20/93	12/20/93	12/20/93	12/20/93	12/20/93
MATRIX:	SOIL	SOIL	SOIL	SOIL	SOIL
EXTRACTION DATE:	12/21/93	12/21/93	12/21/93	12/21/93	12/21/93
ANALYSIS DATE:	12/22/93	12/22/93	12/22/93	12/22/93	12/22/93
PCB MG/KG	0.31	ND	ND	ND.	ND
SURR.RECOVERY %	100.	99.	101.	101.	99.
ANALYST:	DM	DM	DM	DM	DM

MG/KG = PPM
ND = NONE DETECTED(<0.05 MG/KG)
NA = NOT ANALYZED
MI = MATRIX INTERFERENCE WITH SURROGATE RECOVERY
SURROGATE(S) USED: TETRACHLORO-M-XYLENE AND/OR DECACHLOROBIPHENYL

OREGON ANALYTICAL LABORATORY
A Division of Portland General Electric
14855 S.W. Old Scholls Ferry Road
Beaverton, OR 97007
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7477 SW TECH CENTER DRIVE
PORTLAND, OR 97223

REVIEWED BY: DMP

REVIEW DATE: 12/23/93

G.KOSCHAL
639-3400/ FAX 620-7892
JOB #7197

PCB ANALYSIS OF WATER
BY EPA METHODS 3510 AND 8080/8081

SAMPLE ID:	TANK-A	TS-1	TS-2	TS-3
OAL ID: 25-0173-	18987	18988	18989	18990
SAMPLE DATE:	12/21/93	12/21/93	12/21/93	12/21/93
EXTRACTION DATE:	12/22/93	12/22/93	12/22/93	12/22/93
ANALYSIS DATE:	12/22/93	12/22/93	12/22/93	12/22/93
PCB UG/L	160. (1260)	37.(1260)	1500.(1260)	27.(1260)
SURR.RECOVERY %	83.	97.	94.	93.
ANALYST:	CN	CN	CN	CN

UG/L = PPB
ND = NONE DETECTED(<0.5 UG/L)
NA = NOT ANALYZED
MI = MATRIX INTERFERENCE WITH SURROGATE RECOVERY
SURROGATE(S) USED: TETRACHLORO-M-XYLENE AND/OR DECACHLOROBIPHENYL

OREGON ANALYTICAL LABORATORY
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Phone 503-644-5300 • Fax 503-671-1404

RZA AGRA, Inc.

(Formerly: Rittenhouse-Zeman & Associates, Inc.)
Engineering & Environmental Services
7477 SW Tech Center Drive • Portland, OR 97223-8024
(503) 639-3400 • FAX (503) 620-7892

Chain-of-Custody Record / Laboratory Analyses Reques

Project: St Johns (BES) Job #: 7197
Client: City of Portland
Project Manager: Gerry Koschal Phone #: 639-3400
Sampler's Name: Denny Macomber Phone #: 639-3400
Sampler's Signature: Denny R Macomber

Analysis Requested: (Circle, Check Box, or Write Preferred Method in Box)

Sample I.D. #	Date	Time	Preserv.	Matrix	Halogenated Volatiles EPA 601 EPA 8010	Volatile Aromatics EPA 602 EPA 8020	BTXE or BTXE / TPH-G	WA TPH-G or OR TPH-G	WA TPH-D or OR TPH-D	Fuel Scan / TPH by GC 8015-modified	GC Fingerprint / HCID	WA 418.1 Modified or OR 418.1 Modified	GC / MS Volatiles	GC / MS Semi Volatiles	Total Metals ICP AA Other	TCLP Metals	pH Cond. Alk. Color	PCBs		# of Containers	Comments
1. P-1	11/5/93	1600	ice	Soil														X		2	
2. P-2	11/5/93	1635																X		2	
3. P-3	11/5/93	1635																X		2	
4. P-4	11/5/93	1640																X		2	
5. P-5	11/5/93	1645																X		2	
6.																					
7. SS-1	11/5/93	1545	ice	H_2O														X		1	
8.																					
9.																					
10.																					

Relinquished by RZA:	Relinquished by:	Relinquished by:	Laboratory:	Sample Receipt:
Signature: Denny R Macomber	Signature:	Signature:		
Printed Name: Denny R Macomber	Printed Name:	Printed Name:	Shipping I.D.#	Total # Containers:
Firm: RZA AGRA, Inc	Firm:	Firm:	Carrier:	Condition of Containers:
Date/Time: 11/8/93 8:30	Date/Time:	Date/Time:	DOT Designation:	Condition of Seals:
Received by:	**Received by:**	**Received by:**	**Special Instructions/Comments:**	
Signature: Jean Gourley	Signature:	Signature:		
Printed Name: Jean Gourley	Printed Name:	Printed Name:		
Firm: RZA AGRA Inc.	Firm:	Firm:		
Date/Time: 11/8/93 08:30	Date/Time:	Date/Time:		

DISTRIBUTION: WHITE & PINK returned to project manager, YELLOW - lab.

Page ___ of ___

SERVICE REQUEST #:

CRAW00018133

RZA AGRA, Inc.

(Formerly: Rittenhouse-Zeman & Associates, Inc.)
Engineering & Environmental Services
7477 SW Tech Center Drive • Portland, OR 97223-8024
(503) 639-3400 • FAX (503) 620-7892

Chain-of-Custody Record / Laboratory Analyses Request

Project: BES- St Johns Job #: 7197
Client: City of Portland
Project Manager: Penny Koschak Phone # 639-3400
Sampler's Name: Denna Macomber Phone # 639-3400
Sampler's Signature: D Macomber

Analysis Requested: (Circle, Check Box, or Write Preferred Method in Box)

Sample I.D. #	Date	Time	Preserv.	Matrix	Halogenated Volatiles EPA 601 EPA 8010	Volatile Aromatics EPA 602 EPA 8020	BTXE or BTXE / TPH-G	WA TPH-G or OR TPH-G	WA TPH-D or OR TPH-D	Fuel Scan / TPH by GC 8015-modified	GC Fingerprint / HCID	WA 418.1 Modified or OR 418.1 Modified	GC / MS Volatiles	GC / MS Semi Volatiles	Total Metals ICP AA Other	TCLP Metals	pH Cond. Alk Color	PCBs		# of Containers	Comments
1. CL-1	11/5/93	13:10	Ice	Soil		25-0173-16888												X		2	
2. CL-2		13:20						16889										X		2	
3. CL-3		13:30						16890										X		2	
4. CL-4		13:40						16891										X		2	
5. CL-5		13:50						16892										X		2	
6.																					
7.																					
8.																					
9.																					
10.																					

Relinquished by RZA:	Relinquished by:	Relinquished by:	Laboratory:	Sample Receipt:
Signature: D Macomber	Signature:	Signature:		
Printed Name: Denna Macomber	Printed Name:	Printed Name:	Shipping I.D.#	Total # Containers:
Firm: RZA AGRA	Firm:	Firm:	Carrier:	Condition of Containers:
Date/Time: 11/9/93 9:30 am	Date/Time:	Date/Time:	DOT Designation:	Condition of Seals:

Received by:	Received by:	Received by:	Special Instructions/Comments:
Signature:	Signature:	Signature: D Wood	
Printed Name:	Printed Name:	Printed Name: D. Wood	
Firm:	Firm:	Firm: OAL	
Date/Time:	Date/Time:	Date/Time: 11-9-93	

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Page 1 of 1

SERVICE REQUEST #:

CRAW00018134

RZA AGRA, Inc.

(Formerly: Rittenhouse-Zeman & Associates, Inc.)
Engineering & Environmental Services
7477 SW Tech Center Drive • Portland, OR 97223-8024
(503) 639-3400 • FAX (503) 620-7892

Chain-of-Custody Record / Laboratory Analyses Re

Project: BES Job #:
Client: City of Portland
Project Manager: Gerry Kloschel Phone #: 635-3466
Sampler's Name: D. Robertson Phone #:
Sampler's Signature: —

Analysis Requested: (Circle, Check Box, or Write Preferred Method in Box)

Sample I.D. #	Date	Time	Preserv.	Matrix	Halogenated Volatiles EPA 601 EPA 8010	Volatile Aromatics EPA 602 EPA 8020	BTXE or BTXE / TPH-G	WA TPH-G or OR TPH-G	WA TPH-D or OR TPH-D	Fuel Scan / TPH by GC 8015-modified	GC Fingerprint / HCID	WA 418.1 Modified or OR 418.1 Modified	GC / MS Volatiles	GC / MS Semi Volatiles	Total Metals ICP AA Other	TC LP Metals	pH Cond. Alk Color	8080-PCBs only		# of Containers
1. BP-1-11.5	11/11/93		Cool	Soil	25-1170-17006													X		2
2. AP-1-8							17007											X		2
3. BP-2-10.5							17008											X		2
4. AB-2-7							17009											X		2
5. MP-1							17010											X		1
6.																				
7.																				
8.																				
9.																				
10.																				

Relinquished by RZA	Relinquished by:	Relinquished by:	Laboratory:	Sample Receipt:
Signature: Sean Gourley	Signature:	Signature:	OAL	
Printed Name: Sean Gourley	Printed Name:	Printed Name:	Shipping I.D.#	Total # Containers:
Firm: RZA AGRA, Inc.	Firm:	Firm:	Carrier: Ontime	Condition of Containers:
Date/Time: 11/12/93 09:00	Date/Time:	Date/Time:	DOT Designation:	Condition of Seals:
Received by:	**Received by:**	**Received by:**	**Special Instructions/Comments:**	
Signature:	Signature:	Signature: Wally Stranding	Original COC # 1013	
Printed Name:	Printed Name:	Printed Name: Wally Stranding		
Firm:	Firm:	Firm: OAL		
Date/Time:	Date/Time:	Date/Time: 11-12 9:25		

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Page 1 of 1

SERVICE REQUEST #:

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RZA AGRA, Inc.

(Formerly: Rittenhouse-Zemas & Associates, Inc.)
Engineering & Environmental Services
7477 SW Tech Center Drive • Portland, OR 97223-8024
(503) 639-3400 • FAX (503) 620-7892

Chain-of-Custody Record / Laboratory Analyses Requested

Project: RES ST JOHNS Job #: 7177-00
Client: CITY OF PORTLAND
Project Manager: GERRY KOSCHAL Phone #:
Sampler's Name: DAVE ROBERTSON Phone #:
Sampler's Signature:

Analysis Requested: (Circle, Check Box, or Write Preferred Method in Box)

Sample I.D. #	Date	Time	Preserv.	Matrix	Halogenated Volatiles EPA 601 EPA 8010	Volatile Aromatics EPA 602 EPA 8020	BTXE or BTXE / TPH-G	WA TPH-G or OR TPH-G	WA TPH-D or OR TPH-D	Fuel Scan / TPH by GC 8015-modified	GC Fingerprint / HCID	WA 418.1 Modified or OR 418.1 Modified	GC / MS Volatiles	GC / MS Semi Volatiles	Total Metals ICP AA Other	TC LP Metals	pH Cond. Alk Color	8280-PCB		# of Containers	Comments
1. AD-3-5	11/12/93	9:15	CHILL	SOIL		25-0173-			17229									X		2	RUSH
2. BP-3-10	11/11/93	4:05	↓	↓					17230									↓		2	↓
3. BP-4-M5	11/11/93	11:00							17231											2	
4. MP-2	11/11/93	12:15	↓	↓					17232									↓		2	↓
5.																					
6.																					
7.																					
8.																					
9.																					
10.																					

Relinquished by RZA:	Relinquished by:	Relinquished by:	Laboratory:	Sample Receipt:
Signature:	Signature: Jean Gourley	Signature:		
Printed Name: DAVID ROBERTSON	Printed Name: Jean Gourley	Printed Name:	Shipping I.D.#:	Total # Containers:
Firm: RZA AGRA	Firm: RZA AGRA Inc.	Firm:	Carrier:	Condition of Containers:
Date/Time: 11/15/93	Date/Time: 11/16/93	Date/Time:	DOT Designation:	Condition of Seals:
Received by:	**Received by:**	**Received by:**	**Special Instructions/Comments:**	
Signature: Jean Gourley	Signature:	Signature: Willy Strendrig	RUSH - 1 SAMPLES 48 hour TAT - please	
Printed Name: Jean Gourley	Printed Name:	Printed Name: Willy Strendrig		
Firm: RZA AGRA	Firm:	Firm: DAC		
Date/Time: 11/15/93 08:60	Date/Time:	Date/Time: 11-11-93 11:10		

DISTRIBUTION: WHITE & PINK returned to project manager, YELLOW - lab.

Page 1 of

SERVICE REQUEST #:

CRAW00018136

RZA

RITTENHOUSE-ZEMAN & ASSOCIATES, INC.
EARTH & ENVIRONMENTAL CONSULTANTS

7409 S.W. Tech Center Drive, Suite 135
Portland, Oregon 97223-8024
(503) 639-3400 FAX: (503) 620-7892

3689

CHAIN-OF-CUSTODY RECORD / LABORATORY ANALYSES REQUEST

PROJECT: RES-ST Johns JOB #: 7197
CLIENT: City OF Portland
PROJ. MANAGER: G. Koscha PHONE #: 639-3400
SITE ADDRESS: ST Johns Bridge / Burlingame
SAMPLER'S NAME: D. Macomber PHONE #: 639 3400
SAMPLER'S SIGNATURE: [signature]

ANALYSIS REQUESTED: (Circle, Check Box, or Write Preferred Method in Box) OTHER: (Write in)

SAMPLE ID #	DATE	TIME	PRESERV.	MATRIX	Halogenated Volatiles EPA 601 EPA 8010	Aromatics (BTX&E) EPA 602 EPA 8020	Fuel Scan/TPH by GC EPA 602-mod/8015-mod.	Volatile Organ. Compnds	GC Fingerprint	Penta/tetra-chlorophenol EPA 604 EPA 8040	Tot. Petrol. Hydrocarbons EPA 413.1 418.1 / TLC	Total Metals ICP AA Other	EP-TOX Metals	Purgeable Organics EPA 624	Base/Neut.Acids EPA 625 8270	pH Cond. Alk Color	NO3/NO2 N-NO3 NH3-N	Ca Mg Na K Fe Cl SO4	TOX TOC TDS COD	PCBs 8080			# of Containers	Sample Preparation	Detection Limits Desired
1. CL-1B	11/17/93	1600	ice	Soil	25	0173-		17	556											X			2		
2. CL-2B	/	1605	/	/				17	557											X			2		
3. CL-5B	/	1610	/	/				17	558											X			2		
4. MP-3	11/18	10:00						17	559											X					
5. MP-4	"	10:20	↓	↓				17	560	/										X					
6.																									
7.																									
8.																									
9.																									
10.																									

RELINQUISHED BY RZA:	RELINQUISHED BY:	RELINQUISHED BY:	LABORATORY:	SAMPLE RECEIPT:
Signature: [signature]	Signature: [signature]	Signature:		
Printed Name: Denny Macomber	Printed Name: DAVE ROBERTSON	Printed Name:	Shipping I.D. #:	Total # Containers:
Firm: RZA AGRA, Inc	Firm: RZA AGRA	Firm:	Carrier:	Condition of Containers?
Date/Time: 11/18/93 4:15	Date/Time: 11/18/93	Date/Time:	DOT Designation:	Condition of Seals?
RECEIVED BY:	**RECEIVED BY:**	**RECEIVED BY:**	**SPECIAL INSTRUCTIONS/COMMENTS:**	
Signature: [signature]	Signature: [signature]	Signature:	Add'l (Closure Samples) Please identify Aroclor present	
Printed Name: DAVE ROBERTSON	Printed Name: David Bock	Printed Name:		
Firm: RZA AGRA	Firm:	Firm:		
Date/Time: 11/18/93 4:15	Date/Time:	Date/Time:		

DISTRIBUTION: WHITE-return to RZA; YELLOW-lab; PINK-retained by RZA.

PAGE ____ OF ____.

CRAW00018137

RZA AGRA, Inc.
(Formerly: Rittenhouse-Zeman & Associates, Inc.)
Engineering & Environmental Services
7477 SW Tech Center Drive • Portland, OR 97223-8024
(503) 639-3400 • FAX (503) 620-7892

Chain-of-Custody Record / Laboratory Analyses Req

Project: RES-ST Julius Job #: 7197
Client: City of Portland
Project Manager: Gary Kerschel Phone #: 639-3400
Sampler's Name: Gary Macomber Phone #: 639-3400
Sampler's Signature: [signature]

Analysis Requested: (Circle, Check Box, or Write Preferred Method in Box)

Sample I.D. #	Date	Time	Preserv.	Matrix	Halogenated Volatiles EPA 601 EPA 8010	Volatile Aromatics EPA 602 EPA 8020	BTXE or BTXE / TPH-G	WA TPH-G or OR TPH-G	WA TPH-D or OR TPH-D	Fuel Scan / TPH by GC 8015-modified	GC Fingerprint / HCID	WA 418.1 Modified or OR 418.1 Modified	GC / MS Volatiles	GC / MS Semi Volatiles	Total Metals ICP AA Other	TCLP Metals	pH Cond. Alk Color	PCB 8080		# of Containers	Comments
1. MP-6	11/19/93	1600	ice	soil		2	-01	7.3	17	657								X		1	
2. SP-1	11/19	14:00							17	658								X		1	
3. SP-2	11/19	14:05							17	659								X		1	
4. SP-3	11/19	14:10							17	660								X		1	
5. SP-4	11/19	14:15							17	661								X		1	
6. SP-5	11/19	14:20							17	662								X		1	
7. SP-6	11/19	14:25							17	663								X		1	
8. SP-7	11/19	14:30							17	664								X		1	
9. SP-8	11/19	14:35							17	665								X		1	
10. SP-9	11/19	14:40							17	666											

Relinquished by RZA:	Relinquished by:	Relinquished by:	Laboratory:	Sample Receipt:
Signature: [signature]	Signature:	Signature:	OAL	
Printed Name: Gary Kerschel	Printed Name:	Printed Name:	Shipping I.D.#:	Total # Containers:
Firm: RZA AGRA	Firm:	Firm:	Carrier:	Condition of Containers:
Date/Time: 11/22/93 4:50	Date/Time:	Date/Time:	DOT Designation:	Condition of Seals:

Received by:	Received by:	Received by:	Special Instructions/Comments:
Signature: Kelly Nickerson	Signature:	Signature:	48 hr.
Printed Name: K. Nickerson	Printed Name:	Printed Name:	
Firm: OAL	Firm:	Firm:	
Date/Time: 11/22/93 4:50	Date/Time:	Date/Time:	

DISTRIBUTION: WHITE & PINK returned to project manager, YELLOW - lab.

SERVICE REQUEST #: _____

RZA AGRA, Inc.
(Formerly: Rittenhouse-Zeman & Associates, Inc.)
Engineering & Environmental Services
7477 SW Tech Center Drive • Portland, OR 97223-8024
(503) 639-3400 • FAX (503) 620-7892

Chain-of-Custody Record / Laboratory Analyses Requ

Project: BES St. Johns Job #: 7197
Client: City of PDX
Project Manager: G. Koscsal Phone #:
Sampler's Name: D. Malcomson Phone #: 289-3400
Sampler's Signature:

Analysis Requested: (Circle, Check Box, or Write Preferred Method in Box)

Sample I.D. #	Date	Time	Preserv.	Matrix	Halogenated Volatiles EPA 601 EPA 8010	Volatile Aromatics EPA 602 EPA 8020	BTXE or BTXE / TPH-G	WA TPH-G or OR TPH-G	WA TPH-D or OR TPH-D	Fuel Scan / TPH by GC 8015-modified	GC Fingerprint / HCID	WA 418.1 Modified or OR 418.1 Modified	GC / MS Volatiles	GC / MS Semi Volatiles	Total Metals ICP AA Other	TC LP Metals	pH Cond. Alk Color	PCB 8080		# of Containers	Comments
1. SP-10	11/19/93	14:45	ICE	SOIL			25	8173	17667									X		1	
2. SP-11	11/19	14:50							17668									X		1	
3. SP-12	11/19	14:55							17669									X		1	
4. SP-13	11/19	15:00							17670									X		1	
5. SP-14	11/19	15:05							17671									X		1	
6. SP-15	11/19	15:10							17672									X		1	
7. SP-16	11/19	15:15							17673									X		1	
8. SP-17 A	11/22	8:00							17674									X		1	
9. SP-17 B	11/22	8:00							17675									X		1	
10. SP-17 C	11/22	8:00							17676									X		1	

Relinquished by RZA:	Relinquished by:	Relinquished by:	Laboratory:	Sample Receipt:
Signature:	Signature:	Signature:	OAL	
Printed Name: Gordon Koscsal	Printed Name:	Printed Name:	Shipping I.D.#:	Total # Containers:
Firm: RZA Agra	Firm:	Firm:	Carrier:	Condition of Containers:
Date/Time: 11/22/93 4:50	Date/Time:	Date/Time:	DOT Designation:	Condition of Seals:
Received by:	**Received by:**	**Received by:**	**Special Instructions/Comments:**	
Signature: Kelly Nickerson	Signature:	Signature:	48 hr.	
Printed Name: K. Nickerson	Printed Name:	Printed Name:		
Firm: OAL	Firm:	Firm:		
Date/Time: 11/22/93 4:50	Date/Time:	Date/Time:		

DISTRIBUTION: WHITE & PINK returned to project manager, YELLOW - lab.

SERVICE REQUEST #:

RZA AGRA, Inc.
(Formerly: Rittenhouse-Zeman & Associates, Inc.)
Engineering & Environmental Services
7477 SW Tech Center Drive • Portland, OR 97223-8024
(503) 639-3400 • FAX (503) 620-7892

Chain-of-Custody Record / Laboratory Analyses Re

Project: BES ST JOHNS Job #: 7177
Client: CITY OF PDX
Project Manager: G KOSCHAL Phone #: 639-3400
Sampler's Name: D. Hillacomer Phone #:
Sampler's Signature:

Analysis Requested: (Circle, Check Box, or Write Preferred Method in Box)

Sample I.D. #	Date	Time	Preserv.	Matrix	Halogenated Volatiles EPA 601 EPA 8010	Volatile Aromatics EPA 602 EPA 8020	BTXE or BTXE / TPH-G	WA TPH-G or OR TPH-G	WA TPH-D or OR TPH-D	Fuel Scan / TPH by GC 8015-modified	GC Fingerprint / HCID	WA 418.1 Modified or OR 418.1 Modified	GC / MS Volatiles	GC / MS Semi Volatiles	Total Metals ICP AA Other	TC LP Metals	pH Cond. Alk Color	PB 8080		# of Containers	Comments
1. SB17 D	11/22/93	800	ICE	SOIL			25-0173-17677											X		1	
2.																					
3.																					
4.																					
5.																					
6.																					
7.																					
8.																					
9.																					
10.																					

Relinquished by RZA:	Relinquished by:	Relinquished by:	Laboratory:	Sample Receipt:
Signature:	Signature:	Signature:	OAL	
Printed Name: GERARD KOSCHAL	Printed Name:	Printed Name:	Shipping I.D.#	Total # Containers:
Firm: RZA AGRA	Firm:	Firm:	Carrier:	Condition of Containers:
Date/Time: 11/22/93 4:50	Date/Time:	Date/Time:	DOT Designation:	Condition of Seals:
Received by:	**Received by:**	**Received by:**	**Special Instructions/Comments:**	
Signature: Kelly Nickerson	Signature:	Signature:	48 hour	
Printed Name: K. Nickerson	Printed Name:	Printed Name:		
Firm: OAL	Firm:	Firm:		
Date/Time: 11/22/93 4:50	Date/Time:	Date/Time:		

DISTRIBUTION: WHITE & PINK returned to project manager, YELLOW - lab.

SERVICE REQUEST #:

OAL Oregon Analytical Laboratory
14855 S.W. Old Scholls Ferry Rd
Beaverton, Oregon 97007
(503) 590-5300
FAX (503) 671-1404

CHAIN OF CUSTODY RECORD
LABORATORY ANALYSIS REQUEST

Client Information
Company: RZA AGRA, Inc
Contact: Gerry Koschal
Address: 7477 SW TECH CTR DR
Pdx 97223
Phone #: 639-3400 FAX #:

Project Name: BES-St John's
Project Number: 7197
P.O. Number:
Comments: PCBs

Sampler's Name: Denny M
Signature: Denny R Macomber
Sampling Date: 11/19/93
Provide Verbal Results: ☒ Yes ☐ No
Provide FAX Results: ☐ Yes ☐ No

N - 2 weeks
S - 1 week
R - Rush
O - Other

Sample Identification	Date	Time	OAL #	# of Containers	Matrix: Soil	Matrix: Water	Matrix: Other (Note in Remarks)	Volatiles 624/8260 (circle) As Aromatic Halogenated	Semivolatiles 625/8270 (circle) As PAH/SIM Phenol Phthalate	Organochlorinated 608/8080 As PCB Pesticide (circle)	Chlorinated Herbicides 8150	TPH HCID OR DEQ Quantify? Yes No	TPH Quantification (circle) G D 418.1M 418.1	BTEX 602/8020	TCLP Metals (circle) As Ba Cd Cr Pb Hg Se Ag	TCLP Organics (circle) Vol Semivol Pest Herb	Metals - Dissolved Total	Test	PCBs		Containers	Turnaround	Remarks
MP-6	11/19/93	10:15	25-0173-17523	2															X		2	R	
MP-5	11/19/93	9:20	25-0173-17524	1															X		1	R	
3																							
4																							
5																							
6																							
7																							
8																							
9																							
10																							

Relinquished	Date	Time
Signature: Denny R Macomber	11/19/93	11 AM
Print Name: Denny Macomber		
Company: RZA AGRA, Inc		

Received	Date	Time
Signature: Dennise Ward	11-19-93	11 AM
Print Name: D Ward		
Company: OAL		

Relinquished	Date	Time
Signature		
Print Name		
Company		

Received	Date	Time
Signature		
Print Name		
Company		

Shipped Via:
Received @ 4 °C
Appropriate Containers ☒ Yes ☐ No
2 Soil / 1 water
4oz./8oz. Jars
VOA Vials
Plastic Bottles
Glass Bottles
other

CRAW00018141

RZA AGRA, Inc.
(Formerly: Rittenhouse-Zeman & Associates, Inc.)
Engineering & Environmental Services
7477 SW Tech Center Drive • Portland, OR 97223-8024
(503) 639-3400 • FAX (503) 620-7892

Chain-of-Custody Record / Laboratory Analyses Request

Project: ~~0-7199~~ ST JOHNS Job #: 7197
Client: CITY OF PORTLAND - BES
Project Manager: G KOSCHAL Phone #: 639-3400
Sampler's Name: G KOSCHAL Phone #:
Sampler's Signature: [signature]

Analysis Requested: (Circle, Check Box, or Write Preferred Method in Box)

Sample I.D. #	Date	Time	Preserv.	Matrix	Halogenated Volatiles EPA 601 EPA 8010	Volatile Aromatics EPA 602 EPA 8020	BTXE or BTXE / TPH-G	WA. TPH-G or OR. TPH-G	WA. TPH-D or OR. TPH-D	Fuel Scan / TPH by GC 8015-modified	GC Fingerprint / HCID	WA. 418.1 Modified or OR. 418.1 Modified	GC / MS Volatiles	GC / MS Semi Volatiles	Total Metals ICP AA Other	TC LP Metals	pH Cond. Alk Color	PCB		# of Containers	Comments
1. IN-1	11/24/93																	X		1	25-0173-17822
2.																					
3.																					
4.																					
5.																					
6.																					
7.																					
8.																					
9.																					
10.																					

Relinquished by RZA:	Relinquished by:	Relinquished by:	Laboratory:	Sample Receipt:
Signature: [signature]	Signature:	Signature:	OAL	
Printed Name: GERRAD KOSCHAL	Printed Name:	Printed Name:	Shipping I.D.#	Total # Containers:
Firm: RZA AGRA	Firm:	Firm:	Carrier:	Condition of Containers:
Date/Time: 11/29/93 4:20	Date/Time:	Date/Time:	DOT Designation:	Condition of Seals:
Received by:	**Received by:**	**Received by:**	**Special Instructions/Comments:**	
Signature: [signature]	Signature:	Signature:	INSULATION FROM CASE	
Printed Name: D.C. PLATH	Printed Name:	Printed Name:		
Firm: OAL	Firm:	Firm:		
Date/Time: 11/29/93 4:30P	Date/Time:	Date/Time:		

DISTRIBUTION: WHITE & PINK returned to project manager, YELLOW - lab.

Page 1 of 1

SERVICE REQUEST #:

CRAW00018142

RZA AGRA, Inc.

(Formerly: Rittenhouse-Zeman & Associates, Inc.)
Engineering & Environmental Services
7477 SW Tech Center Drive • Portland, OR 97223-8024
(503) 639-3400 • FAX (503) 620-7892

Chain-of-Custody Record / Laboratory Analyses Request

1037

Project: FES-ST Johns Job #: 7197
Client: City of Portland
Project Manager: Gerry Koschal Phone #639-3400
Sampler's Name: D Macomber Phone #: 639-3400
Sampler's Signature: [signature]

Analysis Requested: (Circle, Check Box, or Write Preferred Method in Box)

Sample I.D. #	Date	Time	Preserv.	Matrix	Halogenated Volatiles EPA 601 EPA 8010	Volatile Aromatics EPA 602 EPA 8020	BTXE or BTXE / TPH-G	WA TPH-G or OR TPH-G	WA TPH-D or OR TPH-D	Fuel Scan / TPH by GC 8015-modified	GC Fingerprint / HCID	WA 418.1 Modified or OR 418.1 Modified	GC / MS Volatiles	GC / MS Semi Volatiles	Total Metals ICP AA Other	TC LP Metals	pH Cond. Alk. Color	PCBs		# of Containers	Comments
1. FCL-1B	12/20/93	11:30	ice	Soil														X		1	05-0173-18904
2. FCL-3B		1345																X		1	18905
3. FCL-4B		1400																X		1	18906
4. FCL-6B		1415																X		1	18907
5. FCL-7B		1430																X		1	18908
6.																					
7.																					
8.																					
9.																					
10.																					

Relinquished by RZA:	Relinquished by:	Relinquished by:	Laboratory:	Sample Receipt:
Signature: [signature]	Signature:	Signature:		
Printed Name: Denny Macomber	Printed Name:	Printed Name:	Shipping I.D.#	Total # Containers:
Firm: RZA AGRA	Firm:	Firm:	Carrier:	Condition of Containers:
Date/Time: 12/21/93 9:00	Date/Time:	Date/Time:	DOT Designation:	Condition of Seals:
Received by:	**Received by:**	**Received by:**	**Special Instructions/Comments:**	
Signature: Denice J. Ward	Signature:	Signature:	48 hour turn-around	
Printed Name: D Ward	Printed Name:	Printed Name:		
Firm: OAL	Firm:	Firm:		
Date/Time: 12-21-93 9:02	Date/Time:	Date/Time:		

DISTRIBUTION: WHITE & PINK returned to project manager, YELLOW - lab.

Page ____ of ____.

SERVICE REQUEST #: _____

0216

RZA AGRA, Inc.

(Formerly: Rittenhouse-Zeman & Associates, Inc.)
Engineering & Environmental Services
7477 SW Tech Center Drive • Portland, OR 97223-8024
(503) 639-3400 • FAX (503) 620-7892

Chain-of-Custody Record / Laboratory Analyses Request

Project: BES-3 Job #: 7197
Client: City of Portland
Project Manager: G. Koschal Phone #: 639-3400
Sampler's Name: D. Macomber Phone #: 639-3400
Sampler's Signature: [signature]

Analysis Requested: (Circle, Check Box, or Write Preferred Method in Box)

Sample I.D. #	Date	Time	Preserv.	Matrix	Halogenated Volatiles EPA 601 EPA 8010	Volatile Aromatics EPA 602 EPA 8020	BTXE or BTXE / TPH-G	WA TPH-G or OR TPH-G	WA TPH-D or OR TPH-D	Fuel Scan / TPH by GC 8015-modified	GC Fingerprint / HCID	WA 418.1 Modified or OR 418.1 Modified	GC / MS Volatiles	GC / MS Semi Volatiles	Total Metals ICP AA Other	TC LP Metals	pH Cond. Alk Color	PCBs		# of Containers	Comments
1. TANK-A	12/21/93	1545	ice	H_2O	25-0173-18987													X		1	
2. TS-1	|	1445	|	|			18988										X		1	
3. TS-2	|	1500	|	|			18989										X		1	
4. TS-3	|	1515	|	|			18990										X		1	
5.																					
6.																					
7.																					
8.																					
9.																					
10.																					

Relinquished by RZA:	Relinquished by:	Relinquished by:	Laboratory:	Sample Receipt:
Signature: [signature]	Signature:	Signature:		
Printed Name: Denny Macomber	Printed Name:	Printed Name:	Shipping I.D.#	Total # Containers:
Firm: RZA AGRA, Inc	Firm:	Firm:	Carrier:	Condition of Containers:
Date/Time: 12/22/93 10:30	Date/Time:	Date/Time:	DOT Designation:	Condition of Seals:

Received by:	Received by:	Received by:	Special Instructions/Comments:
Signature: [signature]	Signature:	Signature:	48 hour Turn-Around
Printed Name: D. Ward	Printed Name:	Printed Name:	
Firm: OAL	Firm:	Firm:	
Date/Time: 12-22-93 10:30	Date/Time:	Date/Time:	

DISTRIBUTION: WHITE & PINK returned to project manager, YELLOW - lab.

Page 1 of 1

SERVICE REQUEST #:

CRAW00018144

0282

RZA AGRA, Inc.

(Formerly: Rittenhouse-Zeman & Associates, Inc.)
Engineering & Environmental Services
7477 SW Tech Center Drive • Portland, OR 97223-8024
(503) 639-3400 • FAX (503) 620-7892

Chain-of-Custody Record / Laboratory Analyses Request

Project: BES (RZA office - Baker) Job #: 7147
Client: BES - City of Portland
Project Manager: G. Roschal Phone # 639-3400
Sampler's Name: D. Macomber Phone # 639-3400
Sampler's Signature: [signature]

Analysis Requested: (Circle, Check Box, or Write Preferred Method in Box)

Sample I.D. #	Date	Time	Preserv.	Matrix	Halogenated Volatiles EPA 601 EPA 8010	Volatile Aromatics EPA 602 EPA 8020	BTXE or BTXE / TPH-G	WA. TPH-G or OR. TPH-G	WA. TPH-D or OR. TPH-D	Fuel Scan / TPH by GC 8015-modified	GC Fingerprint / HCID	WA. 418.1 Modified or OR. 418.1 Modified	GC / MS Volatiles	GC / MS Semi Volatiles	Total Metals ICP AA Other	TC LP Metals	pH Cond. Alk Color	PCB		# of Containers	Comments
1. BT-1	7/13/94	845	ice	H_2O														X		2	25-0173-19700
2.																					
3.																					
4.																					
5.																					
6.																					
7.																					
8.																					
9.																					
10.																					

Relinquished by RZA:	Relinquished by:	Relinquished by:	Laboratory:	Sample Receipt:
Signature: [signature]	Signature:	Signature:		
Printed Name: Denny Macomber	Printed Name:	Printed Name:	Shipping I.D.#	Total # Containers:
Firm: RZA AGRA, Inc	Firm:	Firm:	Carrier:	Condition of Containers:
Date/Time: 7/13/94 10 AM	Date/Time:	Date/Time:	DOT Designation:	Condition of Seals:

Received by:	Received by:	Received by:	Special Instructions/Comments:
Signature: K.A. Nickerson	Signature:	Signature:	- Normal turn-around
Printed Name: Kelly Nickerson	Printed Name:	Printed Name:	
Firm: DAL	Firm:	Firm:	
Date/Time: 7/13/94 10 AM	Date/Time:	Date/Time:	

DISTRIBUTION: WHITE & PINK returned to project manager, YELLOW - lab.

Page 1 of 1

SERVICE REQUEST #:

CRAW00018145

OAL

RZA AGRA, INC.
7477 SW TECH CENTER DRIVE
PORTLAND, OR 97223

REVIEWED BY: D. Miller
REVIEW DATE: 11/24/93

GERRY KOSCHAL
639-3400/ FAX 620-7892
JOB #7197

PCB ANALYSIS OF SOLIDS
BY EPA METHODS 3540 AND 8080/8081

SAMPLE ID:	SP-17D
OAL ID: 25-0173-	17677
SAMPLE DATE:	11/19/93
MATRIX:	SOIL
EXTRACTION DATE:	11/23/93
ANALYSIS DATE:	11/23/93
PCB MG/KG	0.25 (1260)
SURR.RECOVERY %	104.
ANALYST:	DM

MG/KG = PPM
ND = NONE DETECTED(<0.05 MG/KG)
NA = NOT ANALYZED
MI = MATRIX INTERFERENCE WITH SURROGATE RECOVERY
SURROGATE(S) USED: TETRACHLORO-M-XYLENE AND/OR DECACHLOROBIPHENYL

OREGON ANALYTICAL LABORATORY
A Division of Portland General Electric
14855 S.W. Old Scholls Ferry Road
Beaverton, OR 97007
Phone 503-644-5300 • Fax 503-671-1404

OAL

RECEIVED DEC 0 3 1993

RZA AGRA, INC.
7477 SW TECH CENTER DRIVE
PORTLAND, OR 97223

REVIEWED BY: DLP

REVIEW DATE: 12/1/93

GERRY KOSCHAL
639-3400/ FAX 620-7892
JOB #7197

PCB ANALYSIS OF SOLIDS
BY EPA METHODS 3540 AND 8080/8081

SAMPLE ID:	CL-1B	CL-2B	CL-5B	MP-3	MP-4
OAL ID: 25-0173-	17556	17557	17558	17559	17560
SAMPLE DATE:	11/17/93	11/17/93	11/17/93	11/18/93	11/18/93
MATRIX:	SOIL	SOIL	SOIL	SOIL	NA
EXTRACTION DATE:	11/29/93	11/29/93	11/29/93	11/29/93	.
ANALYSIS DATE:	11/30/93	11/30/93	11/30/93	11/30/93	.
PCB MG/KG	0.28(1260)*	0.39(1260)	0.06(1260)*	ND	.
SURR.RECOVERY %	97.	100.	99.	98.	.
ANALYST:	DM	DM	DM	DM	.

MG/KG = PPM
ND = NONE DETECTED(<0.05 MG/KG)
NA = NOT ANALYZED
MI = MATRIX INTERFERENCE WITH SURROGATE RECOVERY
SURROGATE(S) USED: TETRACHLORO-M-XYLENE AND/OR DECACHLOROBIPHENYL

* These two samples showed a small amount of Aroclor 1254 also. The result listed is a total.

OREGON ANALYTICAL LABORATORY
A Division of Portland General Electric
14855 S.W. Old Scholls Ferry Road
Beaverton, OR 97007
Phone 503-644-5300 • Fax 503-671-1404

OAL

RZA AGRA, INC.
7477 SW TECH CENTER DRIVE
PORTLAND, OR 97223

REVIEWED BY: DH
REVIEW DATE: 12/1/93

GERRY KOSCHAL
639-3400/ FAX 620-7892
JOB #7197

PCB ANALYSIS OF SOILS
BY SHAKEOUT* AND EPA 8080/8081

SAMPLE ID:	MP-4
OAL ID: 25-0173-	17774
SAMPLE DATE:	11/17/93
PCB SHAKEOUT PPM	0.07(1260)

MG/KG = PPM
ND = NONE DETECTED(<0.05 MG/KG)
NA = NOT ANALYZED
* THE SHAKEOUT PREP IS NOT AN EPA APPROVED PROCEDURE AND SHOULD BE USED FOR SCREENING PURPOSES ONLY.

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OAL

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RZA AGRA, INC.
7477 SW TECH CENTER DRIVE
PORTLAND, OR 97223

REVIEWED BY: DM

REVIEW DATE: 12/9/93

GERRY KOSCHAL
639-3400/ FAX 620-7892
JOB #7197

PCB ANALYSIS OF SOLIDS
BY EPA METHODS 3580 AND 8080/8081

SAMPLE ID:		IN-1
OAL ID: 25-0173-		17822
SAMPLE DATE:		11/24/93
PCB	MG/KG	17000. (1260)

MG/KG = PPM
ND = NONE DETECTED(<0.5 MG/KG)
NA = NOT ANALYZED

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OAL

RZA AGRA, INC.
7477 SW TECH CENTER DRIVE
PORTLAND, OR 97223

REVIEWED BY: Cory DV
REVIEW DATE: 2/15/94

G.K.KOSCHAL
639-3400/ FAX 620-7892
JOB #7197

PCB ANALYSIS OF SOLIDS
BY EPA METHODS 3540 AND 8080/8081

SAMPLE ID:	FCL-1	FCL-2	FCL-3	FCL-4	FCL-5
OAL ID: 25-0173-	18648	18649	18650	18651	18652
SAMPLE DATE:	12/13/93	12/13/93	12/13/93	12/13/93	12/13/93
MATRIX:	SOIL	SOIL	SOIL	SOIL	SOIL
EXTRACTION DATE:	12/15/93	12/15/93	12/15/93	12/15/93	12/15/93
ANALYSIS DATE:	12/15/93	12/15/93	12/15/93	12/15/93	12/15/93
PCB MG/KG	900.	0.31	2,500.	9.4	0.19
SURR.RECOVERY %	96.	95.	96.	98.	98.
ANALYST:	CN	CN	CN	CN	CN

MG/KG = PPM
ND = NONE DETECTED(<0.05 MG/KG)
NA = NOT ANALYZED
MI = MATRIX INTERFERENCE WITH SURROGATE RECOVERY
SURROGATE(S) USED: TETRACHLORO-M-XYLENE AND/OR DECACHLOROBIPHENYL

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14855 S.W. Old Scholls Ferry Road
Beaverton, OR 97007
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RZA AGRA, INC.
7477 SW TECH CENTER DRIVE
PORTLAND, OR 97223

REVIEWED BY: Cory Dep
REVIEW DATE: 2/15/94

G.K.KOSCHAL
639-3400/ FAX 620-7892
JOB #7197

PCB ANALYSIS OF SOLIDS
BY EPA METHODS 3540 AND 8080/8081

SAMPLE ID:	FCL-6	FCL-7	FCL-8	FCL-9	FCL-10
OAL ID: 25-0173-	18653	18654	18655	18656	18657
SAMPLE DATE:	12/13/93	12/13/93	12/13/93	12/13/93	12/13/93
MATRIX:	SOIL	SOIL	SOIL	SOIL	SOIL
EXTRACTION DATE:	12/15/93	12/15/93	12/15/93	12/15/93	12/15/93
ANALYSIS DATE:	12/15/93	12/15/93	12/15/93	12/15/93	12/15/93
PCB MG/KG	9.8	2.2	ND	ND	ND
SURR.RECOVERY %	96.	97.	98.	99.	97.
ANALYST:	CN	CN	CN	CN	CN

MG/KG = PPM
ND = NONE DETECTED(<0.05 MG/KG)
NA = NOT ANALYZED
MI = MATRIX INTERFERENCE WITH SURROGATE RECOVERY
SURROGATE(S) USED: TETRACHLORO-M-XYLENE AND/OR DECACHLOROBIPHENYL

OREGON ANALYTICAL LABORATORY
A Division of Portland General Electric
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RZA AGRA, INC.
7477 SW TECH CENTER DRIVE
PORTLAND, OR 97223

REVIEWED BY: copy DM
REVIEW DATE: 2/15/94

G.K.KOSCHAL
639-3400/ FAX 620-7892
JOB #7197

PCB ANALYSIS OF SOLIDS
BY EPA METHODS 3540 AND 8080/8081

SAMPLE ID:	FCL-11	FCL-12	FCL-13	FCL-13E	FCL-1E
OAL ID: 25-0173-	18658	18659	18660	18661	18662
SAMPLE DATE:	12/14/93	12/14/93	12/14/93	12/14/93	12/14/93
MATRIX:	SOIL	SOIL	SOIL	SOIL	SOIL
EXTRACTION DATE:	12/15/93	12/15/93	12/15/93	12/15/93	12/15/93
ANALYSIS DATE:	12/15/93	12/15/93	12/15/93	12/15/93	12/15/93
PCB MG/KG	ND	ND	ND	ND	ND
SURR.RECOVERY %	93.	96.	87.	89.	98.
ANALYST:	CN	CN	CN	CN	CN

MG/KG = PPM
ND = NONE DETECTED(<0.05 MG/KG)
NA = NOT ANALYZED
MI = MATRIX INTERFERENCE WITH SURROGATE RECOVERY
SURROGATE(S) USED: TETRACHLORO-M-XYLENE AND/OR DECACHLOROBIPHENYL

OREGON ANALYTICAL LABORATORY
A Division of Portland General Electric
14855 S.W. Old Scholls Ferry Road
Beaverton, OR 97007
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OAL

RZA AGRA, INC.
7477 SW TECH CENTER DRIVE
PORTLAND, OR 97223

REVIEWED BY: copy DM
REVIEW DATE: 2/15/94

GERRY KOSCHAL
639-3400/ FAX 620-7892
JOB #7197

PCB ANALYSIS OF SOLIDS
BY EPA METHODS 3540 AND 8080/8081

SAMPLE ID:	FCL-1B	FCL-3B	FCL-4B	FCL-6B	FCL-7B
OAL ID: 25-0173-	18904	18905	18906	18907	18908
SAMPLE DATE:	12/20/93	12/20/93	12/20/93	12/20/93	12/20/93
MATRIX:	SOIL	SOIL	SOIL	SOIL	SOIL
EXTRACTION DATE:	12/21/93	12/21/93	12/21/93	12/21/93	12/21/93
ANALYSIS DATE:	12/22/93	12/22/93	12/22/93	12/22/93	12/22/93
PCB MG/KG	0.31	ND	ND	ND.	ND
SURR.RECOVERY %	100.	99.	101.	101.	99.
ANALYST:	DM	DM	DM	DM	DM

MG/KG = PPM
ND = NONE DETECTED(<0.05 MG/KG)
NA = NOT ANALYZED
MI = MATRIX INTERFERENCE WITH SURROGATE RECOVERY
SURROGATE(S) USED: TETRACHLORO-M-XYLENE AND/OR DECACHLOROBIPHENYL

OREGON ANALYTICAL LABORATORY
A Division of Portland General Electric
14855 S.W. Old Scholls Ferry Road
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OAL

RZA AGRA, INC.
7477 SW TECH CENTER DRIVE
PORTLAND, OR 97223

REVIEWED BY: DP

REVIEW DATE: 12/23/93

G.KOSCHAL
639-3400/ FAX 620-7892
JOB #7197

PCB ANALYSIS OF WATER
BY EPA METHODS 3510 AND 8080/8081

SAMPLE ID:	TANK-A	TS-1	TS-2	TS-3
OAL ID: 25-0173-	18987	18988	18989	18990
SAMPLE DATE:	12/21/93	12/21/93	12/21/93	12/21/93
EXTRACTION DATE:	12/22/93	12/22/93	12/22/93	12/22/93
ANALYSIS DATE:	12/22/93	12/22/93	12/22/93	12/22/93
PCB UG/L	160. (1260)	37.(1260)	1500.(1260)	27.(1260)
SURR.RECOVERY %	83.	97.	94.	93.
ANALYST:	CN	CN	CN	CN

UG/L = PPB
ND = NONE DETECTED(<0.5 UG/L)
NA = NOT ANALYZED
MI = MATRIX INTERFERENCE WITH SURROGATE RECOVERY
SURROGATE(S) USED: TETRACHLORO-M-XYLENE AND/OR DECACHLOROBIPHENYL

OREGON ANALYTICAL LABORATORY
A Division of Portland General Electric
14855 S.W. Old Scholls Ferry Road
Beaverton, OR 97007
Phone 503-644-5300 • Fax 503-671-1404

RZA AGRA, Inc.

(Formerly: Rittenhouse-Zeman & Associates, Inc.)
Engineering & Environmental Services
7477 SW Tech Center Drive • Portland, OR 97223-8024
(503) 639-3400 • FAX (503) 620-7892

Chain-of-Custody Record / Laboratory Analyses Reque

Project: St Johns (BES) Job #: 7197
Client: City of Portland
Project Manager: Gerry Koschal Phone #: 639-3400
Sampler's Name: Denny Macomber Phone #: 639-3400
Sampler's Signature: Denny R Macomber

Analysis Requested: (Circle, Check Box, or Write Preferred Method in Box)

Sample I.D. #	Date	Time	Preserv.	Matrix	Halogenated Volatiles EPA 601 EPA 8010	Volatile Aromatics EPA 602 EPA 8020	BTXE or BTXE / TPH-G	WA TPH-G or OR TPH-G	WA TPH-D or OR TPH-D	Fuel Scan / TPH by GC 8015-modified	GC Fingerprint / HCID	WA 418.1 Modified or OR 418.1 Modified	GC / MS Volatiles	GC / MS Semi Volatiles	Total Metals ICP AA Other	TC LP Metals	pH Cond. Alk. Color	PCBs		# of Containers	Comments
1. P-1	11/5/93	1630	ice	Soil														X		2	
2. P-2	11/5/93	1635																X		2	
3. P-3	11/5/93	1635																X		2	
4. P-4	11/5/93	1640																X		2	
5. P-5	11/5/93	1645																X		2	
6.																					
7. SS-1	11/5/93	1545	ice	H_2O														X		1	
8.																					
9.																					
10.																					

Relinquished by RZA:	Relinquished by:	Relinquished by:	Laboratory:	Sample Receipt:
Signature: Denny R Macomber	Signature:	Signature:		
Printed Name: Denny R Macomber	Printed Name:	Printed Name:	Shipping I.D.#	Total # Containers:
Firm: RZA AGRA, Inc	Firm:	Firm:	Carrier:	Condition of Containers:
Date/Time: 11/8/93 8:30	Date/Time:	Date/Time:	DOT Designation:	Condition of Seals:
Received by:	**Received by:**	**Received by:**	**Special Instructions/Comments:**	
Signature: Sean Gormley	Signature:	Signature:		
Printed Name: Sean Gormley	Printed Name:	Printed Name:		
Firm: RZA AGRA, Inc.	Firm:	Firm:		
Date/Time: 11/8/93 08:30	Date/Time:	Date/Time:		

DISTRIBUTION: WHITE & PINK returned to project manager, YELLOW - lab.

Page 1 of 1
SERVICE REQUEST #:

CRAW00018155

RZA AGRA, Inc.

(Formerly: Rittenhouse-Zeman & Associates, Inc.)
Engineering & Environmental Services
7477 SW Tech Center Drive • Portland, OR 97223-8024
(503) 639-3400 • FAX (503) 620-7892

Chain-of-Custody Record / Laboratory Analyses Request

Project: BES-St Johns Job #: 7197
Client: City of Portland
Project Manager: Gerry Kuschel Phone # 639-3400
Sampler's Name: Dennis Macomber Phone # 639-3400
Sampler's Signature: [signature]

Analysis Requested: (Circle, Check Box, or Write Preferred Method in Box)

Sample I.D. #	Date	Time	Preserv.	Matrix	Halogenated Volatiles EPA 601 EPA 8010	Volatile Aromatics EPA 602 EPA 8020	BTXE or BTXE / TPH-G	WA TPH-G or OR TPH-G	WA TPH-D or OR TPH-D	Fuel Scan / TPH by GC 8015-modified	GC Fingerprint / HCID	WA 418.1 Modified or OR 418.1 Modified	GC / MS Volatiles	GC / MS Semi Volatiles	Total Metals ICP AA Other	TC LP Metals	pH Cond. Alk. Color			# of Containers	Comments
1. CL-1	11/5/93	13:10	ICe	Soil		25-	017	3-	16888									X		2	
2. CL-2		13:20							16889									X		2	
3. CL-3		13:30							16890									X		2	
4. CL-4		13:40							16891									X		2	
5. CL-5		13:50							16892									X		2	
6.																					
7.																					
8.																					
9.																					
10.																					

Relinquished by RZA:	Relinquished by:	Relinquished by:	Laboratory:	Sample Receipt:
Signature: [signature]	Signature:	Signature:		
Printed Name: Dennis Macomber	Printed Name:	Printed Name:	Shipping I.D.#	Total # Containers: 11
Firm: RZA AGRA	Firm:	Firm:	Carrier:	Condition of Containers:
Date/Time: 11/9/93 9:30 am	Date/Time:	Date/Time:	DOT Designation:	Condition of Seals:

Received by:	Received by:	Received by:	Special Instructions/Comments:
Signature:	Signature:	Signature: [signature]	
Printed Name:	Printed Name:	Printed Name: D. Ward	
Firm:	Firm:	Firm: OAL	
Date/Time:	Date/Time:	Date/Time: 11-9-93	

DISTRIBUTION: WHITE & PINK returned to project manager, YELLOW - lab.

Page 1 of 1

SERVICE REQUEST #:

CRAW00018156

RZA AGRA, Inc.

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Engineering & Environmental Services
7477 SW Tech Center Drive • Portland, OR 97223-8024
(503) 639-3400 • FAX (503) 620-7892

Chain-of-Custody Record / Laboratory Analyses Requested

Project: BES Job #:
Client: City of Portland
Project Manager: Gerry Koschel Phone #: 639-3400
Sampler's Name: D. Robertson Phone #:
Sampler's Signature: —

Analysis Requested: (Circle, Check Box, or Write Preferred Method in Box)

Sample I.D. #	Date	Time	Preserv.	Matrix	Halogenated Volatiles EPA 601 EPA 8010	Volatile Aromatics EPA 602 EPA 8020	BTXE or BTXE / TPH-G	WA TPH-G or OR TPH-G	WA TPH-D or OR TPH-D	Fuel Scan / TPH by GC 8015-modified	GC Fingerprint / HCID	WA 418.1 Modified or OR 418.1 Modified	GC / MS Volatiles	GC / MS Semi Volatiles	Total Metals ICP AA Other	TC LP Metals	pH Cond. Alk Color	BOD-PBS only		# of Containers
1. BP-1-11.5	11/11/93		Cool	Soil	25-117		17006											X		2
2. AP-1-8	↓		↓	↓			17007											X		2
3. BP-2-10.5							17008											X		2
4. AB-2-7							17009											X		2
5. MP-1	↓		↓	↓			17010											X		1
6.																				
7.																				
8.																				
9.																				
10.																				

Relinquished by RZA	Relinquished by:	Relinquished by:	Laboratory:	Sample Receipt:
Signature: Sean Gourley	Signature:	Signature:	OAL	
Printed Name: Sean Gourley	Printed Name:	Printed Name:	Shipping I.D.#	Total # Containers:
Firm: RZA AGRA, Inc.	Firm:	Firm:	Carrier: Ontime	Condition of Containers:
Date/Time: 11/12/93 09:00	Date/Time:	Date/Time:	DOT Designation:	Condition of Seals:
Received by:	**Received by:**	**Received by:**	**Special Instructions/Comments:**	
Signature:	Signature:	Signature: Walt Strendling	Original COC # 1013	
Printed Name:	Printed Name:	Printed Name: Wally Strendling		
Firm:	Firm:	Firm: OAL		
Date/Time:	Date/Time:	Date/Time: 11-12 9:25		

DISTRIBUTION: WHITE & PINK returned to project manager, YELLOW - lab.

SERVICE REQUEST #:

RZA AGRA, Inc.

(Formerly: Rittenhouse-Zeman & Associates, Inc.)
Engineering & Environmental Services
7477 SW Tech Center Drive • Portland, OR 97223-8024
(503) 639-3400 • FAX (503) 620-7892

Chain-of-Custody Record / Laboratory Analyses Requested

Project: RES ST JOHNS Job #: 7197-00
Client: CITY OF PORTLAND
Project Manager: GERRY KOSCHAK Phone #:
Sampler's Name: DAVE ROBERTSON Phone #:
Sampler's Signature:

Analysis Requested: (Circle, Check Box, or Write Preferred Method in Box)

Sample I.D. #	Date	Time	Preserv.	Matrix	Halogenated Volatiles EPA 601 EPA 8010	Volatile Aromatics EPA 602 EPA 8020	BTXE or BTXE / TPH-G	WA. TPH-G or OR. TPH-G	WA. TPH-D or OR. TPH-D	Fuel Scan / TPH by GC 8015-modified	GC Fingerprint / HCID	WA. 418.1 Modified or OR. 418.1 Modified	GC / MS Volatiles	GC / MS Semi Volatiles	Total Metals ICP AA Other	TC LP Metals	pH Cond. Alk. Color	8080-PCB		# of Containers	Comments
1. AD-3-5	11/13/93	9:15	CHILL	SOIL		25-D	173-		17229									X		2	RUSH
2. BP-3-10	11/11/93	4:05	↓	↓					17230									↓		2	↓
3. BP-4-MS	11/11/93	4:00							17231											2	
4. MP-2	11/13/93	12:15	↓	↓					17232									↓		2	↓
5.																					
6.																					
7.																					
8.																					
9.																					
10.																					

Relinquished by RZA:	Relinquished by:	Relinquished by:	Laboratory:	Sample Receipt:
Signature:	Signature:	Signature:		
Printed Name: DAVID ROBERTSON	Printed Name: Jean Gormley	Printed Name:	Shipping I.D.#:	Total # Containers:
Firm: RZA AGRA	Firm: RZA AGRA, Inc.	Firm:	Carrier:	Condition of Containers:
Date/Time: 11/15/93	Date/Time: 11/16/93	Date/Time:	DOT Designation:	Condition of Seals:
Received by:	**Received by:**	**Received by:**	**Special Instructions/Comments:**	
Signature: Jean Gormley	Signature:	Signature: Wally Strending	RUSH - 11/13/93 SAMPLES 48 hour TAT - Please	
Printed Name: Jean Gormley	Printed Name:	Printed Name: Wally Strending		
Firm: RZA AGRA	Firm:	Firm: OAC		
Date/Time: 11/15/93 08:50	Date/Time:	Date/Time: 11-16-93 11:10		

DISTRIBUTION: WHITE & PINK returned to project manager, YELLOW - lab.

Page 1 of

SERVICE REQUEST #:

CRAW00018158

RZA

RITTENHOUSE-ZEMAN & ASSOCIATES, INC.
EARTH & ENVIRONMENTAL CONSULTANTS

7409 S.W. Tech Center Drive, Suite 135
Portland, Oregon 97223-8024
(503) 639-3400 FAX: (503) 620-7892

3689

CHAIN-OF-CUSTODY RECORD / LABORATORY ANALYSES REQUEST

PROJECT: RES-ST JOHNS JOB #: 7192
CLIENT: City OF Portland
PROJ. MANAGER: G. Koscha PHONE #: 639-3400
SITE ADDRESS: ST Johns Bridge / Burlingame
SAMPLER'S NAME: D. Macomber PHONE #: 639 3400
SAMPLER'S SIGNATURE: [signature]

ANALYSIS REQUESTED: (Circle, Check Box, or Write Preferred Method in Box) OTHER: (Write In)

SAMPLE ID #	DATE	TIME	PRESERV.	MATRIX	Halogenated Volatiles EPA 601 EPA 8010	Aromatics (BTX&E) EPA 602 EPA 8020	Fuel Scan/TPH by GC EPA 602-mod/8015-mod.	Volatile Organ. Compds	GC Fingerprint	Pentachlorophenol EPA 604 EPA 8010	Tot. Petrol. Hydrocarbons EPA 413.1, 418.1 / TLC	Total Metals ICP AA Other	EP-TOX Metals	Purgeable Organics EPA 624 8240	Base/Neut.Acids EPA 625 8270	pH Cond. Alk Color	NO3/NO2 N-NO3 NH3-N	Ca Mg Na K Fe Cl SO4	TOX TOC TDS COD	PCBs 8080			# of Containers	Sample Preparation	Detection Limits Desired
1. CL-1B	11/17/93	1600	ICE	Soil	25	01	73-	17	556											X			2		
2. CL-2B		1605						17	557											X			2		
3. CL-5B		1610						17	558											X			2		
4. MP-3	11/18	10:00						17	559											X					
5. MP-4	"	10:20						17	560											X					
6.																									
7.																									
8.																									
9.																									
10.																									

RELINQUISHED BY RZA:	RELINQUISHED BY:	RELINQUISHED BY:	LABORATORY:	SAMPLE RECEIPT:
Signature: [signature]	Signature: [signature]	Signature:		
Printed Name: Denny Macomber	Printed Name: DAVE ROBERTSON	Printed Name:	Shipping I.D. #:	Total # Containers:
Firm: RZA AGRA, Inc	Firm: RZA AGRA	Firm:	Carrier:	Condition of Containers?
Date/Time: 11/18/93 4:15	Date/Time: 11/18/93	Date/Time:	DOT Designation:	Condition of Seals?
RECEIVED BY:	**RECEIVED BY:**	**RECEIVED BY:**	**SPECIAL INSTRUCTIONS/COMMENTS:**	
Signature: [signature]	Signature: [signature]	Signature:	(with Additional Closure Samples) Please identify Aroclor present	
Printed Name: DAVE ROBERTSON	Printed Name: David Box	Printed Name:		
Firm: RZA AGRA	Firm:	Firm:		
Date/Time: 11/18/93 4:15	Date/Time:	Date/Time:		

DISTRIBUTION: WHITE-return to RZA; YELLOW-lab; PINK-retained by RZA.

PAGE____ OF ____.

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(Formerly: Rittenhouse-Zeman & Associates, Inc.)
Engineering & Environmental Services
7477 SW Tech Center Drive • Portland, OR 97223-8024
(503) 639-3400 • FAX (503) 620-7892

Chain-of-Custody Record / Laboratory Analyses Req

Project: RES-ST Johns Job #: 7197
Client: City of Portland
Project Manager: Jim Koscher Phone #: 639-3400
Sampler's Name: Dan Macomber Phone #: 639-3400
Sampler's Signature: [signature]

Analysis Requested: (Circle, Check Box, or Write Preferred Method In Box)

Sample I.D. #	Date	Time	Preserv.	Matrix	Halogenated Volatiles EPA 601 EPA 8010	Volatile Aromatics EPA 602 EPA 8020	BTXE or BTXE / TPH-G	WA TPH-G or OR TPH-G	WA TPH-D or OR TPH-D	Fuel Scan / TPH by GC 8015-modified	GC Fingerprint / HCID	WA 418.1 Modified or OR 418.1 Modified	GC / MS Volatiles	GC / MS Semi Volatiles	Total Metals ICP AA Other	TC LP Metals	pH Cond. Alk Color	PCB's 8080		# of Containers	Comments
1. MP-6	11/19/93	1600	ice	soil		25-0173			17657									X		1	
2. SP-1	11/19	14:00							17658									X		1	
3. SP-2	11/19	14:05							17659									X		1	
4. SP-3	11/19	14:10							17660									X		1	
5. SP-4	11/19	14:15							17661									X		1	
6. SP-5	11/19	14:20							17662									X		1	
7. SP-6	11/19	14:25							17663									X		1	
8. SP-7	11/19	14:30							17664									X		1	
9. SP-8	11/19	14:35							17665									X		1	
10. SP-9	11/19	14:40							17666												

Relinquished by RZA:	Relinquished by:	Relinquished by:	Laboratory:	Sample Receipt:
Signature: [signature]	Signature:	Signature:	OAL	
Printed Name: Jim Koscher	Printed Name:	Printed Name:	Shipping I.D.#	Total # Containers:
Firm: RZA AGRA	Firm:	Firm:	Carrier:	Condition of Containers:
Date/Time: 11/22/93 4:50	Date/Time:	Date/Time:	DOT Designation:	Condition of Seals:

Received by:	Received by:	Received by:	Special Instructions/Comments:
Signature: Kelly Nickerson	Signature:	Signature:	48 hr.
Printed Name: K. Nickerson	Printed Name:	Printed Name:	
Firm: OAL	Firm:	Firm:	
Date/Time: 11/22/93 4:50	Date/Time:	Date/Time:	

DISTRIBUTION: WHITE & PINK returned to project manager, YELLOW - lab.

SERVICE REQUEST #: _____

CRAW00018160

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Engineering & Environmental Services
7477 SW Tech Center Drive • Portland, OR 97223-8024
(503) 639-3400 • FAX (503) 620-7892

Chain-of-Custody Record / Laboratory Analyses Req

Project: BES St. Johns Job #: 7197
Client: City of PDX
Project Manager: G. Koscinski Phone #:
Sampler's Name: D. Nicomede Phone #: 639-3400
Sampler's Signature:

Analysis Requested: (Circle, Check Box, or Write Preferred Method in Box)

Sample I.D. #	Date	Time	Preserv.	Matrix	Halogenated Volatiles EPA 601 EPA 8010	Volatile Aromatics EPA 602 EPA 8020	BTXE or BTXE / TPH-G	WA TPH-G or OR TPH-G	WA TPH-D or OR TPH-D	Fuel Scan / TPH by GC 8015-modified	GC Fingerprint / HCID	WA 418.1 Modified or OR 418.1 Modified	GC / MS Volatiles	GC / MS Semi Volatiles	Total Metals ICP AA Other	TC LP Metals	pH Cond. Alk Color	RCRA 8080		# of Containers	Comments
1. SP-10	11/19/93	14:45	ICE	SOIL			25-5173		17667									X		1	
2. SP-11	11/19	14:50							17668									X		1	
3. SP-12	11/19	14:55							17669									X		1	
4. SP-13	11/19	15:00							17670									X		1	
5. SP-14	11/19	15:05							17671									X		1	
6. SP-15	11/19	15:10							17672									X		1	
7. SP-16	11/19	15:15							17673									X		1	
8. SP-17 A	11/22	8:00							17674									X		1	
9. SP-17 B	11/22	8:00							17675									X		1	
10. SP-17 C	11/22	8:00							17676									X		1	

Relinquished by RZA:	Relinquished by:	Relinquished by:	Laboratory:	Sample Receipt:
Signature: [signature]	Signature:	Signature:	OAL	
Printed Name: Gerard Koscinski	Printed Name:	Printed Name:	Shipping I.D.#	Total # Containers:
Firm: RZA Agra	Firm:	Firm:	Carrier:	Condition of Containers:
Date/Time: 11/22/93 4:50	Date/Time:	Date/Time:	DOT Designation:	Condition of Seals:
Received by:	**Received by:**	**Received by:**	**Special Instructions/Comments:**	
Signature: Kelly Nickerson	Signature:	Signature:	48 hr.	
Printed Name: K. Nickerson	Printed Name:	Printed Name:		
Firm: DAL	Firm:	Firm:		
Date/Time: 11/22/93 4:50	Date/Time:	Date/Time:		

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RZA AGRA, Inc.
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Engineering & Environmental Services
7477 SW Tech Center Drive • Portland, OR 97223-8024
(503) 639-3400 • FAX (503) 620-7892

Chain-of-Custody Record / Laboratory Analyses Re

Project: BES Stjohns Job #: 7197
Client: City of PDX
Project Manager: G Koschal Phone #: 639-3400
Sampler's Name: O. Hacomack Phone #:
Sampler's Signature:

Analysis Requested: (Circle, Check Box, or Write Preferred Method in Box)

Sample I.D. #	Date	Time	Preserv.	Matrix	Halogenated Volatiles EPA 601 EPA 8010	Volatile Aromatics EPA 602 EPA 8020	BTXE or BTXE / TPH-G	WA TPH-G or OR TPH-G	WA TPH-D or OR TPH-D	Fuel Scan / TPH by GC 8015-modified	GC Fingerprint / HCID	WA 418.1 Modified or OR 418.1 Modified	GC / MS Volatiles	GC / MS Semi Volatiles	Total Metals ICP AA Other	TC LP Metals	pH Cond. Alk Color	RB 8080		# of Containers	Comments
1 SB17 D	11/22/93	800	ice	Soil			25-0173-17677											X			
2.																					
3.																					
4.																					
5.																					
6.																					
7.																					
8.																					
9.																					
10.																					

Relinquished by RZA:	Relinquished by:	Relinquished by:	Laboratory:	Sample Receipt:
Signature:	Signature:	Signature:	OAL	
Printed Name: Gerard Koschal	Printed Name:	Printed Name:	Shipping I.D.#	Total # Containers:
Firm: RZA AGRA	Firm:	Firm:	Carrier:	Condition of Containers:
Date/Time: 11/22/93 4:50	Date/Time:	Date/Time:	DOT Designation:	Condition of Seals:
Received by:	**Received by:**	**Received by:**	**Special Instructions/Comments:**	
Signature: Kelly Nickerson	Signature:	Signature:	48 hour	
Printed Name: K. Nickerson	Printed Name:	Printed Name:		
Firm: OAL	Firm:	Firm:		
Date/Time: 11/22/93 4:50	Date/Time:	Date/Time:		

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SERVICE REQUEST #:

OAL Oregon Analytical Laboratory
14855 S.W. Old Scholls Ferry Rd
Beaverton, Oregon 97007
(503) 590-5300
FAX (503) 671-1404

CHAIN OF CUSTODY RECORD
LABORATORY ANALYSIS REQUEST

Client Information
Company: RZA AGRA, Inc
Contact: Gerry Koschal
Address: 7477 SW TECH CR DR
Pdx 97223
Phone #: 639-3400 FAX #:

Project Name: BES-St John's
Project Number: 7197
P.O. Number:
Comments: PCBs

Sampler's Name: Denny
Signature:
Sampling Date: 11/19/93
Provide Verbal Results: ☒ Yes ☐ No
Provide FAX Results: ☐ Yes ☐ No

N - 2 weeks
S - 1 week
R - Rush
O - Other

	Sample Identification	Date	Time	OAL #	# of Containers	Matrix: Soil	Matrix: Water	Matrix: Other (Note in Remarks)	Volatiles 624/8260 (circle) All Aromatic Halogenated	Semivolatiles 625/8270 (circle) All PAH/SIM Phenol Phthalate	Organochlorinated 608/8080 (circle) All PCB Pesticide	Chlorinated Herbicides 8150	TPH-HCID OR-DEQ Quantify? ☐Yes ☐No	TPH Quantification (circle) G D 418.1M 418.1	BTEX 602/8020	TCLP Metals (circle) As Ba Cd Cr Pb Hg Se Ag	TCLP Organics (circle) Vol Semivol Pest Herb	Metals - Dissolved T-Total Set	PCBs		Contract	Turnaround	Remarks
1	P-6	11/19/93	10:15	25-0173-17523	2														X		2	R	
2	MP-5	11/19/93	9:20	25-0173-17524	1														X		1	R	
3																							
4																							
5																							
6																							
7																							
8																							
9																							
10																							

Relinquished		Relinquished		
Signature:	Date: 11/19/93	Signature:	Date:	Shipped Via:
Print Name: Denny Macomber	Time: 11 AM	Print Name:	Time:	Received @ 4 °C
Company: RZA AGRA, Inc		Company:		Appropriate Containers ☒ Yes ☐ No
Received		**Received**		2 8oz./1 4oz./8oz. Jars
Signature: Douglas Ward	Date: 11-19-93	Signature:	Date:	___ VOA Vials
Print Name: D Ward	Time: 11 AM	Print Name:	Time:	___ Plastic Bottles
Company: OAL		Company:		___ Glass Bottles
				___ other

CRAW00018163

RZA AGRA, Inc.

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Engineering & Environmental Services
7477 SW Tech Center Drive • Portland, OR 97223-8024
(503) 639-3400 • FAX (503) 620-7892

Tuyt

Chain-of-Custody Record / Laboratory Analyses Request

Project: ~~Q-7199~~ ST JOHNS Job #: 7197
Client: CITY OF PORTLAND - BES
Project Manager: G KOSCHAL Phone #: 659-3400
Sampler's Name: G KOSCHAL Phone #:
Sampler's Signature: [signature]

Analysis Requested: (Circle, Check Box, or Write Preferred Method in Box)

Sample I.D. #	Date	Time	Preserv.	Matrix	Halogenated Volatiles EPA 601 EPA 8010	Volatile Aromatics EPA 602 EPA 8020	BTXE or BTXE / TPH-G	WA TPH-G or OR TPH-G	WA TPH-D or OR TPH-D	Fuel Scan / TPH by GC 8015-modified	GC Fingerprint / HCID	WA 418.1 Modified or OR 418.1 Modified	GC / MS Volatiles	GC / MS Semi Volatiles	Total Metals ICP AA Other	TC LP Metals	pH Cond. Alk Color	PCG		# of Containers	Comments
1. IN-1	11/29/93																	X		1	95-0173-17822
2.																					
3.																					
4.																					
5.																					
6.																					
7.																					
8.																					
9.																					
10.																					

Relinquished by RZA:	Relinquished by:	Relinquished by:	Laboratory:	Sample Receipt:
Signature: [signature]	Signature:	Signature:	OAL	
Printed Name: GERARD KOSCHAL	Printed Name:	Printed Name:	Shipping I.D.#	Total # Containers:
Firm: RZA AGRA	Firm:	Firm:	Carrier:	Condition of Containers:
Date/Time: 11/29/93 4:20	Date/Time:	Date/Time:	DOT Designation:	Condition of Seals:
Received by:	**Received by:**	**Received by:**	**Special Instructions/Comments:**	
Signature: [signature]	Signature:	Signature:	INSULATION FROM CASE	
Printed Name: D.C. PLATH	Printed Name:	Printed Name:		
Firm: OAL	Firm:	Firm:		
Date/Time: 11/29/93 4:30P	Date/Time:	Date/Time:		

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(503) 639-3400 • FAX (503) 620-7892

Chain-of-Custody Record / Laboratory Analyses Request

Project: BES-St Johns Job #: 7197
Client: City of Portland
Project Manager: Jerry Koschal Phone #: 639-3400
Sampler's Name: D Macomber Phone #: 639-3400
Sampler's Signature: Denny

Analysis Requested: (Circle, Check Box, or Write Preferred Method in Box)

Sample I.D. #	Date	Time	Preserv.	Matrix	Halogenated Volatiles EPA 601 EPA 8010	Volatile Aromatics EPA 602 EPA 8020	BTXE or BTXE / TPH-G	WA TPH-G or OR TPH-G	WA TPH-D or OR TPH-D	Fuel Scan / TPH by GC 8015-modified	GC Fingerprint / HCID	WA 418.1 Modified or OR 418.1 Modified	GC / MS Volatiles	GC / MS Semi Volatiles	Total Metals ICP AA Other	TC LP Metals	pH Cond. Alk Color	PCBs		# of Containers	Comments
1. FCL-1B	12/20/93	11:30	ice	Soil														X		1	05-0623-18904
2. FCL-3B		1375																X		1	18905
3. FCL-4B		1400																X		1	189010
4. FCL-6B		1415																X		1	18907
5. FCL-7B		1430																X		1	18908
6.																					
7.																					
8.																					
9.																					
10.																					

Relinquished by RZA:	Relinquished by:	Relinquished by:	Laboratory:	Sample Receipt:
Signature: Denny Mc	Signature:	Signature:		
Printed Name: Denny Macomber	Printed Name:	Printed Name:	Shipping I.D.#	Total # Containers:
Firm: RZA AGRA	Firm:	Firm:	Carrier:	Condition of Containers:
Date/Time: 12/21/93 9:00	Date/Time:	Date/Time:	DOT Designation:	Condition of Seals:
Received by:	**Received by:**	**Received by:**	**Special Instructions/Comments:**	
Signature: Denice J. Ward	Signature:	Signature:	48 hour turn-around	
Printed Name: D Ward	Printed Name:	Printed Name:		
Firm: ODL	Firm:	Firm:		
Date/Time: 12-21-93 9:02	Date/Time:	Date/Time:		

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Page ____ of ____.

SERVICE REQUEST #: _____

0216

RZA AGRA, Inc.

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Engineering & Environmental Services
7477 SW Tech Center Drive • Portland, OR 97223-8024
(503) 639-3400 • FAX (503) 620-7892

Chain-of-Custody Record / Laboratory Analyses Request

Project: BES-5 Job #: 7197
Client: City of Portland
Project Manager: G. Koschal Phone #: 639-3400
Sampler's Name: D. MACOMBER Phone #: 639-3400
Sampler's Signature: [signature]

Analysis Requested: (Circle, Check Box, or Write Preferred Method in Box)

Sample I.D. #	Date	Time	Preserv.	Matrix	Halogenated Volatiles EPA 601 EPA 8010	Volatile Aromatics EPA 602 EPA 8020	BTXE or BTXE / TPH-G	WA TPH-G or OR TPH-G	WA TPH-D or OR TPH-D	Fuel Scan / TPH by GC 8015-modified	GC Fingerprint / HCID	WA 418.1 Modified or OR 418.1 Modified	GC / MS Volatiles	GC / MS Semi Volatiles	Total Metals ICP AA Other	TC LP Metals	pH Cond. Alk Color	PCBS		# of Containers	Comments
1. TANK-A	12/21/93	1545	ice	H_2O	25	017	3-	18987										X		1	
2. TS-1	|	1445	|	|				18988									X		1	
3. TS-2	|	1500	|	|				18989									X		1	
4. TS-3	|	1515	|	|				18990									X		1	
5.																					
6.																					
7.																					
8.																					
9.																					
10.																					

Relinquished by RZA:	Relinquished by:	Relinquished by:	Laboratory:	Sample Receipt:
Signature: [signature]	Signature:	Signature:		
Printed Name: Denny Macomber	Printed Name:	Printed Name:	Shipping I.D.#	Total # Containers:
Firm: RZA AGRA, Inc	Firm:	Firm:	Carrier:	Condition of Containers:
Date/Time: 12/22/93 10.30	Date/Time:	Date/Time:	DOT Designation:	Condition of Seals:
Received by:	**Received by:**	**Received by:**	**Special Instructions/Comments:**	
Signature: D. Ward	Signature:	Signature:	48 hour Turn-Around	
Printed Name: D. Ward	Printed Name:	Printed Name:		
Firm: OAL	Firm:	Firm:		
Date/Time: 12-22-93 10:30	Date/Time:	Date/Time:		

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Page 1 of 1

SERVICE REQUEST #:

CRAW00018166

0286

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(503) 639-3400 • FAX (503) 620-7892

Chain-of-Custody Record / Laboratory Analyses Request

Project: BES (RZA office - Baker) Job #: 7197
Client: BES - City of Portland
Project Manager: G. Roschal Phone # 639-3400
Sampler's Name: D. MacAmber Phone # 639-3400
Sampler's Signature: [signature]

Analysis Requested: (Circle, Check Box, or Write Preferred Method in Box)

Sample I.D. #	Date	Time	Preserv.	Matrix	Halogenated Volatiles EPA 601 EPA 8010	Volatile Aromatics EPA 602 EPA 8020	BTXE or BTXE / TPH-G	WA TPH-G or OR TPH-G	WA TPH-D or OR TPH-D	Fuel Scan / TPH by GC 8015-modified	GC Fingerprint / HCID	WA 418.1 Modified or OR 418.1 Modified	GC / MS Volatiles	GC / MS Semi Volatiles	Total Metals ICP AA Other	TC-LP Metals	pH Cond. Alk. Color	PCB		# of Containers	Comments
1. BT-1	1/13/94	845	ice	H_2O														X		2	25-0173-19700
2.																					
3.																					
4.																					
5.																					
6.																					
7.																					
8.																					
9.																					
10.																					

Relinquished by RZA:	Relinquished by:	Relinquished by:	Laboratory:	Sample Receipt:
Signature: [signature]	Signature:	Signature:		
Printed Name: Denny MacAmber	Printed Name:	Printed Name:	Shipping I.D.#:	Total # Containers:
Firm: RZA AGRA, Inc	Firm:	Firm:	Carrier:	Condition of Containers:
Date/Time: 1/13/94 10 AM	Date/Time:	Date/Time:	DOT Designation:	Condition of Seals:
Received by:	**Received by:**	**Received by:**	**Special Instructions/Comments:**	
Signature: R.A. Nickerson	Signature:	Signature:	- Normal turn-around	
Printed Name: Kelly Nickerson	Printed Name:	Printed Name:		
Firm: DAL	Firm:	Firm:		
Date/Time: 1/13/94 10 AM	Date/Time:	Date/Time:		

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Page 1 of 1

SERVICE REQUEST #:

CRAW00018167

ENVIRONMENTAL SITE INVESTIGATION
DISPOSAL OF BLACK SAND FILL
PROPOSED WATER POLLUTION CONTROL LABORATORY

ST. JOHNS AREA
PORTLAND, OREGON

PREPARED FOR:
BUREAU OF ENVIRONMENTAL SERVICES
CITY OF PORTLAND

21-07197

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FEBRUARY, 1994

RZA AGRA, Inc.
Engineering & Environmental Services

AGRA
Earth & Environmental Group

RZA AGRA, Inc.

(Formerly: Rittenhouse-Zeman & Associates, Inc.)
Engineering & Environmental Services

7477 SW Tech Center Drive
Portland, Oregon 97223-8024
(503) 639-3400
FAX (503) 620-7892

February 15, 1993

10-7197

Bureau of Environmental Services
City of Portland
1120 S.W. Fifth Avenue, Room 400
Portland, OR 97204-1972

Attn: Randy Miller

SUBJECT: ENVIRONMENTAL SITE INVESTIGATION
DISPOSAL OF BLACK SAND FILL
PROPOSED WATER POLLUTION CONTROL LABORATORY
PORTLAND, OREGON

Dear Mr. Miller:

Enclosed is our report that summarizes the results of our Environmental Site Investigation for the proposed Water Pollution Control Laboratory in the St. Johns area of Portland, Oregon.

Our investigation included the excavation of twenty test pits and the installation of five monitoring wells. In addition, more than 2,000 cubic yards of black sand, fill, construction debris and briar were removed from the site and properly recycled or disposed.

A release of PCB-containing oil that was identified during the investigation was characterized, excavated and closed under a separate phase.

Based on the results of our Environmental Site Investigation and removal activities, no environmental problems appear to exist on the site that preclude future construction activities.

We appreciate the opportunity to have served you on this project. If you have any questions or desire further information, please feel free to contact the undersigned.

Respectfully submitted,

RZA AGRA, Inc.

Denny Macomber, Hazardous Waste Specialist

Gerard Koschal, R.G., Senior Geologist

AGRA
Earth & Environmental Group

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0.0 SUMMARY

The proposed site for the Bureau of Environmental Services Water Pollution Control Laboratory is located on the east bank of the Willamette River south of the St. Johns Bridge. The purpose of this investigation was to assess conditions at the site and provide remedial services to assure that the construction of the project could proceed.

Our scope included the characterization, removal and disposal of 2,113 cubic yards of blast sand fill and debris from the site, the excavation of twenty test pits to characterize the fill material on the site, and the installation of a monitoring well network for the site.

The results of our investigation indicate that no major environmental problems are present at the site that would delay construction of the laboratory.

The preceding summary is intended for introductory and reference use. A complete reading of our report is recommended.

1.0 INTRODUCTION

The purpose of this Environmental Site Investigation was to assess the environmental conditions at the site of the proposed Water Pollution Control Laboratory in the St. Johns area of Portland, Oregon, and provide remedial services to assure that construction of the project could proceed. The scope of work includes:

- Prepare a Health and Safety Plan for the field operations.
- A physical reconnaissance of the site and observation of surrounding properties for unusual land colorations, physical irregularities, and noticeable refuse piles.

0.0 SUMMARY

The proposed site for the Bureau of Environmental Services Water Pollution Control Laboratory is located on the east bank of the Willamette River south of the St. Johns Bridge. The purpose of this investigation was to assess conditions at the site and provide remedial services to assure that the construction of the project could proceed.

Our scope included the characterization, removal and disposal of 2,113 cubic yards of blast sand fill and debris from the site, the excavation of twenty test pits to characterize the fill material on the site, and the installation of a monitoring well network for the site.

The results of our investigation indicate that no major environmental problems are present at the site that would delay construction of the laboratory.

The preceding summary is intended for introductory and reference use. A complete reading of our report is recommended.

1.0 INTRODUCTION

The purpose of this Environmental Site Investigation was to assess the environmental conditions at the site of the proposed Water Pollution Control Laboratory in the St. Johns area of Portland, Oregon, and provide remedial services to assure that construction of the project could proceed. The scope of work includes:

- Prepare a Health and Safety Plan for the field operations.
- A physical reconnaissance of the site and observation of surrounding properties for unusual land colorations, physical irregularities, and noticeable refuse piles.

- A review of available historical data pertaining to site and adjacent property use, including but not limited to; conversations with individuals familiar with the property, City of Portland records, and historical aerial photogrammetry.

- The excavation of twenty test pits to an approximate depth of twenty feet. Ten pits would be located on the western portion of the site and ten pits located on the eastern portion of the site.

- The advancing of five auger borings and the installation of monitoring wells in the borings.

- The characterization of the type and extent of the black sand fill by the excavation of shallow trenches.

- The collection of surface and subsurface soils from surface, borings and testpits.

- The analysis of selected soil samples to screen for the presence of fuel hydrocarbons, polychlorinated biphenyls- PCBs, and volatile organic compounds.

- The excavation, removal and proper disposal of the black sand fill and other fill material regulated by ODEQ as solid waste.

- Preparation of a Project Report summarizing all investigation and remedial activities.

This report has been prepared for the exclusive use of Bureau of Environmental Services, City of Portland and their agents, for specific application to the referenced scope of services in accordance with generally accepted environmental practices. No other warranty, expressed or implied is made. In the event that changes in nature, design or layout of the existing site and nearby properties are made, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed or verified in writing.

2.0 SITE DESCRIPTION

The approximately 7.6 acre site is located on east bank of the Willamette River, south of the St. Johns Bridge in the St. Johns area of Portland, Oregon (Figure 1).

Most of the site is located on a bench overlooking the Willamette River. The site is currently vacant. Foundations from previous structures are present on the northwestern and southwestern portions of the site. Asphalt pavement covers the northeastern portion of the site. Prior to our investigation the non-paved portions of the site were overgrown with blackberry bushes. Construction debris and uncontrolled fill material have been dumped on the site.

The site is bounded on the northwest by N. Pittsburg Avenue, on the northeast by The Union Pacific Railroad tracks (Bradford St.), on the southeast by the yard for Lampros Steel (N. Burlington Avenue) and on the southwest by the Willamette River (Figure 2).

The proposed development of the site includes a 50,000 square foot Water Pollution Control Laboratory on the southeastern portion and a storm water detention facility on the northwestern portion of the site.

3.0 SITE HISTORY

Previous site investigation reports, historical aerial photographs, city records and interviews with individuals familiar with the site revealed a history of industrial usage until the 1970s. The structures on the site were demolished in the 1970s. The site is currently vacant. Vicinity usage has been industrial, commercial, residential and recreational.

The Coast Veneer Box Company was located on the northwest portion of the site, adjacent to N. Pittsburg Avenue. This facility manufactured fruit boxes from at the mid-1930s until the early 1970s. The facility had been demolished by 1973.

The Portland Lumber Mill was located on the southeastern portion of the site from the mid-1930s until the late 1970s. The structures had been demolished by 1978.

A combined sewer overflow (CSO) line traverses the site along the Salem Street easement.

The Portland Development Commission purchased the land in the late-1970s as part of a proposed residential development in the St.Johns area.

4.0 PREVIOUS INVESTIGATIONS

Several previous geotechnical and environmental investigations have been conducted at or abjacent to the subject site.

A subsurface investigation was conducted in 1973 by Shannon and Wilson for Brand-S Corporation, the owner of the property at that time. The investigation concerned the fill activities in the Coast Veneer area and along the bank. The potential source of the fill material was an area south of Richmond Street or dredge material from the Willamette River adjacent to the site.

A subsurface geotechnical investigation was conducted in 1978 by Rittenhouse-Zeman & Associates for the Portland Development Commission. The Portland Lumber Mill had been demolished by this time. One boring and one test pit were placed on the site.

Emcon Northwest conducted an Environmental Survey of the adjacent property in 1988. The black sand fill, found on the subject site, was also identified on the adjacent property. The black sand was spent sandblast grit that had been used to clean petroleum tanks. The fill was placed in 1977-1978. The winter rains flushed oil out of the fill and washed into the river. After a request by the Coast Guard the owner stopped the placement of the fill. Analyses indicated that the sands did contain petroleum products, but was not an EPA characteristic hazardous waste.

Emcon Northwest conducted an Environmental Survey of the subject site in 1989 for a potential buyer. The results of their subsurface investigation indicated that approximately 600 cubic yards of black sand fill was present on the subject site. The black sand was not a characteristic hazardous waste but did contain some petroleum product. Groundwater was collected from four on-site borings. Slightly elevated levels of 2,4-dimethylphenol was detected in one sample. The boring (T-4) was located in the southeast corner of the site near the river.

The Bureau of Environmental Services (BES) conducted a sampling survey on the subject site to determine if the black sands and other uncontrolled fill were hazardous wastes. Analyses conducted indicated that the black sand was not a characteristic hazardous waste.

5.0 SURFICIAL FILL CHARACTERIZATION AND REMOVAL

The original grade at the site appears to have been similar to the grade of the present Cathedral Park northwest of the site. The original grade gently sloped from the Union Pacific Rail Road (UPRR) tracks to the river. The site has been filled to the present grade by various fill episodes.

Based on a review of historic photographs, the Portland Lumber Mill was once located on a elevated deck at the level of the UPRR tracks. This deck extended above the river supported by timber piling. The volume below the deck appears to have been filled over the years to the present grade. The source of the fill material is not known. Based on this and previous investigations this fill material consisted of dredge material, construction debris, clinkers and ash.

At least four episodes of fill placement can be defined on the subject site.

Pre-1970s fill placement that brought the site to the grade of the pavement for the Portland Lumber Mill.

The placement of fill in the early-1970s in the foundation of the Coast Veneer facility and along the bank of the Willamette River.

The placement of the black sand fill,

The uncontrolled placement of piles of construction and other debris.

The purpose of this phase of the investigation was to characterize the most recent fill materials and to determine the most cost efficient disposal option for the materials.

5.1 Regulatory Review

The Oregon Department of Environmental Quality (ODEQ) regulates the disposal of solid and hazardous wastes. Certain construction debris and other clean fill is not considered a solid waste and is not regulated by ODEQ. The determination of the type of waste is made based on the source of the material and the impact the material can have on the environment.

Hazardous waste is defined by the US EPA in 40 CFR 261. A listed hazardous waste is a waste that is derived from one of the listed processes or contains a certain level of a listed hazardous material. A characteristic hazardous waste is a waste that displays certain hazardous characteristics, such as, toxicity, reactivity, corrosivity or flammability. EPA hazardous wastes must be handled and disposed according to EPA regulations. Most oil and petroleum products are not EPA listed hazardous wastes.

In Oregon, oil and petroleum products are included as listed hazardous wastes. Soils impacted by petroleum products must be disposed according to ODEQ guidelines.

Solid waste is regulated by ODEQ. Solid wastes are wastes from specific sources and are defined in OAR 340-93. Solid waste must be disposed according to ODEQ regulations. Spent sandblast grit or sand is a listed ODEQ solid waste. This material can be recycled, disposed at a permitted landfill, or if determined to be inert, used as fill material. The process to determine if a solid waste is inert involves a ODEQ permit.

Clean fill is defined in OAR-340-93-030 (10) as material consisting of soil, rock, concrete, brick, building block, tile, or asphalt paving, which do not contain contaminants which could adversely impact the waters of the State or public health. This term does not include putrescible wastes, construction and demolition wastes and industrial solid waste.

The previous Emcon Northwest investigations identified the black sand as waste sandblast grit. This "knowledge of process" makes the black sand a solid waste. The Emcon Northwest and the BES investigation determined that the black sand did not meet the definition of a EPA listed or characteristic hazardous waste. Some of the black sand contained levels of petroleum product that exceeded the ODEQ guidelines for an inert waste.

Based on this information, RZA AGRA choose excavation and disposal at a permitted landfill as the most prudent option.

ODEQ solid waste permits consider levels greater than 100 ppm TPH for diesel and heavier hydrocarbons as petroleum contaminated soils. Soils with levels greater than 100 ppm TPH must be treated prior to disposal or disposed only at permitted landfills. In the Portland area, the Hillsboro Landfill accepts petroleum contaminated soils.

RZA AGRA's approach was to segregate the black sand based on TPH content. Black sand with levels of TPH greater than 100 ppm would be transported to either the Hillsboro Landfill for disposal or to Oregon Hydrocarbon for thermal treatment. The final destination would be based on cost.

For sand with TPH levels less than 100 ppm, the disposal options included disposal at Hillsboro Landfill or use as cover material at St. Johns Landfill or Hillsboro Landfill. The destination would be based on acceptance by the facility and cost.

5.2 Field Methods

A Health and Safety plan was prepared for the field operations. All field operations were conducted following the procedures outlined in this plan.

A utility locate survey was conducted by Maintenence NW, Portland, Oregon. Due to the past use of the site, an abundance of underground pipes were identified.

The southern portion of the site had been overgrown with blackberry bushes. The first field task was to remove the blackberry bushes to gain access to the site. Excavation and transportation services for the project were provided by C. Wark Trucking, Tualatin, Oregon. The brush was segregated for disposal.

A security fence was placed along the perimeter of two sides of the site. This fence limited access to the site.

Five trenches were excavated across the black sand and uncontrolled fill area. Location of the trenches are shown on Plate 1. The purpose of the trenches was to determine the volume of the black sand and to provide a sampling grid for the area. The fill material was logged and thirty samples were collected from the trench system. On sample was collected from the black sand horizon in test pit TP-3. Each sample was placed in airtight, teflon sealed containers, and transported on ice to RZA AGRA's Environmental Laboratory for chemical analysis.

The black sand was concentrated as a layer up to six feet thick in the area of the former Coast Veneer facility, trenches T-1 through T-4. Several isolated areas of black sand were identified around the site. The uncontrolled fill piles were tested with trench T-5. This material was placed on the old asphalt pavement surface and consisted primarily of sand and soil.

5.3 Quantitative Analysis

Samples were identified by trench number and a consecutive sample number. Nineteen samples were submitted to RZA AGRA's Environmental Laboratory in Portland, Oregon, for analysis for total petroleum hydrocarbons (TPH) by EPA Method 418.1 Modified. One sample (T2-10) was submitted to Hughes Analytical Laboratory , Gresham, Oregon, for analysis for TCLP-8 metals by EPA Method 1311, 6010, 7000, PCB by EPA Method 8080, and volatile organics by EPA Method 8240. Laboratory results and chain-of-custody documentation are presented in Appendix A.

SAMPLE #	Depth	TPH (ppm)
T1-1	12"	74.7
T1-3	36'	16.6
T1-5	24"	129
T1-6	8"	61.4
TP3-16	12"	667
T2-9	24"	41.0
T2-10	24"	380
T2-11	36"	24.0
T2-14	60"	17.6
T3-17	12"	15.0
T3-21	12"	12.3
T3-23	12"	17.3
T3-24	36"	33.0
T4-25	12"	28.6
T4-26	48"	134
T4-27	36"	62.7
T5-28	40"	32.3
T5-29	12"	15.3
T5-30	12"	25.0

No volatile organics compounds, leachable metals or PCBs were detected above regulatory limits in sample T2-10, which had a TPH level of 380 ppm.

Four of the 19 samples submitted detected levels of greater than 100 ppm TPH. Three of the samples were black sand. one sample was a white sand. The impacted black sands could be visibly separated from the lesser impacted black sand.

5.4 Disposal

Copies of the analytical data was submitted to the Hillsboro Landfill and the St. Johns Landfill for approval for disposal. St. Johns Landfill accepted the clean black sand and clean fill as cover material with no tipping fee. The Hillsboro Landfill accepted the clean blast sand and clean fill as cover material with no tipping fee. The Hillsboro Landfill accepted the briar and wood debris for recycling at a fee of $5.84/cubic yard. The

Hillsboro Landfill accepted the dirty black sand and other construction debris for a tipping fee of $59.04/cubic yard. The Durham Pit accepted clean asphalt and concrete for recycling at a tipping fee of $2.50/cubic yard.

The material had to meet specifications to be accepted as cover material. No large rocks or organic material was accepted.

A summary of the disposal activities includes:

AMOUNT (cubic yards)	MATERIAL	DESTINATION
1446	Black Sand/Clean Fill	St. Johns Landfill
242	Clean Fill	Hillsboro Landfill
144	Briar/Wood	Hillsboro Landfill
27	Dirty Black Sand	Hillsboro Landfill
254	Asphalt/ Concrete	Durham Pit
2113	Total Cubic Yards Removed	

6.0 SUBSURFACE INVESTIGATION

Our subsurface exploration consisted of advancing five borings and excavating twenty test pits. A two inch-diameter monitoring well was installed in each of the borings. The purpose of the test pit investigation was to define the near-surface lithology of the site and to screen the subsurface for the presence of contamination that would have to be remediated prior to construction activities. The purpose of the monitoring wells was to provide a network of wells that could be used to provide baseline and future data for the site.

6.1 Test Pits

The test pits were scheduled to be excavated to a depth of twenty feet or refusal. Excavation activities were conducted by C. Wark trucking, Tualatin, Oregon. Ten of the test pits (TP-1 through TP-10) were located on

the northwestern portion of the property, northwest of the CSO. A stormwater detention facility was planned for this area. Ten test pits (TP-11 through TP-20) were located over the remainder of the site. Test pit locations are shown on Plate 1. Test pit logs are presented in Appendix B.

Samples were classified in the field by a geologist from RZA AGRA. Representative portions of each sample were collected, placed in airtight, teflon-sealed containers, and transported to RZA AGRA's in-house laboratory for quantitative analyses.

Petroleum odors, as noted on the test pit logs, are subjective information provided at the time of sampling. Detection of petroleum odors is dependant on the olfactory sensitivity of the person classifying the sample, as well as other factors, including air and sample temperature, wind velocity, the length of time the sample is out of the boring, product type and product degradation. Because these constraints are not readily quantifiable, and no test standards exist, olfactory observations should be taken as general subjective information. It is our understanding that humans may be able to detect petroleum product odor in the range of one part per million (ppm).

All pit spoils were placed back into the test pits. No compaction testing of the backfill material was conducted.

6.2 Monitoring Wells

The borings were drilled by Crisman Drilling, Portland, Oregon using a CME truck-mounted drilling rig with hollow stem auger and continuous core sampling.

The five environmental borings (MW-1 through MW-5) were drilled to depths ranging from of approximately 40 to 42 feet. Boring locations are presented on Plate 1. Soil samples were collected continuously using a casing advancer in each of the borings. This sampling, combined with the logging of drilling character, provided the basis for our geologic characterization of the site.

Samples were classified in the field by a geologist from RZA AGRA. Representative portions of each sample were collected, placed in airtight, teflon-sealed containers, and transported to RZA AGRA's Environmental Laboratory. Geologic boring logs are presented in Appendix C.

Petroleum odors, as noted on the boring logs, are subjective information provided at the time of sampling. Detection of petroleum odors is dependant on the olfactory sensitivity of the person classifying the sample, as well as other factors, including air and sample temperature, wind velocity, the length of time the sample is out of the boring, product type and product degradation. Because these constraints are not readily quantifiable, and no test standards exist, olfactory observations should be taken as general subjective information. It is our understanding that humans may be able to detect petroleum product odor in the range of one part per million (ppm).

In addition, borehole and recovered samples were field-screened with a combustible gas indicator (Gastech model 1314) for volatile hydrocarbons, measured in parts per million (ppm) and Lower Explosive Limit (LEL). All drill cuttings were placed in drums. Since no evidence of contamination was identified, the cuttings were later used as backfill on-site.

Surveying the well elevations was to be conducted by others. No well elevation data is available.

6.3 Piping Trench Excavation

During a geotechnical exploration on the site by another contractor, a release of PCB-containing oil was identified. RZA AGRA characterized and remediated the release, removing all the impacted soils. The remediation is presented in a separate report. During the release characterization, a trench approximately 10 feet in depth was excavated across the site. The location of the trench is shown on Plate 1.

6.4 Subsurface Conditions

In general, soils on the site consist of 10-20 feet of fill material overlying native silts and sands deposited by the Willamette River.

6.4.1 Non-native Fill - The nature of the fill material varies over the site, consisting of dredge spoils, construction debris, wood, clinkers and ash. A veneer of spent blast sand covered the northwest portion of the site. Most of this blast sand has been removed from the site.

The fill in the northeastern portion of the site primarily consists of dredge spoils. Toward the river, the fill material includes more brick and demolition debris. Clinkers and ash are more abundant near the location of the old boiler, in the southern corner of the property.

An episode of fill placement was conducted in the early 1970s in the area of the former Coast Veneer facility and along the river bank. One source of this fill material may have been dredge spoils from activities adjacent to the site. The fill material from this episode appears to contain more organic material and displays a slight hydrocarbon odor. This fill material appears to be fairly extensive over the former Coast Veneer area.

6.4.2 Foundations and pipes - Concrete foundations, piling and pipes are present in the shallow subsurface over most of the site. The foundations and utility pipes were not removed during demolition activities at the site. Many of the foundations are placed on piling. Any construction activity will probably have to remove a portion of these features.

Figure 3 presents the pipes and foundation encountered during the trench excavation.

6.4.3 Field Volatile Screening - Petroleum-like odors were noted in four areas on the site.

1. Petroleum odors were noted in a layer of fill material extending over a portion of the area of the former Coast Veneer facility. Soil samples of the identified horizon were submitted for analysis for TPH by EPA Method 418.1 from test pits TP-2 (TP-2-5), TP-5 (TP-5-6), TP-6 (TP-6-5), and TP-8 (TP-8-10). Samples from the horizon below the impacted layer were submitted from test pits TP-5 (TP-5-12) and TP-8 (TP-8-20).

2. An oil sheen was noted in the gravel basecourse in a test pit (TP-14) near the UPRR tracks. Similar impacted gravels were noted in a nearby CH2M Hill test pit. A sample of the basecourse material was submitted for analysis for TPH by EPA method 418.1 from test pit TP-14 (TP-14-1).

3. Petroleum odors were noted in samples from a CH2M Hill geotech boring. Soil samples from the 15 and 20 foot depths (CH2-B4-15 and CH2-B4-20) were submitted for analysis for TPH by EPA Method 418.1. An RZA AGRA test pit was located near the boring. No evidence of contamination was noted in the excavation.

4. Petroleum odors were noted in the trench excavation near the dogleg of the trench. Sample TP-23-6 was submitted for analysis of volatile organic compounds by EPA Method 8010/8020.

In addition samples were submitted for analysis for TPH from two horizons in test pit TP-12 (TP-12-12 and TP-12-15).

6.5 Groundwater

Shallow groundwater was encountered within sands of the Willamette river sediments at a depth of 20-26 feet. No odors or petroleum product sheen was noted during development and sampling.

Groundwater samples from each monitoring well were submitted for analysis for PCBs by EPA Method 608 and chlorinated phenolics by EPA Method 8040.

7.0 QUANTITATIVE ANALYSES

Laboratory analyses for this project were carried out at RZA AGRA's Environmental Laboratory, Portland Oregon and Hughes Analytical Laboratory, Gresham, Oregon. Soil Samples were identified by the test pit number and by the successively recorded sample number corresponding to depth as noted on the test pit logs. Groundwater samples were identified by the well number.

All laboratory analytical results are included in Appendix A

7.1 Soil Analyses

Soil sample test results are described below. Sample locations are identified on Plate 1.

7.1.1 Total Petroleum Hydrocarbons (EPA Method 418.1, modified) - Eleven soil samples were submitted for analysis by infra-red (IR) to quantify TPH contamination.

SAMPLE #	Depth	TPH (ppm)
TP-2-5	5'	16.6
TP-5-6	6'	120
TP-5-12	12'	ND
TP-6-5	5'	28.5
TP-8-10	10'	12.6
TP-8-20	20'	19.3
TP-12-12	12'	6.6
TP-12-15	15'	ND
TP-14-1	1'	116
CH2-B4-15	15'	ND
CH2-B4-20	20'	534

7.1.2 Volatile Organic Compounds (EPA Method 8010/8020) - One sample, TP-23-6, was submitted for analysis by gas chromatograghy to determine the concentrations of volatile organic compounds by EPA Method 8010/8020.

No halogenated volatile compounds were detected in this sample. Ethylbenzene and xylenes were detected at levels well below ODEQ reference levels.

The sampling survey indicates that all petroleum product concerns appear to be minor and below the ODEQ Matrix Level II reference standards (500 ppm). The levels of TPH in the CH2M Hill boring are slightly above Matrix Level II standards, but the area of impact appears limited in lateral extent. It should be noted that ODEQ does not have cleanup standards for TPH impacted soils except the UST Matrix standards. The UST Matrix standards do not apply to this site, but act as a common reference for petroleum product impact to soils.

7.2 Groundwater Samples

7.2.1 Polychlorinated biphenyls, PCBs (EPA Method 608) - Five water samples were analyzed for the presence of PCBs.

No PCBs were detected in any of the analyzed samples.

SAMPLE	RESULT
MW-1	ND
MW-2	ND
MW-3	ND
MW-4	ND
MW-5	ND

7.2.2 Chlorinated Phenolics (EPA Method 8040) - Five water samples were analyzed for the presence of Pentachlorophenol and 2,4,5-Trichlorophenol.

Pentachlorophenol was detected in one of the analyzed samples.

SAMPLE	PENTACHLOROPHENOL	TRICHLOROPHENOL
MW-1	ND	ND
MW-2	ND	ND
MW-3	ND	ND
MW-4	ND	ND
MW-5	18 ppb	ND

8.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the our Environmental Site Investigation and disposal activities, no environmental impacts exist at the site that would significantly alter the construction plans for the site.

Based on our investigation, 2,113 cubic yards of spent blast sand, fill, and debris were characterized, removed from the site and disposed properly.

Several areas of environmental concern were investigated including fill material in the Coast Veneer area, petroleum product in gravel base course, and several pockets of impacted soil. The fill material was below Matrix Level II levels in all but one area. In that area the TPH level was only slightly elevated above the Matrix level and the impact appeared limited in extent.

The PCB release was remediated by excavation. Clean closure was obtained.

Based on the amount of fill at the site, isolated pockets of contaminated fill may be encountered during construction. The areal extent of these pockets does not appear to be extensive.

We appreciate the opportunity to have served you on this project. If you have any questions or desire further information, please feel free to contact the undersigned.

RZA AGRA, Inc.

Denny Macomber, Hazardous Waste Specialist

Gerard Koschal, R.G., Senior Geologist

REGISTERED PROFESSIONAL GEOLOGIST
OREGON
GERARD KOSCHAL
RG 1015

Appendix A

Quantitative Analysis Chain-of-Custody

RZA AGRA, Inc.

(Formerly: Rittenhouse-Zeman & Associates, Inc.)
Engineering & Environmental Services

7477 SW Tech Center Drive
Portland, Oregon 97223-8024
(503) 639-3400
FAX (503) 620-7892

Client: City of Portland
Project No.: 7197-00
Project Manager: Gerry Koschal
Sample Matrix: Soil

Service Request No.: OR930189
Report Date: 10/13/93
Report No.: 5061
C.O.C. No.: 3750, 3751

Total Petroleum Hydrocarbons by IR
EPA Method 418.1 Modified
mg/kg(ppm)

Sample Name	Lab Code	Sample Date	Date Extracted	Date Analyzed	Method Detection Limit	Result
T1-1	0189-1	10/11	10/13	10/13	4.00	74.7
T2-3	0189-2	10/11	10/13	10/13	4.00	16.6
T1-5	0189-3	10/11	10/13	10/13	4.00	129
T1-6	0189-4	10/11	10/13	10/13	4.00	61.4
TP3-16	0189-5	10/11	10/13	10/13	4.00	667
T2-9	0189-6	10/11	10/13	10/13	4.00	41.0
T2-10	0189-7	10/11	10/13	10/13	4.00	380
T2-11	0189-8	10/11	10/13	10/13	4.00	24.0
T2-14	0189-9	10/11	10/13	10/13	4.00	17.6
T3-17	0189-10	10/11	10/13	10/13	4.00	15.0
T3-21	0189-11	10/11	10/13	10/13	4.00	12.3
T3-23	0189-12	10/11	10/13	10/13	4.00	17.3
T3-24	0189-13	10/11	10/13	10/13	4.00	33.0
LAB BLANK	10-13SBK	-	10/13	10/13	4.00	ND

ND Not Detected

Signature of Chemist

Laboratory Manager

AGRA
Earth & Environmental Group

RZA AGRA, Inc.

(Formerly: Rittenhouse-Zeman & Associates, Inc.)
Engineering & Environmental Services

7477 SW Tech Center Drive
Portland, Oregon 97223-8024
(503) 639-3400
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Client City of Portland
Project No. 7197-00
Project Manager Gerry Koschal
Sample Matrix Soil

Service Request No.: OR930189
Report Date: 10/14/93
Report No.: 5061qc
C.O.C. No.: 3750, 3751

Quality Assurance Data Report
Total Petroleum Hydrocarbons by IR
EPA Method 418.1 Modified
mg/kg (ppm)

Sample Name	Lab Code	Method Detection Limit	Sample Result	Dup. Sample Result	RPD	Spike Level	Spiked Result	% Recovery	% Recovery Acceptance Limits
T1-1	0189-1	4.00	74.70	69.4	5.19	200	256	91.9	75-125

RPD Relative Percent Difference

Signature of Chemist

Laboratory Manager

AGRA
Earth & Environmental Group

RZA AGRA, Inc.

(Formerly: Rittenhouse-Zeman & Associates, Inc.)
Engineering & Environmental Services

7477 SW Tech Center Drive
Portland, Oregon 97223-8024
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Client: City of Portland
Project No.: 7197-00
Project Manager: Gerry Koschal
Sample Matrix: Soil

Service Request No.: OR930191
Report Date: 10/14/93
Report No.: 5062
C.O.C. No.: 3752

Total Petroleum Hydrocarbons by IR
EPA Method 418.1 Modified
mg/kg (ppm)

Sample Name	Lab Code	Sample Date	Date Extracted	Date Analyzed	Method Detection Limit	Result
T4-25	0191-1	10/14	10/14	10/14	4.00	28.6
T4-26	0191-2	10/14	10/14	10/14	4.00	134
T4-27	0191-3	10/14	10/14	10/14	4.00	62.7
T5-28	0191-4	10/14	10/14	10/14	4.00	32.3
T5-29	0191-5	10/14	10/14	10/14	4.00	15.3
T5-30	0191-6	10/14	10/14	10/14	4.00	25.0
LAB BLANK	10-14SBK	10/14	10/14	10/14	4.00	ND

ND Not Detected

Signature of Chemist

Lean Gowley
Laboratory Manager

EPA418.1mod.

AGRA
Earth & Environmental Group

RZA AGRA, Inc.

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Client City of Portland
Project No. 7197-00
Project Manager Gerry Koschal
Sample Matrix Soil

Service Request No.: OR930189
Report Date: 10/14/93
Report No.: 5062qc
C.O.C. No.: 3752

Quality Assurance Data Report
Total Petroleum Hydrocarbons by IR
EPA Method 418.1 Modified
mg/kg (ppm)

Sample Name	Lab Code	Method Detection Limit	Sample Result	Dup. Sample Result	RPD	Spike Level	Spiked Result	% Recovery	% Recovery Acceptance Limits
Blank Spike	10-14blk spk	4.00	ND	NA	NA	200	204	102	75-125

ND Not Detected
NA Not Applicable
RPD Relative Percent Difference

Signature of Chemist

Laboratory Manager

AGRA
Earth & Environmental Group

HUGHES
ANALYTICAL LABORATORY

October 27, 1993

Mr. Gerry Koschal
RZA AGRA, Inc.
7477 SW Tech Center Drive
Portland, OR 97223

Dear Mr. Koschal:

Enclosed is the lab report for your samples which were received on October 19, 1993. The Hughes Report # is 93-0438 and the Client Project is 7197, City of Portland BES St. Johns.

One soil sample was received under a chain of custody. The sample was received in containers consistent with U.S. EPA (United States Environmental Protection Agency) protocol.

Standard Quality Assurance/Quality Control (QA/QC) procedures were performed as stated in "EPA Test Methods for Evaluating Solid Waste (SW-846)", 3rd Edition and "Standard Methods for the Examination of Water and Wastewater", 17th Edition. The EPA laboratory protocols followed include sample holding times, laboratory method blanks, laboratory matrix spikes, replicate samples and calibration standards. There were no significant variations from these protocols that would invalidate the analytical data.

Test methods may include minor modifications of detection limits or lists of parameters for the published methods. Solid samples are reported on a wet weight basis unless otherwise noted.

Compounds not detected are listed under results as ND.

Sincerely,

Kim Hughes

Kim Hughes
Lab Director

21920 N.E. Glisan ▪ Gresham, Oregon 97030 ▪ (503) 669-3745 ▪ FAX (503) 669-4165

RZA AGRA, Inc.

(Formerly: Rittenhouse-Zeman & Associates, Inc.)
Engineering & Environmental Services

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Client City of Portland
Project No. 7197-00
Project Manager Gerry Koschal
Sample Matrix Soil

Service Request No.: OR930188
Report Date: 10/18/93
Report No.: 5067qc
C.O.C. No.: 87

Quality Assurance Data Report
Diesel Range Organic Compounds
ODEQ Method WTPH-D
mg/kg(ppm)

Sample Name	Lab Code	Sample Result	Dup. Result	RPD	Spike Level	Spiked Result	% Recovery	% Rec. Acceptance Criteria	% Surrogate Recovery
Blank Spike	10-15blk spk	38.0	-	-	50.0	-	75.9	75.0-125	79.5

WDOE Acceptance Criteria: 50-150

Signature of Chemist

Laboratory Manager

AGRA
Earth & Environmental Group

RZA AGRA, Inc.

(Formerly: Rittenhouse-Zeman & Associates, Inc.)
Engineering & Environmental Services

7477 SW Tech Center Drive
Portland, Oregon 97223-8024
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FAX (503) 620-7892

Client: BES- St Johns
Project No.: Gerry Koschal
roject Manager: 7197-00
Sample Matrix: Soil

Service Request No.: OR930196
Report Date: 10/19/93
Report No.: 5070
C.O.C. No.: 126

Total Petroleum Hydrocarbons by IR
EPA Method 418.1 Modified
mg/kg (ppm)

Sample Name	Lab Code	Sample Date	Date Extracted	Date Analyzed	Method Detection Limit	Result
CH2 B4-15	0196-1	10/15	10/18	10/18	4.00	ND
CH2-B4-20	0196-2	10/15	10/18	10/18	4.00	534
TP-12-12	0196-3	10/15	10/18	10/18	4.00	6.60
TP-12-15	0196-4	10/15	10/18	10/18	4.00	ND
TP-14-1	0196-5	10/15	10/18	10/18	4.00	116
LAB BLANK	10-18SBK	-	10/18	10/18	4.00	ND

ND Not Detected

Signature of Chemist

Laboratory Manager

AGRA
Earth & Environmental Group

HUGHES ANALYTICAL LABORATORY

HUGHES REPORT #: 93-0438
CLIENT: RZA AGRA, Inc.
DATE: October 27, 1993
ITEMS: One Soil Sample

CLIENT JOB: 7197 BES
St. Johns

METHOD: TCLP Metals per EPA 1311,3005,6010,7000 series
Results in mg/L (ppm)

Extraction: 10/21/93
Analysis: 10/25/93

ANALYTE	T2-10	DETECTION LIMIT	REGULATORY LIMIT
Arsenic	ND	0.5	5.0
Barium	2.0	0.5	100.0
Cadmium	ND	0.05	1.0
Chromium	0.09	0.05	5.0
Lead	2.0	0.5	5.0
Mercury	ND	0.0002	0.2
Selenium	ND	0.7	1.0
Silver	ND	0.5	5.0

METHOD: PCB Analysis per EPA 8080
Results in mg/Kg (ppm)
Dry Weight Basis

Extraction: 10/25/93
Analysis: 10/25/93

SAMPLE I.D.	AROCLOR	PCB	SURROGATE RECOVERY, %
T2-10	1260	0.24	104
T2-10 replicate	1260	0.17	102
Lab Blank	--	ND	114
Detection Limit		0.05	

ND = Not Detected

HUGHES ANALYTICAL LABORATORY

HUGHES REPORT #: 93-0438
CLIENT: RZA AGRA, Inc.
DATE: October 27, 1993
ITEMS: One Soil Sample

CLIENT JOB: 7197 BES
St. Johns

METHOD: VOLATILE ORGANIC COMPOUNDS
per EPA 8240
Results in ug/Kg (ppb)

Extraction: 10/22/93
Analysis: 10/25/93

DESCRIPTION	T2-10	LAB BLANK	DETECTION LIMIT
ACETONE	ND	ND	1000
ACROLEIN	ND	ND	1000
ACRYLONITRILE	ND	ND	1000
ALLYL CHLORIDE	ND	ND	50
BENZENE	ND	ND	50
BROMODICHLOROMETHANE	ND	ND	25
BROMOFORM	ND	ND	25
BROMOMETHANE	ND	ND	50
2-BUTANONE	ND	ND	1000
CARBON DISULFIDE	ND	ND	25
CARBON TETRACHLORIDE	ND	ND	25
CHLOROBENZENE	ND	ND	25
CHLOROETHANE	ND	ND	25
2-CHLOROETHYL VINYL ETHER	ND	ND	500
CHLOROFORM	ND	ND	25
CHLOROMETHANE	ND	ND	50
DIBROMOCHLOROMETHANE	ND	ND	25
1,2-DIBROMOETHANE	ND	ND	25
DIBROMOMETHANE	ND	ND	25
1,2-DICHLOROBENZENE	ND	ND	50
1,3-DICHLOROBENZENE	ND	ND	50
1,4-DICHLOROBENZENE	ND	ND	50
1,4-DICHLORO-2-BUTENE	ND	ND	50
DICHLORODIFLUOROMETHANE	ND	ND	250
1,1-DICHLOROETHANE	ND	ND	25
1,2-DICHLOROETHANE	ND	ND	25
1,1-DICHLOROETHENE	ND	ND	25
trans-1,2-DICHLOROETHENE	ND	ND	25
1,2-DICHLOROPROPANE	ND	ND	25
cis-1,3-DICHLOROPROPENE	ND	ND	25

ND = Not Detected

RZA AGRA, Inc.

(Formerly: Rittenhouse-Zeman & Associates, Inc.)
Engineering & Environmental Services

7477 SW Tech Center Drive
Portland, Oregon 97223-8024
(503) 639-3400
FAX (503) 620-7892

Client: City of Portland
Project No.: 7197
ject Manager: Gerry Koschal
ample Matrix: Soil

Service Request No.: OR930188
Report Date: 10/18/93
Report No.: 5067
C.O.C. No.: 87

Total Petroleum Hydrocarbons - Diesel Range
ODEQ Method TPH-D
mg/kg (ppm)

Sample Name	Lab Code	Sample Date	Analysis Date	Method Detection Limit	Concentration	Surrogate Recovery 2-Fluorobiphenyl
TP-2-5	0188-1	10/12/93	10/15/93	12.50	16.6	147
TP-5-6	0188-2	10/12/93	10/15/93	12.50	120	*
TP-5-12	0188-3	10/12/93	10/15/93	12.50	ND	135
TP-6-5	0188-4	10/12/93	10/15/93	12.50	28.5	*
LAB BLANK	10-15SBKD	-	10/15/93	12.50	ND	137

* Surrogate recovery can not be reported due to target and non-target peaks within the retention time window of the surrogate.

ODEQ Acceptance Criteria 50%-150%

ND Not Detected

Signature of Chemist

Laboratory Manager

ODEQTPHD.XLS

AGRA
Earth & Environmental Group

HUGHES ANALYTICAL LABORATORY

HUGHES REPORT #: 93-0437
CLIENT: RZA AGRA, Inc.
DATE: October 27, 1993
ITEMS: One Soil Sample

CLIENT JOB: 6764-01 PDC
South Waterfront

METHOD: VOLATILE ORGANIC COMPOUNDS (Continued)
per EPA 8240
Results in ug/Kg (ppb)

Extraction: 10/22/93
Analysis: 10/25/93

DESCRIPTION	T2-10	LAB BLANK	DETECTION LIMIT
trans-1,3-DICHLOROPROPENE	ND	ND	25
ETHYLMETHACRYLATE	ND	ND	250
ETHYLBENZENE	ND	ND	25
2-HEXANONE	ND	ND	250
IODOMETHANE	ND	ND	50
METHACRYLONITRILE	ND	ND	250
METHYL ISOBUTYL KETONE	ND	ND	250
METHYLENE CHLORIDE	ND	ND	500
METHYLMETHACRYLATE	ND	ND	250
PENTACHLOROETHANE	ND	ND	25
STYRENE	ND	ND	25
1,1,1,2-TETRACHLOROETHANE	ND	ND	25
1,1,2,2-TETRACHLOROETHANE	ND	ND	25
TETRACHLOROETHENE	ND	ND	25
TOLUENE	ND	ND	25
1,1,1-TRICHLOROETHANE	ND	ND	25
1,1,2-TRICHLOROETHANE	ND	ND	25
TRICHLOROETHENE	ND	ND	25
TRICHLOROFLUOROMETHANE	ND	ND	25
VINYL CHLORIDE	ND	ND	50
TOTAL XYLENES	ND	ND	50

Surrogate Recovery, %			Acceptance Limits
d4-1,2-Dichloroethane	82.5	87.3	74-121
d8-Toluene	82.1	87.9	70-121
Bromofluorobenzene	87.4	93.6	81-117

ND = Not Detected

RZA AGRA, Inc.

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Engineering & Environmental Services

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Client BES- St Johns
Project No. Gerry Koschal
Project Manager 7197-00
Sample Matrix Soil

Service Request No.: OR930196
eport Date: 10/19/93
Report No.: 5070qc
C.O.C. No.: 126

Quality Assurance Data Report
Total Petroleum Hydrocarbons by IR
EPA Method 418.1 Modified
mg/kg (ppm)

Sample Name	Lab Code	Sample Result	Dup. Result	RPD	Spike Level	Spiked Result	% Recovery	% Rec. Acceptance Criteria
Blank Spike	10-18sbk spk	101	-	-	100	-	101	75.0%-125%

Sean Stanley For Brian Hong
Signature of Chemist

Sean Stanley
Laboratory Manager

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Engineering & Environmental Services

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FAX (503) 620-7892

Client: City of Portland
Project No.: 7197-00
Project Manager: Gerry Koschal
Sample Matrix: Soil

Service Request No.: OR930192
Report Date: 10/14/93
Report No.: 5063
C.O.C. No.: 139

Total Petroleum Hydrocarbons by IR
EPA Method 418.1 Modified
mg/kg (ppm)

Sample Name	Lab Code	Sample Date	Date Extracted	Date Analyzed	Method Detection Limit	Result
TP-8-10	0192-1	10/14	10/14	10/14	4.00	12.6
TP-8-20	0192-2	10/14	10/14	10/14	4.00	19.3
LAB BLANK	10-14SBK	10/14	10/14	10/14	4.00	ND

ND Not Detected

Signature of Chemist

Sean Tomley
Laboratory Manager

EPA418.1mod.

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Engineering & Environmental Services

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Portland, Oregon 97223-8024
(503) 639-3400
FAX (503) 620-7892

Client City of Portland
Project No. 7197-00
Project Manager Gerry Koschal
Sample Matrix Soil

Service Request No.: OR930192
Report Date: 10/14/93
Report No.: 5063QC
C.O.C. No.: 0139

Quality Assurance Data Report
Total Petroleum Hydrocarbons by IR
EPA Method 418.1 Modified
mg/kg (ppm)

Sample Name	Lab Code	Method Detection Limit	Sample Result	Dup. Sample Result	RPD	Spike Level	Spiked Result	% Recovery	% Recovery Acceptance Limits
TP-8-10	0192-1	4.00	12.6	8.27	29.9	200	210	99.8	75-125

RPD Relative Percent Difference

Signature of Chemist

Sean T. Lomley
Laboratory Manager

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Earth & Environmental Group

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Engineering & Environmental Services

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(503) 639-3400
FAX (503) 620-7892

Client: City of Portland
Project No.: 21-07197-00
Project Manager: Gerry Koschal
Sample Matrix: Soil

Service Request No.: OR930215
Report Date: 11/8/93
Report No.: 5129
C.O.C. No.: 0173

Volatile Organic Compounds
EPA Methods 8010/8020
mg/kg(ppm)

Sample Name:	TP-23-6	Lab Blank	Detection
Lab Code:	0215-2	0215-MB	Limit
Bromodichloromethane	ND	ND	0.05
Bromoform	ND	ND	0.05
Bromomethane	ND	ND	0.10
Carbon Tetrachloride	ND	ND	0.05
Chlorobenzene	ND	ND	0.05
Chloroethane	ND	ND	0.10
2-Chloroethylvinyl ether	ND	ND	0.05
Chloroform	ND	ND	0.05
Chloromethane	ND	ND	0.10
Dibromochloromethane	ND	ND	0.05
1,2-Dibromoethane	ND	ND	0.05
1,2-Dichlorobenzene	ND	ND	0.05
1,3-Dichlorobenzene	ND	ND	0.05
1,4-Dichlorobenzene	ND	ND	0.05
1,1-Dichloroethane	ND	ND	0.05
1,2-Dichloroethane	ND	ND	0.05
1,1-Dichloroethene	ND	ND	0.05
C-1,2-Dichloroethene	ND	ND	0.05
T-1,2-Dichloroethene	ND	ND	0.05
1,2-Dichloropropane	ND	ND	0.05
C-1,3-Dichloropropene	ND	ND	0.05
T-1,3-Dichloropropene	ND	ND	0.05
Methylene Chloride	0.12(a)	0.15(a)	0.05
1,1,2,2-Tetrachloroethane	ND	ND	0.05
Tetrachloroethene (PCE)	ND	ND	0.05
1,1,1-Trichloroethane (TCA)	ND	ND	0.05
1,1,2-Trichloroethane	ND	ND	0.05
Trichloroethene (TCE)	ND	ND	0.05
Trichlorofluoromethane	ND	ND	0.05
Vinyl Chloride	ND	ND	0.10
Benzene	ND	ND	0.05
Ethylbenzene	0.47	ND	0.05
Toluene	ND	ND	0.05
m/p-Xylene	1.50	ND	0.05
o-Xylene	0.16	ND	0.05
Sample Date:	10/26/93	11/4/93	
Analysis Date:	11/5/93	11/5/93	

ND Not Detected
(a) Estimated value because the analyte is also found in the associated method blank.

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Volatile Organic Compounds
EPA Methods 8010/8020

Surrogate Recoveries:			
Sample Name:	TP-23-6	Lab Blank	Control
Lab Code:	0215-2	0215-MB	Limits
Bromochloromethane:	101	84.1	72.7%-132%
1,4 - Dichlorobutane:	74.0	81.0	51.4%-133%
a,a,a - Trifluorotoluene:	104	106	77.7%-123%

Signature of Chemist

Laboratory Manager

801020.xls

AGRA
Earth & Environmental Group

HUGHES
ANALYTICAL LABORATORY

November 3, 1993

Mr. Gerry Koschal
RZA AGRA, Inc.
7477 SW Tech Center Drive
Portland, OR 97223

Dear Mr. Koschal:

Enclosed is the lab report for your samples which were received on October 20, 1993. The Hughes Report # is 93-0445 and the Client Project is 7197, BES St. Johns.

Five water samples were received under a chain of custody. The samples were received in containers consistent with U.S. EPA (United States Environmental Protection Agency) protocol.

Standard Quality Assurance/Quality Control (QA/QC) procedures were performed as stated in "EPA Test Methods for Evaluating Solid Waste (SW-846)", 3rd Edition and "Standard Methods for the Examination of Water and Wastewater", 17th Edition. The EPA laboratory protocols followed include sample holding times, laboratory method blanks, laboratory matrix spikes, replicate samples and calibration standards. There were no significant variations from these protocols that would invalidate the analytical data.

Test methods may include minor modifications of detection limits or lists of parameters for the published methods. Solid samples are reported on a wet weight basis unless otherwise noted.

Compounds not detected are listed under results as ND.

Sincerely,

Kim Hughes

Kim Hughes
Lab Director

21920 N.E. Glisan ■ Gresham, Oregon 97030 ■ (503) 669-3745 ■ FAX (503) 669-4165

HUGHES ANALYTICAL LABORATORY

HUGHES REPORT #: 93-0434
CLIENT: RZA AGRA, Inc.
DATE: November 3, 1993
ITEMS: Five Water Samples

CLIENT JOB: 7197 BES
St. Johns

METHOD: PCB Analysis per EPA 608
Results in ug/L (ppb)

Extraction: 10/22/93
Analysis: 10/25/93

SAMPLE I.D.	AROCLOR	PCB	SURROGATE RECOVERY, %
MW-1	---	ND	89.4
MW-2	---	ND	95.5
MW-3	---	ND	96.0
MW-4	---	ND	103
MW-5	---	ND	95.4
Lab Blank	---	ND	100
Detection Limit		1.0	

ND = Not Detected

HUGHES ANALYTICAL LABORATORY

HUGHES REPORT #: 93-0434
CLIENT: RZA AGRA, Inc.
DATE: November 3, 1993
ITEMS: Five Water Samples

CLIENT JOB: 7197 BES
St. Johns

METHOD: Chlorinated Phenolics per EPA Method 8040 Results in ug/L (ppb)

Extraction: 10/22/93
Analysis: 10/26/93
11/01/93

SAMPLE I.D.	PENTACHLORO-PHENOL	2,4,5-TRICHLORO-PHENOL	SURROGATE RECOVERY, %
MW-1	ND	ND	43.7
MW-2	ND	ND	50.0
MW-3	ND	ND	59.7
MW-4	ND	ND	69.0
MW-5	18	ND	65.1
Lab Blank	ND	ND	61.6
Detection Limit	10	5	

ND = Not Detected

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Portland, Oregon 97223-8024
(503) 639-3400 FAX: (503) 620-7892

3751

CHAIN-OF-CUSTODY RECORD / LABORATORY ANALYSES REQUEST

PROJECT: BES JOB #: 7197-00
CLIENT: City of Portland
PROJ. MANAGER: Gary K PHONE #: 639-3400
SITE ADDRESS: Pittsburg / St Johns Bridge, St Helens, Oregon
SAMPLER'S NAME: Denny M PHONE #: 639-3400
SAMPLER'S SIGNATURE:

ANALYSIS REQUESTED: (Circle, Check Box, or Write Preferred Method in Box) OTHER: (Write in)

SAMPLE ID #	DATE	TIME	PRESERV.	MATRIX	Halogenated Volatiles EPA 601 EPA 8010	Aromatics (BTX&E) EPA 602 EPA 8020	Fuel Scan/TPH by GC EPA 602-mod/8015-mod.	Volatile Organ. Compnds	GC Fingerprint	Penta/tetra-chlorophenol EPA 604 EPA 8040	Tot. Petrol. Hydrocarbons EPA 413.1, 418.1 / TLC	Total Metals ICP AA Other	EP-TOX Metals	Purgeable Organics EPA 624 8240	Base/Neut.Acids EPA 625 8270	pH Cond. Alk Color	NO3/NO2 N-NO3 NH3-N	Ca Mg Na K Fe Cl SO4	TOX TOC TDS COD	TPH			# of Containers	Sample Preparation	Detection Limits Desired
1. T3-22	10/11/93		ICe	Soil																+			1		
2. T3-23																							1		
3. T3-24																							1		
4.																									
5.																									
6.																									
7.																									
8.																									
9.																									
10.																									

RELINQUISHED BY RZA:	RELINQUISHED BY:	RELINQUISHED BY:
Signature:	Signature:	Signature:
Printed Name: Denny Macomber	Printed Name: DAVE ROBERTSON	Printed Name:
Firm: RZA AGRA, Inc.	Firm: RZA AGRA	Firm:
Date/Time: 10/12/93 6:00P	Date/Time: 10/13/93	Date/Time:
RECEIVED BY:	**RECEIVED BY:**	**RECEIVED BY:**
Signature:	Signature: Jean Gormley	Signature:
Printed Name: DAVE ROBERTSON	Printed Name: Jean Gormley	Printed Name:
Firm: RZA AGRA	Firm: RZA AGRA	Firm:
Date/Time: 10/12/93 6:00P	Date/Time: 10/13/93 7:30	Date/Time:

LABORATORY:
Shipping I.D. #:
Carrier:
DOT Designation:

SAMPLE RECEIPT:
Total # Containers:
Condition of Containers?
Condition of Seals?

SPECIAL INSTRUCTIONS/COMMENTS:
Lab Project: OR930189

DISTRIBUTION: WHITE-return to RZA; YELLOW-lab; PINK-retained by RZA.

PAGE_____ OF _____.

CRAW00018211

RZA
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Portland, Oregon 97223-8024
(503) 639-3400 FAX: (503) 620-7892

3750

CHAIN-OF-CUSTODY RECORD / LABORATORY ANALYSES REQUEST

PROJECT: BES St Johns JOB #: 7197-00
CLIENT: City of Pdx
PROJ. MANAGER: Gerry K PHONE #: 639-3400
SITE ADDRESS: Pittsburg/St Johns Bridge St Helens OREGON
SAMPLER'S NAME: Denny M PHONE #: 639-3400
SAMPLER'S SIGNATURE: Denny Mount

ANALYSIS REQUESTED: (Circle, Check Box, or Write Preferred Method in Box) OTHER: (Write in)

SAMPLE ID #	DATE	TIME	PRESERV.	MATRIX	Halogenated Volatiles EPA 601 EPA 8010	Aromatics (BTXAE) EPA 602 EPA 8020	Fuel Scan/TPH by GC EPA 602-mod/8015-mod.	Volatile Organ. Compnds	GC Fingerprint	Penta/Ietra-chlorophenol EPA 604 EPA 8040	Tot. Petrol. Hydrocarbons EPA 413.1 418.1 / TLC	Total Metals ICP AA Other	EP-TOX Metals	Purgeable Organics EPA 624 8240	Base/Neut.Acids EPA 625 8270	pH Cond. Alk Color	NO3/NO2 N-NO3 NH3-N	Ca Mg Na K Fe Cl SO4	TOX TOC TDS COD	TPH			# of Containers	Sample Preparation	Detection Limits Desired
1. T1-2	10/11/93		ice	Soil																X			1		
T2-3 2. T3-12																							1		
3. T1-5																							1		
T1-6 4. T1-16																							1		
5. TP3-16																							1		
6. T2-9																							1		
7. T2-10																							1		
8. T2-11																							1		
9. T2-14																							1		
10. T3-17																							1		

RELINQUISHED BY RZA:	RELINQUISHED BY:	RELINQUISHED BY:	LABORATORY:	SAMPLE RECEIPT:
Signature: Denny Mount	Signature: David Robertson	Signature:		
Printed Name: Denny Macomber	Printed Name: DAVID ROBERTSON	Printed Name:	Shipping I.D. #:	Total # Containers:
Firm: RZA AGRA, Inc	Firm: RZA AGRA	Firm:	Carrier:	Condition of Containers?
Date/Time: 10/12/93	Date/Time: 10/12/93	Date/Time:	DOT Designation:	Condition of Seals?
RECEIVED BY:	**RECEIVED BY:**	**RECEIVED BY:**	**SPECIAL INSTRUCTIONS/COMMENTS:**	
Signature: David Robertson	Signature:	Signature: Jean Gamble	Lab Project: OR930185	
Printed Name: DAVID ROBERTSON	Printed Name:	Printed Name: Jean Gamble		
Firm: RZA AGRA	Firm:	Firm: RZA AGRA		
Date/Time: 10/12/93	Date/Time:	Date/Time: 10/13/93 7:30		

DISTRIBUTION: WHITE-return to RZA; YELLOW-lab; PINK-retained by RZA.

...TENHOUSE-ZEMAN & ASSOCIATES, INC.
EARTH & ENVIRONMENTAL CONSULTANTS

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(503) 639-3400 FAX: (503) 620-7892

3752

CHAIN-OF-CUSTODY RECORD / LABORATORY ANALYSES REQUEST

PROJECT: BES/St Johns JOB #: 7197
CLIENT: City of Portland
PROJ. MANAGER: Gerry K. PHONE #: 639-3400
SITE ADDRESS: St Johns Bridge/Pittsburg St St Johns Oregon
SAMPLER'S NAME: Kenny M PHONE #: 639-3400
SAMPLER'S SIGNATURE: [signature]

ANALYSIS REQUESTED: (Circle, Check Box, or Write Preferred Method in Box) OTHER: (Write in)

SAMPLE ID #	DATE	TIME	PRESERV.	MATRIX	Halogenated Volatiles EPA 601 EPA 8010	Aromatics (BTX&E) EPA 602 EPA 8020	Fuel Scan/TPH by GC EPA 602-mod/8015-mod.	Volatile Organ. Compnds	GC Fingerprint	Penta/Iso-chlorophenol EPA 604 EPA 8040	Tot. Petrol. Hydrocarbons EPA 413.1. 418.1 / TLC	Total Metals ICP AA Other	EP-TOX Metals	Purgeable Organics EPA 624 8240	Base/Neut/Acids EPA 625 8270	pH Cond. Alk Color	NO3/NO2 N-NO3 NH3-N	Ca Mg Na K Fe Cl SO4	TOX TOC TDS COD	TPH-418.1			# of Containers	Sample Preparation	Detection Limits Desired
1. T4-25	10/13/93	9:40	Ice	Soil																X			1		
2. T4-26		9:50																					1		
3. T4-27		10:10																					1		
T5-28		15:55																					1		
T5-29		16:00																					1		
T5-30		16:10																					1		
7.																									
8. ~~[illegible]~~		~~[illegible]~~	~~[illegible]~~	~~[illegible]~~																			~~[illegible]~~		
9.																									
10.																									

RELINQUISHED BY RZA:	RELINQUISHED BY:	RELINQUISHED BY:
Signature: [signature]	Signature: [signature]	Signature:
Printed Name: Kenny Macomber	Printed Name: DAVE ROBERTSON	Printed Name:
Firm: RZA AGRA	Firm: RZA AGRA	Firm:
Date/Time: 10/13/93 16:00P	Date/Time: 10/14/93 8:00	Date/Time:
RECEIVED BY:	**RECEIVED BY:**	**RECEIVED BY:**
Signature: [signature]	Signature:	Signature: [signature]
Printed Name: DAVE ROBERTSON	Printed Name:	Printed Name: Sean Grimley
Firm: RZA AGRA	Firm:	Firm: RZA AGRA Inc.
Date/Time: 10/13/93 16:00P	Date/Time:	Date/Time: 10/14/93 8:00

LABORATORY:
Shipping I.D. #:
Carrier:
DOT Designation:

SAMPLE RECEIPT:
Total # Containers:
Condition of Containers?
Condition of Seals?

SPECIAL INSTRUCTIONS/COMMENTS:
OR93D162
0191

DISTRIBUTION: WHITE-return to RZA; YELLOW-lab; PINK-retained by RZA.

PAGE_____ OF _____.

CRAW00018213

93-0453

0152

RZA AGRA, Inc.

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Engineering & Environmental Services
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(503) 639-3400 • FAX (503) 620-7892

Chain-of-Custody Record / Laboratory Analyses Request

Project: BES - ST Johns Job #: 7197
Client: City of Portland
Project Manager: Gerry Koschal Phone #: 639-3100
Sampler's Name: Penny Mccomber Phone #: ↓
Sampler's Signature: —

Analysis Requested: (Circle, Check Box, or Write Preferred Method in Box)

	Sample I.D. #	Date	Time	Preserv.	Matrix	Halogenated Volatiles EPA 601 EPA 8010	Volatile Aromatics EPA 602 EPA 8020	BTXE or BTXE / TPH-G	WA TPH-G or OR TPH-G	WA TPH-D or OR TPH-D	Fuel Scan / TPH by GC 8015-modified	GC Fingerprint / HCID	WA 418.1 Modified or OR 418.1 Modified	GC / MS Volatiles 8240	GC / MS Semi Volatiles	Total Metals ICP AA Other	TC LP Metals	pH Cond. Alk. Color	8080/8085		# of Containers	Comments
01	TZ-10	10/18/93	1:00	Cool	S									X			X		X			
2.																						
3.																						
4.																						
5.																						
6.																						
7.																						
8.																						
9.																						
10.																						

Relinquished by: RZA	Relinquished by:	Relinquished by:	Laboratory:	Sample Receipt:
Signature: Jean Gourley	Signature:	Signature:	Hughes Analytical Lab	
Printed Name: Jean Gourley	Printed Name:	Printed Name:	Shipping I.D.#:	Total # Containers:
Firm: RZA AGRA, Inc	Firm:	Firm:	Carrier: Courier	Condition of Containers:
Date/Time: 10/19/93	Date/Time:	Date/Time:	DOT Designation:	Condition of Seals:

Received by:	Received by:	Received by:	Special Instructions/Comments:
Signature: Jenni Hughes	Signature:	Signature:	Original COC is 0150
Printed Name: Jenni Hughes	Printed Name:	Printed Name:	
Firm: Hughes Analytical	Firm:	Firm:	
Date/Time: 10-19-93 10:35	Date/Time:	Date/Time:	

DISTRIBUTION: WHITE & PINK returned to project manager, YELLOW - lab.

Page ____ of ____

SERVICE REQUEST #: _____

CRAW00018214

RZA AGRA, Inc.
(Formerly: Rittenhouse-Zeman & Associates, Inc.)
Engineering & Environmental Services
7477 SW Tech Center Drive • Portland, OR 97223-8024
(503) 639-3400 • FAX (503) 620-7892

Chain-of-Custody Record / Laboratory Analyses Request

Project: BES ST. JOHNS Job #: 7197-00
Client: CITY OF PORTLAND
Project Manager: KOSCHAL Phone #:
Sampler's Name: ROBERTSON Phone #:
Sampler's Signature:

Analysis Requested: (Circle, Check Box, or Write Preferred Method in Box)

Sample I.D. #	Date	Time	Preserv.	Matrix	Halogenated Volatiles EPA 601 EPA 8010	Volatile Aromatics EPA 602 EPA 8020	BTXE or BTXE / TPH-G	WA. TPH-G or OR. TPH-G	WA. TPH-D or OR. TPH-D	Fuel Scan / TPH by GC 8015-modified	GC Fingerprint / HCID	WA 418.1 Modified or OR 418.1 Modified	GC / MS Volatiles	GC / MS Semi Volatiles	Total Metals ICP AA Other	TC LP Metals	pH Cond. Alk Color			# of Containers	Comments
1. TP-B-10	10/13/93	4:25	CHILL	SOIL								X									
2. TP-B-20	"	4:45	↓	↓								X									
3.																					
4.																					
5.																					
6.																					
7.																					
8.																					
9.																					
10.																					

Relinquished by RZA:	Relinquished by:	Relinquished by:	Laboratory:	Sample Receipt:
Signature:	Signature:	Signature:		
Printed Name:	Printed Name:	Printed Name:	Shipping I.D.#	Total # Containers:
Firm:	Firm:	Firm:	Carrier:	Condition of Containers:
Date/Time:	Date/Time:	Date/Time:	DOT Designation:	Condition of Seals:

Received by:	Received by:	Received by:	Special Instructions/Comments:
Signature: Jean Gormley	Signature:	Signature:	OR930192
Printed Name: Jean Gormley	Printed Name:	Printed Name:	
Firm: RZA AGRA	Firm:	Firm:	
Date/Time: 10/14/93	Date/Time:	Date/Time:	

DISTRIBUTION: WHITE & PINK returned to project manager, YELLOW - lab.

Page ____ of ____

SERVICE REQUEST #: _____

RZA AGRA, INC.
(Formerly: Rittenhouse-Zeman & Associates, Inc.)
Engineering & Environmental Services
7477 SW Tech Center Drive • Portland, OR 97223-8024
(503) 639-3400 • FAX (503) 620-7892

Chain-of-Custody Record / Laboratory Analyses Request

Project: BES - ST JOHNS Job #: 7197-00
Client: CITY OF PORTLAND
Project Manager: G. KOSCHAL Phone #:
Sampler's Name: D. ROBERTSON Phone #:
Sampler's Signature: [signature]

Analysis Requested: (Circle, Check Box, or Write Preferred Method in Box)

Sample I.D. #	Date	Time	Preserv.	Matrix	Halogenated Volatiles EPA 601 EPA 8010	Volatile Aromatics EPA 602 EPA 8020	BTXE or BTXE / TPH-G	WA TPH-G or OR TPH-G	WA TPH-D or OR TPH-D	Fuel Scan / TPH by GC 8015-modified	GC Fingerprint / HCID	WA 418.1 Modified or OR 418.1 Modified	GC / MS Volatiles	GC / MS Semi Volatiles	Total Metals ICP AA Other	TC LP Metals	pH Cond. Alk Color			# of Containers	Comments
1. CH2B4-15	10/15	11:00	CHILL	SOIL								X								1	
2. CH2B4-20	"	11:00																		1	
3. TP-12-12	10/14	11:05																		2	
4. TP-12-15		11:20																		2	
5. TP-14-1		2:10																		1	
6.																					
7.																					
8.																					
9.																					
10.																					

Relinquished by RZA:	Relinquished by:	Relinquished by:	Laboratory:	Sample Receipt:
Signature: [signature]	Signature:	Signature:		
Printed Name: DAVE ROBERTSON	Printed Name:	Printed Name:	Shipping I.D.#	Total # Containers:
Firm: RZA AGRA	Firm:	Firm:	Carrier:	Condition of Containers:
Date/Time: 10/15/93 3:20P	Date/Time:	Date/Time:	DOT Designation:	Condition of Seals:
Received by:	**Received by:**	**Received by:**	**Special Instructions/Comments:**	
Signature: [signature]	Signature:	Signature:		
Printed Name: Jean Gormley	Printed Name:	Printed Name:		
Firm: RZA AGRA, Inc.	Firm:	Firm:		
Date/Time: 10/15/93 15:20	Date/Time:	Date/Time:		

DISTRIBUTION: WHITE & PINK returned to project manager, YELLOW - lab.

Page ____ of ____.
SERVICE REQUEST #: Q530195

RZA AGRA, Inc.
(Formerly: Rittenhouse-Zeman & Associates, Inc.)
Engineering & Environmental Services
7477 SW Tech Center Drive • Portland, OR 97223-8024
(503) 639-3400 • FAX (503) 620-7892

Chain-of-Custody Record / Laboratory Analyses Request

Project: BES ST John — Job #: 7197
Client: (BES) City of Portland
Project Manager: Gerry Koschal — Phone #: 639-3400
Sampler's Name: Denny Macomber — Phone #: 639-3400
Sampler's Signature: Denny Macomber

Analysis Requested: (Circle, Check Box, or Write Preferred Method in Box)

Sample I.D. #	Date	Time	Preserv.	Matrix	Halogenated Volatiles EPA 601 EPA 8010	Volatile Aromatics EPA 602 EPA 8020	BTXE or BTXE / TPH-G	WA. TPH-G or OR. TPH-G	WA. TPH-D or OR. TPH-D	Fuel Scan / TPH by GC 8015-modified	GC Fingerprint / HCID	WA. 418.1 Modified or OR. 418.1 Modified	GC / MS Volatiles	GC / MS Semi Volatiles	Total Metals ICP AA Other	TC LP Metals	pH Cond. Alk. Color	8080/PCB's	8040*	# of Containers	Comments
01 1. MW-1	10/15/93	9:30	ice	H_2O														X	X	3	3
02 2. MW-2		10:10																X	X	3	3
03 3. MW-3		11:20																X	X	3	3
04 4. MW-4		12:10																X	X	3	3
05 5. MW-5		13:20																X	X	3	3
6.																					
7.																					
8.																					
9.																					
10.																					

Relinquished by RZA:	Relinquished by:	Relinquished by:	Laboratory:	Sample Receipt:
Signature: Denny Macomber	Signature: Jean Gormley	Signature:		
Printed Name: Denny Macomber	Printed Name: Jean Gormley	Printed Name:	Shipping I.D.#:	Total # Containers:
Firm: RZA AGRA Inc	Firm: RZA AGRA, Inc.	Firm:	Carrier:	Condition of Containers:
Date/Time: 10/15/93 @ 16:00	Date/Time: 10/20/93	Date/Time:	DOT Designation:	Condition of Seals:

Received by:	Received by:	Received by:	Special Instructions/Comments:
Signature: Jean Gormley	Signature: Jenni Hughes	Signature:	* 8040 = Pentachlorophenol + 2,4,5-Trichlorophenol
Printed Name: Jean Gormley	Printed Name: Jenni Hughes	Printed Name:	
Firm: RZA AGRA	Firm: Hughes Analytical	Firm:	Note: Extraction Holding Times are up Friday
Date/Time: 10/15/93 16:00	Date/Time: 10-20-93 3:30	Date/Time:	

DISTRIBUTION: WHITE & PINK returned to project manager, YELLOW - lab.

Page ____ of ____

SERVICE REQUEST #: _____

CRAW00018217

Appendix B

Test Pit Logs
Boring Logs

TEST PIT LOGS

Depth (ft.)	Materials Encountered
Test Pit 1	
0 – 5.5	Soft to medium stiff, moist, light brown, SILT with trace-to some fine sand and scattered concrete chunks. (fill)
5.5 – 12	Medium stiff to stiff, moist grading to wet, brown, SILT with trace fine sand.
12 – 20	Medium dense, wet, gray-brown fine SAND grading from silty to trace sand at 18 feet.
	Terminated at 20 feet. No seepage observed. No caving observed.
Test Pit 2	
0 – 2	Loose, dry, black, green and white, blast SAND with some gravel and misc. debris (fill).
2 – 4	Soft, moist, gray-brown, SILT with areas of black discoloration and wood fragments (slight hydrocarbon-like odor) (fill).
10 – 11	Large concrete debris or foundation elements.
	Refusal on concrete at 11 feet. No seepage observed. No caving observed.
Test Pit 3	
0 – 3	Soft, dry to moist, tan to white, SILT with abundant brick and concrete debris (fill).
3 – 7.5	Loose, moist, black, blast sand (fill).
7.5 – 13	Medium stiff, moist, light brown, SILT with trace to some clay; grades to some fine sand, and no clay at 10 feet.
13 – 19	Medium dense, moist to wet, gray-brown, fine SAND grading from silty to some silt.
	Terminated at 19 feet. No seepage observed. No caving observed.

Depth (ft.)	Materials Encountered
Test Pit 4	
0 – 4	Soft to medium stiff, dry to moist, tan, SILT with scattered rootlets to 1.5 feet and some gravel (fill).
4 – 9	Medium stiff, moist, lightly rust mottled, light brown, SILT with trace clay and fine sand.
9 – 20	Medium dense, moist, fine SAND grading from silty to some silt at 12 feet.
	Terminated at 20 feet. No seepage observed. No caving observed.
Test Pit 5	
0 – 4	Loose to medium dense, dry to moist, black, blast SAND and tan gravelly SILT with brick and concrete debris (fill).
4 – 9	Medium stiff, moist, green-gray, SILT; some black discoloration and a slight hydrocarbon-like odor (fill).
9 – 13	Stiff, moist, lightly rust mottled, light brown SILT with trace clay.
13 – 19	Medium dense, moist grading to wet, gray-brown, fine SAND, silty grading to some silt at 16 feet.
19 – 20	Medium stiff, wet, gray, SILT with trace fine sand.
	Terminated at 20 feet. Light seepage at 9 feet. No caving observed.
Test Pit 6	
0 – 2	Soft, dry, tan and gray gravelly SILT and blast SAND (fill).
2 – 4	Soft to medium stiff, moist, light brown, gravelly SILT (fill).
4 – 7.5	Soft to medium stiff, moist, dark gray-green, gravelly SILT. Slight hydrocarbon-like odor (fill).
7.5 – 9	Large flat concrete object - possibly slab and foundation. Adjacent soils consist of medium stiff, wet, black, SILT, GRAVEL and CHARRED WOOD DEBRIS (fill).
	Refusal on (foundation elements?) at 9 feet. No seepage observed. No caving observed.

Depth (ft.)	Materials Encountered
Test Pit 7	
0 – 6.5	Soft to medium stiff, dry to moist, light brown and white, SILT and fine SAND (fill).
7 – 12	Medium stiff, moist, dark blue-gray, SILT with some gravel and a slight hydrocarbon-like odor (fill).
	Refusal on concrete and rebar at 12 feet. No seepage observed. Moderate caving from 7 feet to 12 feet.
Test Pit 8	
0 – 3	Loose, dry to moist, black blast SAND with trace concrete debris (fill).
3 – 5	Medium stiff, moist, light brown, SILT with scattered chunks of black slag-like material and some gravel (fill).
5 – 11	Medium stiff, moist, dark blue-gray SILT with some gravel and trace fine sand. Slight organic and possible hydrocarbon-like odor (fill).
11 – 16	Medium dense, wet grading to saturated, dark blue-gray, silty fine SAND (fill).
16 – 20	Medium stiff, saturated SILT with some gravel; abundant rusted nails, pipe, etc (fill).
	Terminated at 20 feet. Light seepage at 16 feet. Minor caving from 16 to 20 feet.
Test Pit 9	
0 – 1	Soft, moist, brown, gravelly silty SAND with abundant rootlets (fill).
1 – 5.5	Medium stiff, dry to moist, light brown SILT with scattered lenses of white and black blast sand and some concrete chunks up to 1 - 2 feet in the long direction (fill).
5.5 – 20	Medium stiff, moist grading to wet, blue and brown silty SAND and sandy SILT with occasional roots and woody debris. Organic and charred wood odor (fill).
	Terminated at 20 feet. No seepage observed. No caving observed.

Depth (ft.)	Materials Encountered
Test Pit 10	
0 – 2	Loose, dry, gravelly SAND with some silt and trace brick debris (fill).
2 – 2.5	Loose, dry, white, blast SAND (fill).
2.5 – 15	Medium stiff, moist, blue-gray, gravelly SILT with trace to some fine sand, abundant charred wood, rebar, concrete and brick (debris) from 2.5 feet to 10 feet (fill).
15 – 18	Medium stiff, moist to wet, blue-gray, silty fine SAND (dredge fill?)
	Terminated at 18 feet due to interference with debris in upper 10 feet.
	No seepage observed. Extreme caving from 0 - 10 feet. Moderate caving from 10 - 20 feet.
Test Pit 11	
0 – 3	Soft to medium stiff, dry, brown SILT with a 6-inch thick lense of black blast sand at 2.5 feet. Abundant brick and concrete debris; rusted piping from surface to 3 feet in old utility corridor; also large slab and foundation elements including a timber pile.
3 – 10	Medium stiff, moist, brown, silty SAND with trace gravel and rootlets; old pipe at 4 feet (fill).
10 – 12	Loose, to medium stiff, moist to wet, green-gray, fine SAND (dredge fill?).
12 – 16.5	Soft, wet, green-gray, clayey SILT with trace fine SAND (dredge fill?).
	Terminated at 16.5 feet due to interference with pipe and foundation elements in upper 5 feet. No seepage observed. No caving observed.
Test Pit 12	
0 - 1	Two inches of ASPHALT over moist, brown GRAVEL.
1 – 8.5	Medium dense, moist, green and gray fine to medium SAND with scattered thin lenses of brown SILT (dredge fill?).
8.5 – 10	Medium stiff, moist, green-gray SILT with some clay and sand (dredge fill?).
10 – 14	Loose to medium dense, moist, dark gray, fine to medium SAND (dredge fill?).
	Terminated at 14 feet due to extreme caving. No seepage observed.

Depth (ft.)	Materials Encountered
Test Pit 13	
0 – 1	Three inches of ASPHALT over dense, moist, brown, silty GRAVEL.
1 – 15	Loose to medium dense, moist, green-gray, fine to medium SAND with trace to some silt and scattered thin lenses of moist, brown, SILT. Becomes dark gray at 10 feet (dredge fill?).
15 – 16	Stiff, moist to wet, brown SILT with some clay and sawdust (fill).
16 – 20	Stiff to very stiff, wet, green-gray SILT with some clay and fine sand.
	Terminated at 20 feet. Light seepage at 11 feet. Moderate caving from 5 - 15 feet.
Test Pit 14	
0 – 1	Two inches of ASPHALT over base coarse GRAVEL. Oily sheen seeping from gravel.
1 – 4.5	Stiff, moist, brown, SILT (fill).
4.5 – 10.5	Soft to medium stiff, moist grading to saturated, dark blue-gray SILT with some organics and large concrete debris at the basal contact (fill).
10.5 – 12	Loose, wet, dark brown, organics and woody debris. Timber pile and 2 - 3 inch metal pipe encountered at basal contact (fill).
12 – 19	Stiff, wet, gray-brown, SILT.
	Terminated at 19 feet. Light seepage at 1 foot and 12 feet. Moderate caving from 4.5 to 10.5 feet.
Test Pit 15	
0 – 1	Two inches of broken up ASPHALT over dry, brown, silty GRAVEL.
1 – 3.5	Stiff, moist, brown, SILT with trace woody debris (fill).
3.5 – 11	Medium stiff, wet, dark blue-gray, SILT with trace clay and fine sand (fill).
11 – 13	Loose, wet to saturated, dark brown ORGANICS and wood, brick and metal debris (fill).
13 – 20	Stiff, moist, light brown, SILT with trace clay.
	Terminated at 20 feet. Minor caving from 9 to 13 feet.

Light seepage at 13 feet.

Depth (ft.)	Materials Encountered
Test Pit 16	
0 – .5	Two inches of ASPHALT over CRUSHED ROCK.
.5 – 1.5	Dense, moist, brown, silty GRAVEL (fill).
1.5 – 10	Medium stiff, moist, dark greenish gray, SILT with some woody debris; Large flat concrete structure at 7 - 9 feet and 3-4" metal pipe at 8 feet.
	Refusal due to obstruction by pipe and concrete at 10 feet. No seepage observed. No caving observed.
Test Pit 17	
0 – 1	Two inches of ASPHALT over brown, silty GRAVEL.
1 – 6.5	Stiff, moist, brown and blue gray SILT. (2) 3" pipes at 2 feet. (1) 3/4" pipe at 4 feet. (1) 3" pipe at 4 feet. Some rounded gravel in pipe trenches.
	Refusal due to obstructions (pipe) at 6.5 feet. No seepage observed. No caving observed.
Test Pit 18	
0 – 1	Soft, dry, moist, brown, silty, TOPSOIL with abundant fine rootlets.
1 – 7	Very stiff, moist, light brown SILT with some gravel and trace fine SAND. Large concrete foundation elements and a 2-inch pipe and 6-inch pipe at 6 - 7 feet.
	Refused due to obstruction (pipe) at 7 feet. No seepage observed. No caving observed.
Test Pit 19	
0 – .5	Soft, moist, brown, silty TOPSOIL with abundant fine rootlets.
.5 – 4	Very stiff moist, light brown, gravelly SILT with trace fine organics, concrete and metal debris (fill).
4 – 8	Soft, moist, dark gray, organic-rich SILT with abundant woody debris. Three inch metal pipe at 7 feet.
	Terminated at 8 feet due to obstruction by (pipe). No seepage observed. No caving observed.

Depth (ft.)	Materials Encountered
Test Pit 20	
0 – 3	Very stiff, moist, tan SILT with some gravel and trace fine sand; cable, brick, etc (fill).
3 – 5	Loose, moist, dark brown, organic-rich SILT with abundant wood debris (fill).
5 – 14	Medium stiff, moist, green-gray SILT with trace clay and fine sand (dredge fill?).
14 – 19	Medium Dense, moist, green-gray, silty fine SAND (dredge fill?).
	Terminated at 19 feet. No seepage observed. No caving observed.

PROJECT: ST. JOHNS WATER QUALITY LAB START CARD No.: 47353 WELL No.: MW-1

Elevation Reference: N / A
Groundwater Surface Elevation: N / A
Well Completed: October 6, 1993
Relative Casing Elevation: N / A
Boring Method: Hollow Stem Auger
Borehole Diameter: 8.25 in.

Depth (feet)	SOIL DESCRIPTION	Graphic Log	Continuous Sample	Blow Counts	Volatile Readings ppm/%LEL	Ground Water	AS-BUILT DESIGN	ANALYSES
0	3 in. Asphalt cover, underlain by 3 / 4 in. minus FILL.						Flush Mounted Steel Monument with water-tight seal	
	Medium stiff, moist, gray-brown, silty fine SAND.		S1		0/0		Concrete Patch	
	Medium soft, moist, organic SILT (debris content up to 10 %, including wood, brick, and rock.		S2				Locking Cap	
5	Soft to medium stiff, moist, gray SILT, with some brown mottling.				0/0		Bentonite Seal	
							2 Inch dia. sch.40 PVC Blank Casing	
10			S3		20/0			
					70/0			
	Very stiff, dry to moist, brown SILT, with some gray mottling below 12.5 ft.							
15			S4		40/0			
	Medium stiff, moist, brown, silty, slightly micaceous fine SAND.							
20	Micaceous, slightly silty, medium SAND lens.		S5					
	Medium stiff, moist, brown, silty, slightly micaceous fine SAND.							
	Medium soft, wet to saturated, gray, slightly silty, micaceous, medium SAND lens.				20/0			
25			S6			WD	PVC Screen (2 Inch I.d. with 0.020-Inch slots)	
							Silica Sand Filter Pack (# 8-12 sieve)	
30	Medium soft, saturated, brown, micaceous, fine SAND.		S7					

LEGEND

(S35) Sample Number

Encountered groundwater level While drilling (WD)

Measured static groundwater level (SW)

Groundwater Analysis (Sample No. Shown)

8015 / 8240 Soil Analysis (Test Method Shown)

RZA AGRA JOB No. 21-7197-00
CITY OF PORTLAND / B E S
Foot of N. Salem Street
Portland, Oregon

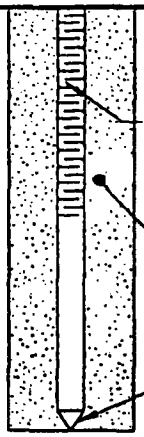
RZA AGRA, Inc.
(Formerly Rittenhouse-Zeman & Associates, Inc.)
ENGINEERING & ENVIRONMENTAL SERVICES
7477 S.W. Tech Center Drive
Portland, Oregon 97223-8024
Phone (503) 639-3400 Fax (503) 620-7892

Drilling Started: 10 / 6 / 93 Drilling Completed: 10 / 6 / 93 Logged By: P.D.E.

PROJECT: St. JOHNS WATER QUALITY LAB START CARD No.: 47353 WELL No.: MW-1, Pg. 2

Elevation Reference: N / A
Groundwater Surface Elevation: N / A
Well Completed: October 6, 1993
Relative Casing Elevation: N / A
Boring Method: Hollow Stem Auger
Borehole Diameter: 8.25 in.

Depth (feet)	SOIL DESCRIPTION	Graphic Log	Continuous Sample	Blow Counts	Volatile Readings	Ground Water	AS-BUILT DESIGN	ANALYSES
30	Medium soft, saturated, brown, micaceous, fine SAND.				ppm/ %LEL			
	Soft, saturated, brown, slightly silty, micaceous, medium SAND.				200/ 0			
35			S8					
	Medium stiff, saturated, light brown, micaceous, very silty, fine SAND.							
40	BORING COMPLETED AT 40 FEET BELOW GROUND SURFACE. MW-1 INSTALLED.							
45								
50								
55								
60								



LEGEND

(S35) Sample Number

WD Encountered groundwater level While drilling

SW Measured static groundwater level

Groundwater Analysis (Sample No. Shown)

8015 / 8240 Soil Analysis (Test Method Shown)

RZA AGRA JOB No. 21-7197-00
CITY OF PORTLAND / B E S
Foot of N. Salem Street
Portland, Oregon

RZA AGRA, Inc.
(Formerly Rittenhouse-Zeman & Associates, Inc.)
ENGINEERING & ENVIRONMENTAL SERVICES
7477 S.W. Tech Center Drive
Portland, Oregon 97223-8024
Phone (503) 639-3400 Fax (503) 620-7892

Drilling Started: 10 / 6 / 93 Drilling Completed: 10 / 6 / 93 Logged By: P.D.E.

PROJECT: St. JOHNS WATER QUALITY LAB START CARD No.: 47354 WELL No.: MW-2

Elevation Reference: N / A
Groundwater Surface Elevation: N / A

Well Completed: October 6, 1993
Relative Casing Elevation: N / A

Boring Method: Hollow Stem Auger
Borehole Diameter: 8.25 in.

Depth (feet)	SOIL DESCRIPTION	Graphic Log	Continous Sample	Blow Counts	Volatile Readings ppm/%LEL	Ground Water	AS-BUILT DESIGN	ANALYSES
0	3 in Asphalt cover, underlain by 3 / 4 in. minus FILL.						Flush Mounted Steel Monument with water-tight seal	
	Medium stiff, moist, gray, slightly micaceous SILT.		S9				Concrete Patch	
							Locking Cap	
							Bentonite Seal	
5			S10					
					60/0		2 inch dia. sch.40 PVC Blank Casing	
	Medium stiff, moist, black, organic plastic SILT lens.							
10	Medium stiff, moist, gray, slightly micaceous SILT.		S11					
	Medium soft, moist, gray, slightly silty, micaceous medium SAND.				40/0			
	Gray SILT lens.							
15	Gray, medium SAND.		S12					
	Gray SILT.				70/0			
20			S13					
	Gray fine and medium SAND.				70/0			
25							PVC Screen (2 inch i.d. with 0.020-inch slots)	
	SAND, becoming brown in color, SILT content increasing with depth.		S14		90/0	WD	Silica Sand Filter Pack (# 8-12 sieve)	
	Brown SILT, with fine sand.							
30			S15					

LEGEND

(S35) Sample Number

WD Encountered groundwater level While drilling

SW Measured static groundwater level

△ Groundwater Analysis (Sample No. Shown)

8015 / 8240 Soil Analysis (Test Method Shown)

RZA AGRA JOB No. 21-7197-00
CITY OF PORTLAND / B E S
Foot of N. Salem Street
Portland, Oregon

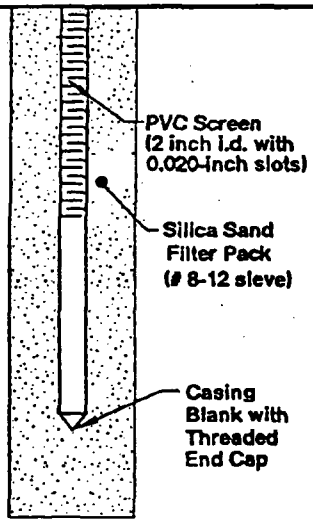
RZA AGRA, Inc.
(Formerly Rittenhouse-Zeman & Associates, Inc.)
ENGINEERING & ENVIRONMENTAL SERVICES
7477 S.W. Tech Center Drive
Portland, Oregon 97223-8024
Phone (503) 639-3400 Fax (503) 620-7892

Drilling Started: 10 / 6 / 93 Drilling Completed: 10 / 6 / 93 Logged By: P.D.E.

PROJECT: St. JOHNS WATER QUALITY LAB START CARD No.: 47354 WELL No.: MW-2

Elevation Reference: N / A
Groundwater Surface Elevation: N / A
Well Completed: October 6, 1993
Relative Casing Elevation: N / A
Boring Method: Hollow Stem Auger
Borehole Diameter: 8.25 in.

Depth (feet)	SOIL DESCRIPTION	Graphic Log	Continous Sample	Blow Counts	Volatile Readings	Ground Water	AS-BUILT DESIGN	ANALYSES
30	Brown SILT, with fine sand.				ppm / %LEL			
	Soft, saturated, brown, slightly silty, micaceous, medium SAND.				20/0			
35					50/0			
40								
	BORING COMPLETED AT 42 FEET BELOW GROUND SURFACE. MW-2 INSTALLED.							
45								
50								
55								
60								



LEGEND

- (S35) Sample Number
- Encountered groundwater level WD While drilling
- Measured static groundwater level SW
- Groundwater Analysis (Sample No. Shown)
- 8015 / 8240 Soil Analysis (Test Method Shown)

RZA AGRA JOB No. 21-7197-00
CITY OF PORTLAND / B E S
Foot of N. Salem Street
Portland, Oregon

RZA AGRA, Inc.
(Formerly Rittenhouse-Zeman & Associates, Inc.)
ENGINEERING & ENVIRONMENTAL SERVICES
7477 S.W. Tech Center Drive
Portland, Oregon 97223-8024
Phone (503) 639-3400 Fax (503) 620-7892

Drilling Started: 10 / 6 / 93 Drilling Completed: 10 / 6 / 93 Logged By: P.D.E.

PROJECT: St. JOHNS WATER QUALITY LAB START CARD No.: 47356 WELL No.: MW-3

Elevation Reference: N / A
Groundwater Surface Elevation: N / A
Well Completed: October 7, 1993
Relative Casing Elevation: N / A
Boring Method: Hollow Stem Auger
Borehole Diameter: 8.25 in.

Depth (feet)	SOIL DESCRIPTION	Graphic Log	Continous Sample	Blow Counts	Volatile Readings ppm/%LEL	Ground Water	AS-BUILT DESIGN	ANALYSES
0	Medium stiff, moist, brown, very gravelly silt FILL.						Flush Mounted Steel Monument with water-tight seal; Concrete Patch; Locking Cap; Bentonite Seal	
	Soft, dry, brown, micaceous, very silty medium SAND.							
	Medium soft to stiff, dry, gray, organic SILT (wood fragment debris).		S16					
5	Loose, dry to moist, black to gray, silty coarse SAND, with some wood and red/white brick debris.		S17		60/0		2 inch dia. sch.40 PVC Blank Casing	
10	Few gravel-sized clasts at 10 ft. depth.		S18					
			S19		40/0			
	Medium soft, wet, gray, very silty, fine SAND, with slight organic odor.							
15					70/0			
20			S20					
					70/0			
	Medium stiff, wet, brown, very fine sandy SILT.							
25	Soft, saturated, gray, slighty micaceous medium SAND.		S21				PVC Screen (2 inch i.d. with 0.020-inch slots); Silica Sand Filter Pack (# 8-12 sieve)	
					90/0			
	Medium stiff, saturated, brown, slighty micaceous SILT.							
30			S22					

LEGEND

(S35) Sample Number

Encountered groundwater level While drilling (WD)

Measured static groundwater level (SW)

Groundwater Analysis (Sample No. Shown)

8015 / 8240 Soil Analysis (Test Method Shown)

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Drilling Started: 10 / 7 / 93 Drilling Completed: 10 / 7 / 93 Logged By: P.D.E.

PROJECT: St. JOHNS WATER QUALITY LAB START CARD No.: 47356 WELL No.: MW-3, Pg. 2

Elevation Reference: N / A
Groundwater Surface Elevation: N / A
Well Completed: October 7, 1993
Relative Casing Elevation: N / A
Boring Method: Hollow Stem Auger
Borehole Diameter: 8.25 in.

Depth (feet)	SOIL DESCRIPTION	Graphic Log	Continous Sample	Blow Counts	Volatile Readings ppm/%LEL	Ground Water	AS-BUILT DESIGN	ANALYSES
30	Medium stiff, saturated, brown, slighty micaceous SILT.				20/0		PVC Screen (2 inch i.d. with 0.020-inch slots)	
	Soft, saturated, gray, silty fine SAND.							
35	Medium stiff, saturated, brown, fine sandy SILT.						Silica Sand Filter Pack (# 8-12 sieve)	
	Soft to medium stiff, brown, micaceous, silty, medium SAND.				50/0		Casing Blank with Threaded End Cap	
40	BORING COMPLETED AT 40 FEET BELOW GROUND SURFACE. MW-3 INSTALLED.							
45								
50								
55								
60								

LEGEND

(S35) Sample Number

Encountered groundwater level
WD While drilling

Measured static groundwater level
SW

Groundwater Analysis (Sample No. Shown)

8015 / 8240 Soil Analysis (Test Method Shown)

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Drilling Started: 10 / 7 / 93 Drilling Completed: 10 / 7 / 93 Logged By: P.D.E.

PROJECT: St. JOHNS WATER QUALITY LAB START CARD No.: 50010 WELL No.: MW-4

Elevation Reference: N / A
Groundwater Surface Elevation: N / A
Well Completed: October 7, 1993
Relative Casing Elevation: N / A
Boring Method: Hollow Stem Auger
Borehole Diameter: 8.25 in.

Depth (feet)	SOIL DESCRIPTION	Graphic Log	Continuous Sample	Blow Counts	Volatile Readings ppm/%LEL	Ground Water	AS-BUILT DESIGN	ANALYSES
0	Medium stiff, dry, tan-brown, slightly gravelly silty SAND.						Flush Mounted Steel Monument with water-tight seal	
	Medium soft-medium stiff, moist, tan-red, silty micaceous fine SAND.				0/0		Concrete Patch; Locking Cap; Bentonite Seal	
5			S23					
	Medium-stiff, moist, red-tan, medium SAND.				0/0		2 inch dia. sch.40 PVC Blank Casing	
10			S24					
	Medium stiff, moist, brown-gray, clayey SILT.							
	Medium stiff, moist, brown-red medium SAND.				20/0			
	Medium stiff, moist, gray-brown SILT.							
15			S25					
	Medium stiff, moist, dark gray, micaceous medium coarse SAND, intercalated with SILTS.		S26		0/0			
	Medium stiff, moist, mottled brown and black organic SILT (wood and organic debris).							
20	Medium stiff, moist-wet, dark gray, very fine sandy micaceous SILT.		S27					
	Medium stiff, wet, dark gray, silty micaceous medium SAND.				0/0			
	Wet gray SILT.					WD		
	Dark gray, saturated, medium SAND.							
	Dark gray SILT.							
25			S28					
	Gray medium SAND.						PVC Screen (2 inch i.d. with 0.020-inch slots)	
	Mottled brown SILT.				0/0			
	SILTS intercalated with medium-stiff, saturated, brown, slightly silty micaceous medium SAND.						Silica Sand Filter Pack (# 8-12 sieve)	
30			S29					

LEGEND

- (S35) Sample Number
- Encountered groundwater level While drilling (WD)
- Measured static groundwater level (SW)
- Groundwater Analysis (Sample No. Shown)
- 8015 / 8240 Soil Analysis (Test Method Shown)

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Portland, Oregon 97223-8024
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Drilling Started: 10 / 7 / 93 Drilling Completed: 10 / 7 / 93 Logged By: P.D.E.

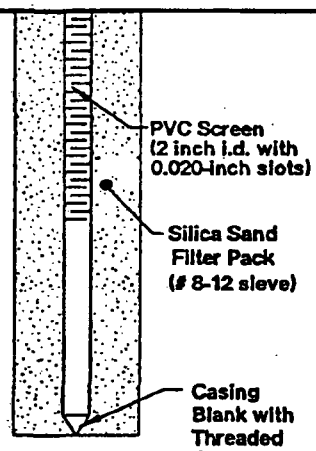
PROJECT: SL JOHNS WATER QUALITY LAB START CARD No.: 50010 WELL No.: MW-4 , Pg. 2

Elevation Reference: N / A
Groundwater Surface Elevation: N / A

Well Completed: October 7, 1993
Relative Casing Elevation: N / A

Boring Method: Hollow Stem Auger
Borehole Diameter: 8.25 in.

Depth (feet)	SOIL DESCRIPTION	Graphic Log	Continous Sample	Blow Counts	Volatile Readings ppm/ %LEL	Ground Water	AS-BUILT DESIGN	ANALYSES
30	Intercalated SILTS and SANDS.							
	Medium stiff, saturated, brown, slightly silty micaceous SAND, coarsening downwards.							
35								
40	BORING COMPLETED AT 40 FEET BELOW GROUND SURFACE. MW-4 INSTALLED.							
45								
50								
55								
60								



LEGEND

(S35) Sample Number

Encountered groundwater level While drilling (WD)

Measured static groundwater level (SW)

Groundwater Analysis (Sample No. Shown)

8015 / 8240 Soil Analysis (Test Method Shown)

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Drilling Started: 10 / 7 / 93 Drilling Completed: 10 / 7 / 93 Logged By: P.D.E.

PROJECT: St. JOHNS WATER QUALITY LAB START CARD No.: 50009 WELL No.: MW-5

Elevation Reference: N / A
Groundwater Surface Elevation: N / A
Well Completed: October 7, 1993
Relative Casing Elevation: N / A
Boring Method: Hollow Stem Auger
Borehole Diameter: 8.25 in.

Depth (feet)	SOIL DESCRIPTION	Graphic Log	Continous Sample	Blow Counts	Volatile Readings ppm/%LEL	Ground Water	AS-BUILT DESIGN	ANALYSES
0	Medium stiff, dry, tan-brown, slightly micaceous SILT. Becoming moister with depth.						Flush Mounted Steel Monument with water-tight seal; Concrete Patch; Locking Cap; Bentonite Seal	
					0/0			
5			S30					
					0/0		2 inch dia. sch.40 PVC Blank Casing	
10	Few angular basalt fragments (to 2 inches) encountered.		S31					
					20/0			
15	Soil becomes wet, gray mottling encountered, at 15-17 ft. depth.		S32					
	Soft, wet, gray and brown, organic SILT with wood and brick debris, slight organic odor.		S33		0/0			
20	Medium stiff, wet, gray, micaceous SILT.		S34					
	Medium stiff, wet, gray, fine to medium SAND.				0/0			
25	Medium stiff, wet, gray, slightly micaceous SILT.		S35					
	Soft, saturated, gray, silty, micaceous, medium SAND.					WD	PVC Screen (2 inch i.d. with 0.020-inch slots)	
	Medium stiff, wet, brown and gray mottled micaceous SILT.				0/0			
	Medium stiff, saturated, brown and red mottled, silty fine SAND.						Silica Sand Filter Pack (# 8-12 sieve)	
30								

LEGEND

(S35) Sample Number

WD Encountered groundwater level While drilling

SW Measured static groundwater level

Groundwater Analysis (Sample No. Shown)

8015 / 8240 Soil Analysis (Test Method Shown)

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Drilling Started: 10 / 7 / 93 Drilling Completed: 10 / 7 / 93 Logged By: P.D.E.

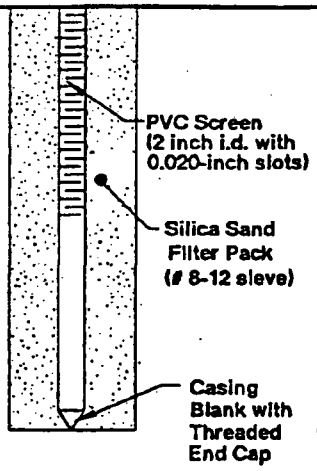
PROJECT: St. JOHNS WATER QUALITY LAB START CARD No.: 50009 WELL No.: MW-5

Elevation Reference: N / A
Groundwater Surface Elevation: N / A

Well Completed: October 7, 1993
Relative Casing Elevation: N / A

Boring Method: Hollow Stem Auger
Borehole Diameter: 8.25 in.

Depth (feet)	SOIL DESCRIPTION	Graphic Log	Continous Sample	Blow Counts	Volatile Readings ppm/%LEL	Ground Water	AS-BUILT DESIGN	ANALYSES
30	Soft to medium stiff, saturated, brown, silty to slightly silty, intercalated fine and medium SAND.							
35	Gray silty SAND.							
	Gray coarse SAND.							
40	BORING COMPLETED AT 40 FEET BELOW GROUND SURFACE. MW-5 INSTALLED.							
45								
50								
55								
60								



LEGEND

(S35) Sample Number

Encountered groundwater level
WD While drilling

Measured static
SW groundwater level

Groundwater Analysis
(Sample No. Shown)

8015 / 8240 Soil Analysis
(Test Method Shown)

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Drilling Started: 10 / 7 / 93 Drilling Completed: 10 / 7 / 93 Logged By: P.D.E.

ACTION AND CONSENT OF SHAREHOLDER
OF
SSI INTERNATIONAL (OREGON), INC.

Pursuant to ORS 60.211 and the Bylaws of SSI International (Oregon), Inc. (the "Corporation"), Manufacturing Management, Inc., in its capacity as the sole shareholder of the Corporation's issued and outstanding stock, hereby takes the following actions:

> RESOLVED, that the Agreement and Plan of Merger dated January 4, 1999, between the Corporation and Manufacturing Management, Inc., is hereby approved and adopted by the sole shareholder of the Corporation; and
>
> FURTHER RESOLVED, that the officers of the Corporation are authorized and directed to take all actions and execute all documents necessary or appropriate to carry out the purpose and intent of the foregoing resolution.

The undersigned shareholder, owning the number of shares set opposite its name, signs its name and consents to the foregoing actions as of January 4, 1999.

MANUFACTURING MANAGEMENT, INC. 2,500 Shares

By X Philip
Robert W. Philip, President

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ACTION AND CONSENT OF BOARD OF DIRECTORS

OF

SSI INTERNATIONAL (OREGON), INC.

Pursuant to ORS 60.341 and the Bylaws of SSI International (Oregon), Inc. (the "Corporation"), the directors of the Corporation hereby unanimously take the following actions:

> RESOLVED, that the Agreement and Plan of Merger dated January 4, 1999, between the Corporation and Manufacturing Management, Inc., is hereby approved and adopted by the sole shareholder of the Corporation; and
>
> FURTHER RESOLVED, that the officers of the Corporation are authorized and directed to take all actions and execute all documents necessary or appropriate to carry out the purpose and intent of the foregoing resolution.

IN WITNESS WHEREOF, we, who are all of the directors of the Corporation, subscribe our names hereto for the purpose of consenting to the foregoing actions as of January 4, 1999.

LEONARD SCHNITZER

KENNETH M. NOVACK

ROBERT W. PHILIP

DORI SCHNITZER

DIRECTORS

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ARTICLES OF MERGER

Manufacturing Management, Inc. ("MMI"), the surviving corporation in a merger effected under ORS 60.481-60.501, submits these Articles of Merger pursuant to ORS 60.494:

1. The parties to the merger are SSI International (Oregon), Inc. ("SSI International"), an Oregon corporation (Oregon Registry No. 118095-14), and MMI, an Oregon corporation (Oregon Registry No. 149405-14).

2. MMI is the surviving corporation of the merger.

3. A copy of the Agreement and Plan of Merger is attached hereto.

4. The holder of SSI International's common stock has approved the merger, such approval being the only shareholder approval required on the part of SSI International. At the date of the shareholder vote, there were 2,500 shares of SSI International common stock outstanding, all of which were entitled to be cast with respect to approval of the merger. There were 2,500 votes cast for and -0- votes cast against the Agreement and Plan of Merger.

5. Pursuant to ORS 60.487(7), no action by the holders of MMI's common stock was required on the Agreement and Plan of Merger.

6. The merger of SSI International and MMI shall be effective as of the date and time these Articles of Merger are filed with the office of the Secretary of State of the State of Oregon.

IN WITNESS WHEREOF, SSI International and MMI have executed these Articles of Merger on January 4, 1999.

SSI INTERNATIONAL (OREGON), INC.	MANUFACTURING MANAGEMENT, INC.
By: x Novack	By: x Philip
Kenneth M. Novack (Print or Type Name)	Robert W. Philip (Print or Type Name)
Vice President (Title)	President (Title)

Person to contact about this filing: Anton U. Pardini
Telephone: (503)323-2807
Facsimile: (503)299-2277

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AGREEMENT AND PLAN OF MERGER

THIS AGREEMENT AND PLAN OF MERGER (this "Agreement") is entered into as of January 4, 1999 by MANUFACTURING MANAGEMENT, INC. ("MMI") and SSI INTERNATIONAL (OREGON), INC. ("SSI International").

RECITALS

A. MMI's and SSI International's boards of directors have determined that both corporations would benefit if merged into a single corporation. Thus, pursuant to the Oregon Business Corporation Act, ORS 60.481 *et seq.*, MMI and SSI International, both of which are Oregon corporations, desire to effect a merger on the terms set forth in this Agreement.

B. MMI and SSI International intend the merger to be a reorganization within the meaning of IRC §368(a)(1)(A).

AGREEMENT

ARTICLE 1
MERGER

1.1 Merger. On the Effective Date (*see* Section 1.3), SSI International shall be merged with and into MMI, the separate existence of SSI International shall cease, and MMI shall survive as a corporation under the name Manufacturing Management, Inc. (the "Surviving Corporation"), organized under and governed by Oregon laws. From that time, the Surviving Corporation shall possess all the combined rights, privileges, immunities, and franchises of MMI and SSI International, all property belonging to SSI International shall be transferred to and vested in the Surviving Corporation without further act or deed, and the Surviving Corporation shall be responsible for all liabilities of MMI and SSI International, all in the manner and with the effect set forth in ORS 60.497.

1.2 Further Assurances. From time to time after the Effective Date, the officers and directors of SSI International last in office shall execute and deliver such instruments and shall take such actions as reasonably necessary in order to vest or perfect in the Surviving Corporation title to and possession of all of SSI International's property, interests, assets, rights, immunities, and franchises.

1.3 Effective Date. The merger of SSI International and MMI shall become effective on the day that MMI and SSI International file articles of merger pursuant to ORS 60.494 (the "Effective Date").

1.4 Articles and Bylaws. MMI's articles of incorporation and bylaws as in effect on the Effective Date shall continue in full force and effect as the articles of incorporation and bylaws of the Surviving Corporation.

1.5 Officers and Directors. MMI's officers and directors as of the Effective Date shall continue as the officers and directors of the Surviving Corporation and shall remain in office until the Surviving Corporation's next annual shareholders' meeting and until their successors have been elected and qualified.

1.6 Closing. Subject to the satisfaction of the conditions set forth in Article 3, the closing of the contemplated transactions shall occur at MMI's offices in Portland, Oregon at 9:00 a.m., five (5) business days after the shareholder of both SSI International and MMI have approved this Agreement, or on a date mutually acceptable to MMI and SSI International (the "Closing"). Shortly after the Closing, the parties shall cause articles of merger to be filed in the office of Oregon's Secretary of State and the merger to become effective.

ARTICLE 2
MANNER AND BASIS OF CONVERTING SHARES

2.1 Conversion of Shares. At the Effective Date:

2.1.1 The shares of common stock of SSI International issued and outstanding immediately prior to the Effective Date shall by virtue of the merger, and without any action on the part of the holder thereof, be converted into shares of fully paid and nonassessable common stock of MMI in the ratio of one (1) share of MMI stock for each five hundred (500) shares of SSI International stock.

2.1.2 The shares of common stock of MMI issued and outstanding immediately prior to the Effective Date shall remain issued and outstanding shares of common stock of the Surviving Corporation, without change or alteration in the ownership, voting powers or other rights, and the qualifications, limitations or restrictions thereof.

2.2 Certificates for Shares. Each certificate that, prior to the Effective Date, represented shares of common stock of MMI shall, after the Effective Date, represent shares of common stock of the Surviving Corporation. Each certificate that, prior to the Effective Date, represented shares of common stock of SSI International shall, after the Effective Date, represent the number of shares of common stock of MMI into which such shares are converted. Each holder of shares of SSI International common stock that are converted into shares of common stock of the Surviving Corporation, upon surrender of the certificate therefor to the Surviving Corporation, shall be entitled to receive a

CRAW00018322

certificate evidencing ownership of shares of common stock in the Surviving Corporation.

ARTICLE 3
CONDITIONS.

3.1 **Conditions to Obligation of SSI International.** The obligation of SSI International to effect the merger is subject to the satisfaction or waiver of each of the following conditions:

3.1.1 This Agreement shall have been duly approved by the board of directors of MMI in accordance with the Oregon Business Corporation Act.

3.1.2 This Agreement shall have been approved by the holder of all of the outstanding shares of common stock of SSI International entitled to vote thereon in accordance with the Oregon Business Corporation Act.

3.2 **Conditions to Obligation of MMI.** The obligation of MMI to effect the merger is subject to the satisfaction or waiver of each of the following conditions:

3.2.1 This Agreement shall have been duly approved by the board of directors of SSI International in accordance with the Oregon Business Corporation Act.

3.2.2 This Agreement shall have been approved by the holder of all of the outstanding shares of common stock SSI International entitled to vote thereon in accordance with the Oregon Business Corporation Act.

ARTICLE 4
TERMINATION

4.1 **Failure of Shareholder Approval.** This Agreement shall automatically terminate in the event it is brought to a vote and not adopted by the holder of all of the outstanding shares of common stock of either MMI or SSI International respectively.

4.2 **Other Termination.** This Agreement may be terminated and the merger abandoned at any time prior to the Effective Date, whether before or after submission to or approval by the shareholder of either of MMI or SSI International, by mutual agreement of the boards of directors of MMI and SSI International.

4.3 **Effect of Termination.** In the event of termination of this Agreement as provided in this Article 4, this Agreement shall become wholly void and of no effect, each party shall bear its own expenses, and there shall be no liability or obligation on the part of either party.

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ARTICLE 5
MISCELLANEOUS PROVISIONS

5.1 Expenses. Each party shall pay the expenses incurred by it in connection with the transactions contemplated hereby.

5.2 Amendment. This Agreement may be amended at any time prior to the Effective Date with the approval of SSI International's and MMI's boards of directors, provided that no amendment shall change the conversion ratio set forth in Section 2.1.1 without the approval of SSI International's and MMI's shareholders.

MANUFACTURING MANAGEMENT, INC.	SSI INTERNATIONAL (OREGON), INC.
By: X _____	By: X _____
Robert W. Philip	Kenneth M. Novack
(Print or Type Name)	(Print or Type Name)
Its: President	Its: Vice President

CRAW00018324

ACTION AND CONSENT OF SHAREHOLDER
OF
SSI INTERNATIONAL (OREGON), INC.

Pursuant to ORS 60.211 and the Bylaws of SSI International (Oregon), Inc. (the "Corporation"), Manufacturing Management, Inc., in its capacity as the sole shareholder of the Corporation's issued and outstanding stock, hereby takes the following actions:

1. The Corporation's financial condition and business during the past year, having been reviewed, are found to be in proper order.

2. All acts and deeds of the Corporation's officers and directors from and including December 9, 1997 are approved and ratified as and for acts and deeds of the Corporation.

3. The Minutes of previous meetings of the shareholder and directors, and actions previously taken by the shareholder and directors without meeting, as evidenced by the written consents to those actions which are incorporated in the Corporation's Record Book, are correct and in proper order.

4. LEONARD SCHNITZER, KENNETH M. NOVACK, ROBERT W. PHILIP and DORI SCHNITZER are hereby nominated and elected as directors of this Corporation, to hold office for one year from the effective date of this action and until their successors have been elected and qualified.

The undersigned shareholder, owning the number of shares set opposite its name, signs its name and consents to the foregoing actions as of the 8th day of December, 1998.

MANUFACTURING MANAGEMENT, INC. 2,500 Shares

By_____
Robert W. Philip, President

ACTION AND CONSENT OF BOARD OF DIRECTORS

OF

SSI INTERNATIONAL (OREGON), INC.

Pursuant to ORS 60.341 and the Bylaws of SSI International (Oregon), Inc. (the "Corporation"), the directors of the Corporation hereby unanimously take the following actions:

1. The Corporation's financial condition and business during the past year, having been reviewed, are found to be in proper order.

2. All acts and deeds of the Corporation's officers and directors from and including December 9, 1997 are approved and ratified as and for acts and deeds of the Corporation.

3. The Minutes of previous meetings of the directors, and actions previously taken by the directors without meeting, as evidenced by the written consents to those actions which are incorporated in the Corporation's Record Book, are correct and in proper order.

4. The following persons are unanimously elected to the offices shown opposite their names for a term of one year from the date of this action and until their successors shall have been elected and qualified:

Leonard Schnitzer	Chief Executive Officer
Hyoung D. Gim	President
Robert W. Philip	Executive Vice President
Kenneth M. Novack	Executive Vice President
Si C. Wooh	Vice President
Edgar C. Shanks	Vice President
Barry A. Rosen	Vice President/Treasurer

Dori Schnitzer	Secretary
Anton U. Pardini	Assistant Secretary

IN WITNESS WHEREOF, we, who are all of the directors of the Corporation, subscribe our names hereto for the purpose of consenting to the foregoing actions as of the 8th day of December, 1998.

LEONARD SCHNITZER

KENNETH M. NOVACK

ROBERT W. PHILIP

DORI SCHNITZER

DIRECTORS

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CRAW00018328

ACTION AND CONSENT OF SHAREHOLDER
OF
SSI INTERNATIONAL (OREGON), INC.

Pursuant to ORS 60.211 and the Bylaws of SSI International (Oregon), Inc. (the "Corporation"), Manufacturing Management, Inc., in its capacity as the sole shareholder of the Corporation's issued and outstanding stock, hereby takes the following actions:

1. The Corporation's financial condition and business during the past year, having been reviewed, are found to be in proper order.

2. All acts and deeds of the Corporation's officers and directors from and including December 10, 1996 are approved and ratified as and for acts and deeds of the Corporation.

3. The Minutes of previous meetings of the shareholder and directors, and actions previously taken by the shareholder and directors without meeting, as evidenced by the written consents to those actions which are incorporated in the Corporation's Record Book, are correct and in proper order.

4. LEONARD SCHNITZER, KENNETH M. NOVACK, ROBERT W. PHILIP and DORI SCHNITZER are hereby nominated and elected as directors of this Corporation, to hold office for one year from the effective date of this action and until their successors have been elected and qualified.

The undersigned shareholder, owning the number of shares set opposite its name, signs its name and consents to the foregoing actions as of the 9th day of December, 1997.

MANUFACTURING MANAGEMENT, INC. 2,500 Shares

By _____
Robert W. Philip, President

ACTION AND CONSENT OF BOARD OF DIRECTORS

OF

SSI INTERNATIONAL (OREGON), INC.

Pursuant to ORS 60.341 and the Bylaws of SSI International (Oregon), Inc. (the "Corporation"), the directors of the Corporation hereby unanimously take the following actions:

1. The Corporation's financial condition and business during the past year, having been reviewed, are found to be in proper order.

2. All acts and deeds of the Corporation's officers and directors from and including December 10, 1996 are approved and ratified as and for acts and deeds of the Corporation.

3. The Minutes of previous meetings of the directors, and actions previously taken by the directors without meeting, as evidenced by the written consents to those actions which are incorporated in the Corporation's Record Book, are correct and in proper order.

4. The following persons are unanimously elected to the offices shown opposite their names for a term of one year from the date of this action and until their successors shall have been elected and qualified:

Leonard Schnitzer	Chief Executive Officer
Hyoung D. Gim	President
Robert W. Philip	Executive Vice President
Kenneth M. Novack	Executive Vice President
Si C. Wooh	Vice President
Edgar C. Shanks	Vice President
Barry A. Rosen	Vice President/Treasurer

Dori Schnitzer	Secretary
Anton U. Pardini	Assistant Secretary

IN WITNESS WHEREOF, we, who are all of the directors of the Corporation, subscribe our names hereto for the purpose of consenting to the foregoing actions as of the 9th day of December, 1997.

LEONARD SCHNITZER

KENNETH M. NOVACK

ROBERT W. PHILIP

DORI SCHNITZER

DIRECTORS

G:\CORP1107.MNS

CRAW00018332

ACTION AND CONSENT OF SOLE SHAREHOLDER
OF
MMI INTERNATIONAL (OREGON), INC.

Pursuant to ORS 60.211 and the Bylaws of MMI International (Oregon), Inc. (the "Corporation"), Manufacturing Management, Inc., in its capacity as the sole shareholder of the Corporation's issued and outstanding stock, hereby takes the following actions:

RESOLVED, that the name of the Corporation be changed to "SSI INTERNATIONAL (OREGON), INC."

FURTHER RESOLVED, that the Corporation be and is hereby authorized to file Articles of Amendment with the State of Oregon, Corporation Division, amending Article I of the Articles of Incorporation to read as follows:

"The name of the Corporation is SSI International (Oregon), Inc., and its duration shall be perpetual."

The undersigned shareholder, owning the number of shares set opposite its name, signs its name and consents to the foregoing actions as of August 5, 1997.

MANUFACTURING MANAGEMENT, INC. 2,500 Shares

By: _____
Robert W. Philip
President

G:\SSI-INT.MNS

ACTION AND CONSENT OF SHAREHOLDER
OF
MMI INTERNATIONAL (OREGON), INC.

Pursuant to ORS 60.211 and the Bylaws of MMI International (Oregon), Inc. (the "Corporation"), Manufacturing Management, Inc., in its capacity as the sole shareholder of the Corporation's issued and outstanding stock, hereby takes the following actions:

1. The Corporation's financial condition and business during the past year, having been reviewed, are found to be in proper order.

2. All acts and deeds of the Corporation's officers and directors from and including December 12, 1995 are approved and ratified as and for acts and deeds of the Corporation.

3. The Minutes of previous meetings of the shareholder and directors, and actions previously taken by the shareholder and directors without meeting, as evidenced by the written consents to those actions which are incorporated in the Corporation's Record Book, are correct and in proper order.

4. LEONARD SCHNITZER, KENNETH M. NOVACK, ROBERT W. PHILIP and DORI SCHNITZER are hereby nominated and elected as directors of this Corporation, to hold office for one year from the effective date of this action and until their successors have been elected and qualified.

The undersigned shareholder, owning the number of shares set opposite its name, signs its name and consents to the foregoing actions as of the 10th day of December, 1996.

MANUFACTURING MANAGEMENT, INC. 2,500 Shares

By_____
Robert W. Philip, President

ACTION AND CONSENT OF BOARD OF DIRECTORS

OF

MMI INTERNATIONAL (OREGON), INC.

Pursuant to ORS 60.341 and the Bylaws of MMI International (Oregon), Inc. (the "Corporation"), the directors of the Corporation hereby unanimously take the following actions:

1. The Corporation's financial condition and business during the past year, having been reviewed, are found to be in proper order.

2. All acts and deeds of the Corporation's officers and directors from and including December 12, 1995 are approved and ratified as and for acts and deeds of the Corporation.

3. The Minutes of previous meetings of the directors, and actions previously taken by the directors without meeting, as evidenced by the written consents to those actions which are incorporated in the Corporation's Record Book, are correct and in proper order.

4. The following persons are unanimously elected to the offices shown opposite their names for a term of one year from the date of this action and until their successors shall have been elected and qualified:

Leonard Schnitzer	Chief Executive Officer
Hyoung D. Gim	President
Robert W. Philip	Executive Vice President
Kenneth M. Novack	Executive Vice President
Si C. Wooh	Vice President
Edgar C. Shanks	Vice President
Barry A. Rosen	Vice President/Treasurer
Dori Schnitzer	Secretary
Anton U. Pardini	Assistant Secretary

IN WITNESS WHEREOF, we, who are all of the directors of the Corporation, subscribe our names hereto for the purpose of consenting to the foregoing actions as of the 10th day of December, 1996.

LEONARD SCHNITZER

KENNETH M. NOVACK

ROBERT W. PHILIP

DORI SCHNITZER

DIRECTORS

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CRAW00018337

ACTION AND CONSENT OF SHAREHOLDER
OF
MMI INTERNATIONAL (OREGON), INC.

Pursuant to ORS 60.211 and the Bylaws of MMI International (Oregon), Inc. (the "Corporation"), Manufacturing Management, Inc., in its capacity as the sole shareholder of the Corporation's issued and outstanding stock, hereby takes the following actions:

1. The Corporation's financial condition and business during the past year, having been reviewed, are found to be in proper order.

2. All acts and deeds of the Corporation's officers and directors from and including May 26, 1994 are approved and ratified as and for acts and deeds of the Corporation.

3. The Minutes of previous meetings of the shareholder and directors, and actions previously taken by the shareholder and directors without meeting, as evidenced by the written consents to those actions which are incorporated in the Corporation's Record Book, are correct and in proper order.

4. LEONARD SCHNITZER, KENNETH M. NOVACK, ROBERT W. PHILIP and DORI SCHNITZER are hereby nominated and elected as directors of this Corporation, to hold office for one year from the effective date of this action and until their successors have been elected and qualified.

The undersigned shareholder, owning the number of shares set opposite its name, signs its name and consents to the foregoing actions as of the 12th day of December, 1995.

MANUFACTURING MANAGEMENT, INC. 2,500 Shares

By_____
Robert W. Philip, President

ACTION AND CONSENT OF BOARD OF DIRECTORS

OF

MMI INTERNATIONAL (OREGON), INC.

Pursuant to ORS 60.341 and the Bylaws of MMI International (Oregon), Inc. (the "Corporation"), the directors of the Corporation hereby unanimously take the following actions:

1. The Corporation's financial condition and business during the past year, having been reviewed, are found to be in proper order.

2. All acts and deeds of the Corporation's officers and directors from and including May 26, 1994 are approved and ratified as and for acts and deeds of the Corporation.

3. The Minutes of previous meetings of the directors, and actions previously taken by the directors without meeting, as evidenced by the written consents to those actions which are incorporated in the Corporation's Record Book, are correct and in proper order.

4. The following persons are unanimously elected to the offices shown opposite their names for a term of one year from the date of this action and until their successors shall have been elected and qualified:

Leonard Schnitzer	Chief Executive Officer
Hyoung D. Gim	President
Robert W. Philip	Executive Vice President
Kenneth M. Novack	Executive Vice President
Si C. Wooh	Vice President
Edgar C. Shanks	Vice President
Barry A. Rosen	Vice President/Treasurer
Dori Schnitzer	Secretary
Anton U. Pardini	Assistant Secretary

IN WITNESS WHEREOF, we, who are all of the directors of the Corporation, subscribe our names hereto for the purpose of consenting to the foregoing actions as of the 12th day of December, 1995.

LEONARD SCHNITZER

KENNETH M. NOVACK

ROBERT W. PHILIP

DORI SCHNITZER

DIRECTORS

P:\CORP1107.MNS

ACTION AND CONSENT OF BOARD OF DIRECTORS

OF

MMI INTERNATIONAL (OREGON), INC.

Pursuant to the Bylaws of MMI International (Oregon), Inc. (the "Corporation") and ORS 60.341, the members of the Board of Directors of the Corporation act unanimously as follows:

> RESOLVED, that the Board of Directors appoints Edgar C. Shanks as Vice President to serve until his successor has been duly elected and qualified.

IN WITNESS WHEREOF, the undersigned Directors have consented to the foregoing action as of May 15, 1995.

LEONARD SCHNITZER

ROBERT W. PHILIP

KENNETH M. NOVACK

DORI SCHNITZER

DIRECTORS

MMI005.MNS

ACTION AND CONSENT OF BOARD OF DIRECTORS

OF

MMI INTERNATIONAL (OREGON), INC.

Pursuant to the Bylaws of MMI International (Oregon), Inc. (the "Corporation") and ORS 60.341, members of the Board of Directors of the Corporation act unanimously as follows:

> RESOLVED, the Board of Directors hereby adopts the attached U.S. Bank of Washington, National Association, banking resolutions.

IN WITNESS WHEREOF, the undersigned Directors have consented to the foregoing action as of March 30, 1995.

LEONARD SCHNITZER	ROBERT W. PHILIP
KENNETH M. NOVACK	DORI SCHNITZER

DIRECTORS

MMI002.MNS

The undersigned, being the owner, principal(s) or other authorized individual(s) of the following business or organization:

MMI INTERNATIONAL (OREGON), INC., a

☐ Partnership ☐ Nonprofit _____ ☒ Corporation ☐ Association
☐ Sole Proprietorship ☐ Public Funds ☐ Limited Liability Company

("Customer") hereby agrees:

1. Customer has received a copy of the Account Agreement which governs this Account, plus disclosure of Account Charges and other disclosures required by law. All transactions between Bank and Customer are governed by contract as printed on this Account Signature Card, the Account Agreement, other disclosure forms provided to Customer and other Bank forms including deposit slips.

2. Customer hereby designates the U.S. Bank indicated on the reverse side of this form, ("Bank"), at any one or more of its offices, as the banking depository of the Customer and requests that the Bank establish a demand deposit Account on behalf of customer.

3. In compliance with Internal Revenue Service ("IRS") Regulations, Customer hereby certifies, under penalty of perjury, that the Taxpayer Identification Number provided on this Account Signature Card is correct. By marking "No" in the "Subject to Backup Withholding" box, Customer certifies that Customer is not subject to backup withholding either because the IRS has not notified Customer that backup withholding is required due to underreporting or because the IRS has notified Customer that Customer is no longer subject to backup withholding.

4. The person(s) whose name(s) and signature(s) appear on the reverse hereof, is/are hereby authorized to sign, on behalf of Customer, orders for payment or withdrawal from Customer's account, whether payable to any of the authorized signees or otherwise; and is/are also authorized to endorse for deposit, payment or collection any check, bill, draft or other instrument made, drawn or endorsed to Customer for deposit into this account or any other transaction with Bank; such orders shall require the signature(s) of any 2 over $2,000 of said persons. All prior authorizations are hereby superseded. This authority shall remain in effect until Customer terminates said authority in writing to the Bank.

5. Customer's assumed business name, if any, is duly registered with the Office of the Secretary of State under date and number _____, if not registered, the Customer will promptly advise Bank of date and number whenever registered.

6. If any other person becomes an owner, principal or officer of Customer, or if Customer shall be organized as a limited liability company or incorporated, Customer agrees to notify the Bank promptly.

For Corporations, Associations or Public Funds:

I hereby certify that the foregoing is a full and correct copy of the resolution duly adopted by the Board of Directors or officers of MMI INTERNATIONAL (OREGON), INC. by unanimous consent on March 30, 1995 and that the signatures appearing on the reverse hereof are the actual signatures of the persons designated who are duly qualified and acting in their respective capacities.

Secretary* [signature] Officer _____

*The Secretary and another director or officer must certify when the secretary is among those authorized to sign on the account alone.

For Limited Liability Companies, Partnerships or Sole Proprietorships: (All Managers, [or if none, All Members] All General Partners or Sole Proprietor must sign)

ORGANIZATION: MMI INTERNATIONAL (OR), INC	ACCOUNT NUMBER: 070-0109-044
ADDRESS: 1902 Marine View Drive	DATE: 3/30/95
CITY:	STATE: WA ZIP: 98422
TA (b) (4) 2	SUBJECT TO BACKUP WITHHOLDING? ☐ YES ☒ NO ☐ EXEMPT
NUMBER OF SIGNATURES REQUIRED: 2 over $2,000	

U.S. BANK COMMERCIAL ACCOUNT SIGNATURE CARD
AUTHORIZED SIGNATURES

BANK:
☐ United States National Bank of Oregon
☒ U.S. Bank of Washington, National Association
☐ U.S. Bank of Idaho, National Association
☐ U.S. Bank of California
☐ U.S. Bank of Nevada

1. SIGNATURE x [signature]	
NAME (TYPED): Ned H. Buhler	TITLE: [redacted]
2. SIGNATURE x [signature]	
NAME (TYPED): Keith Atchley	TITLE: Agent
3. SIGNATURE x [signature]	
NAME (TYPED): Hyoung D. Gim	TITLE: President
4. SIGNATURE x	
NAME (TYPED)	TITLE
5. SIGNATURE x	
NAME (TYPED)	TITLE

OPENING DATE	OPENED BY	OPENING DEPOSIT
PHONE NUMBER	TYPE OF BUSINESS	

5-64 12/94

CRAW00018344

ACTION AND CONSENT OF BOARD OF DIRECTORS
OF
MMI INTERNATIONAL (OREGON), INC.

Pursuant to ORS 60.341 and the Bylaws of MMI International (Oregon), Inc. (the "Corporation"), the directors of the Corporation hereby unanimously take the following actions:

1. Section 1, Article I of the Corporation's Bylaws is hereby repealed and replaced by the following:

ARTICLE I

Section 1. Annual Meeting. The annual meeting of the Shareholders shall be held on the second Tuesday of December of each year, for the purpose of electing Directors and for the transaction of such other business as may come before the meeting. If the election of Directors shall not be held on the date designated herein for any annual meeting of the Shareholders, or at any adjournment thereof, the Board of Directors shall cause the election to be held at a special meeting of the Shareholders as soon thereafter as conveniently possible.

2. Section 1, Article II of the Corporation's Bylaws is hereby repealed and replaced by the following:

ARTICLE II

Section 1. Number, Term and Qualification. The number of directors of the corporation shall be at least three (3) and no more than thirteen (13). Within this range, the number of directors shall be determined from time to time by the board of directors. The term of a director shall expire at the next annual meeting of shareholders after his or her election. No reduction in the number of directors shall shorten the term of any incumbent director. Despite the expiration of a director's term, the director shall continue to serve until the director's successor is elected and qualified or the number of directors is decreased. Directors need not be residents of Oregon or shareholders of the corporation.

MIS\MMI005.MNS

3. Article VII of the Corporation's Bylaws is hereby repealed and replaced by the following:

ARTICLE VII

Indemnification of Officers and Directors

The corporation shall indemnify, to the fullest extent not prohibited by law, any current or former director or officer of the corporation who is made, or threatened to be made, a party to an action, suit or proceeding, whether civil, criminal, administrative, investigative or other (including an action, suit or proceeding by or in the right of the corporation) by reason of the fact that such person is or was a director, officer, employee or agent of the corporation or a fiduciary within the meaning of the Employee Retirement Income Security Act of 1974 with respect to any employee benefit plan of the corporation, or serves or served at the request of the corporation as a director, officer, employee or agent, or as a fiduciary of an employee benefit plan, of another corporation, partnership, joint venture, trust or other enterprise. The corporation shall pay all expenses incurred by any such person defending such proceeding in advance of its final disposition at the written request of such person if the person furnishes the corporation (a) a written statement of a good faith belief that he or she is entitled to indemnification and (b) a written undertaking to repay such advance if it is ultimately determined by a court that such person is not entitled to be indemnified. No amendment to these Bylaws that limits the corporation's obligation to indemnify directors and officers of the corporation shall have any effect on such obligation for any act or omission which occurs prior to the later of the effective date of the amendment or the date notice of the amendment is given to the officer or director. This Article shall not be deemed exclusive of any other provisions for indemnification or advancement of expenses of directors, officers, employees, agents and fiduciaries that may be included in the corporation's Articles of Incorporation or any statute, agreement, general or specific action of the board of directors, vote of shareholders or other document or arrangement.

IN WITNESS WHEREOF, we, who are all of the directors of the Corporation, have consented to the foregoing actions as of March 29, 1995.

LEONARD SCHNITZER

KENNETH M. NOVACK

ROBERT W. PHILIP

DORI SCHNITZER

DIRECTORS

MIS\MMI005.MNS

ACTION AND CONSENT OF BOARD OF DIRECTORS

OF

MMI INTERNATIONAL (OREGON), INC.

Pursuant to ORS 60.341 and the Bylaws of MMI International (Oregon), Inc. (the "Corporation"), the directors of the Corporation hereby unanimously elect the following persons to the offices shown opposite their names for a term of one year from the date of this action and until their successors shall have been elected and qualified:

Leonard Schnitzer	Chief Executive Officer
Hyoung D. Gim	President
Robert W. Philip	Executive Vice President
Kenneth M. Novack	Executive Vice President
Si C. Wooh	Vice President
Barry A. Rosen	Vice President/Treasurer
Dori Schnitzer	Secretary
Anton U. Pardini	Assistant Secretary

IN WITNESS WHEREOF, we, who are all of the directors of the Corporation, have consented to the foregoing action as of March 29, 1995.

LEONARD SCHNITZER

ROBERT W. PHILIP

KENNETH M. NOVACK

DORI SCHNITZER

DIRECTORS

MMI001.MNS

ACTION AND CONSENT OF SHAREHOLDER

OF

MMI INTERNATIONAL (OREGON), INC.

Pursuant to ORS 60.341 and the Bylaws of MMI International (Oregon), Inc. (the "Corporation"), Manufacturing Management, Inc., which is the sole shareholder of the Corporation, hereby nominates and elects LEONARD SCHNITZER, KENNETH M. NOVACK, ROBERT W. PHILIP and DORI SCHNITZER as the directors of the Corporation, to hold office for one year from the effective date of this action and until their successors have been elected and qualified.

IN WITNESS WHEREOF, the undersigned shareholder has consented to the foregoing action as of March 29, 1995.

MANUFACTURING MANAGEMENT, INC.

Dr. Leonard Schnitzer
Chief Executive Officer

MMI001.MNS

BRIDGEWATER GROUP, INC.

Crawford Street Corporation Site Hydrogeologic Conceptual Site Model

TO: Tom Gainer/DEQ

COPY: Mat Cusma/Crawford Street Corporation

FROM: Ross Rieke/Bridgewater Group

DATE: May 22, 2002

This memorandum and attachments provide the information requested by you in your March 27, 2002 email to Mat Cusma and myself. In particular, attached please find:

- Table 1 presenting the measured groundwater elevations in the three temporary groundwater monitoring wells.
- Figure 1 showing the hydrogeologic conceptual site model based on a cross section of the river bank at PP-1.

As shown by the groundwater elevations and the associated conceptual site model, the groundwater sample collected from PP-1 clearly represents the groundwater that would be impacted by any contamination present in the black sand that could possibly migrate to the Willamette River. The lack of any semi-volatile organic compounds in the groundwater sample demonstrates that the black sand does not adversely affect the Willamette River through the groundwater pathway. As noted in the February 26, 2002, *Black Sand Removal Report* and as shown on Figure 1, removal of the black sand from along the edge of the top of the slope and construction of a berm along the edge of the slope prevents migration of the black sand to the river through surface water runoff or sloughing of the black sand.

Based on the groundwater elevations in the other two monitoring wells and the relative Willamette River elevation, groundwater samples from PP-2 and PP-3 are also representative of the groundwater discharge to the river. The lack of contaminants in these wells also indicates that any soil contamination that might be present in the site uplands has not migrated to the river through the groundwater pathway.

Please call if you have any questions.

CRAW00018351

Table 1
Groundwater Elevations in Temporary Monitoring Wells
Crawford Street Corporation

Monitoring Well	Depth to Screen (ft)	Approximate TOC Elev (ft)	Approximate Ground Surface Elevation (ft)	Date	Depth (ft)	Approximate GW Elev (ft)
PP-1	35	31.5	32.0	4/25/2001	26.8	4.7
				5/16/2002	24.4	7.1
PP-2	35	29.5	30.0	4/25/2001	27.6	1.9
				5/16/2002	25.2	4.3
PP-3	35	27.5	28.0	4/25/2001	28.6	-1.1
				5/16/2002	26.5	1.0
Willamette River				4/25/2001		5
				5/16/2002		7.5

Elevations based on NGDV
Willamette River elevation from Morrison Street Bridge gauge

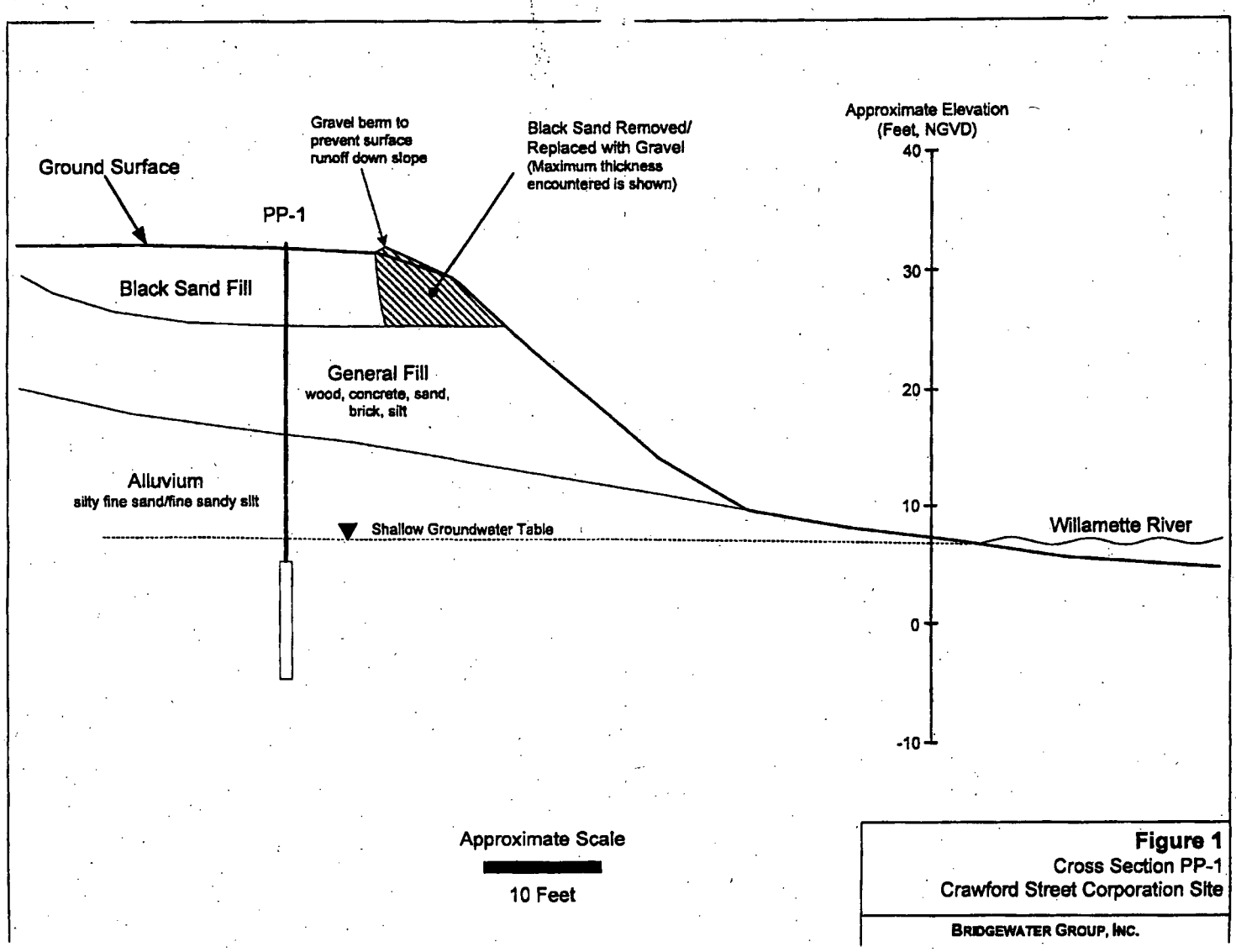


Figure 1
Cross Section PP-1
Crawford Street Corporation Site

BRIDGEWATER GROUP, INC.

CRAW00018353

PROVISIONAL DATA SUBJECT TO REVISION

USGS 13292000 IMNAHA RIVER AT IMNAHA, OR

Date	GAGE HEIGHT (FEET) Mean (02_00065)
04/24/2001	2.45
04/25/2001	2.61
04/26/2001	2.83

USGS 13329770 WALLOWA R ABV CROSS CNTRY CANAL, NR ENTERPRISE, OR

Date	GAGE HEIGHT (FEET) Mean (04_00065)
04/24/2001	1.83
04/25/2001	1.82
04/26/2001	1.88

USGS 13330000 LOSTINE RIVER NEAR LOSTINE, OR

Date	GAGE HEIGHT (FEET) Mean (05_00065)
04/24/2001	2.10
04/25/2001	2.35
04/26/2001	2.82

USGS 13330300 LOSTINE RIVER AT BAKER ROAD, NEAR LOSTINE, OR

Date	GAGE HEIGHT (FEET) Mean (02_00065)
04/24/2001	3.41
04/25/2001	3.52
04/26/2001	3.75

USGS 13330500 BEAR CREEK NEAR WALLOWA, OR

Date	GAGE HEIGHT (FEET) Mean

Date	GAGE HEIGHT (FEET) Maximum (01_00065)	GAGE HEIGHT (FEET) Minimum (01_00065)	GAGE HEIGHT (FEET) Mean (01_00065)
04/24/2001	7.32	4.74	5.86
04/25/2001	7.86	5.17	6.23
04/26/2001	8.28	5.56	6.59

USGS 14211550 JOHNSON CREEK AT MILWAUKIE,OREG.

Date	GAGE HEIGHT (FEET) Mean (02_00065)
04/24/2001	24.57
04/25/2001	24.50
04/26/2001	24.45

USGS 14211720 WILLAMETTE RIVER AT PORTLAND,OREG.

Date	GAGE HEIGHT (FEET) Mean (03_00065)
04/24/2001	3.17
04/25/2001	3.56 + 1.55 = 5
04/26/2001	3.92

NGVD

5/21/2002 6.18 compares well with NOAA web page

USGS 14211820 COLUMBIA SLOUGH AT PORTLAND, OR

Date	GAGE HEIGHT (FEET) Mean (06_00065)
04/24/2001	3.20
04/25/2001	3.60
04/26/2001	3.95

USGS 14246900 COLUMBIA RIVER @ BEAVER ARMY TERMINAL NR QUINCY,OR

Date	GAGE HEIGHT (FEET) Mean (03_00065)
04/24/2001	
04/25/2001	
04/26/2001	

USGS 14306340 EAST FORK LOBSTER CREEK NEAR ALSEA, OR.

Date	GAGE HEIGHT (FEET) Mean

BRIDGEWATER GROUP, INC.

Crawford Street Corporation Site
Results of Beach Soil Sampling and Analysis

TO: Tom Gainer/DEQ

COPY: Mat Cusma/Crawford Street Corporation
Mark Reeve/Reeve Kearns

FROM: Ross Rieke/Bridgewater Group

DATE: March 7, 2002

This memorandum presents the results of beach soil sampling and analysis performed at the Crawford Street Corporation site in north Portland, Oregon. The purpose of the sampling and analysis was to assess the gross magnitude of beach sand that has elevated metal concentrations.

Sampling Locations and Depths

Soil samples were collected on December 5, 2001 along three sampling transects perpendicular to the site shoreline. The three transects are shown on Figure 1. Soil samples were collected at three locations along each transect. Samples were collected at the following points along the transect:

- A point at the toe of the bank.
- As far out in the water as possible to collect the samples directly by hand (using waders and hand tools).
- A point midway between the two above points.

Samples were also collected at Sample Point 4 shown on Figure 1 to assess the metal concentrations at the western edge of the beach.

Samples were collected from the upper 2 inches and from a depth of 2 to 3 feet at each location. Due to sloughing of the saturated sediment, it was not feasible to collect a representative deep sample at the submerged sample point.

Chemical Analysis

The soil/sediment samples were analyzed for the copper, lead, and nickel using EPA Method 6000/7000 series.

Chemical Analysis Results

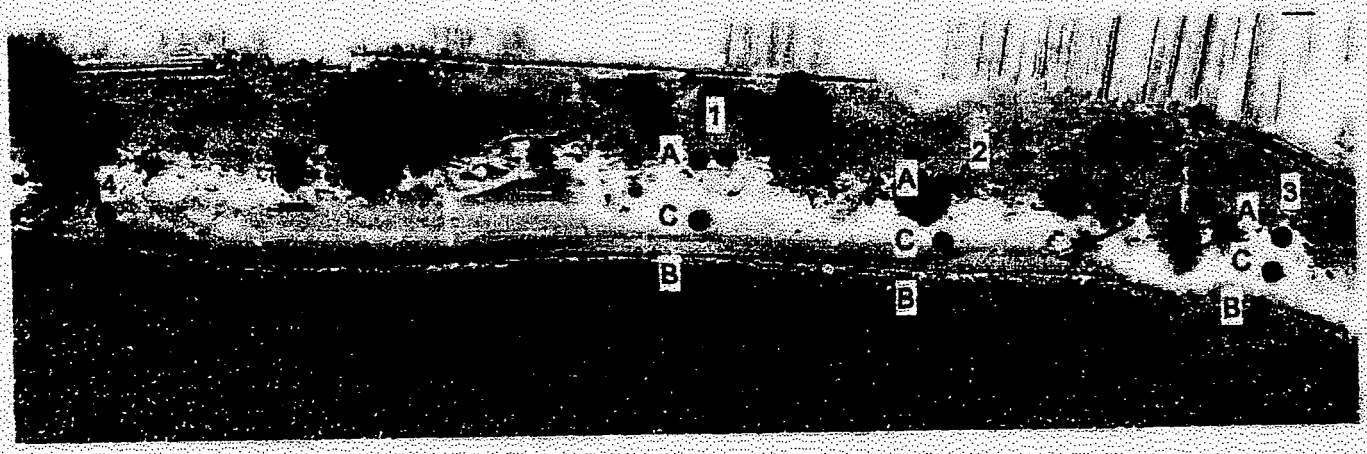
Table 1 and Figure 2 summarize the results of the beach soil sampling and analysis. A copy of the analytical laboratory report is also attached.

CRAW00018356

Table 1
Metal Concentrations in Beach Soil Samples
Crawford Street
All results in mg/kg

Sample	Depth (ft)	Copper	Lead	Nickel
T1-A-S	0.1	49.2	15.6	32.7
T1-A-D	3.2	28.7	14	22.5
T1-B-S	0.1	217	22.5	20.1
T1-C-S	0.1	281	14.6	23.5
T1-C-D	2	89.2	23.9	41.8
T2-A-S	0.1	31.8	10.2	25.3
T2-A-D	2.4	27.7	11.5	21.5
T2-B-S	0.1	33.9	16.4	16.4
T2-C-S	0.1	105	13.7	14
T2-C-D	2.5	32	34.6	26
T3-A-S	0.1	75.3	61.1	25.8
T3-A-D	2.1	34.8	38.4	23.3
T3-B-S	0.1	418	18.5	17.5
T3-C-S	0.1	52.8	27.6	20.2
T3-C-D	2	29.8	11.5	18.9
S4-S	0.1	700	23.7	57.5
S4-D	1.7	902	54.5	102

Comparison Criteria			
Portland Harbor Baseline	60	30	32
DEQ Ecological Sediment SLV	36	35	18
McDonald Consensus PECs	149	128	48.6
EPA PRG (worker protection)	76000	750	41000



A ● Sampling Point

4 Sample Transect

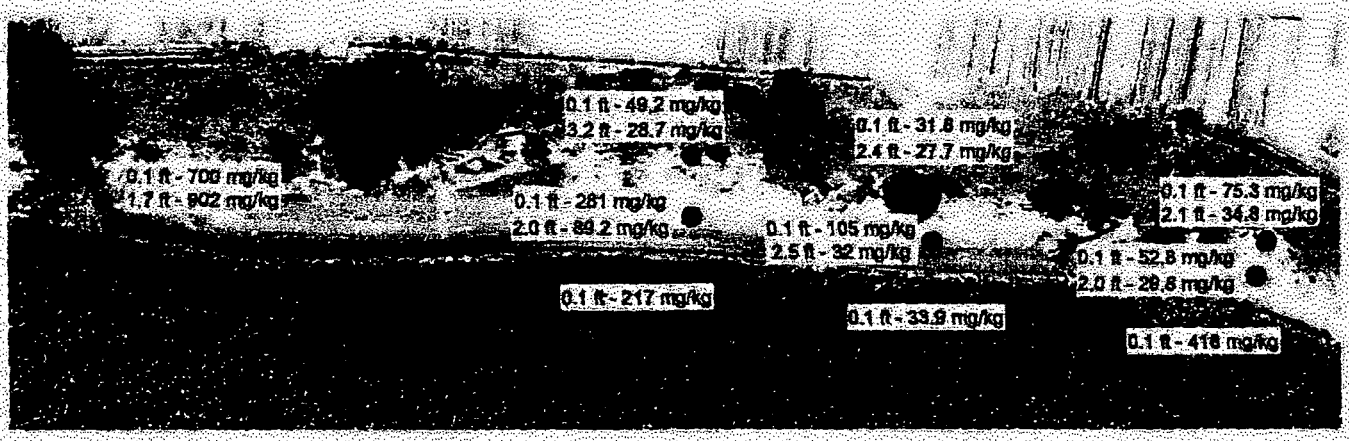
Approximate Scale

66 feet

Project

Figure 1
Beach Soil Sample Locations
Crawford Street Corporation

BRIDGEWATER GROUP, INC.



Sampling Point

0.1 ft - 281 mg/kg
2.0 ft - 89.2 mg/kg
Sample Depth and Copper Concentration

N
Project

Approximate Scale
66 feet

Figure 2
Copper Concentrations in Beach Samples
Crawford Street Corporation

BRIDGEWATER GROUP, INC.

CRAW00018359

www.ncalabs.com

Seattle 11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244
425.420.9200 fax 425.420.9210
Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
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18 December, 2001

Ross Rieke
Bridgewater Group
4500 Kruse Way Suite 110
Lake Oswego, OR 97035

RE: Crawford St.

Enclosed are the results of analyses for samples received by the laboratory on 12/06/01 13:18. If have any questions concerning this report, please feel free to contact me.

Sincerely,

Philip Nerenberg
Laboratory Manager

Work Orders included in this report:
P1L0176

North Creek Analytical, Inc.
Environmental Laboratory Network

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Bridgewater Group	Project: Crawford St.	
4500 Kruse Way Suite 110	Project Number: na	Reported:
Lake Oswego, OR 97035	Project Manager: Ross Ricke	12/18/01 12:07

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
T1-A-S	P1L0176-01	Soil	12/05/01 12:00	12/06/01 13:18
T1-A-D	P1L0176-02	Soil	12/05/01 12:00	12/06/01 13:18
T1-B-S	P1L0176-03	Soil	12/05/01 12:00	12/06/01 13:18
T1-C-S	P1L0176-04	Soil	12/05/01 12:00	12/06/01 13:18
T1-C-D	P1L0176-05	Soil	12/05/01 12:00	12/06/01 13:18
T2-A-S	P1L0176-06	Soil	12/05/01 12:00	12/06/01 13:18
T2-A-D	P1L0176-07	Soil	12/05/01 12:00	12/06/01 13:18
T2-B-S	P1L0176-08	Soil	12/05/01 12:00	12/06/01 13:18
T2-C-S	P1L0176-09	Soil	12/05/01 12:00	12/06/01 13:18
T2-C-D	P1L0176-10	Soil	12/05/01 12:00	12/06/01 13:18
T3-A-S	P1L0176-11	Soil	12/05/01 12:00	12/06/01 13:18
T3-A-D	P1L0176-12	Soil	12/05/01 12:00	12/06/01 13:18
B-S	P1L0176-13	Soil	12/05/01 12:00	12/06/01 13:18
T3-C-S	P1L0176-14	Soil	12/05/01 12:00	12/06/01 13:18
T3-C-D	P1L0176-15	Soil	12/05/01 12:00	12/06/01 13:18
S4-S	P1L0176-16	Soil	12/05/01 12:00	12/06/01 13:18
S4-D	P1L0176-17	Soil	12/05/01 12:00	12/06/01 13:18

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Philip Nerenberg, Laboratory Manager

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Bridgewater Group	Project: Crawford St.	
4500 Kruse Way Suite 110	Project Number: na	Reported:
Lake Oswego, OR 97035	Project Manager: Ross Rieke	12/18/01 12:07

Total Metals per EPA 6000/7000 Series Methods

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
T1-A-S (P1L0176-01) Soil					Sampled: 12/05/01	Received: 12/06/01			
Copper	49.2	0.775	mg/kg dry	1	EPA 6020	12/13/01	12/14/01	1120460	
Lead	15.6	0.388	"	"	"	"	"	"	
Nickel	32.7	0.775	"	"	"	"	"	"	
T1-A-D (P1L0176-02) Soil					Sampled: 12/05/01	Received: 12/06/01			
Copper	28.7	0.813	mg/kg dry	1	EPA 6020	12/13/01	12/14/01	1120460	
Lead	14.0	0.407	"	"	"	"	"	"	
Nickel	22.5	0.813	"	"	"	"	"	"	
T1-B-S (P1L0176-03) Soil					Sampled: 12/05/01	Received: 12/06/01			
Copper	217	0.763	mg/kg dry	1	EPA 6020	12/13/01	12/14/01	1120460	
Lead	22.5	0.382	"	"	"	"	"	"	
[illegible]el	20.1	0.763	"	"	"	"	"	"	
T1-C-S (P1L0176-04) Soil					Sampled: 12/05/01	Received: 12/06/01			
Copper	281	0.909	mg/kg dry	1	EPA 6020	12/13/01	12/14/01	1120460	
Lead	14.6	0.455	"	"	"	"	"	"	
Nickel	23.5	0.909	"	"	"	"	"	"	
T1-C-D (P1L0176-05) Soil					Sampled: 12/05/01	Received: 12/06/01			
Copper	89.2	0.813	mg/kg dry	1	EPA 6020	12/13/01	12/14/01	1120460	
Lead	23.9	0.407	"	"	"	"	"	"	
Nickel	41.8	0.813	"	"	"	"	"	"	
T2-A-S (P1L0176-06) Soil					Sampled: 12/05/01	Received: 12/06/01			
Copper	31.8	1.00	mg/kg dry	1	EPA 6020	12/13/01	12/14/01	1120460	
Lead	10.2	0.500	"	"	"	"	"	"	
Nickel	25.3	1.00	"	"	"	"	"	"	

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Bridgewater Group	Project: Crawford St.	
4500 Kruse Way Suite 110	Project Number: na	Reported:
Lake Oswego, OR 97035	Project Manager: Ross Rieke	12/18/01 12:07

Total Metals per EPA 6000/7000 Series Methods

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
T2-A-D (P1L0176-07) Soil					Sampled: 12/05/01	Received: 12/06/01			
Copper	27.7	0.667	mg/kg dry	1	EPA 6020	12/13/01	12/14/01	1120460	
Lead	11.5	0.333	"	"	"	"	"	"	
Nickel	21.5	0.667	"	"	"	"	"	"	
T2-B-S (P1L0176-08) Soil					Sampled: 12/05/01	Received: 12/06/01			
Copper	33.9	1.00	mg/kg dry	1	EPA 6020	12/13/01	12/14/01	1120460	
Lead	16.4	0.500	"	"	"	"	"	"	
Nickel	16.4	1.00	"	"	"	"	"	"	
T2-C-S (P1L0176-09) Soil					Sampled: 12/05/01	Received: 12/06/01			
Copper	105	0.741	mg/kg dry	1	EPA 6020	12/13/01	12/14/01	1120460	
Lead	13.7	0.370	"	"	"	"	"	"	
Nickel	14.0	0.741	"	"	"	"	"	"	
T2-C-D (P1L0176-10) Soil					Sampled: 12/05/01	Received: 12/06/01			
Copper	32.0	0.730	mg/kg dry	1	EPA 6020	12/13/01	12/14/01	1120460	
Lead	34.6	0.365	"	"	"	"	"	"	
Nickel	26.0	0.730	"	"	"	"	"	"	
T3-A-S (P1L0176-11) Soil					Sampled: 12/05/01	Received: 12/06/01			
Copper	75.3	1.00	mg/kg dry	1	EPA 6020	12/13/01	12/14/01	1120460	
Lead	61.1	0.500	"	"	"	"	"	"	
Nickel	25.8	1.00	"	"	"	"	"	"	
T3-A-D (P1L0176-12) Soil					Sampled: 12/05/01	Received: 12/06/01			
Copper	34.8	1.00	mg/kg dry	1	EPA 6020	12/13/01	12/14/01	1120460	
Lead	38.4	0.500	"	"	"	"	"	"	
Nickel	23.3	1.00	"	"	"	"	"	"	

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Philip Nerenberg, Laboratory Manager

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Bridgewater Group	Project: Crawford St.	
4500 Kruse Way Suite 110	Project Number: na	Reported:
Lake Oswego, OR 97035	Project Manager: Ross Rieke	12/18/01 12:07

Total Metals per EPA 6000/7000 Series Methods

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
T3-B-S (P1L0176-13) Soil					Sampled: 12/05/01	Received: 12/06/01			
Copper	418	0.847	mg/kg dry	1	EPA 6020	12/13/01	12/14/01	1120460	
Lead	18.5	0.424	"	"	"	"	"	"	
Nickel	17.5	0.847	"	"	"	"	"	"	
T3-C-S (P1L0176-14) Soil					Sampled: 12/05/01	Received: 12/06/01			
Copper	52.8	0.690	mg/kg dry	1	EPA 6020	12/13/01	12/14/01	1120460	
Lead	27.6	0.345	"	"	"	"	"	"	
Nickel	20.2	0.690	"	"	"	"	"	"	
T3-C-D (P1L0176-15) Soil					Sampled: 12/05/01	Received: 12/06/01			
Copper	29.8	0.794	mg/kg dry	1	EPA 6020	12/13/01	12/14/01	1120460	
Lead	11.5	0.397	"	"	"	"	"	"	
Nickel	18.9	0.794	"	"	"	"	"	"	
S4-S (P1L0176-16) Soil					Sampled: 12/05/01	Received: 12/06/01			
Copper	700	7.94	mg/kg dry	10	EPA 6020	12/13/01	12/14/01	1120460	
Lead	23.7	0.397	"	1	"	"	12/14/01	"	
Nickel	57.5	0.794	"	"	"	"	"	"	
S4-D (P1L0176-17) Soil					Sampled: 12/05/01	Received: 12/06/01			
Copper	902	7.87	mg/kg dry	10	EPA 6020	12/13/01	12/14/01	1120460	
Lead	54.5	0.394	"	1	"	"	12/14/01	"	
Nickel	102	0.787	"	"	"	"	"	"	

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PN

Philip Nerenberg, Laboratory Manager

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Bridgewater Group	Project: Crawford St.	
4500 Kruse Way Suite 110	Project Number: na	Reported:
Lake Oswego, OR 97035	Project Manager: Ross Rieke	12/18/01 12:07

Percent Dry Weight (Solids) per Standard Methods

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
T1-A-S (P1L0176-01) Soil					Sampled: 12/05/01	Received: 12/06/01			
% Solids	82.8	1.00	% by Weight	1	NCA SOP	12/10/01	12/11/01	1120274	
T1-A-D (P1L0176-02) Soil					Sampled: 12/05/01	Received: 12/06/01			
% Solids	72.6	1.00	% by Weight	1	NCA SOP	12/10/01	12/11/01	1120274	
T1-B-S (P1L0176-03) Soil					Sampled: 12/05/01	Received: 12/06/01			
% Solids	83.1	1.00	% by Weight	1	NCA SOP	12/10/01	12/11/01	1120274	
T1-C-S (P1L0176-04) Soil					Sampled: 12/05/01	Received: 12/06/01			
% Solids	89.2	1.00	% by Weight	1	NCA SOP	12/10/01	12/11/01	1120274	
T1-C-D (P1L0176-05) Soil					Sampled: 12/05/01	Received: 12/06/01			
olids	76.6	1.00	% by Weight	1	NCA SOP	12/10/01	12/11/01	1120274	
T2-A-S (P1L0176-06) Soil					Sampled: 12/05/01	Received: 12/06/01			
% Solids	71.3	1.00	% by Weight	1	NCA SOP	12/10/01	12/11/01	1120274	
T2-A-D (P1L0176-07) Soil					Sampled: 12/05/01	Received: 12/06/01			
% Solids	73.0	1.00	% by Weight	1	NCA SOP	12/10/01	12/11/01	1120274	
T2-B-S (P1L0176-08) Soil					Sampled: 12/05/01	Received: 12/06/01			
% Solids	78.0	1.00	% by Weight	1	NCA SOP	12/10/01	12/11/01	1120274	
T2-C-S (P1L0176-09) Soil					Sampled: 12/05/01	Received: 12/06/01			
% Solids	85.5	1.00	% by Weight	1	NCA SOP	12/10/01	12/11/01	1120274	

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Bridgewater Group	Project: Crawford St.	
4500 Kruse Way Suite 110	Project Number: na	Reported:
Lake Oswego, OR 97035	Project Manager: Ross Rieke	12/18/01 12:07

Percent Dry Weight (Solids) per Standard Methods

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Dilution	Method	Prepared	Analyzed	Batch	Notes
T2-C-D (P1L0176-10) Soil					Sampled: 12/05/01	Received: 12/06/01			
% Solids	70.2	1.00	% by Weight	1	NCA SOP	12/10/01	12/11/01	1120274	
T3-A-S (P1L0176-11) Soil					Sampled: 12/05/01	Received: 12/06/01			
% Solids	63.3	1.00	% by Weight	1	NCA SOP	12/10/01	12/11/01	1120274	
T3-A-D (P1L0176-12) Soil					Sampled: 12/05/01	Received: 12/06/01			
% Solids	68.6	1.00	% by Weight	1	NCA SOP	12/10/01	12/11/01	1120274	
T3-B-S (P1L0176-13) Soil					Sampled: 12/05/01	Received: 12/06/01			
% Solids	69.4	1.00	% by Weight	1	NCA SOP	12/10/01	12/11/01	1120274	
T3-C-S (P1L0176-14) Soil					Sampled: 12/05/01	Received: 12/06/01			
›lids	88.6	1.00	% by Weight	1	NCA SOP	12/10/01	12/11/01	1120274	
T3-C-D (P1L0176-15) Soil					Sampled: 12/05/01	Received: 12/06/01			
% Solids	68.7	1.00	% by Weight	1	NCA SOP	12/10/01	12/11/01	1120274	
S4-S (P1L0176-16) Soil					Sampled: 12/05/01	Received: 12/06/01			
% Solids	81.4	1.00	% by Weight	1	NCA SOP	12/10/01	12/11/01	1120274	
S4-D (P1L0176-17) Soil					Sampled: 12/05/01	Received: 12/06/01			
% Solids	77.5	1.00	% by Weight	1	NCA SOP	12/10/01	12/11/01	1120274	

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Philip Nerenberg, Laboratory Manager

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Bridgewater Group	Project: Crawford St.	
4500 Kruse Way Suite 110	Project Number: na	Reported:
Lake Oswego, OR 97035	Project Manager: Ross Rieke	12/18/01 12:07

Total Metals per EPA 6000/7000 Series Methods - Quality Control

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1120460 - EPA 3050										
Blank (1120460-BLK1)				Prepared: 12/13/01	Analyzed: 12/14/01					
Copper	ND	1.00	mg/kg							
Lead	ND	0.500	"							
Nickel	ND	1.00	"							
LCS (1120460-BS1)				Prepared: 12/13/01	Analyzed: 12/14/01					
Copper	57.6	1.00	mg/kg	50.0		115	80-120			
Lead	104	0.500	"	100		104	80-120			
Nickel	58.1	1.00	"	50.0		116	80-120			
Duplicate (1120460-DUP1)		Source: P1L0176-01		Prepared: 12/13/01	Analyzed: 12/14/01					
Copper	38.3	1.00	mg/kg dry		49.2			24.9	40	
Lead	22.7	0.500	"		15.6			37.1	40	
Nickel	19.7	1.00	"		32.7			49.6	40	Q-06
Matrix Spike (1120460-MS1)		Source: P1L0176-01		Prepared: 12/13/01	Analyzed: 12/14/01					
Copper	98.9	1.00	mg/kg dry	59.8	49.2	83.1	75-125			
Lead	135	0.500	"	120	15.6	99.5	75-125			
Nickel	85.7	1.00	"	59.8	32.7	88.6	75-125			
Matrix Spike (1120460-MS2)		Source: P1L0176-02		Prepared: 12/13/01	Analyzed: 12/14/01					
Copper	98.0	1.00	mg/kg dry	63.2	28.7	110	75-125			
Lead	139	0.500	"	126	14.0	99.2	75-125			
Nickel	91.5	1.00	"	63.2	22.5	109	75-125			

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Bridgewater Group	Project: Crawford St.	
4500 Kruse Way Suite 110	Project Number: na	Reported:
Lake Oswego, OR 97035	Project Manager: Ross Rieke	12/18/01 12:07

Percent Dry Weight (Solids) per Standard Methods - Quality Control

North Creek Analytical - Portland

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1120274 - Dry Weight										
Duplicate (1120274-DUP1)		Source: P1K0817-01		Prepared: 12/10/01 Analyzed: 12/11/01						
% Solids	83.5	1.00	% by Weight		84.1			0.716	20	
Duplicate (1120274-DUP2)		Source: P1L0201-01		Prepared: 12/10/01 Analyzed: 12/11/01						
% Solids	88.7	1.00	% by Weight		88.2			0.565	20	

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Bridgewater Group	Project: Crawford St.	
4500 Kruse Way Suite 110	Project Number: na	Reported:
Lake Oswego, OR 97035	Project Manager: Ross Rieke	12/18/01 12:07

Notes and Definitions

Q-06	Analyses are not controlled on RPD values from sample concentrations less than 5 times the reporting limit.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis. MRLs are adjusted if %Solids are less than 50%.
wet	Sample results reported on a wet weight basis (as received)
RPD	Relative Percent Difference

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20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711 (541) 383-9310 FAX 382-7588

CHAIN OF CUSTODY REPORT

Work Order #: PIL0176

CLIENT: Bridgewater Group
REPORT TO: Ross Rieke
ADDRESS:
PHONE: (503) 675-5252 FAX: (503) 675-1960
PROJECT NAME: Crawford Street
PROJECT NUMBER: CRF001
SAMPLED BY: Rieke

INVOICE TO:
P.O. NUMBER: CRF00

TURNAROUND REQUEST in Business Days*
Organic & Inorganic Analyses: 10 (STD.) 7 5 4 3 2 1 <1
Petroleum Hydrocarbon Analyses: 5 (STD.) 4 3 2 1 <1
OTHER — Please Specify
*Turnaround Requests less than standard may incur Rush Charges.

REQUESTED ANALYSES

CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	Copper Lead Nickel												MATRIX (W, S, O)	# OF CONT.	COMMENTS	NCA ID
1. T1-A-S	12/5/01	X															
2. T1-A-D		X															
3. T1-B-S		X															
4. T1-C-S		X															
5. T1-C-D		X															
6. T2-A-S		X															
7. T2-A-D		X															
8. T2-B-S		X															
9. T2-C-S		X															
10. T2-C-D		X															
11. T3-A-S		X															
12. T3-A-D		X															
13. T3-B-S		X															
14. T3-C-S		X															
15. T3-C-D		X															

RELINQUISHED BY:	DATE: 12/6	RECEIVED BY:	DATE: 12/6/01
PRINT NAME: Ross Rieke FIRM: Bridgewater Grp	TIME: 13:18	PRINT NAME: Rachel Arriola FIRM: NCA	TIME: 13:18
RELINQUISHED BY:	DATE:	RECEIVED BY:	DATE:
PRINT NAME: FIRM:	TIME:	PRINT NAME: FIRM:	TIME:

ADDITIONAL REMARKS:

TEMP: °C

CRAW00018370

North Creek Analytical, Inc.
Environmental Laboratory Network
www.ncalabs.com

11720 North Creek Pkwy N, Suite 400, Bothell, WA 98011-8244 (425) 420-9200 FAX 420-9210
East 11115 Montgomery, Suite B, Spokane, WA 99206-4776 (509) 924-9200 F 24-9290
9405 S.W. Nimbus Avenue, Beaverton, OR 97008-7132 (503) 906-9200 06-9210
20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711 (541) 383-9310 FAX 382-7588

CHAIN OF CUSTODY REPORT

Work Order #: PIL0176

CLIENT: Bridgewater Group
REPORT TO: Ross Rieke
ADDRESS:
PHONE: FAX:

INVOICE TO:
P.O. NUMBER:

PROJECT NAME: Crawford Street
PROJECT NUMBER:
SAMPLED BY: Rieke

TURNAROUND REQUEST in Business Days*
Organic & Inorganic Analyses: 10 (STD.) 7 5 4 3 2 1 <1
Petroleum Hydrocarbon Analyses: 5 (STD.) 4 3 2 1 <1
OTHER Please Specify
*Turnaround Requests less than standard may incur Rush Charges.

REQUESTED ANALYSES

CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	Copper Lead Nickel	MATRIX (W, S, O)	# OF CONT.	COMMENTS	NCA ID
1. S4-S	12/5/01	X				
2. S4-D	12/5/01	X				
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						

RELINQUISHED BY: [signature] DATE: 12/5/01
PRINT NAME: Ross D. Rieke FIRM: Bridgewater Gp TIME: 13:16
RECEIVED BY: [signature] DATE: 12/6/01
PRINT NAME: Rachel Arciola FIRM: NCA TIME: 13:18

RELINQUISHED BY: DATE:
PRINT NAME: FIRM: TIME:
RECEIVED BY: DATE:
PRINT NAME: FIRM: TIME:

ADDITIONAL REMARKS:
TEMP: 5°F

CRAW00018371

Black Sand Removal Action

Crawford Street Site
Portland, Oregon

Prepared for
Crawford Street Corporation

February 26, 2002

BRIDGEWATER GROUP, INC.