Interim
Soils, water

REMEDIATION OF PETROLEUM RELEASE

BURGER KING

Seattle, Washington

PREPARED FOR

Dave Lively

PROJECT NO. 9003-17V

OCTOBER 1990

ASSOCIATED EARTH SCIENCES, INC
911 - 5th Avenue, Suite 100, Kirkland, WA 98033
(206) 827-7701

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REMEDIATION OF PETROLEUM RELEASE
PROPOSED BURGER KING SITE
4TH AVENUE SOUTH AND SOUTH HORTON STREET
SEATTLE, WASHINGTON

October 9, 1990
Project No. 9003-17V

1.0 INTRODUCTION

1.1 BACKGROUND

In February 1990, Associated Earth Sciences, Inc. (AESI) was contracted to perform a geotechnical assessment of the proposed Burger King site located at 4th Avenue South and South Horton Street in Seattle, Washington. On February 23, 1990, a strong petroleum odor was noticed in a subsurface sample while drilling exploration borings. A sample of the soil from the boring was collected and submitted to an analytical laboratory. Analysis indicated that the sample contained 1400 parts per million (ppm) of total petroleum hydrocarbons (TPH) as petroleum oil. This level is above Washington State Department of Ecology's (Ecology) soil cleanup level of 200 ppm for TPH.

In March 1990, AESI conducted an environmental assessment of the subject site to estimate the source and extent of hydrocarbon contamination. Subsurface exploration indicated that contamination originated in the northeast corner of the site and decreased toward the south portion of the property. However, historical information obtained during the assessment indicated that restaurants had been situated on the site for the last 40 years and that no likely source of contamination was present on site. It was concluded that the BP (formerly Exxon) gas station located at the northwest corner of the intersection of 4th Avenue South and South Horton Street may have been responsible for the contamination as historical research indicated that leaking tanks had been present on the site in the past. Mr. Joe hickey of Ecology was contacted regarding the situation. Mr. Hickey felt that the contamination was "of insufficient threat to human health or the environment to warrant any immediate cleanup action on the part of Ecology at this time".

In late September, three underground storage tanks (USTs) were discovered during excavation activities in the southeast portion of the site. These tanks were apparently left from a gasoline station which existed on the site in the early 1900's. Ecology allowed the tanks to be removed without the regular required 30-day notice of

intent to remove USTs. Brad Mason Trucking and Excavating, Inc. removed the UST's and performed sampling in the excavation, while ChemPro was responsible disposal of the tanks. Samples were collected from the sidewalls and floor of the excavation and analyzed for TPH as gasoline and diesel as well as for benzene, toluene, ethylbenzene, and xylenes (BTEX). Laboratory analysis indicated levels of TPH as gasoline above Ecology's current cleanup guidelines of 200 ppm. Table 1 lists analytical results from the UST excavation prior to remedial efforts.

TABLE 1
ANALYTICAL RESULTS AT TIME OF UST REMOVAL

Sample Location	TPH	Benzene	Toluene	Ethylbenzene	Xylenes
Ecology Cleanup Guidelines (Soil)	200	0.66	145	14	N.E.
East Sidewall	<20	N.D.	N.D.	N.D.	N.D.
West Sidewall	55	N.D.	N.D.	16	56
North Sidewall	760	N.D.	N.D.	42	370
South Sidewall	320	N.D.	N.D.	110	310
Floor	610	N.D.	N.D.	28	167

All results given in parts per million.
N.E. - not established
N.D. - not detected

Based on the results of the laboratory analyses, Ecology requested that remedial activities be performed to lower contaminant levels to those less than current cleanup guidelines.

1.2 PURPOSE AND SCOPE

This report presents the results of the remedial activities performed at the proposed Burger King site. The purpose of AESI's activities was to estimate the extent of TPH contamination in the vicinity of the former USTs and to observe removal of the TPH-contaminated soil until contamination was no longer indicated by visual and field instrumentation.

Burger King

The scope of work included these tasks:

1. A site safety plan was developed and implemented.

2. Indications of contamination in the excavation were noted. Soils were screened for the presence of hydrocarbon contamination using visual evidence and field instrumentation.

3. Once visual means and field instrumentation indicated levels of contamination likely to be below cleanup guidelines, samples were collected at the extent of the excavation for laboratory analysis of TPH and BTEX by EPA Method 8015/8020. This was done to verify that contamination above Ecology's cleanup levels had been removed within the vicinity of the remedial excavation. (Note: Duplicate soil samples will be retained by AESI for a minimum of 30 days,)

4. This report was prepared to present our observations, field conditions, results, conclusions, and recommendations.

1.3 SITE LOCATION AND DESCRIPTION

The subject site is located at the southwest corner of the intersection of 4th Avenue South and South Horton Street in Seattle, Washington. A vicinity map is presented as Figure 1. The site was generally flat and all previously existing buildings and vegetation had been removed from the site in preparation for construction activities. A building pad was located on the center of the site.

2.0 FIELD CONDITIONS AND OPERATIONS

On September 28, 1990 a representative of AESI observed the excavation of hydrocarbon-contaminated materials associated with three former USTs on the subject site. Contractors utilized a backhoe to remove TPH-contaminated materials until contamination was no longer indicated by field instrumentation and visual observation. All materials which appeared to be contaminated were placed on visqueen and covered to avoid contamination of the surrounding areas. Removal of the excavated materials will be the responsibility of the client. It is anticipated that the contaminated materials will be transported to Cedar Hills Landfill for proper disposal.

During the removal of the contaminated material, various types of fill materials were encountered including concrete, yard waste, brick, and household refuse as the area was apparently used as a fill area at one time. It did not appear that cans, barrels, or

other containers commonly associated with hazardous materials were present in the fill material.

After the removal of the materials which appeared to be contaminated, the excavation measured approximately 39 feet by 33 feet and extended to a depth of 7 feet in the north end and 9 feet in the south end. Subsurface tidal water was encountered at a depth of 9 feet in the south end of the excavation. The location of the excavation and sample collection points are presented in Figure 2 - Site and Excavation Plan.

Samples were collected at the extent of the excavation for submittal to an analytical laboratory to confirm that no significant quantities of TPH remained. These samples were sealed in laboratory-cleaned jars and placed on ice for shipment to an analytical laboratory. Duplicate samples were collected from each sampling point. One set of samples was submitted for laboratory analyses and the other set will be retained by AESI for a minimum of 30 days in the event that additional analyses are needed. The procedures for sample collection, shipping, and equipment decontamination are described in Appendix A - Methods. Table 2 lists sampling information for each sample obtained from the UST excavation.

TABLE 2
SAMPLING INFORMATION

Sample I.D.	Type	Location	Depth (ft.)
UE-S-8	soil	South sidewall	8
UE-WS-7	soil	West sidewall, south end	7
UE-WC-7	soil	West sidewall, center	7
UE-WN-7	soil	West sidewall, north end	7
UE-FW-7	soil	Floor, west end	7
UE-FC-7	soil	Floor, center	7
UE-N-7	soil	North sidewall	7
UE-GW-9	water	South end, floor	9

3.0 ANALYTICAL RESULTS

Samples collected from the floor and west, north, and south sidewalls of the excavation were selected for laboratory analysis. A sample from the east sidewall was not submitted because contamination was not indicated in samples collected from the UST excavation prior to remedial activities. The three samples collected from the west sidewall were combined in the laboratory to form a single composite sample which represented the entire

sidewall. The samples collected from the floor of the excavation were also composited. All samples were analyzed for TPH (as gasoline) and BTEX by EPA method 8015/8020 to assure that contamination above Ecology's cleanup levels was removed during remedial activities.

Analysis of samples collected from each of the sidewalls and floor did not indicate contamination above Ecology's soil cleanup guidelines for TPH, benzene, toluene, and ethylbenzene. However, analysis of the subsurface tidal water sample indicated TPH levels of 29 ppm; this level falls above Ecology's cleanup guideline of 15 ppm TPH for water.

TABLE 3
SUMMARY OF ANALYTICAL RESULTS AFTER REMEDIAL ACTIVITIES

Sample Location	TPH	Benzene	Toluene	Ethylbenzene	Xylenes
Ecology Cleanup Guidelines (Soil)	200	0.66	145	14	N.E.
Ecology Cleanup Guidelines (Water)	15	0.066	14.5	1.4	N.E.
West Sidewall	39	N.D.	N.D.	N.D.	N.D.
North Sidewall	6.2	N.D.	N.D.	N.D.	N.D.
South Sidewall	74	N.D.	N.D.	N.D.	N.D.
Floor	56	N.D.	N.D.	N.D.	N.D.
Subsurface Tidal Water	29	N.D.	N.D.	N.D.	N.D.

All results given in parts per million.
N.E. - not established
N.D. - not detected

4.0 CONCLUSIONS

Based on the results obtained from the laboratory analyses of the soil samples collected at the extent of the remedial excavation, it is AESI's opinion that the subject site no longer contains "significant quantities" of TPH-contaminated materials within the vicinity of the west, north, and south sidewalls and floor of the

remedial excavation. The term "significant quantities" is defined as contamination levels which are above the current cleanup levels as determined by Ecology and the U.S. Environmental Protection Agency (EPA). However, contamination does exist at levels above Ecology's cleanup guidelines in the subsurface tidal water. If recommended by Ecology, a monitoring well should be installed within the area of the excavation so that further monitoring of subsurface water in the area may be periodically conducted. Although samples collected from the west wall at a depth of 7 feet did not appear to contain elevated levels of TPH, a small vein (approximately 8 inches in width) contamination may still exist along the west wall of the excavation at a depth of approximately 4 feet. It was not possible to fully assess this area during remedial activities due to the placement of the materials removed from the excavation. This potential area of contamination should be removed and sampled if Ecology determines it to be an environmental threat.

5.0 STANDARD OF CARE

The recommendations and conclusions contained in this report represent our professional opinions. These opinions were derived in accordance with currently accepted hydrogeology, engineering, and environmental practiced at this time and location. Other than this, no warranty is implied or intended.

Sincerely,
ASSOCIATED EARTH SCIENCES, INC.

Anastasia E. Duarte

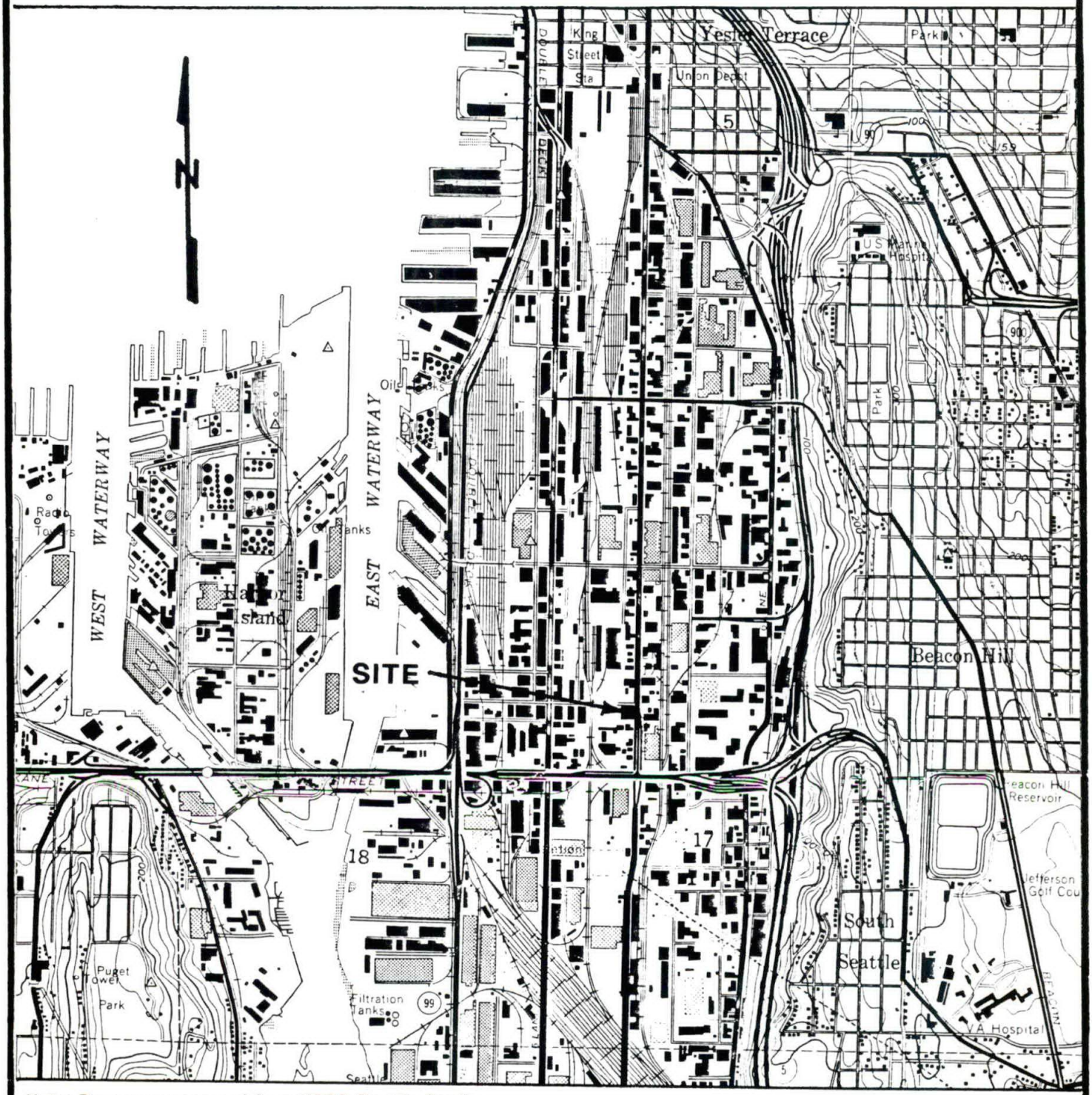
Anastasia E. Duarte
Environmental Toxicologist
Environmental Services Division

Gary A. Flowers

Gary A. Flowers, P.G.
Principal

AED/ad
C003-17V
DK/WP.9/90 ld

VICINITY MAP



Note: Base map prepared from USGS Seattle South, Washington Quadrangle, dated 1973.

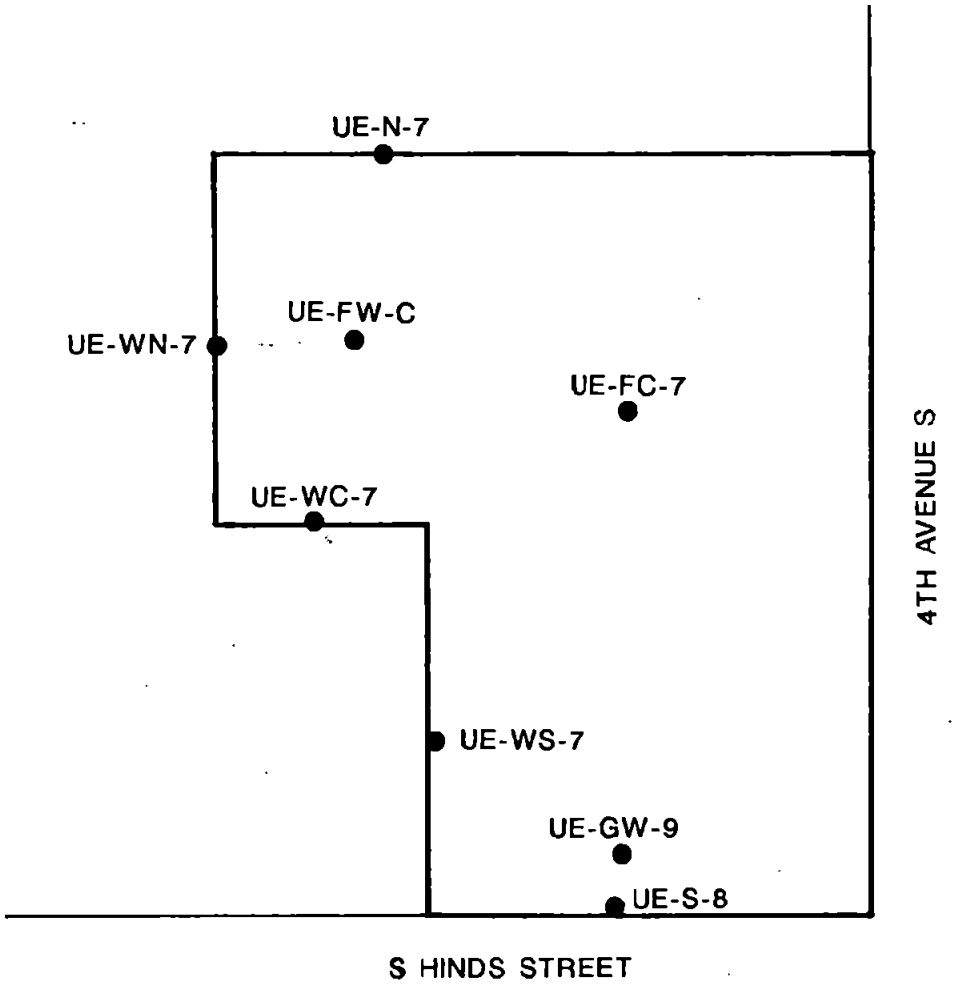
0 2000 4000

Scale in feet

Burger King Restaurant
Seattle, Washington.

ASSOCIATED EARTH SCIENCES, INC

9003-17V	July 1990	Figure 1



LEGEND

UE-N-7 ● **Location of sample**

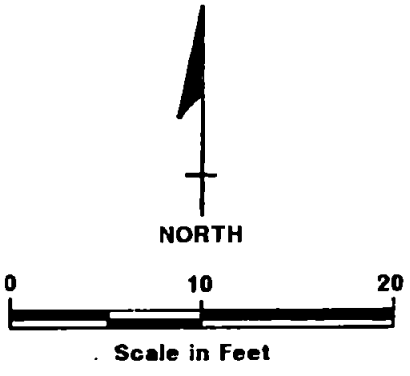


FIGURE 2:
SITE AND EXPLORATION PLAN

Burger King Restaurant
Seattle, Washington

ASSOCIATED EARTH SCIENCES, INC

9003-17V	July 1990	Figure 2

APPENDIX A

APPENDIX A

METHODS

Decontamination

Decontamination is performed as a quality assurance measure and as a safety measure. It prevents cross-contamination between samples and also helps to maintain a clean and safe working environment.

Decontamination is most commonly achieved by rinsing with liquids which include soap and/or detergent solutions, tap water, distilled water, and methanol. Equipment may be allowed to "air dry" after decontamination or wiped dry with chemical-free cloths or paper towels if immediate re-use is necessary. Immersible equipment is normally washed in a soap or detergent solution and triple rinsed with water. In some cases it may also be sprayed with methanol before it is re-used. Non-immersible equipment is usually sprayed with methanol and wiped dry with chemical-free cloths.

At most sites, decontamination will be conducted between each sample collection point. Waste products produced by the decontamination procedures including liquids, rags, gloves, etc. will be collected and disposed of properly based on the nature of their contamination.

Soil Screening for Total Organic Vapors

As samples are collected in the field and placed in laboratory-cleaned jars, a headspace analysis is performed to screen samples in the filed for organic contamination using a Microtip photoionization detector. This instrument is designed to measure organic vapor levels in the range of 0 - 1000 parts per million (ppm). In addition, the Microtip can be used to monitor air quality as part of the site's Health and Safety program. Prior to field use, the Microtip is calibrated with 100 ppm isobutylene. To screen a sample, the probe nozzle is placed in close proximity to the sample, taking care not to contaminate the probe with the sample. The concentration of organic vapors may then be read from the instrument's readout dial.

The Microtip may also be used to monitor organic vapors within boreholes and excavation pits by lowering the probe into the area of interest. The readings may then be recorded on boring logs or exploration pit logs.

NOTE: The Microtip is not capable of measuring actual levels of soil contamination. The Microtip is capable of detecting only those volatile (airborne) organic compounds which easily undergo

photoionization. In many cases the Microtip readings may differ significantly from contaminant levels indicated by analytical analysis. Such differences may result from soil type, contaminant type, temperature effects, humidity effects, or other variations in field conditions.

Chemical Sampling

After screening with the Microtip, samples are selected for shipment to an analytical laboratory. Soil and water samples selected for analysis are packaged so that they will not break, leak, or vaporize. Each sample label includes the following information: project name, project number, field identification number, date, and the analysis required. Cold packs or ice are placed in heavy duty zip-lock type bags and distributed over the tops of the samples for shipping. Additional packing material is also used to protect the samples.

All samples are collected as duplicate samples. In some cases individual subsamples may be combined to form composite samples which may represent an entire boring or exploration pit. Composite samples are used to estimate the existence or nonexistence of contamination in areas which appear to have levels of contamination which fall below cleanup guidelines. This practice minimizes the number of chemical analyses. If elevated levels of contamination are indicated in composite samples, the second subsamples collected at various boring or exploration pit depths may be submitted for analysis individually to estimate the location and concentration of TPH contamination.

Chain of Custody

Upon completion of sample collection, a chain of custody log is initiated. The chain of custody log includes the following information: project, work order number, shipping recipient, sampling point, location, field identification number, date, time of collection, sample type, number of containers, analysis required, and sampler's signature(s).

The chain of custody records accompany the samples to the laboratory. Upon arrival, the samples are checked in and signed over to the appropriate laboratory personnel. A copy of the chain of custody is then turned over the to project manager. Upon completion of the laboratory analysis, the completed chain of custody is returned to the project manager.

APPENDIX B

NORTH CREEK ANALYTICAL

18939 120th Avenue N.E., Suite 101 • Bothell, WA 98011
Phone (206) 481-9200 • FAX (206) 485-2992

Associated Earth Sciences, Inc.	Client Project ID:	9003-17V	Sampled:	Sep 28, 1990
911 5th Avenue, Suite 100	Matrix Descript:	Soil	Received:	Sep 28, 1990
Kirkland, WA 98033	Analysis Method:	EPA 5030/8015/8020	Analyzed:	Sep 28, 1990
Attention: Liam Russell	First Sample #:	009-0637	Reported:	Oct 1, 1990

TOTAL PETROLEUM FUEL HYDROCARBONS with BTEX DISTINCTION (EPA 8015/8020)

Sample Number	Sample Description	Low/Medium B.P. Hydrocarbons mg/kg (ppm)	Benzene mg/kg (ppm)	Toluene mg/kg (ppm)	Ethyl Benzene mg/kg (ppm)	Xylenes mg/kg (ppm)
009-0637	UE-S-6.0	74	N.D.	N.D.	N.D.	N.D.
009-0638	UE-WS-6, UE-WN-7 and UE-WC-7	39	N.D.	N.D.	N.D.	N.D.
009-0639	UE-WF-7 & UE-FC-7	56	N.D.	N.D.	N.D.	N.D.
009-0641	UE-N-7	6.2	N.D.	N.D.	N.D.	N.D.
Detection Limits:		**1.0**	**0.050**	**0.10**	**0.10**	**0.10**

Low to Medium Boiling Point Hydrocarbons are quantitated against a gasoline standard.
Analytes reported as N.D. were not present above the stated limit of detection.

NORTH CREEK ANALYTICAL

Scot Cocanour
Laboratory Director

Please Note:
Sample contamination appears to be due to diesel fuel, the extent of which may be significantly higher than indicated here. EPA 3550/8015 modified for diesel fuel is strongly recommended.

NORTH CREEK ANALYTICAL

18939 120th Avenue N.E., Suite 101 • Bothell, WA 98011
Phone (206) 481-9200 • FAX (206) 485-2992

Associated Earth Sciences, Inc.	Client Project ID:	9003-17V	Sampled:	Sep 28, 1990
911 5th Avenue, Suite 100	Sample Descript.:	Water	Received:	Sep 28, 1990
Kirkland, WA 98033	Analysis Method:	EPA 5030/ 8015/8020	Analyzed:	Oct 1, 1990
Attention: Liam Russell	Lab Number:	009-0640	Reported:	Oct 1, 1990

TOTAL PETROLEUM FUEL HYDROCARBONS WITH BTEX DISTINCTION (EPA 8015/8020)

Analyte	Detection Limit µg/L (ppb)	Sample Results µg/L (ppb)
Low to Medium Boiling Point Hydrocarbons	**200**	**29,000**
Benzene	20	N.D.
Toluene	20	N.D.
Ethyl Benzene	20	N.D.
Xylenes	20	N.D.

Low to Medium Boiling Point Hydrocarbons are quantitated against a gasoline standard.
Analytes reported as N.D. were not present above the stated limit of detection.

NORTH CREEK ANALYTICAL

Scot Cocanour
Laboratory Director

Please Note:
Sample contamination appears to be due to diesel fuel, the extent of which may be significantly higher than indicated here. EPA 3510/8015 modified for diesel fuel is strongly recommended.

ASSOCIATED EARTH SCIENCES, INC.
903 5th Avenue
KIRKLAND, WASHINGTON 98033

(206) 827-7701

Memo
LETTER

RECEIVED
OCT 11 1990
DEPT. OF ECOLOGY

To Joe Hickey
4350 - 150th Ave NE
Redmond, WA 98052

Date Oct. 10, 1990

Subject Burger King Site - Seattle

Dear Mr. Hickey -

Enclosed is a report for our remedial efforts at the Burger King Site in Seattle. I hope that you find it satisfactory. If you have any questions, please call our office.

Sincerely,
Anne Duarte
SIGNED

☐ Please reply ☐ No reply necessary

ASSOCIATED EARTH SCIENCES, INC

October 9, 1990
Project No. 9003-17V

Mr. Dave Lively
14035 Southeast 181st Street
Seattle, Washington 98056

Subject: Remediation of Petroleum Release
Proposed Burger King Site
4th Avenue South and South Horton Street
Seattle, Washington

Enclosed are three copies of the report describing the remedial activities performed at the proposed Burger King site at the above noted location in Seattle, Washington. Based on laboratory results collected from the extent of the remedial excavation, it appears that contamination is no longer present in the vicinity of the south, east, and north sidewalls and floor of the excavation. Although analysis of the sample collected from the west side wall did not indicate the presence of elevated levels of contamination, a small vein of potential contamination which could not be entirely excavated during remedial activities may be present at a depth of four feet. In addition, subsurface tidal water was found to contain petroleum hydrocarbon levels of 29 parts per million; this level is above Ecology's cleanup guidelines of 15 parts per million for water.

It has been a pleasure to have served you during this project. If you have any questions regarding the content of this report or should require additional information, please feel free to contact our office.

Thank you for the opportunity to be of service to you.

Sincerely,
ASSOCIATED EARTH SCIENCES, INC.

Anastasia E. Duarte

Anastasia E. Duarte
Environmental Toxicologist
Environmental Services Division

cc: Joe Hickey, Department of Ecology

AED/ad
C003-17V
DK/WP.9/90 ld