REPORT
BUILDING 7-48-09 SOIL SAMPLING
KENT BENAROYA
KENT, WASHINGTON

November 19, 1991

Prepared for:

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Boeing Commercial Airplane Group
Renton Division
Environmental Engineering
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Project Manager

GROUNDWATER TECHNOLOGY

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EXECUTIVE SUMMARY

This report presents the results of the soil sampling activities conducted for a trenching project near building 7-48-09 at the Boeing Kent Benaroya facility. The soil sampling was performed to investigate the near surface soils for possible contaminants.

Four soil piles were initially generated from a trenching project for an eye-wash station in building 7-48-09 and for a stormwater/hazardous waste spill prevention trench. These piles were sampled on August 29, 1991 and analyzed for total petroleum hydrocarbons (TPH), volatile organics, and TCLP metals. Concentrations of TPH were detected in the piles ranging from 6 to 230 parts per million (mg/kg). Volatile organic and metal concentrations were all below the state action levels set forth in the Model Toxics Control Act.

On September 20, 1991 four soil borings were hand-augered in the approximate location where the soil pile containing 230 ppm TPH was generated. The four samples from the borings were composited into one sample at the laboratory and analyzed for TPH, volatile organics and TCLP metals. All contaminant concentrations in the sample were below state action levels. During construction activities at the site, the four soil piles were inadvertently combined into a single pile.

On November 4, 1991 the single soil pile comprised of the four original piles was sampled for landfill disposition characterization parameters. The samples were analyzed for polychlorinated biphenyls (PCB's), TCLP semi-volatile organics, TCLP pesticides, corrosivity, flashpoint, and reactivity. All contaminant concentrations detected were below state action levels.

REPORT
BUILDING 7-48-09 SOIL SAMPLING
KENT BENAROYA
KENT, WASHINGTON

1.0 INTRODUCTION

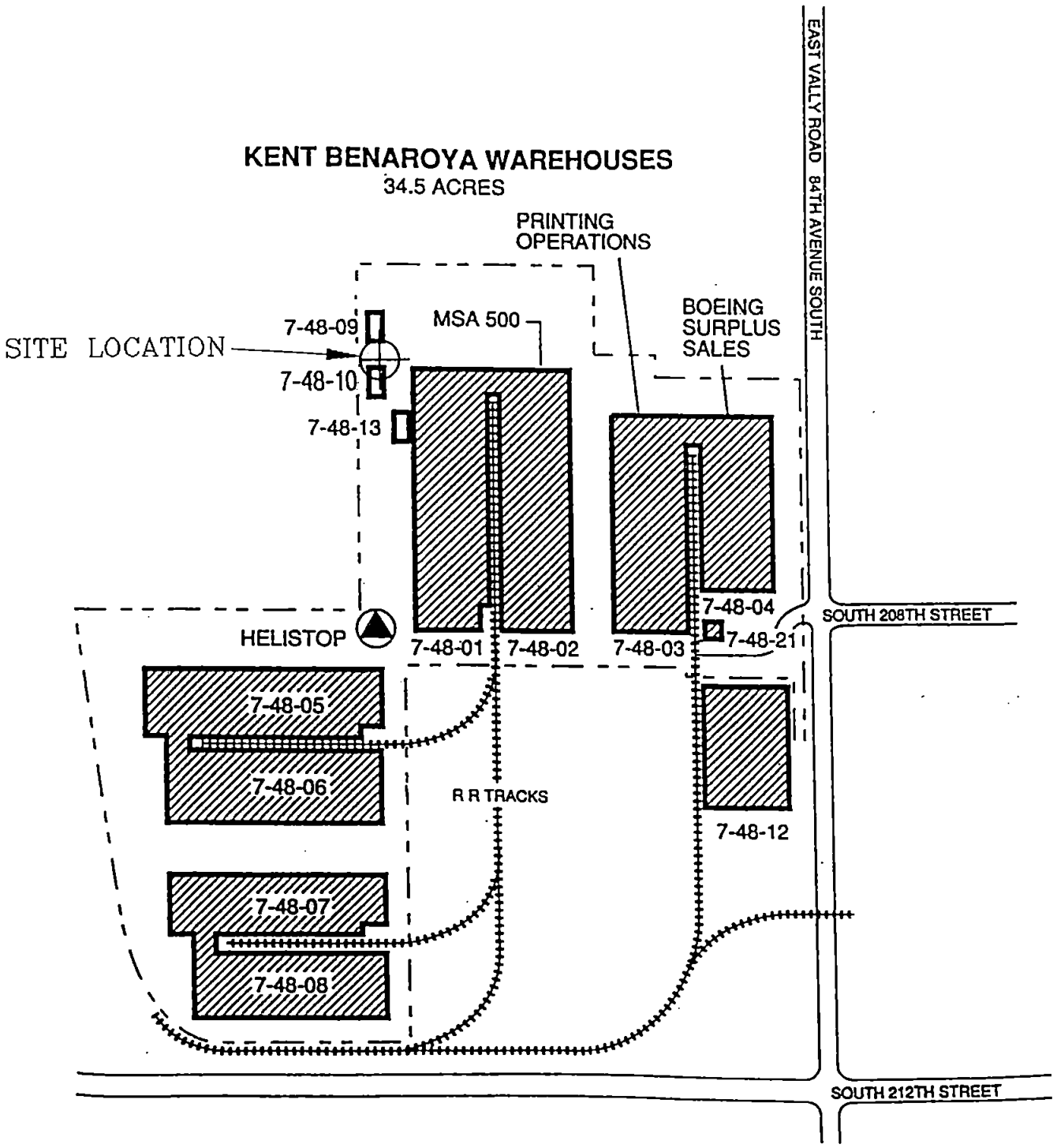
This report presents the results of the soil sampling activities conducted by Groundwater Technology, Inc. for a trenching project near building 7-48-09 at the Boeing Kent Benaroya facility. The site is located between buildings 7-48-09 and 7-48-10 (Figure 1, Site Location Map). The soil sampling activities were authorized by the Boeing Commercial Airplane Group (BCAG) Renton Division in order to investigate for the presence of chemically impacted soil.

The trenching project at the site was conducted to provide plumbing to building 7-48-09 for an eye-wash station and for a stormwater/hazardous waste spill prevention trench (Figure 2, Site Plan).

2.0 WORK PERFORMED

Groundwater Technology was initially retained to sample four soil piles for analyses of possible contaminants. The results of this initial round of sampling found one of the piles to contain a TPH concentration in excess of the state action level (200 ppm) as established in the Model Toxics Control Act (MTCA). Further investigation was therefore performed in the source area for this soil pile. Additional sampling and analyses were performed for landfill soil disposition characterization.

A detailed discussion of the services performed and results of the analyses conducted are presented in the following sections of this report.



0 500 FT
SCALE

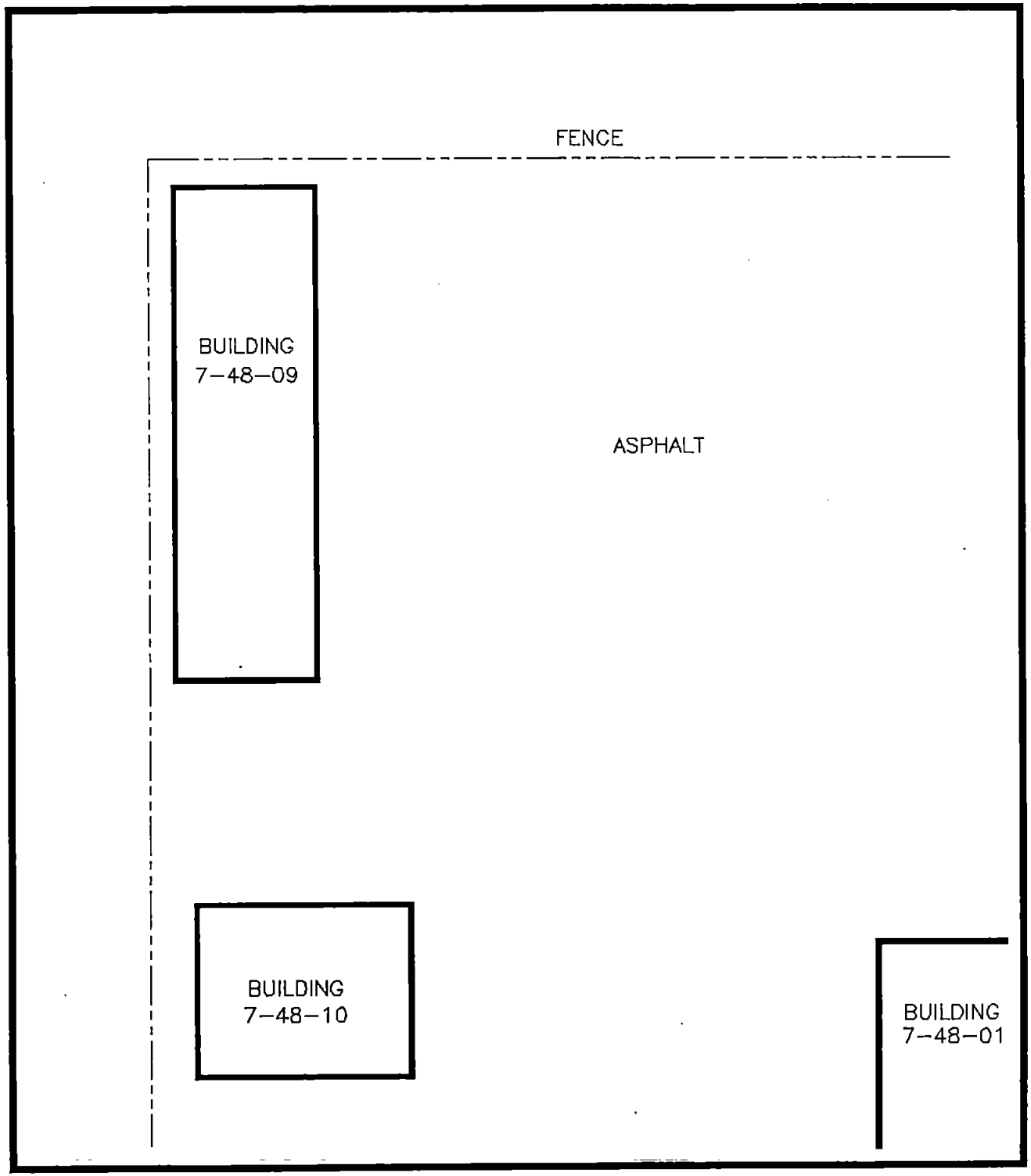
N

BOEING OCCUPIED AREAS ARE SHADED

SITE: BOEING COMMERCIAL AIRPLANE GROUP KENT, WASHINGTON			JOB # 201-799-5022.03
SITE LOC.: KENT – BENAROYA BUILDING 7-48-10			DWG NAME FIGURE1
MAP TYPE: SITE LOCATION MAP			
DRAWN BY	DATE 01/10/91	APPROVED BY	DATE

FIGURE 1

GROUNDWATER TECHNOLOGY, INC.



LEGEND

N

0 40'

APPROX. SCALE

SITE: BOEING COMMERCIAL AIRPLANE GROUP KENT, WASHINGTON			JOB # 020601767
SITE LOC.: BUILDING 7-48-09 KENT BENAROYA			
MAP TYPE: SITE PLAN			
DRAWN BY KWH	DATE 11/19/91	APPROVED BY	DATE

REV	REVISION	DATE	BY
A			

FILENAME: KBSP

FIGURE 2

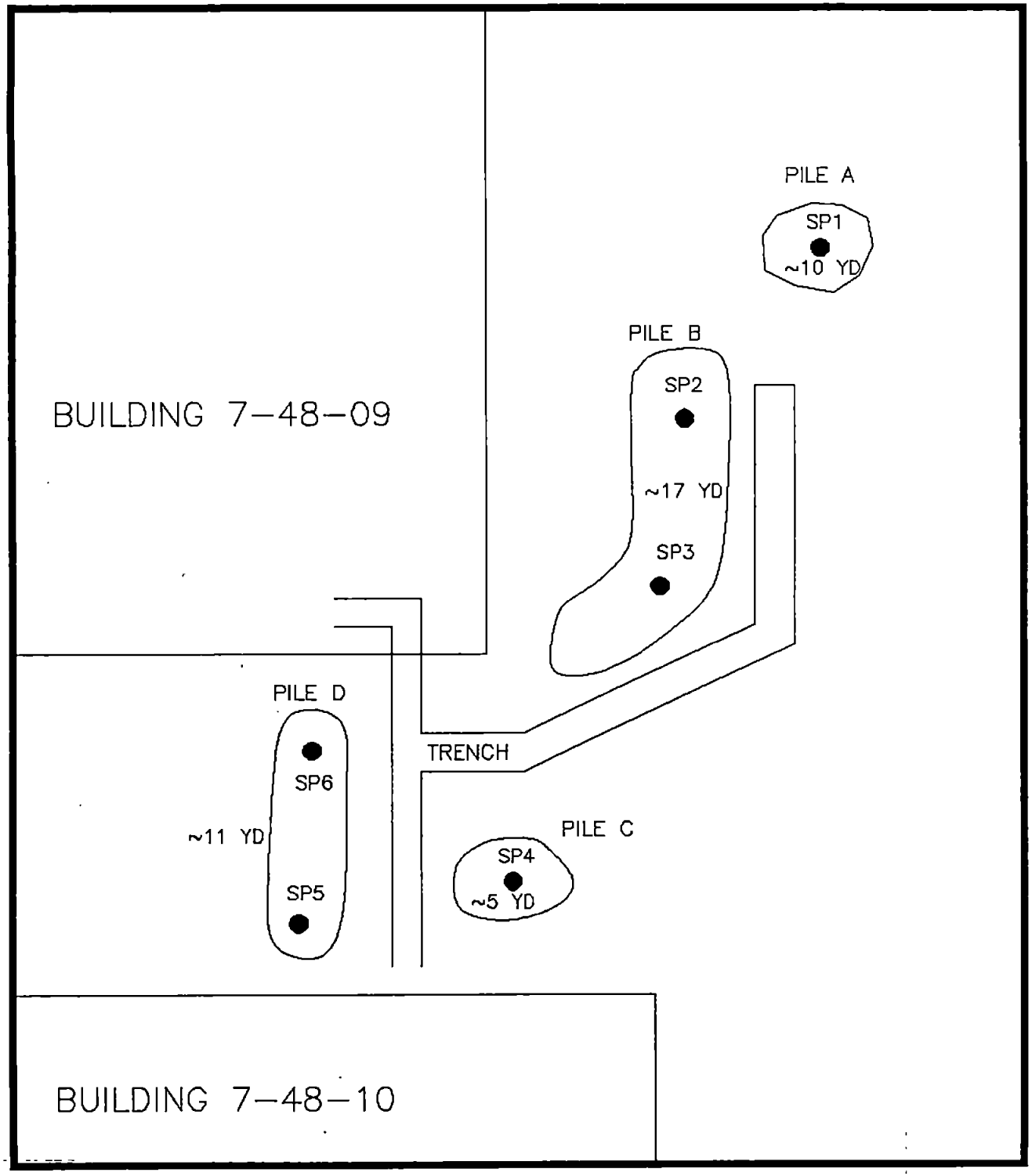
GROUNDWATER TECHNOLOGY

3.0 SOIL SAMPLING AND ANALYSES

August 29, 1991

On August 29, 1991, Groundwater Technology personnel sampled four soil piles (A, B, C, and D) generated during trenching at the site. The estimated volumes for the piles were 10, 17, 5 and 11 cubic yards for piles A, B, C, and D, respectively. A total of six samples (SP1 through SP6) were obtained at the locations shown on Figure 3, Sample Location Map (8/29/91). Each sample was collected in a brass tube, capped, sealed, and labeled. The samples were then placed on ice in an insulated cooler for delivery to GTEL Environmental Laboratories for analyses of TPH by Environmental Protection Agency (EPA) Method 418.1, volatile organics by EPA Method 8240 and TCLP metals by EPA 6000/7000 series methods. The two samples from pile "B" (SP2 and SP3) and two samples from pile "D" (SP5 and SP6) were composited at the laboratory prior to analysis. As per Boeing's request, the analyses were performed on expedited turnaround. A chain-of-custody accompanied the samples at all times.

The laboratory report for the analyses performed is included in Appendix A. A summary of the laboratory results for the August 29, 1991 sampling is shown in Table 1. The results of the analyses found TPH concentrations ranging from 6 ppm to 230 ppm. Sample SP4 obtained from soil pile "C" was found to contain a TPH concentration of 230 ppm and was the only sample with a TPH concentration above the state action level of 200 ppm. No volatile organic concentrations above the laboratory detection limits were found. No TCLP metals concentrations were found above state action levels.



LEGEND

N

0 15'

APPROX. SCALE

● Approximate Soil Sample Location & Identification

SITE: BOEING COMMERCIAL AIRPLANE GROUP KENT, WASHINGTON			JOB # 020601767
SITE LOC.: KENT-BENAROYA BUILDING 7-48-09			
MAP TYPE: SAMPLE LOCATION MAP (8/29/91)			
DRAWN BY KWH	DATE 09/06/91	APPROVED BY	DATE

REV	REVISION	DATE	BY
A			

FILENAME: KB

FIGURE 3

GROUNDWATER TECHNOLOGY

TABLE 1 PILES A, B, C, AND D SOIL ANALYSES RESULTS 8/29/91 (in parts per million)				
CONSTITUENT	SP1	SP2-3	SP4	SP5-6
Volatile Organics	ND	ND	ND	ND
TPH	6	21	230	42
Arsenic	<0.1	<0.1	<0.1	<0.1
Barium	0.21	0.28	0.32	0.20
Cadmium	<0.1	<0.1	<0.1	<0.1
Chromium	<0.1	<0.1	<0.1	<0.1
Copper	<0.15	<0.1	<0.1	<0.1
Lead	<0.15	<0.15	<0.15	<0.15
Mercury	<0.002	0.002	<0.002	<0.002
Nickel	<0.1	<0.1	<0.1	<0.1
Selenium	<0.5	<0.5	<0.5	<0.5
Silver	<0.25	<0.25	<0.25	<0.25
Zinc	0.39	0.15	0.15	0.19

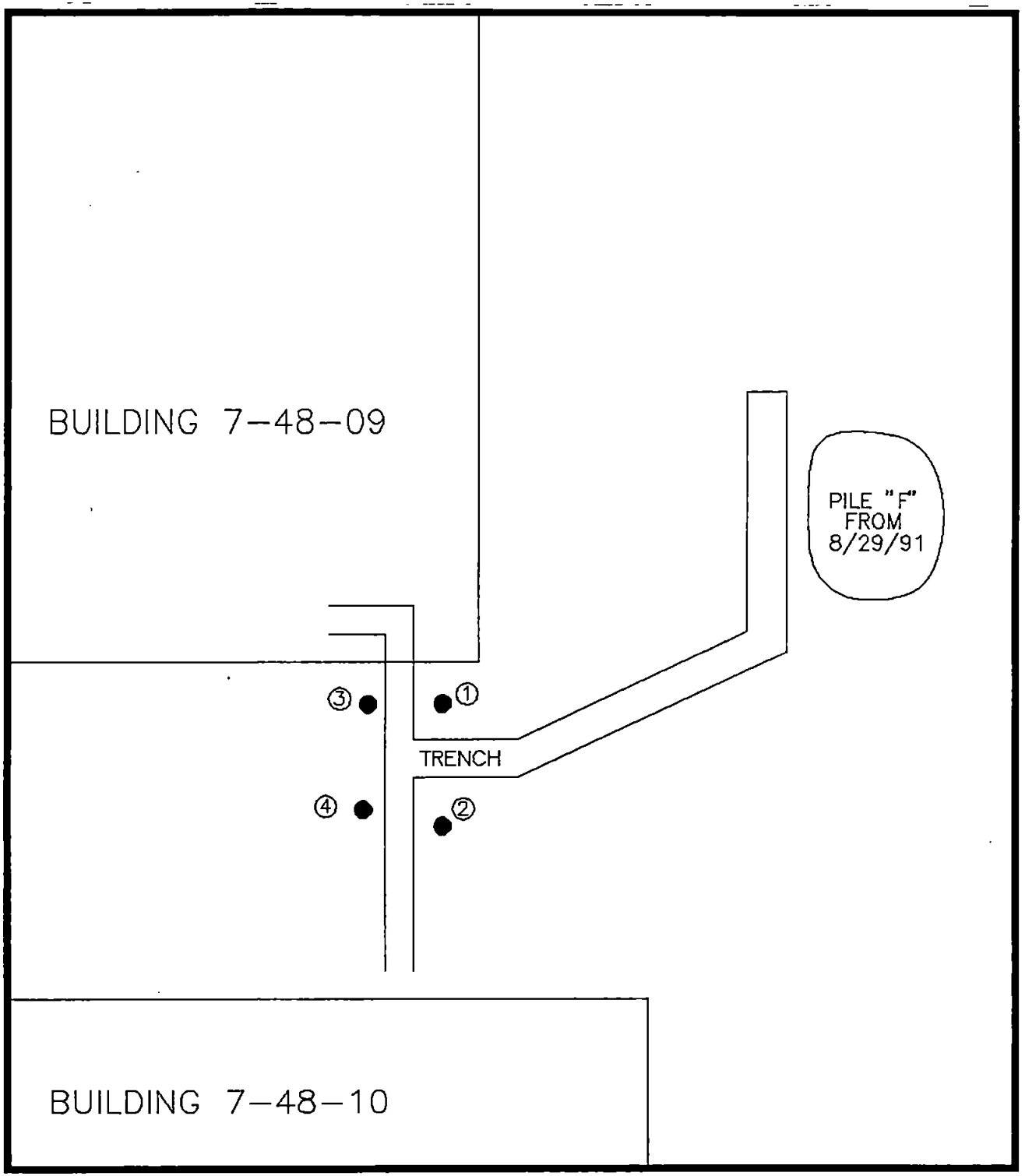
ND = Non-Detectable

September 20, 1991

Based on analyses from samples taken on August 29, 1991, Groundwater Technology was asked to perform additional investigation at one particular area adjacent to the trenching project. This area was the approximate location where the soil from pile "C" was excavated. On September 20, 1991 Groundwater Technology personnel met Boeing officials on site to discuss sampling activities. Four grab samples (1,2,3, and 4) of the native soils were collected at depths of approximately 1.5 feet below grade from four hand auger borings at the west end of the trench. The boring locations are shown on Figure 4, Sample Location Map (9/20/91).

The four grab samples were sent to GTEL Environmental Laboratories and analyzed on an expedited 72-hour turnaround basis. As requested by Boeing, the samples were composited into a single sample at the laboratory and analyzed for TPH (EPA Method 418.1), volatile organics (EPA Method 8240), and TCLP metals (EPA 6000/7000 series methods). Each sample was screened in the field for the presence of volatile organics with a photo-ionization detector (PID). All PID readings were <5 ppm.

The results of the laboratory analyses indicated a TPH concentration of 51 ppm in the composite sample. No volatile organic concentrations above the laboratory detection limits were found. No metals concentrations were found above state and federal action levels. The laboratory report for the analyses performed is presented in Appendix B. A summary of the laboratory results is shown in Table 2.



LEGEND

N

0 15'

APPROX. SCALE

● Approximate Soil Sample Location & Identification

SITE: BOEING COMMERCIAL AIRPLANE GROUP KENT, WA			JOB # 020601767
SITE LOC.: KENT-BENAROYA BUILDING 7-48-09			
MAP TYPE: SAMPLE LOCATION MAP (9/20/91)			
DRAWN BY KWH	DATE 09/27/91	APPROVED BY	DATE

REV	REVISION	DATE	BY
A			

FILENAME: KB4

FIGURE 4

GROUNDWATER TECHNOLOGY

TABLE 2 SOIL BORING ANALYSES RESULTS 9/20/91 (in parts per million)	
Constituent	Composite 1, 2, 3, 4
Volatile Organics	ND
TPH	51
Arsenic	ND
Barium	0.33
Cadmium	ND
Chromium	ND
Copper	ND
Lead	ND
Mercury	ND
Nickel	ND
Selenium	ND
Silver	ND
Zinc	0.29

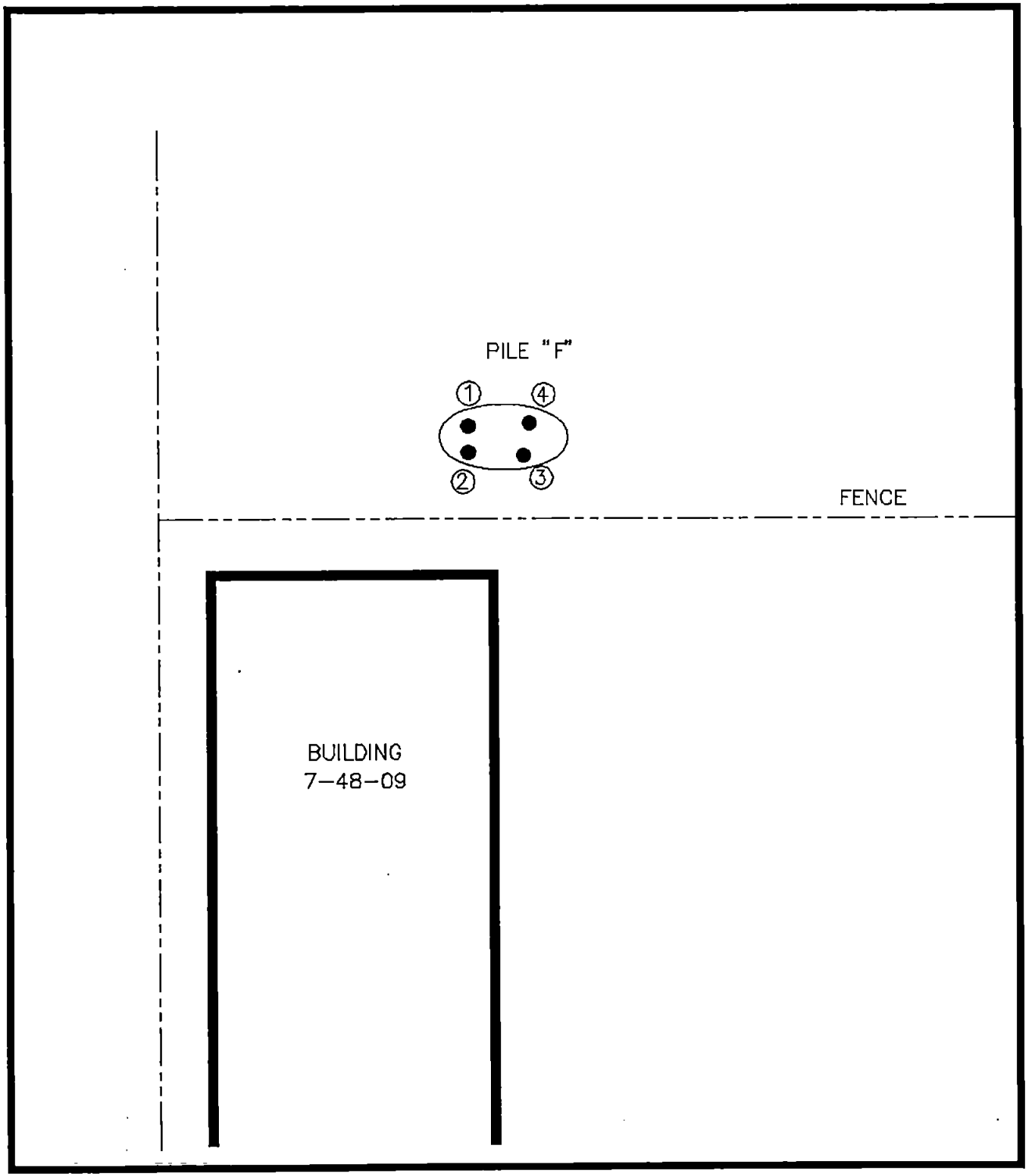
ND = Non-detectable

November 4, 1991

During construction activities, previously sampled piles (A,B,C, and D) were inadvertently combined into one pile (pile F) to the east of the trenching activities prior to Groundwater Technology's site visit on September 20, 1991. This pile was subsequently moved to the north side of Building 7-48-09. Total volume of the pile was estimated to be between 40 and 45 cubic yards.

On November 4, 1991 Groundwater Technology was asked to sample and arrange soil disposition analyses for the soil pile. The pile was divided up into four quadrants and a sample was taken from each quadrant as shown on Figure 5, Sample Location Map (11/4/91). Samples were sent to GTEL Environmental Laboratories for analyses on a standard turnaround basis (two weeks). The samples were composited at the laboratory and analyzed for PCB's (EPA method 8080), corrosivity, flashpoint, reactivity, TCLP semi-volatiles, and TCLP pesticides.

The laboratory reports for the analyses performed are included in Appendix C. A summary of the results is presented in Table 3. The analyses detected PCB concentrations of 0.10 ppm, pH = 7.7, no flash at temperatures < 160°F, cyanide reactivity of < 1mg HCN/kg, and sulfide reactivity of < 1mg H_2S/kg. All TCLP analyses concentrations were below laboratory detection limits. All analyses indicated results below state action levels.



LEGEND

N

0 20'

APPROX. SCALE

● SAMPLE LOCATION & IDENTIFICATION

SITE: BOEING COMMERCIAL AIRPLANE GROUP KENT, WASHINGTON			JOB # 020601767
SITE LOC.: BUILDING 7-48-09 KENT BENAROYA			
MAP TYPE: SAMPLE LOCATION MAP (11/4/91)			
DRAWN BY KWH	DATE 11/19/91	APPROVED BY	DATE

REV	REVISION	DATE	BY
A			

FILENAME: KB5

FIGURE 5

GROUNDWATER TECHNOLOGY

TABLE 3 PILE "F" SOIL ANALYSES RESULTS (11/4/91) (in parts per million unless otherwise noted)	
Analytes	Composite F1-4
PCB	0.10
TCLP Semi-volatiles	ND
TCLP Pesticides	ND
Corrosivity	pH = 7.7
Flashpoint	NF @<160°F
Cyanide Reactivity	<1mg HCN/kg
Sulfide Reactivity	<1mg H_2S/kg

ND = Non-detectable
NF @< = No flash at temperature less then 160°F

4.0 SOIL DISPOSAL

In summary, the only contaminant concentrations above the state action levels set forth in MTCA were found in the soil sample obtained from the relatively small soil pile "C" (approximately 5 cubic yards) on August 29, 1991. Based on the soil disposition characterization analyses, pile "F" was not found to contain any contaminant concentrations requiring the material to be handled as a hazardous material. However, it should be noted that soil pile "C", with a TPH concentration of 230 ppm, was inadvertently mixed into pile "F". Table 4 summarizes all the analyses performed on soil relating to pile "F".

5.0 CONCLUSIONS

Soil sampling and analyses detected TPH concentrations of 230 ppm, which is above the TPH cleanup action level (200 ppm). This pile was comprised of approximately 5 cubic yards of soil excavated from the west side of a plumbing trench for an eye-wash station in building 7-48-09. Additional investigation of this area was performed by taking four hand-augered soil borings in the area. The samples were composited at the laboratory and detected a TPH concentration of 51 ppm. All other samples found no constituents of concern above cleanup action levels

TABLE 4
SUMMARY OF LABORATORY RESULTS
(reported in parts per million unless otherwise noted)

Date Sampled	8/29/91				9/20/91	11/4/91
Pile Identification	Pile A	Pile B	Pile C	Pile D	Borings	Pile F
Analytes	SP-1	SP2-3	SP4	SP5-6	1-4	F1-4
Volatile Organics	ND	ND	ND	ND	ND	NA
TPH	6	21	230	42	51	NA
Arsenic	ND	ND	ND	ND	ND	NA
Barium	0.21	0.28	0.32	0.20	0.33	NA
Cadmium	ND	ND	ND	ND	ND	NA
Chromium	ND	ND	ND	ND	ND	NA
Copper	ND	ND	ND	ND	ND	NA
Lead	ND	ND	ND	ND	ND	NA
Mercury	ND	0.002	ND	ND	ND	NA
Nickel	ND	ND	ND	ND	ND	NA
Selenium	ND	ND	ND	ND	ND	NA
Silver	ND	ND	ND	ND	ND	NA
Zinc	0.39	0.15	0.15	0.19	0.29	NA
PCB-1260	NA	NA	NA	NA	NA	0.10
TCLP Semi-volatiles	NA	NA	NA	NA	NA	ND
TCLP Pesticides	NA	NA	NA	NA	NA	ND
Corrosivity	NA	NA	NA	NA	NA	pH=7.7
Flashpoint	NA	NA	NA	NA	NA	NF@<160°F
Cyanide Reactivity	NA	NA	NA	NA	NA	<1mg HCN/kg
Sulfide Reactivity	NA	NA	NA	NA	NA	<1mg H_2S/kg

NA = Not Analyzed
ND = Non-Detectable
TCLP = Toxicity Characteristics Leachate Procedure
PCB = Polychlorinated Biphenyls
TPH = Total Petroleum Hydrocarbons
NF @< = No flash at temperature less than 160°F

APPENDIX A
LABORATORY REPORTS (8/29/91)

GTEL
ENVIRONMENTAL
LABORATORIES, INC.

Northwest Region
4080-C Pike Lane
Concord, CA 94520
(415) 685-7852
(800) 544-3422 *from inside California*
(800) 423-7143 *from outside California*
(415) 825-0720 (FAX)

RECEIVED SEP 18 1991

Client Number: 020601767
Project ID: Kent, Benaroya
Work Order Number: C1-08-949

September 12, 1991

Lynn Pera
Groundwater Technology, Inc.
19033 West Valley Hwy., D-104
Kent, WA 98032

Enclosed please find the analytical results for samples received by GTEL Environmental Laboratories, Inc. on 08/30/91, under chain of custody record 72-12474.

A formal Quality Control/Quality Assurance (QA/QC) program is maintained by GTEL, which is designed to meet or exceed the EPA requirements. Analytical work for this project met QA/QC criteria, unless otherwise stated in the footnotes.

GTEL is certified by the California State Department of Health Services to perform analyses for drinking water, wastewater, and hazardous waste materials according to EPA protocols.

If you have any questions concerning this analysis or if we can be of further assistance, please call our Customer Service Representative.

Sincerely,
GTEL Environmental Laboratories, Inc.

Emma P. Popek/R.M.

Emma P. Popek
Laboratory Director

Client Number: 020601767
Project ID: Kent, Benaroya
Work Order Number: C1-08-949

Table 1

ANALYTICAL RESULTS

Total Petroleum Hydrocarbons in Soil by Infrared Spectrometry

APHA Method 5520CF[a]

a. Standard Methods for the Examination of Water and Wastewater, 17th ed., American Public Health Association, 1989. Results reported on a wet weight basis.

GTEL Sample Number		01	02	03	04
Client Identification		SP1	SP2-3	SP4	SP5-6
Date Sampled		08/29/91	08/29/91	08/29/91	08/29/91
Date Prepared		09/04/91	09/04/91	09/04/91	09/04/91
Date Analyzed		09/06/91	09/06/91	09/06/91	09/06/91
Analyte	Quantitation Limit, mg/Kg	Concentration, mg/Kg			
Total Petroleum Hydrocarbons	5	6	21	230	42
Quantitation Limit Multiplier		1	1	1	1
Percent solids		94	89	92	87

GTEL ENVIRONMENTAL LABORATORIES, INC.

GTEL
ENVIRONMENTAL
LABORATORIES, INC.

Northwest Region
4080-C Pike Lane
Concord, CA 94520
(415) 685-7852
(800) 544-3422 *from inside California*
(800) 423-7143 *from outside California*
(415) 825-0720 (FAX)

Client Number: 020601767
Project ID: Kent, Benaroya
Work Order Number: C1-08-950

September 12, 1991

Lynn Pera
Groundwater Technology, Inc.
19033 West Valley Hwy., D-104
Kent, WA 98032

Enclosed please find the analytical results for samples received by GTEL Environmental Laboratories, Inc. on 08/30/91, under chain of custody record 72-12474.

A formal Quality Control/Quality Assurance (QA/QC) program is maintained by GTEL, which is designed to meet or exceed the EPA requirements. Analytical work for this project met QA/QC criteria, unless otherwise stated in the footnotes.

GTEL is certified by the California State Department of Health Services to perform analyses for drinking water, wastewater, and hazardous waste materials according to EPA protocols.

If you have any questions concerning this analysis or if we can be of further assistance, please call our Customer Service Representative.

Sincerely,
GTEL Environmental Laboratories, Inc.

Emma P. Popek / R.M.

Emma P. Popek
Laboratory Director

Table 1

ANALYTICAL RESULTS

Volatile Organics in Soil

EPA Method 8240[a]

GTEL Sample Number		01	02	03	04
Client Identification		SP1	SP2-3	SP4	SP5-6
Date Sampled		08/29/91	08/29/91	08/29/91	08/29/91
Date Extracted		09/04/91	09/04/91	09/04/91	09/04/91
Date Analyzed		09/04/91	09/04/91	09/04/91	09/04/91
Analyte	Quantitation Limit, ug/Kg	Concentration, ug/Kg			
Chloromethane	10	<10	<10	<10	<10
Bromomethane	10	<10	<10	<10	<10
Vinyl chloride	10	<10	<10	<10	<10
Chloroethane	10	<10	<10	<10	<10
Methylene chloride	5	<5	<5	<5	<5
Acetone	100	<100	<100	<100	<100
Carbon disulfide	5	<5	<5	<5	<5
1,1-Dichloroethene	5	<5	<5	<5	<5
1,1-Dichloroethane	5	<5	<5	<5	<5
1,2-Dichloroethene, total	5	<5	<5	<5	<5
Chloroform	5	<5	<5	<5	<5
1,2-Dichloroethane	5	<5	<5	<5	<5
2-Butanone	100	<100	<100	<100	<100
1,1,1-Trichloroethane	5	<5	<5	<5	<5
Carbon tetrachloride	5	<5	<5	<5	<5
Vinyl acetate	50	<50	<50	<50	<50
Bromodichloromethane	5	<5	<5	<5	<5
1,2-Dichloropropane	5	<5	<5	<5	<5
cis-1,3-Dichloropropene	5	<5	<5	<5	<5
Trichloroethene	5	<5	<5	<5	<5
Dibromochloromethane	5	<5	<5	<5	<5

a. Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986 (method modified for additional compounds). Results reported on a dry weight basis.

Table 1 (Continued)

ANALYTICAL RESULTS

Volatile Organics in Soil

EPA Method 8240[a]

GTEL Sample Number		01	02	03	04
Client Identification		SP1	SP2-3	SP4	SP5-6
Date Sampled		08/29/91	08/29/91	08/29/91	08/29/91
Date Extracted		09/04/91	09/04/91	09/04/91	09/04/91
Date Analyzed		09/04/91	09/04/91	09/04/91	09/04/91
Analyte	Quantitation Limit, ug/Kg	Concentration, ug/Kg			
1,1,2-Trichloroethane	5	<5	<5	<5	<5
Benzene	5	<5	<5	<5	<5
trans-1,3-Dichloropropene	5	<5	<5	<5	<5
2-Chloroethylvinyl ether	10	<10	<10	<10	<10
Bromoform	5	<5	<5	<5	<5
4-Methyl-2-pentanone	50	<50	<50	<50	<50
2-Hexanone	50	<50	<50	<50	<50
Tetrachloroethene	5	<5	<5	<5	<5
1,1,2,2-Tetrachloroethane	5	<5	<5	<5	<5
Toluene	5	<5	<5	<5	<5
Chlorobenzene	5	<5	<5	<5	<5
Ethylbenzene	5	<5	<5	<5	<5
Styrene	5	<5	<5	<5	<5
1,2-Dichlorobenzene	5	<5	<5	<5	<5
1,3-Dichlorobenzene	5	<5	<5	<5	<5
1,4-Dichlorobenzene	5	<5	<5	<5	<5
Xylene, total	5	<5	<5	<5	<5
Trichlorofluoromethane	5	<5	<5	<5	<5
Quantitation Limit Multiplier		1	1	1	1
Percent solids		94	87	91	86

a. Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986 (method modified for additional compounds). Results reported on a dry weight basis.

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LABORATORIES, INC.

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(415) 825-0720 (FAX)

Client Number: 020601767
Project ID: Kent, Benaroya
Work Order Number: C1-08-951

September 12, 1991

Lynn Pera
Groundwater Technology, Inc.
19033 West Valley Hwy., D-104
Kent, WA 98032

Enclosed please find the analytical results report prepared by GTEL for samples received on 08/30/91, under chain of custody number 72-12474.

GTEL is certified by the California State Department of Health Services to perform analyses for drinking water, wastewater, and hazardous waste materials according to EPA protocols.

A formal quality control/quality assurance program is maintained by GTEL, which is designed to meet or exceed the EPA requirements. Analytical work for this project was performed in strict adherence to our QA/QC program to ensure sample integrity and to meet quality control criteria.

If you have any questions concerning this analysis or if we can be of further assistance, please call our Customer Service Representative.

Sincerely,
GTEL Environmental Laboratories, Inc.

Emma P. Popek/RM

Emma P. Popek
Laboratory Director

Table 1

ANALYTICAL RESULTS

Metals in TCLP Leachate[a]

GTEL Sample Number			01	02	03	04
Client Identification			SP1	SP2-3	SP4	SP5-6
Date Sampled			08/29/91	08/29/91	08/29/91	08/29/91
Date Leached			09/03/91	09/03/91	09/03/91	09/03/91
Date Analyzed (Method 6010)			09/06/91	09/06/91	09/06/91	09/06/91
Date Analyzed (Method 7470)			09/05/91	09/05/91	09/05/91	09/05/91
Analyte	Method[b]	Quantitation Limit, mg/L	Leachate Concentration, mg/L			
Arsenic	EPA 6010	0.1	<0.1	<0.1	<0.1	<0.1
Barium	EPA 6010	0.01	0.21	0.28	0.32	0.20
Cadmium	EPA 6010	0.1	<0.1	<0.1	<0.1	<0.1
Chromium, total	EPA 6010	0.1	<0.1	<0.1	<0.1	<0.1
Copper	EPA 6010	0.1	0.15	<0.1	<0.1	<0.1
Lead	EPA 6010	0.15	<0.15	<0.15	<0.15	<0.15
Mercury	EPA 7470	0.002	<0.002	<0.002	<0.002	<0.002
Nickel	EPA 6010	0.1	<0.1	<0.1	<0.1	<0.1
Selenium	EPA 6010	0.5	<0.5	<0.5	<0.5	<0.5
Silver	EPA 6010	0.25	<0.25	<0.25	<0.25	<0.25
Zinc	EPA 6010	0.1	0.39	0.15	0.15	0.19
Quantitation Limit Multiplier			1	1	1	1

a. Federal Register, June 29, 1990, 40 CFR, Part 261, Appendix II - Method 1311. These data are corrected for analytical bias as required by Method 1311 by applying a correction determined by matrix spike recovery.

b. Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986. Digestion by Method 3005 except for: Method 7470 for mercury.

GTEL ENVIRONMENTAL LABORATORIES, INC.

4080- Pike Lane
Concord, CA 94520
415-685-7852

800-544-3422 (In CA)
800-423-7143 (Outside CA)

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST 72- 12474

C108949

A-3

Project Manager: Lynn Pera

Phone #: (206) 251-5441

FAX #: (206) 251-8452

Address: 19033 W. Valley Hwy HD-104 Kent, WA 98032

Site location: Kent-Benaroya

Project Number: [illegible]

Project Name: Boeing/Kent-Benaroya

I attest that the proper field sampling procedures were used during the collection of these samples.

Sampler Name (Print): J. Josey

ANALYSIS REQUEST

Analysis columns: BTEX 602 ☐ 8020 ☐ with MTBE ☐; BTEX/TPH Gas 602/8015 ☐ 8020/8015 ☐ MTBE ☐; TPH as ☐ Gas ☐ Diesel ☐ Jet Fuel; Product I.D. by GC (SIMDIS) ☐; Total Oil & Grease: 413.1 ☐ 413.2 ☐ 503A ☐; Total Petroleum Hydrocarbons: 418.1 ☒ 503E ☐; EPA 601 ☐ 8010 ☐ DCA only ☐; EPA 602 ☐ 8020 ☐; EPA 608 ☐ 8080 ☐ PCBs only ☐; EPA 610 ☐ 8310 ☐; EPA 624 ☐ 8240 ☒ NBS +15 ☐; EPA 625 ☐ 8270 ☐ NBS +25 ☐; EPTOX: Metals ☐ Pesticides ☐ Herbicides ☐; TCLP Metals ☒ VOA ☐ Semi VOA ☐; EPA Priority Pollutant Metals ☐ HSL ☐; LEAD 7420 ☐ 7421 ☐ 239.2 ☐ 6010 ☐ Org. Lead ☐; CAM Metals ☐ STLC ☐ TTLC; Corrosivity ☐ Flashpoint ☐ Reactivity ☐

Field Sample ID	Source of Sample	GTEL Lab # (Lab use only)	# Containers	Matrix	Method Preserved	Sampling Date	Sampling Time	Remark	Total Petroleum Hydrocarbons 418.1	EPA 624/8240	TCLP Metals
SP1	soil	-01	1	Soil X	Ice X	8/27			X	X	X
SP2	↓	02	↓	↓	↓	↓		composite	X	X	X
SP3	↓		↓	↓	↓	↓		composite			
SP4	↓	03	↓	↓	↓	↓			X	X	X
SP5	↓	04	↓	↓	↓	↓		composite	X	X	X
SP6	↓		↓	↓	↓	↓		composite			

CUSTODY RECORD

	Date	Time	
Relinquished by Sampler: [signature]			Received by:
Relinquished by:			Received by:
Relinquished by:	8/30	10:30	Received by Laboratory: [signature]

Way bill # 1931551968

SPECIAL HANDLING

24 HOURS ☐
EXPEDITED 48 Hours ☐
SEVEN DAY ☐
OTHER 5 (#) BUSINESS DAYS
QA/QC CLP Level ☐ Blue Level ☐
FAX ☐

SPECIAL DETECTION LIMITS (Specify)

SPECIAL REPORTING REQUIREMENTS (Specify)

REMARKS: Include copper, nickel, and zinc in TCLP metals analyses

Lab Use Only
Lot #:

Storage Location
Work Order #:

APPENDIX B
LABORATORY REPORTS (9/20/91)

GTEL
ENVIRONMENTAL
LABORATORIES, INC.

Northwest Region
4080-C Pike Lane
Concord, CA 94520
(415) 685-7852
(800) 544-3422 *from inside California*
(800) 423-7143 *from outside California*
(415) 825-0720 (FAX)

Client Number: 020601767
Project ID: Kent, WA
Work Order Number: C1-09-668

November 2, 1991

Lynn Pera
Groundwater Technology, Inc.
19033 West Valley Hwy., D-104
Kent, WA 98032

Enclosed please find the analytical results for samples received by GTEL Environmental Laboratories, Inc. on 09/21/91, under chain of custody record 21042.

A formal Quality Control/Quality Assurance (QA/QC) program is maintained by GTEL, which is designed to meet or exceed the EPA requirements. Analytical work for this project met QA/QC criteria, unless otherwise stated in the footnotes.

GTEL is certified by the California State Department of Health Services to perform analyses for drinking water, wastewater, and hazardous waste materials according to EPA protocols.

If you have any questions concerning this analysis or if we can be of further assistance, please call our Customer Service Representative.

Sincerely,
GTEL Environmental Laboratories, Inc.

Emma P. Popek /RAB

Emma P. Popek
Laboratory Director

Client Number: 020601767
Project ID: Kent, WA
Work Order Number: C1-09-668

Table 1

ANALYTICAL RESULTS

Total Petroleum Hydrocarbons in Soil by Infrared Spectrometry

APHA Method 5520CF[a]

a. Standard Methods for the Examination of Water and Wastewater, 17th ed., American Public Health Association, 1989. Results reported on a wet weight basis.

GTEL Sample Number		01			
Client Identification		1-4			
Date Sampled		09/20/91			
Date Prepared		09/24/91			
Date Analyzed		09/25/91			
Analyte	Quantitation Limit, mg/Kg	Concentration, mg/Kg			
Total Petroleum Hydrocarbons	5	51			
Quantitation Limit Multiplier		1			

This report replaces one of the same number dated 10/01/91.

GTEL ENVIRONMENTAL LABORATORIES, INC.

GTEL
ENVIRONMENTAL
LABORATORIES, INC.

Northwest Region
4080 Pike Lane
Concord, CA 94520
(415) 685-7852
(800) 544-3422 from inside California
(800) 423-7143 from outside California

Client Number: 020601767
Project ID: Kent, WA
Work Order Number: C1-09-669

October 1, 1991

Lynn Pera
Groundwater Technology, Inc.
19033 West Valley Hwy., D-104
Kent, WA 98032

Enclosed please find the analytical results for samples received by GTEL Environmental Laboratories, Inc. on 09/21/91, under chain of custody record 21042.

A formal Quality Control/Quality Assurance (QA/QC) program is maintained by GTEL, which is designed to meet or exceed the EPA requirements. Analytical work for this project met QA/QC criteria, unless otherwise stated in the footnotes.

GTEL is certified by the California State Department of Health Services to perform analyses for drinking water, wastewater, and hazardous waste materials according to EPA protocols.

If you have any questions concerning this analysis or if we can be of further assistance, please call our Customer Service Representative.

Sincerely,
GTEL Environmental Laboratories, Inc.

Emma P. Popek
Laboratory Director

Table 1

ANALYTICAL RESULTS

Volatile Organics in Soil

EPA Method 8240[a]

GTEL Sample Number		01			
Client Identification		1-4			
Date Sampled		09/20/91			
Date Extracted		09/23/91			
Date Analyzed		09/23/91			
Analyte	Quantitation Limit, ug/Kg	Concentration, ug/Kg			
Chloromethane	10	<10			
Bromomethane	10	<10			
Vinyl chloride	10	<10			
Chloroethane	10	<10			
Methylene chloride	5	<5			
Acetone	100	<100			
Carbon disulfide	5	<5			
1,1-Dichloroethene	5	<5			
1,1-Dichloroethane	5	<5			
1,2-Dichloroethene, total	5	<5			
Chloroform	5	<5			
1,2-Dichloroethane	5	<5			
2-Butanone	100	<100			
1,1,1-Trichloroethane	5	<5			
Carbon tetrachloride	5	<5			
Vinyl acetate	50	<50			
Bromodichloromethane	5	<5			
1,2-Dichloropropane	5	<5			
cis-1,3-Dichloropropene	5	<5			
Trichloroethene	5	<5			
Dibromochloromethane	5	<5			

a. Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986 (method modified for additional compounds). Results reported on a dry weight basis.

Table 1 (Continued)

ANALYTICAL RESULTS

Volatile Organics in Soil

EPA Method 8240[a]

GTEL Sample Number		01			
Client Identification		1-4			
Date Sampled		09/20/91			
Date Extracted		09/23/91			
Date Analyzed		09/23/91			
Analyte	Quantitation Limit, ug/Kg	Concentration, ug/Kg			
1,1,2-Trichloroethane	5	<5			
Benzene	5	<5			
trans-1,3-Dichloropropene	5	<5			
2-Chloroethylvinyl ether	10	<10			
Bromoform	5	<5			
4-Methyl-2-pentanone	50	<50			
2-Hexanone	50	<50			
Tetrachloroethene	5	<5			
1,1,2,2-Tetrachloroethane	5	<5			
Toluene	5	<5			
Chlorobenzene	5	<5			
Ethylbenzene	5	<5			
Styrene	5	<5			
1,2-Dichlorobenzene	5	<5			
1,3-Dichlorobenzene	5	<5			
1,4-Dichlorobenzene	5	<5			
Xylene, total	5	<5			
Trichlorofluoromethane	5	<5			
Quantitation Limit Multiplier		1			
Percent solids		87			

a. Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986 (method modified for additional compounds). Results reported on a dry weight basis.

GTEL
ENVIRONMENTAL
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Northwest Region
4080 Pike Lane
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(800) 423-7143 from outside California

RECEIVED OCT 0 7 1991

Client Number: 020601767
Project ID: Kent, WA
Work Order Number: C1-09-670

September 27, 1991

Lynn Pera
Groundwater Technology, Inc.
19033 West Valley Hwy., D-104
Kent, WA 98032

Enclosed please find the analytical results report prepared by GTEL for samples received on 09/21/91, under chain of custody number 21042.

GTEL is certified by the California State Department of Health Services to perform analyses for drinking water, wastewater, and hazardous waste materials according to EPA protocols.

A formal quality control/quality assurance program is maintained by GTEL, which is designed to meet or exceed the EPA requirements. Analytical work for this project was performed in strict adherence to our QA/QC program to ensure sample integrity and to meet quality control criteria.

If you have any questions concerning this analysis or if we can be of further assistance, please call our Customer Service Representative.

Sincerely,

GTEL Environmental Laboratories, Inc.

Emma P. Popek

Emma P. Popek
Laboratory Director

Client Number: 020601767
Project ID: Kent, WA
Work Order Number: C1-09-670

Table 1

ANALYTICAL RESULTS

Metals in TCLP Leachate[a]

GTEL Sample Number			01			
Client Identification			1-4			
Date Sampled			09/20/91			
Date Leached			09/23/91			
Date Analyzed (Method 6010)			09/24/91			
Date Analyzed (Method 7470)			09/25/91			
Analyte	Method[b]	Quantitation Limit, mg/L	Leachate Concentration, mg/L			
Arsenic	EPA 6010	0.1	<0.1			
Barium	EPA 6010	0.01	0.33			
Cadmium	EPA 6010	0.1	<0.1			
Chromium, total	EPA 6010	0.1	<0.1			
Copper	EPA 6010	0.1	<0.1			
Lead	EPA 6010	0.15	<0.15			
Mercury	EPA 7470	0.002	<0.002			
Nickel	EPA 6010	0.1	<0.1			
Selenium	EPA 6010	0.5	<0.5			
Silver	EPA 6010	0.25	<0.25			
Zinc	EPA 6010	0.1	0.29			
Quantitation Limit Multiplier			1			

a. Federal Register, June 29, 1990, 40 CFR, Part 261, Appendix II - Method 1311. These data are corrected for analytical bias as required by Method 1311 by applying a correction determined by matrix spike recovery.

b. Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986. Digestion by Method 3005 except for: Method 7470 for mercury.

APPENDIX C
LABORATORY REPORTS (11/4/91)

GTEL
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LABORATORIES, INC.

Northwest Region
4080-C Pike Lane
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(415) 685-7852
(800) 544-3422 *from inside California*
(800) 423-7143 *from outside California*
(415) 825-0720 (FAX)

Client Number: 020601767
Project ID: Kent, WA
Work Order Number: C1-11-096

November 18, 1991

Lynn Pera
Groundwater Technology, Inc.
19033 West Valley Hwy., D-104
Kent, WA 98032

Enclosed please find the analytical results for samples received by GTEL Environmental Laboratories, Inc. on 11/05/91, under chain of custody record 20964.

A formal Quality Control/Quality Assurance (QA/QC) program is maintained by GTEL, which is designed to meet or exceed the EPA requirements. Analytical work for this project met QA/QC criteria, unless otherwise stated in the footnotes.

GTEL is certified by the California State Department of Health Services to perform analyses for drinking water, wastewater, and hazardous waste materials according to EPA protocols.

If you have any questions concerning this analysis or if we can be of further assistance, please call our Customer Service Representative.

Sincerely,
GTEL Environmental Laboratories, Inc.

Emma P. Popek
Laboratory Director

Table 1

ANALYTICAL RESULTS

Polychlorinated Biphenyls in Soil

EPA Method 8080[a]

GTEL Sample Number		02			
Client Identification		COMPOSITE F1-F4			
Date Sampled		11/04/91			
Date Extracted		11/06/91			
Date Analyzed		11/12/91			
Analyte	Quantitation Limit, mg/Kg	Concentration, mg/Kg			
PCB-1016	0.1	<0.1			
PCB-1221	0.1	<0.1			
PCB-1232	0.1	<0.1			
PCB-1242	0.1	<0.1			
PCB-1248	0.1	<0.1			
PCB-1254	0.1	<0.1			
PCB-1260	0.1	0.1			
Quantitation Limit Multiplier		1			
Percent solids		81			

a. Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986. Sample extraction by EPA Method 3540. Results reported on a wet weight basis.

GTEL
ENVIRONMENTAL
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4080-C Pike Lane
Concord, CA 94520
(415) 685-7852
(800) 544-3422 *from inside California*
(800) 423-7143 *from outside California*
(415) 825-0720 (FAX)

Client Number: 020601767
Project ID: Kent, WA
Work Order Number: C1-11-101

November 18, 1991

Lynn Pera
Groundwater Technology, Inc.
19033 West Valley Hwy., D-104
Kent, WA 98032

Enclosed please find the analytical results for samples received by GTEL Environmental Laboratories, Inc. on 11/05/91, under chain of custody record 20964.

A formal Quality Control/Quality Assurance (QA/QC) program is maintained by GTEL, which is designed to meet or exceed the EPA requirements. Analytical work for this project met QA/QC criteria, unless otherwise stated in the footnotes.

GTEL is certified by the California State Department of Health Services to perform analyses for drinking water, wastewater, and hazardous waste materials according to EPA protocols.

If you have any questions concerning this analysis or if we can be of further assistance, please call our Customer Service Representative.

Sincerely,
GTEL Environmental Laboratories, Inc.

Emma P. Popek
Laboratory Director

Client Number: 020601767
Project ID: Kent, WA
Work Order Number: C1-11-101

ANALYTICAL RESULTS

Matrix: Soil

				Sample Number	02	
				Sample Identification	COMPOSITE F1-F4	
				Date Sampled	11/04/91	
Test Description	Units	Detection Limit	Method	Date Analyzed	Test Result	
Corrosivity	pH	NA	EPA 9045	11/07/91	7.7	
Flashpoint	°F	60	EPA 1010	11/08/91	NF@<160	
Cyanide Reactivity Screen	mg HCN/Kg	1	ASTMD5049-90	11/08/91	<1	
Sulfide Reactivity Screen	mg H_2S/Kg	1	ASTMD4978-89	11/08/91	<1	

NA = Not Applicable
NF@< = No flash at temperature less than 160 °F.

GTEL ENVIRONMENTAL LABORATORIES, INC.

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(800) 544-3422 *from inside California*
(800) 423-7143 *from outside California*
(415) 825-0720 (FAX)

Client Number: 020601767
Project ID: Kent, WA
Work Order Number: C1-11-099

November 18, 1991

Lynn Pera
Groundwater Technology, Inc.
19033 West Valley Hwy., D-104
Kent, WA 98032

Enclosed please find the analytical results for samples received by GTEL Environmental Laboratories, Inc. on 11/05/91, under chain of custody record 20964.

A formal Quality Control/Quality Assurance (QA/QC) program is maintained by GTEL, which is designed to meet or exceed the EPA requirements. Analytical work for this project met QA/QC criteria, unless otherwise stated in the footnotes.

GTEL is certified by the California State Department of Health Services to perform analyses for drinking water, wastewater, and hazardous waste materials according to EPA protocols.

If you have any questions concerning this analysis or if we can be of further assistance, please call our Customer Service Representative.

Sincerely,
GTEL Environmental Laboratories, Inc.

Emma P. Popek
Laboratory Director

Client Number: 020601767
Project ID: Kent, WA
Work Order Number: C1-11-099

Table 1

ANALYTICAL RESULTS

Semi-Volatile Organics in TCLP Leachate[a]

EPA Method 8270[b]

GTEL Sample Number		02			
Client Identification		COMPOSITE F1-F4			
Date Sampled		11/04/91			
Date Leached		11/06/91			
Date Extracted		11/07/91			
Date Analyzed		11/14/91			
Analyte	Quantitation Limit, mg/L	Concentration, mg/L			
o-Cresol	0.033	<0.033			
m-Cresol + p-Cresol	0.033	<0.033			
1,4-Dichlorobenzene	0.033	<0.033			
2,4-Dinitrotoluene	0.033	<0.033			
Hexachloro-1,3-butadiene	0.033	<0.033			
Hexachlorobenzene	0.033	<0.033			
Hexachloroethane	0.033	<0.033			
Nitrobenzene	0.033	<0.033			
Pentachlorophenol	0.17	<0.17			
Pyridine	0.033	<0.033			
2,4,5-Trichlorophenol	0.033	<0.033			
2,4,6-Trichlorophenol	0.033	<0.033			
Quantitation Limit Multiplier		1			

a. Federal Register, March 29, 1990, 40 CFR, Part 261, Appendix II - Method 1311. These data are corrected for analytical bias as required by Method 1311 by applying a correction determined by matrix spike recovery.

b. Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA, November 1986. Aqueous leachates are extracted by Method 3510.

GTEL
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LABORATORIES, INC.

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(800) 544-3422 *from inside California*
(800) 423-7143 *from outside California*
(415) 825-0720 (FAX)

Client Number: 020601767
Project ID: Kent, WA
Work Order Number: C1-11-100

November 18, 1991

Lynn Pera
Groundwater Technology, Inc.
19033 West Valley Hwy., D-104
Kent, WA 98032

Enclosed please find the analytical results for samples received by GTEL Environmental Laboratories, Inc. on 11/05/91, under chain of custody record 20964.

A formal Quality Control/Quality Assurance (QA/QC) program is maintained by GTEL, which is designed to meet or exceed the EPA requirements. Analytical work for this project met QA/QC criteria, unless otherwise stated in the footnotes.

GTEL is certified by the California State Department of Health Services to perform analyses for drinking water, wastewater, and hazardous waste materials according to EPA protocols.

If you have any questions concerning this analysis or if we can be of further assistance, please call our Customer Service Representative.

Sincerely,
GTEL Environmental Laboratories, Inc.

Emma P. Popek
Laboratory Director

Table 1

ANALYTICAL RESULTS

Pesticides in TCLP Leachate[a]

GTEL Sample Number			02			
Client Identification			COMPOSITE F1-F4			
Date Sampled			11/04/91			
Date Leached by EPA 1311			11/08/91			
Date Extracted by EPA 3510			11/11/91			
Date Analyzed by EPA 8150			11/15/91			
Date Analyzed by EPA 8080			11/15/91			
Analyte	Method[b]	Quantitation Limit, ug/L	Leachate Concentration, ug/L			
Chlordane	EPA 8080	0.05	<0.05			
Endrin	EPA 8080	0.01	<0.01			
Heptachlor	EPA 8080	0.02	<0.02			
Heptachlor epoxide	EPA 8080	0.1	<0.1			
Lindane	EPA 8080	0.01	<0.01			
Methoxychlor	EPA 8080	0.01	<0.01			
Toxaphene	EPA 8080	0.5	<0.5			
Quantitation Limit Multiplier			1			

a. Federal Register, March 29, 1990, 40 CFR, Part 261, Appendix II - Method 1311.

b. Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986.