REMEDIATION PROGRESS REPORT
OCTOBER THROUGH DECEMBER 1997
SOUTHLAND STORE NO. 14392
9 NICKERSON STREET
SEATTLE, WASHINGTON

Fluor Daniel GTI Project 020600348
WDOE L.U.S.T. 4016

March 19, 1998

Prepared for:

Mr. Bob DeNinno
The Southland Corporation
19033 West Valley Hwy, Ste D-104
Kent, Washington 98032

Fluor Daniel GTI
Submitted by:

Steven Hartman
Associate Geologist

Fluor Daniel GTI
Approved by:

Stan Haskins, RG
Lead Geologist/Project Manager

FLUOR DANIEL GTI

[redacted]

Inspector SB
Site address: 9 Nickerson St, Seattle
UST #:
ERTS #:
LUST#: 4016

Depth to GW: 22.9-23.7'
Free product:
GW flow: NW

Media affected:
☒ GW ☒ Soil
Extent of contam. known:
☐ Yes ☒ No

Report date: March 19, 1998
Date received: May 6, 1998

Project status:
✓ Cleanup started
___ Awaiting cleanup
___ Reported cleaned up
✓ Monitoring
___ NFA
___ Unknown

Report status:
✓ interim
___ final

Remediation method:
✓ Aeration/Vapor extraction
✓ Air stripping/Air sparging
___ Biological treatment
___ Carbon absorption
___ Chemical destruction
___ Incineration
___ Off-site containment/Landfill
___ On-site containment/Landfill
___ Physical separation
___ Reuse/Recycling
___ Soil washing
___ Solidification/Stabilization
___ Solvent extraction
___ Thermal desorption
___ Vitrification
___ Other

Comments:

- TPH-G above MTCA A in MW-1 (1220 ppb).
- Soil sample from GB-1 exceeds MTCA A for TPH-G. However, statistical analysis from Ecology ~~documents~~ guidance adjusts the concentration from ~~69.6~~ 372 ppm to 69.6 ppm.

EXECUTIVE SUMMARY

The following report documents the remediation progress and groundwater monitoring and sampling at Southland Facility No. 14392 during the period of October through December, 1997. This report is prepared under Southland Environmental Work Order No. 102645-0 dated February 7, 1997.

The following briefly discusses the findings:

- Groundwater levels were gauged in monitoring wells MW-1, MW-2, and MW-3 on December 23, 1997. The groundwater elevation at the site, relative to an arbitrary site datum, ranged from 22.89 to 23.73 feet. The apparent groundwater flow direction was northwest with a hydraulic gradient of approximately 0.01 feet per foot.

- Total petroleum hydrocarbons-as-gasoline (TPH-G) concentrations were measured above the Model Toxics Control Act Method A Compliance Cleanup Levels [CCL(a)s] in monitoring well MW-1, reported at 1,220 micrograms per liter (µg/L). Benzene concentrations were not detected above the CCL(a) in MW-1. Benzene and TPH-G concentrations in MW-2 and MW-3 were not detected at the method reporting limits.

- According to monitoring data, the hydrocarbon removal rate is currently not detectable using current field methods. The effluent oxygen concentrations are at 20.9%, indicating non-detectable levels of biologic activity.

- Fourteen soil samples were collected at various depths from seven soil borings to analyze the progress of the ASV remediation system. No samples contained benzene concentrations exceeding the method reporting limits. One soil sample, collected at four feet below grade in boring GB-1, contained 372 milligrams per kilogram (mg/Kg) of TPH-G, which exceeds the CCL(a). A statistical analysis of the TPH-G concentrations, using the methods described in Appendix E of Guidance for Remediation of Releases From Underground Storage Tanks (WDOE, July 1991), yielded an adjusted TPH-G concentration of 69.6 mg/Kg, which meets the cleanup goal for TPH-G.

The body of the report, which follows, includes a detailed presentation and discussion of the above items. Included in the report are field data, laboratory reports, figures and tables.

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1.0 INTRODUCTION

This report presents the results of remediation system progress and groundwater monitoring activities completed by Fluor Daniel GTI at the Southland Corporation's 7-Eleven Facility No. 14392, located at 9 Nickerson Street in Seattle, WA (Figure 1). This report covers the period from October through December, 1997 and is prepared under Southland Environmental Work Order No. 102645-0 dated February 7, 1997. In January 1993, one 10,000-gallon regular leaded gasoline underground storage tank (UST) and the associated piping were closed in-place. In March 1993, the in-place closure report was submitted. The remaining USTs were taken out of service (product and dispensers removed) in September 1993. In March 1994, three USTs and all associated piping were removed. In June 1994, a UST Decommissioning report was submitted. In September 1995, a remediation system was installed using both air sparge and vapor extraction technologies. The purpose of the system is to both remove and promote the bioremediation of petroleum hydrocarbons in the subsurface soil and groundwater. Site groundwater conditions have been discussed in quarterly monitoring reports.

2.0 SCOPE OF WORK

A brief list of the work performed during this reporting period is presented below. Detailed discussions of the work performed are included in the following sections.

- Monitored the effluent air from the vapor extraction system (VES) for volatile hydrocarbons, oxygen, and carbon dioxide using portable field instruments.
- Measured depth to water and collected groundwater samples from groundwater monitoring wells.
- Conducted system maintenance.
- Advanced seven soil borings to various depths and collected confirmation soil samples for analysis.
- Compiled data for this summary report.

3.0 SYSTEM OPERATIONS

3.1 System Monitoring

The air-sparge/vapor extraction (ASV) system was inspected once by Fluor Daniel GTI personnel during the reporting period. During the site visit the following data were collected:

Air-Sparge System
- Injection Pressure

VES System
- Manifold Vacuum

- Flow Rates at Sparge Wells
- Effluent Air Velocity
- O_2, CO_2, Volatile Organic Compounds

Operational parameters for the remediation system were collected during the visit to help monitor subsurface conditions. The concentrations of volatile organics, oxygen, and carbon dioxide were analyzed with portable instruments. System monitoring data are given in Table 1.

The air flow rate to three air sparge wells (AS-1, AS-3, and AS-4) was measured during the site visit. Air sparge well AS-2 is currently not in use. Individual flow rates varied from 80 to 180 cubic feet per hour (cfh) per well.

3.2 System Maintenance

The system has operated as expected since start-up. There have been no significant maintenance problems.

4.0 GROUNDWATER MONITORING AND SAMPLING

One groundwater sampling event was conducted at the site during this reporting period. On December 23, 1997, groundwater levels were gauged to obtain groundwater elevations during system operation. Monitoring wells at the site were gauged with an ORS Interface Probe™ to acquire depth to groundwater and/or liquid phase hydrocarbons (LPH) data. The probe and measuring tape were cleaned using Alconox and distilled water prior to use at each well. Water level measurements were made from the top of casing (TOC) of each well and are accurate to approximately 0.01 feet. Depth to water measurements were used to calculate groundwater elevations relative to an assumed TOC elevation of 30 feet for MW-2.

The groundwater elevation at the site, relative to the MW-2 datum, ranged from 22.89 to 23.73 feet on December 23, 1997. Groundwater elevations and measurements for this reporting period and previous monitoring or sampling dates are summarized in Table 2. Groundwater elevations and contours generated from the August 15, 1997 data are shown in Figure 3. As depicted in Figure 3, the apparent groundwater flow direction was northwest with a hydraulic gradient of approximately 0.01 feet per foot.

Following depth-to-groundwater measurements, monitoring wells MW-1, MW-2, and MW-3 were purged of approximately three (3) casing volumes, or until dry, prior to sampling. Each well was purged using a clean disposable bailer or by pumping using a diaphragm-pump and clean, dedicated suction-tubing. Purge water was pumped through two 9-ounce carbon filters in series and discharged on site. Wells which recharged slowly were allowed to recover to within 60 percent of the static water level prior to sample collection, or for two hours, whichever came first. Each well was sampled within 8 hours of purging, using a new disposable bailer.

The samples obtained were decanted into laboratory-supplied 40-milliliter bottles preserved with hydrochloric acid (HCl) for volatile organics analysis. The samples were stored in chilled coolers for

shipment to North Creek Analytical in Bothell, Washington for analysis of benzene, toluene, ethylbenzene, xylenes (BTEX) and total petroleum hydrocarbons-as-gasoline (TPH-G). A chain-of-custody form was filled out and accompanied the samples to the laboratory.

5.0 ANALYTICAL RESULTS

Groundwater samples collected during this reporting period were analyzed by the analytical methods listed below:

- BTEX by EPA Method 8020
- TPH-G by Washington Department of Ecology Method WTPH-G

The cumulative groundwater analytical results are listed in Table 3, with the Model Toxics Control Act Method A Compliance Cleanup Levels (CCL(a)s). BTEX and TPH-G concentrations are shown in Figure 4. Benzene was not detected at concentrations exceeding the CCL(a). Ethylbenzene and TPH-G concentrations were detected above the CCL(a)s in monitoring well MW-1, reported at 64.4 micrograms per liter (µg/L)and 1,220 µg/L, respectively . BTEX and TPH-G concentrations in MW-2 and MW-3 were not detected at the method reporting limits. Complete laboratory analyses are included in Appendix A.

6.0 CONFIRMATION SOIL SAMPLES

On October 15 and 16, 1997, Transglobal Environmental Geosciences Northwest, Inc. (TEG) was contracted to collect and analyze confirmation soil samples under the direction of Fluor Daniel GTI. The purpose of this work was to analyze the progress of the ASV remediation system. Soil samples were collected at various depths at seven sampling locations (Figure 5) using Strataprobe® direct push technology. Soil samples were analyzed on site by TEG for BTEX and TPH-G concentrations.

A total of 14 soil samples were analyzed for BTEX and TPH-G. No samples contained benzene concentrations over the laboratory's method detection limit of 0.05 milligrams per kilogram (mg/kg). TPH-G concentrations were detected in soil samples GB-1A, GB-2A, and GB-7A, each from a depth of four feet below grade. The TPH-G concentration in GB-1A (372 mg/kg) exceeded the CCL(a) of 100 mg/kg. Soil sample analytical results are summarized in Table 4. Complete laboratory analyses are included in Appendix B.

A statistical analysis of the TPH-G concentrations was completed using the methods described in Appendix E of Guidance for Remediation of Releases From Underground Storage Tanks (WDOE, July 1991). The following formula was used to determine if the cleanup goal had been met:

Mean of set + [Standard deviation of set x (T ÷ √Numbers of samples in set)]

where: Mean of set = 34.4 (Note: 5 mg/Kg was used where analytical result was reported as < 10 mg/Kg.)
Standard deviation of set = 97.6
T (constant for 14 samples) = 1.350

The resulting adjusted TPH-G concentration is 69.6 mg/Kg, which meets the cleanup goal for TPH-G.

7.0 CONCLUSIONS

The ASV remediation system operated normally throughout the period. According to the system monitoring data, the hydrocarbon removal rate has been undetectable by current field methods since July, 1996 (with the exception of August 1997 when a removal rate of approximately 0.14 pounds per day was detected). The effluent oxygen concentrations have remained at 20.9%, indicating reduced biologic activity. Benzene and TPH-G concentrations in MW-1 have steadily declined since system installation in September 1995.

Fourteen soil samples were collected at various depths from seven soil borings to analyze ASV remediation system progress with respect to adsorbed petroleum hydrocarbon concentrations. One sample (GB-1A) collected at four feet below grade in boring GB-1 contained TPH-G concentrations exceeding the CCL(a). A statistical analysis of the TPH-G concentrations resulted in an adjusted concentration of 69.6 mg/Kg, which meets the cleanup goal for TPH-G. No benzene concentrations were detected above the MDL in the 14 samples analyzed.

8.0 RECOMMENDATIONS

Fluor Daniel GTI recommends discontinuing ASV operation and continuing groundwater monitoring through 1998.

FIGURES

SOURCE: USGS SEATTLE NORTH QUADRANGLE, WASHINGTON – KING COUNTY. 7.5 MINUTE SERIES, 1968

EXPLANATION

▲ SITE LOCATION

N

SCALE 1:24000

1000 0 1000 2000 3000 4000 5000 FEET

THE SOUTHLAND CORPORATION
7-ELEVEN FACILITY NO. 14392
9 NICKERSON STREET
SEATTLE, WASHINGTON
020605375

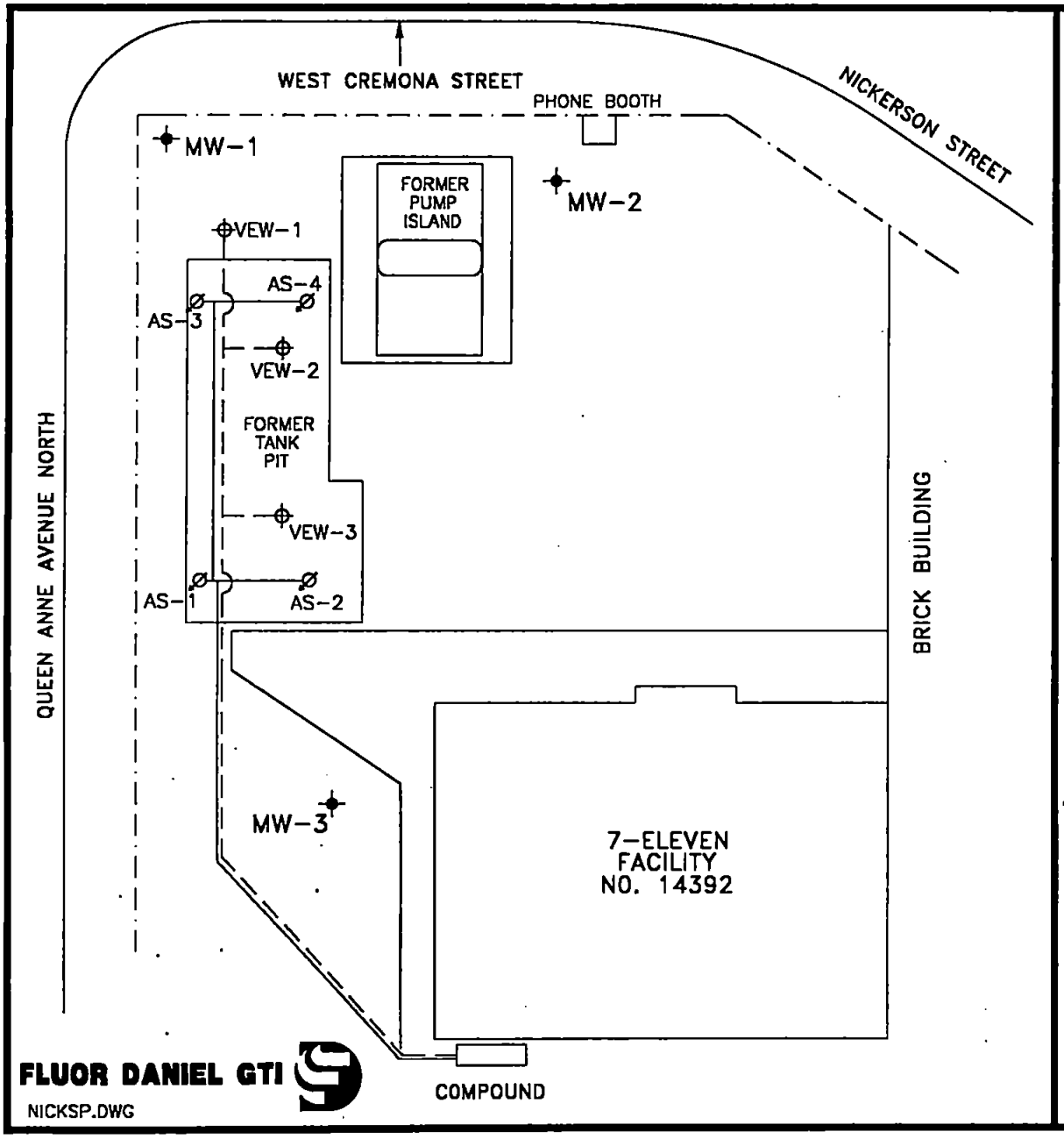
DRAWN BY: L. CORNELL DATE: 04-11-94
DRAFTED BY: C. YOUNG DATE: 04-11-94
CHECKED BY:_____ DATE:_____

FLUOR DANIEL GTI

0000-SL

SITE LOCATION
FIGURE 1

Figure 1



EXPLANATION

- MONITORING WELL
- AIR SPARGE WELL
- VAPOR EXTRACTION WELL
- APPROXIMATE PROPERTY BOUNDARY
- SPARGE MANIFOLD PIPING
- VAPOR EXTRACTION MANIFOLD PIPING

N

0 20 40

APPROX. SCALE IN FEET

THE SOUTHLAND CORPORATION

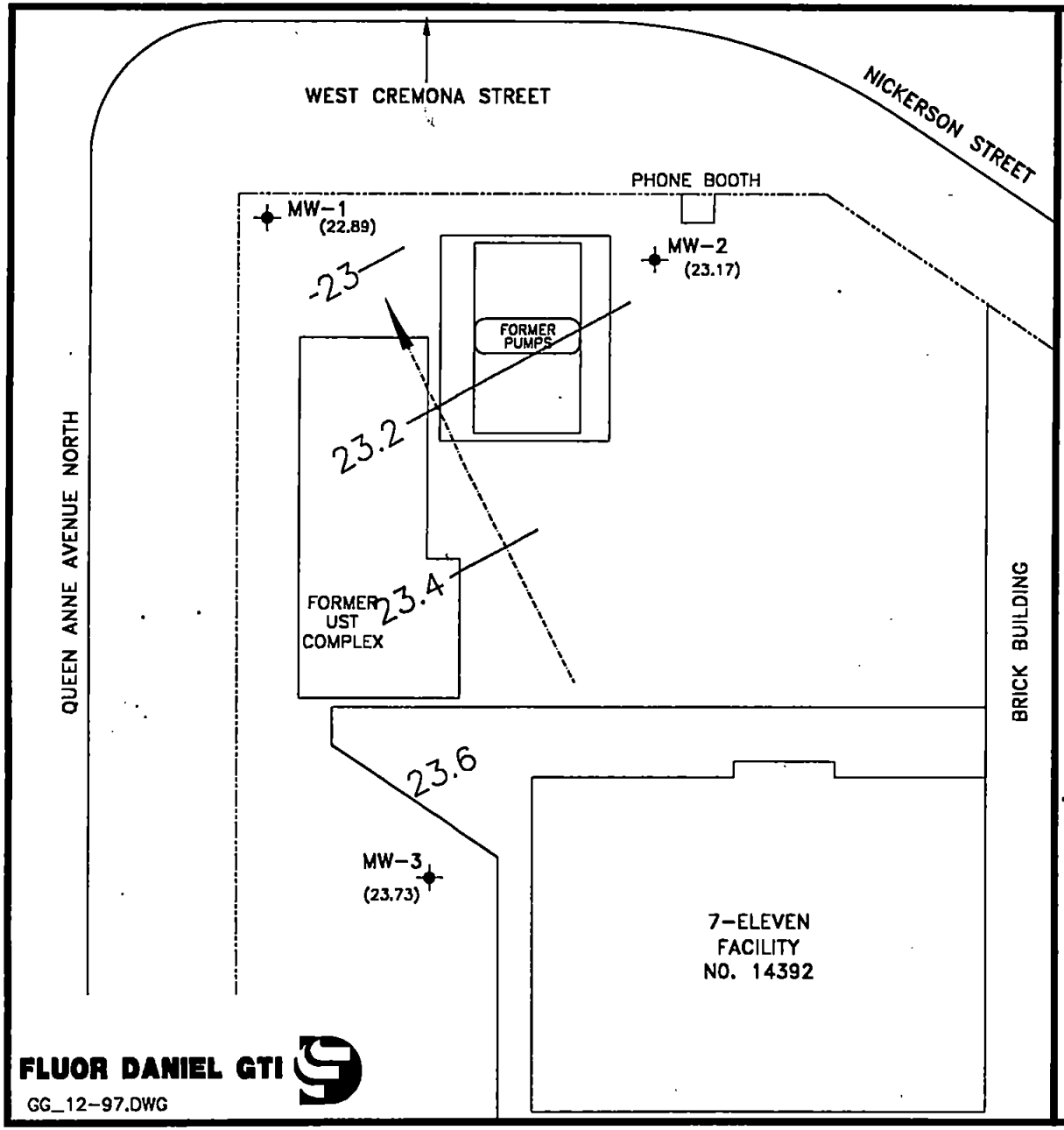
7-ELEVEN FACILITY NO. 14392

9 NICKERSON STREET
SEATTLE, WASHINGTON
020600223

DRAWN BY: ERIC RICH DATE: 02/24/95
DRAFTED BY: DEN HOLMES DATE: 06/16/94
CHECKED BY:_____ DATE:_____

SITE PLAN

FIGURE 2



EXPLANATION

- MONITORING WELL
- APPROXIMATE PROPERTY BOUNDARY
- (23.59) GROUNDWATER ELEVATION IN FEET
- —23.5— GROUNDWATER CONTOUR (CONTOUR INTERVAL = 0.2 FT)
- GROUNDWATER FLOW LINE (WITH DIRECTION ARROW)

N

0 20 40

APPROX. SCALE IN FEET

THE SOUTHLAND CORPORATION

7-ELEVEN FACILITY NO. 14392

9 NICKERSON STREET
SEATTLE, WASHINGTON
020600348

DRAWN BY: STEVE HARTMAN DATE: 02/18/98
DRAFTED BY: STEVE HARTMAN DATE: 02/18/98
CHECKED BY:_____ DATE:_____

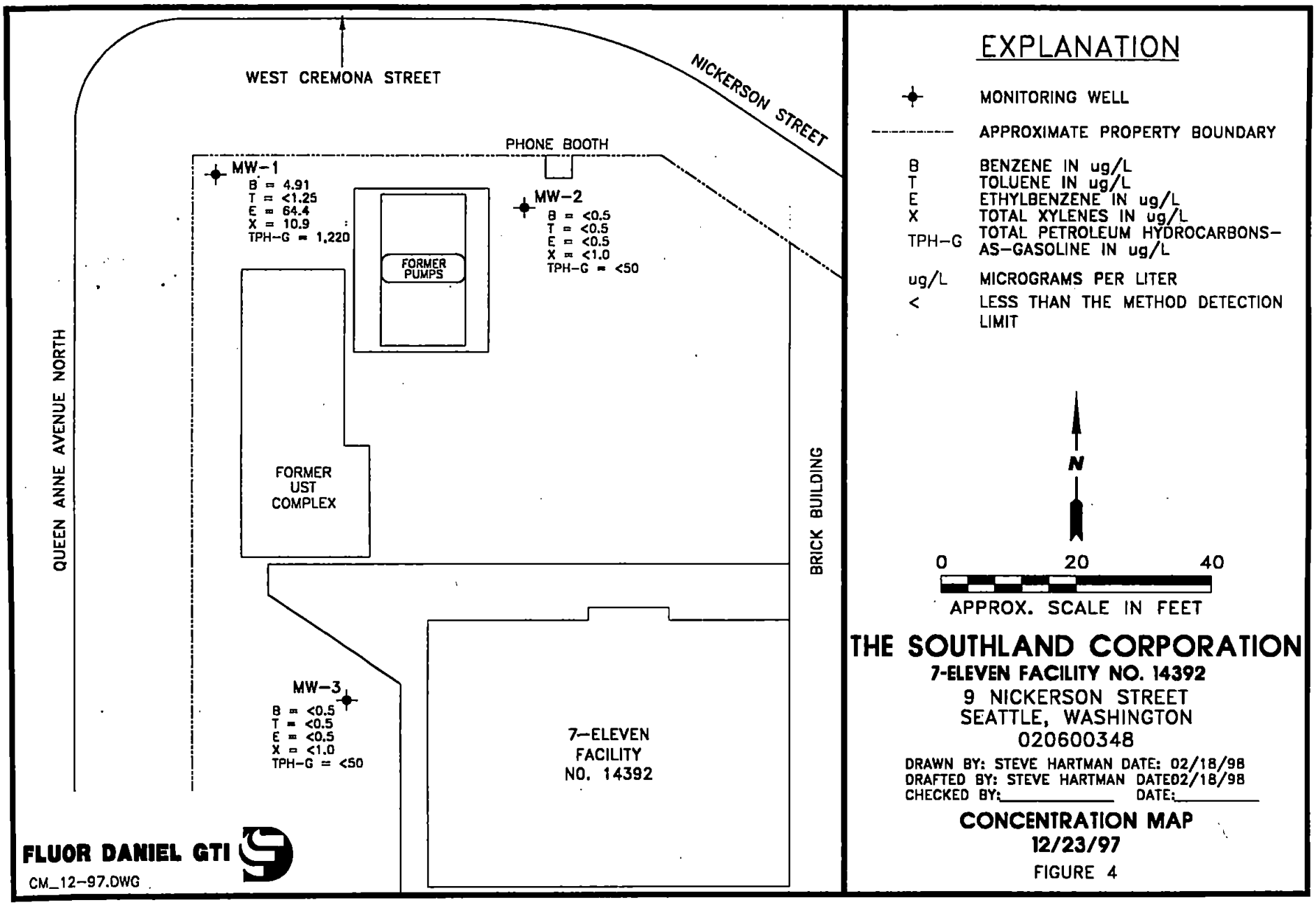
GROUNDWATER GRADIENT MAP

12/23/97

FIGURE 3

FLUOR DANIEL GTI

GG_12-97.DWG



EXPLANATION

⌖	MONITORING WELL
----------	APPROXIMATE PROPERTY BOUNDARY
B	BENZENE IN ug/L
T	TOLUENE IN ug/L
E	ETHYLBENZENE IN ug/L
X	TOTAL XYLENES IN ug/L
TPH-G	TOTAL PETROLEUM HYDROCARBONS-AS-GASOLINE IN ug/L
ug/L	MICROGRAMS PER LITER
<	LESS THAN THE METHOD DETECTION LIMIT

N

0 20 40

APPROX. SCALE IN FEET

THE SOUTHLAND CORPORATION

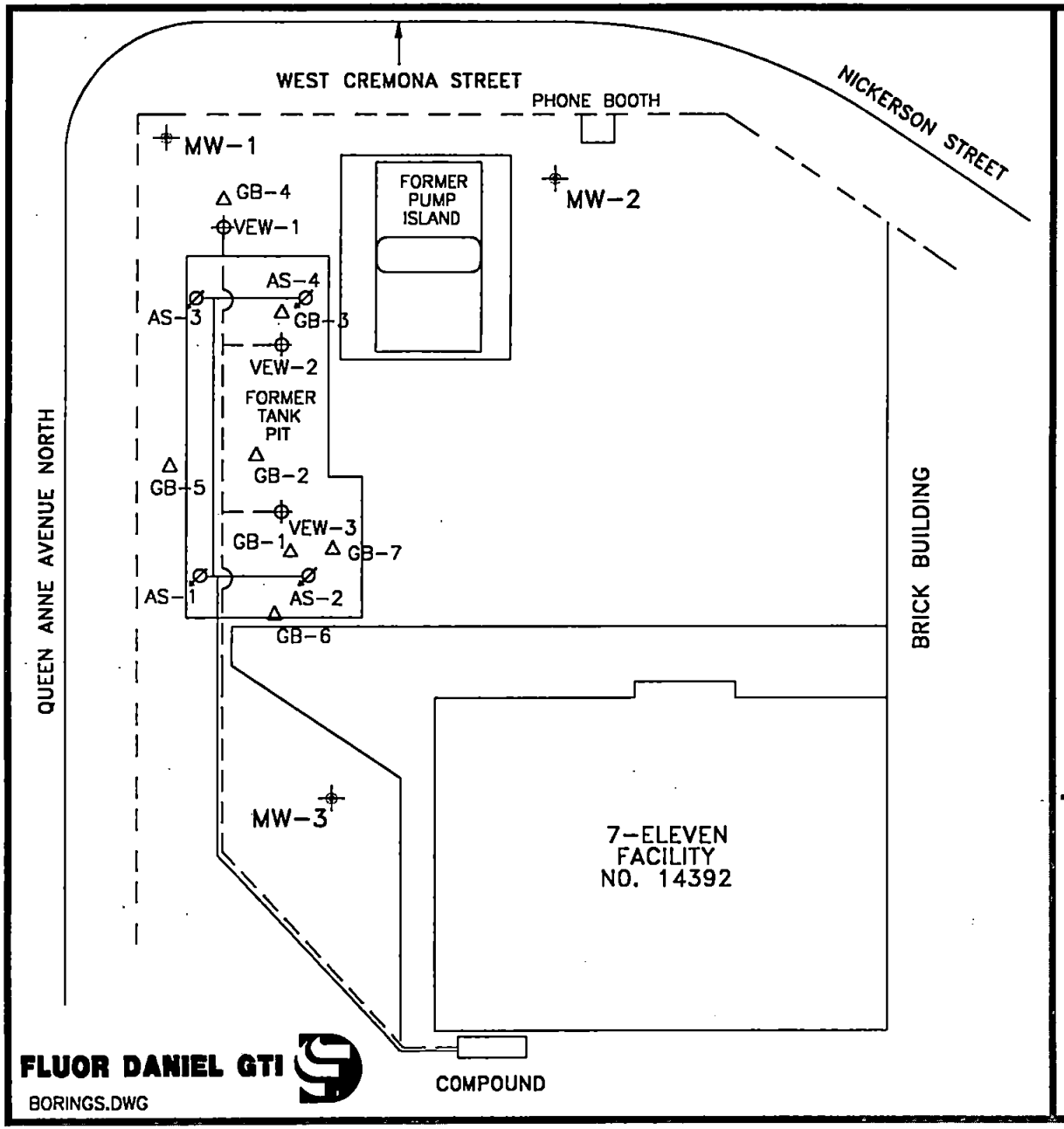
7-ELEVEN FACILITY NO. 14392

9 NICKERSON STREET
SEATTLE, WASHINGTON
020600348

DRAWN BY: STEVE HARTMAN DATE: 02/18/98
DRAFTED BY: STEVE HARTMAN DATED2/18/98
CHECKED BY:_____ DATE:_____

CONCENTRATION MAP
12/23/97

FIGURE 4



FLUOR DANIEL GTI

BORINGS.DWG

EXPLANATION

- △ SOIL BORING
- ⊕ MONITORING WELL
- ⌀ AIR SPARGE WELL
- ⊕ VAPOR EXTRACTION WELL
- — — — APPROXIMATE PROPERTY BOUNDARY
- ——— SPARGE MANIFOLD PIPING
- — — — VAPOR EXTRACTION MANIFOLD PIPING

N

0 20 40

APPROX. SCALE IN FEET

THE SOUTHLAND CORPORATION

7-ELEVEN FACILITY NO. 14392

9 NICKERSON STREET
SEATTLE, WASHINGTON
020600223

DRAWN BY: DATE:
DRAFTED BY: DATE:
CHECKED BY:_____ DATE:_____

SOIL BORING LOCATION MAP

FIGURE 5

TABLES

TABLE 1 CUMULATIVE FIELD ASV MONITORING DATA SOUTHLAND FACILITY #14392 9 NICKERSON STREET, SEATTLE, WASHINGTON							
	VES BLOWER	VAPOR EXTRACTION EFFLUENT					SPARGE SYSTEM
DATE	VACUUM	FLOW RATE		PID	O_2	TPH	PRESSURE
	inches H_2O	ft/min	scfm	ppm(v)	%	lbs/day	psi
10/04/95	Sparge System Start Up						
10/04/95	37/32	4300	93.81	29	18.8	0.66	13
10/05/95	37/30	3800	82.90	23.4	19.1	0.47	13
10/13/95	--/--	3900	85.08	2.9	20.9	0.06	13
12/05/95	40/36	4200	91.63	0.3	20.7	0.01	14
02/02/96	40/36	4200	91.63	0.0	20.9	0.00	16
03/20/96	36/34	4500	98.17	3.0	20.9	0.07	18
04/11/96	44/42	3200	69.81	12.8	20.9	0.22	13
05/20/96	40/40	3400*	74.17	0.6	20.9	0.01	12
07/01/96	34/33	3600	78.54	15.4	20.9	0.29	12
07/18/96	38/34	3200	69.81	0.0	20.7	0.00	12
08/07/96	37/35	4000	87.26	0.0	20.9	0.00	13
09/18/96	45/45	3300	71.99	0.0	20.9	0.00	13
10/31/96	40/40	4000	87.26	0.0	20.9	0.00	15
11/22/96	40/44	3600	78.54	0.0	20.9	0.00	15
03/05/97	40/44	3500	76.36	0.0	20.9	0.00	17
05/07/97	40/39	3000	65.45	0.0	20.9	0.00	22
08/15/97	35/35	3000	65.45	8.6	20.9	0.14	22
12/23/97	48/44	1500	32.72	0.0	20.9	0.00	26

ft/min	=	Feet per minute
scfm	=	Standard cubic feet per minute
cfh	=	Cubic feet per hour
ppm(v)	=	Parts per million (volume)
lbs/day	=	Pounds per day
*	=	Assumed velocity

Vacuum readings are reported as blower vacuum / applied vacuum at the KO drum.

TABLE 2 CUMULATIVE GROUNDWATER ELEVATION DATA SOUTHLAND FACILITY #14392 9 NICKERSON STREET, SEATTLE, WASHINGTON				
Well ID	Date	TOC (ft)	DTW (ft)	GWE (ft)
MW-1	04/24/92	30.36	7.85	22.51
	09/10/93	30.36	8.69	21.67
	01/31/94	30.36	8.39	21.97
	09/07/94	30.36	9.09	21.27
	02/02/95	30.36	7.31	23.05
	05/11/95	30.36	7.49	22.87
	08/21/95	30.36	8.24	22.12
	09/20/95*	30.36	8.83	21.53
	12/05/95	30.36	7.75	22.61
	02/02/96	30.36	6.63	23.73
	05/20/96	30.36	7.10	23.26
	08/07/96	30.36	8.11	22.25
	11/22/96	30.36	7.48	22.88
	03/05/97	30.36	6.77	23.59
	05/07/97	30.36	7.03	23.33
	08/15/97	30.36	8.17	22.19
	12/23/97	30.36	7.47	22.89
MW-2	04/24/92	30.00	7.35	22.65
	09/10/93	30.00	8.16	21.84
	01/31/94	30.00	7.59	22.41
	09/07/94	30.00	8.58	21.42
	02/02/95	30.00	6.65	23.35
	05/11/95	30.00	6.83	23.17
	08/21/95	30.00	7.97	22.03
	09/20/95*	30.00	8.32	21.68
	12/05/95	30.00	6.91	23.09
	02/02/96	30.00	6.30	23.70
	05/20/96	30.00	6.72	23.28
	08/07/96	30.00	7.57	22.43
	11/22/96	30.00	7.26	22.74
	03/05/97	30.00	7.21	22.79
	05/07/97	30.00	6.65	23.35

TABLE 2 CUMULATIVE GROUNDWATER ELEVATION DATA SOUTHLAND FACILITY #14392 9 NICKERSON STREET, SEATTLE, WASHINGTON				
Well ID	Date	TOC (ft)	DTW (ft)	GWE (ft)
MW-2 Cont.	08/15/97	30.00	7.63	22.37
	12/23/97	30.00	6.83	23.17
MW-3	04/24/92	30.17	6.57	23.60
	09/10/93	30.17	7.50	22.67
	01/31/94	30.17	7.11	23.06
	09/07/94	30.17	8.04	22.13
	02/02/95	30.17	6.38	23.79
	05/11/95	30.17	6.58	23.59
	08/21/95	30.17	8.53	21.64
	09/20/95*	30.17	8.82	21.35
	12/05/95	30.17	8.94	21.23
	02/02/96	30.17	5.77	24.40
	05/20/96	30.17	6.31	23.86
	08/07/96	30.17	7.18	22.99
	11/22/96	30.17	7.08	23.09
	03/05/97	30.17	6.31	23.86
	05/07/97	30.17	6.18	23.99
	08/15/97	30.17	8.18	21.99
	12/23/97	30.17	6.44	23.73

DTW=Depth to water, referenced to TOC
GWE=Groundwater elevation
TOC=Top of casing elevation

Elevations are based on an assumed TOC elevation of 30 feet for MW-2.
* = DTW was measured on 9/20/95 to confirm the 8/21/95 gradient.

TABLE 3
CUMULATIVE GROUNDWATER ANALYTICAL RESULTS
SOUTHLAND FACILITY #14392
9 NICKERSON STREET, SEATTLE, WASHINGTON

Well ID	Sample Date	Benzene µg/L	Toluene µg/L	Ethyl-benzene µg/L	Total Xylenes µg/L	TPH-G µg/L	Total Lead µg/L
MW-1	04/24/92	130	5	ND	550	5,400	--
	09/10/93	190	17	58	35	840	--
	01/31/94	1,400	430	230	440	4,100	<5
	09/07/94	1,300	85	270	390	3,000	--
	02/02/95	1,200	280	660	1,700	12,000	--
	05/11/95	800	74	890	2,100	15,000	--
	08/21/95	660	9.7	850	770	10,000	--
	12/05/95	220	3.1	470	470	9,500	--
	02/02/96	180	56	440	370	7,100	--
	05/20/96	149	<5.0	681	367	9,190	--
	08/07/96	52.5	<5.0	452	114	5,670	--
	11/22/96	28.4	4.72	316	102	4,110	--
	03/05/97	21.9	1.02	323	103	4,530	--
	05/07/97	25.1	<2.5	240	74.5	4,300	--
	08/15/97	13.5	<2.5	186	41.7	2,570	--
	12/23/97	4.91	<1.25	64.4	10.9	1,220	--
MW-2	04/24/92	ND	ND	ND	ND	ND	--
	09/10/93	<0.3	<0.3	<0.3	<0.5	<10	--
	01/31/94	<0.3	<0.3	<0.3	<0.5	<10	<5
	09/07/94	<0.3	<0.3	<0.3	<0.5	<10	--
	02/02/95	<0.3	<0.3	<0.3	<0.5	<10	--
	05/11/95	<0.3	<0.3	<0.3	<0.5	<50	--
	08/21/95	<0.3	<0.3	<0.3	<0.5	<50	--
	12/05/95	0.5	<0.3	<0.3	<0.5	<50	--
	02/02/96	<0.5	<0.5	<0.5	<1.0	<50	--
	05/20/96	<0.5	<0.5	<0.5	<1.0	<50	--
	08/07/96	<0.5	<0.5	<0.5	<1.0	<50	--
	11/22/96	<0.5	<0.5	<0.5	<1.0	<50	--
	03/05/97	<0.5	<0.5	<0.5	<1.0	<50	--
	05/07/97	<0.5	<0.5	<0.5	<1.0	<50	--
	08/15/97	<0.5	<0.5	<0.5	<1.0	<50	--

TABLE 3
CUMULATIVE GROUNDWATER ANALYTICAL RESULTS
SOUTHLAND FACILITY #14392
9 NICKERSON STREET, SEATTLE, WASHINGTON

Well ID	Sample Date	Benzene µg/L	Toluene µg/L	Ethyl-benzene µg/L	Total Xylenes µg/L	TPH-G µg/L	Total Lead µg/L
MW-2	12/23/97	<0.5	<0.5	<0.5	<1.0	<50	--
MW-3	04/24/92	ND	ND	ND	ND	ND	--
	09/10/93	<0.3	<0.3	<0.3	<0.5	<10	--
	01/31/94	<0.3	<0.3	<0.3	<0.5	<10	10
	09/07/94	<0.3	<0.3	<0.3	<0.5	<10	--
	02/02/95	<0.3	<0.3	<0.3	<0.5	<10	--
	05/11/95	<0.3	<0.3	<0.3	<0.5	<50	--
	08/21/95	<0.3	<0.3	<0.3	<0.5	<50	--
	12/05/95	<0.3	<0.3	<0.3	<0.5	<50	--
	02/02/96	<0.5	<0.5	<0.5	<1.0	<50	--
	05/20/96	<0.5	<0.5	<0.5	<1.0	<50	--
	08/07/96	<0.5	<0.5	<0.5	<1.0	<50	--
	11/22/96	<0.5	<0.5	<0.5	<1.0	<50	--
	03/05/97	<0.5	<0.5	<0.5	<1.0	<50	--
	05/07/97	<0.5	<0.5	<0.5	<1.0	<50	--
	08/15/97	<0.5	<0.5	<0.5	<1.0	<50	--
	12/23/97	<0.5	<0.5	<0.5	<1.0	<50	--
MTCA-CCL[a]		5	40	30	20	1,000	5

TPH-G = Total petroleum hydrocarbons-as-gasoline
ND = Not detected at the method detection limits.
-- = Not sampled or analyzed
< = Less than the method detection limits
µg/L = Micrograms per liter
MTCA-CCL[a] = Model Toxics Control Act Method A Compliance Cleanup Level

Bold values exceed the CCL(a)

TABLE 4 SUMMARY OF SOIL SAMPLE ANALYTICAL RESULTS SOUTHLAND FACILITY #14392 9 NICKERSON STREET, SEATTLE, WASHINGTON						
Sample ID	Sample Depth feet bg	Benzene mg/Kg	Toluene mg/Kg	Ethyl-benzene mg/Kg	Total Xylenes mg/Kg	TPH-G mg/Kg
GB-1A	4-5	<0.05	<0.05	0.76	3.16	**372**
GB-1B	9-10	<0.05	<0.05	<0.05	<0.05	<10
GB-1C	14-15	<0.05	<0.05	<0.05	<0.05	<10
GB-2A	4-5	<0.05	<0.05	0.50	0.85	39
GB-2B	9-10	<0.05	<0.05	<0.05	<0.05	<10
GB-2C	14-15	<0.05	<0.05	<0.05	<0.05	<10
GB-3A	4-5	<0.05	<0.05	<0.05	<0.05	<10
GB-3B	9-10	<0.05	<0.05	<0.05	<0.05	<10
GB-3C	14-15	<0.05	<0.05	<0.05	<0.05	<10
GB-4	9-10	<0.05	<0.05	<0.05	<0.05	<10
GB-5	7-8	<0.05	<0.05	<0.05	<0.05	<10
GB-6	7-8	<0.05	<0.05	<0.05	<0.05	<10
GB-7A	4-5	<0.05	<0.05	<0.05	<0.05	15
GB-7B	9-10	<0.05	<0.05	<0.05	<0.05	<10
MTCA CCL(A)s		0.5	40	20	20	100

TPH-G = Total petroleum hydrocarbons-as-gasoline
< = Less than the method detection limits
mg/Kg = Milligrams per kilogram
MTCA-CCL[a] = Model Toxics Control Act Method A Compliance Cleanup Level
bg = Below grade

Bold values exceed the CCL(a)
Sample ID indicated the soil boring of origin (ie. sample GB-1A was collected from boring GB-1)

APPENDIX A

LABORATORY REPORTS - GROUNDWATER

NORTH CREEK ANALYTICAL
Environmental Laboratory Services

BOTHELL ▪ (425) 481-9200 ▪ FAX 485-2992
SPOKANE ▪ (509) 924-9200 ▪ FAX 924-9290
PORTLAND ▪ (503) 643-9200 ▪ FAX 644-2202

1998

Fluor Daniel - GTI, Inc. - Kent	Project:	Sthl/14392/9 Nickerson Way	Sampled: 12/23/97
19033 West Valley Hwy, D-104	Project Number:	Not Provided	Received: 12/24/97
Kent, WA 98032	Project Manager:	Stan Haskins	Reported: 12/31/97 10:06

Summary Report*
(Please refer to the Analytical Report for a thorough review of the complete data set.)

Method	Analyte	Units	MW-1 Water 12/23/97 B712529-01	MW-2 Water 12/23/97 B712529-02	MW-3 Water 12/23/97 B712529-03		
WTPH-G/8020	Gasoline Range Hydrocarbons	ug/l	1220	<50.0	<50.0		
"	Benzene	"	4.91	<0.500	<0.500		
"	Toluene	"	<1.25	<0.500	<0.500		
"	Ethylbenzene	"	64.4	<0.500	<0.500		
"	Xylenes (total)	"	10.9	<1.00	<1.00		

North Creek Analytical, Inc.

The Summary Report is a subset of the final Analytical Report and does not include substantial supportive information such as quality control data; this report accurately summarizes sample results for your convenience only.

Joy B Chang, Project Manager

18939 120th Avenue N.E., Suite 101, Bothell, WA 98011-9508
East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
9405 S.W. Nimbus Avenue, Beaverton, OR 97008-7132

NORTH CREEK ANALYTICAL
Environmental Laboratory Services

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SPOKANE ▪ (509) 924-9200 ▪ FAX 924-9290
PORTLAND ▪ (503) 643-9200 ▪ FAX 644-2202

Fluor Daniel - GTI, Inc. - Kent	Project:	Sthl/14392/9 Nickerson Way	Sampled:	12/23/97
19033 West Valley Hwy, D-104	Project Number:	Not Provided	Received:	12/24/97
Kent, WA 98032	Project Manager:	Stan Haskins	Reported:	12/31/97 09:56

ANALYTICAL REPORT FOR SAMPLES:

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
MW-1	B712529-01	Water	12/23/97
MW-2	B712529-02	Water	12/23/97
MW-3	B712529-03	Water	12/23/97

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PORTLAND ▪ (503) 643-9200 ▪ FAX 644-2202

Fluor Daniel - GTI, Inc. - Kent	Project:	Sthl/14392/9 Nickerson Way	Sampled: 12/23/97
19033 West Valley Hwy, D-104	Project Number:	Not Provided	Received: 12/24/97
Kent, WA 98032	Project Manager:	Stan Haskins	Reported: 12/31/97 09:56

Gasoline Hydrocarbons (Toluene to Dodecane) and BTEX by WTPH-G and EPA 8020A
North Creek Analytical - Bothell

Analyte	Batch Number	Date Prepared	Date Analyzed	Surrogate Limits	Reporting Limit	Result	Units	Notes*
MW-1			B712529-01				Water	
Gasoline Range Hydrocarbons	1270761	12/29/97	12/29/97		125	**1220**	ug/l	
Benzene	"	"	"		1.25	**4.91**	"	
Toluene	"	"	"		1.25	ND	"	
Ethylbenzene	"	"	"		1.25	**64.4**	"	
Xylenes (total)	"	"	"		2.50	**10.9**	"	
Surrogate: 4-BFB (FID)	"	"	"	*50.0-150*		*103*	%	
Surrogate: 4-BFB (PID)	"	"	"	*50.0-150*		*100*	"	
MW-2			B712529-02				Water	
Gasoline Range Hydrocarbons	1270761	12/29/97	12/29/97		50.0	ND	ug/l	
Benzene	"	"	"		0.500	ND	"	
Toluene	"	"	"		0.500	ND	"	
Ethylbenzene	"	"	"		0.500	ND	"	
Xylenes (total)	"	"	"		1.00	ND	"	
Surrogate: 4-BFB (FID)	"	"	"	*50.0-150*		*80.8*	%	
Surrogate: 4-BFB (PID)	"	"	"	*50.0-150*		*90.6*	"	
MW-3			B712529-03				Water	
Gasoline Range Hydrocarbons	1270761	12/29/97	12/29/97		50.0	ND	ug/l	
Benzene	"	"	"		0.500	ND	"	
Toluene	"	"	"		0.500	ND	"	
Ethylbenzene	"	"	"		0.500	ND	"	
Xylenes (total)	"	"	"		1.00	ND	"	
Surrogate: 4-BFB (FID)	"	"	"	*50.0-150*		*78.5*	%	
Surrogate: 4-BFB (PID)	"	"	"	*50.0-150*		*94.6*	"	

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SPOKANE ▪ (509) 924-9200 ▪ FAX 924-9290
PORTLAND ▪ (503) 643-9200 ▪ FAX 644-2202

Fluor Daniel - GTI, Inc. - Kent	Project:	Sthl/14392/9 Nickerson Way	Sampled: 12/23/97
19033 West Valley Hwy, D-104	Project Number:	Not Provided	Received: 12/24/97
Kent, WA 98032	Project Manager:	Stan Haskins	Reported: 12/31/97 09:56

Gasoline Hydrocarbons (Toluene to Dodecane) and BTEX by WTPH-G and EPA 8020A/Quality Control
North Creek Analytical - Bothell

Analyte	Date Analyzed	Spike Level	Sample Result	QC Result	Units	Reporting Limit / Recov. Limits	Recov. %	RPD Limit	RPD %	Notes*
Batch: 1270761	**Date Prepared: 12/29/97**					**Extraction Method: EPA 5030 (P/T)**				
Blank	**1270761-BLK1**									
Gasoline Range Hydrocarbons	12/29/97			**ND**	ug/l	**50.0**				
Benzene	"			**ND**	"	**0.500**				
Toluene	"			**ND**	"	**0.500**				
Ethylbenzene	"			**ND**	"	**0.500**				
Xylenes (total)	"			**ND**	"	**1.00**				
Surrogate: 4-BFB (FID)	"	*48.0*		*39.4*	"	*50.0-150*	*82.1*			
Surrogate: 4-BFB (PID)	"	*48.0*		*46.7*	"	*50.0-150*	*97.3*			
LCS	**1270761-BS1**									
Gasoline Range Hydrocarbons	12/29/97	500		538	ug/l	75.0-125	108			
Surrogate: 4-BFB (FID)	"	*48.0*		*41.6*	"	*50.0-150*	*86.7*			
Duplicate	**1270761-DUP1**		**B712530-04**							
Gasoline Range Hydrocarbons	12/29/97		1280	1050	ug/l			25.0	**19.7**	
Surrogate: 4-BFB (FID)	"	*48.0*		*39.5*	"	*50.0-150*	*82.3*			
Duplicate	**1270761-DUP2**		**B712536-01**							
Gasoline Range Hydrocarbons	12/29/97		4640	5030	ug/l			25.0	**8.07**	
Surrogate: 4-BFB (FID)	"	*48.0*		*39.1*	"	*50.0-150*	*81.5*			
Matrix Spike	**1270761-MS1**		**B712529-03**							
Benzene	12/29/97	10.0	ND	10.6	ug/l	70.0-130	**106**			
Toluene	"	10.0	ND	9.79	"	70.0-130	**97.9**			
Ethylbenzene	"	10.0	ND	9.57	"	70.0-130	**95.7**			
Xylenes (total)	"	30.0	ND	27.9	"	70.0-130	**93.0**			
Surrogate: 4-BFB (PID)	"	*48.0*		*44.5*	"	*50.0-150*	*92.7*			
Matrix Spike Dup	**1270761-MSD1**		**B712529-03**							
Benzene	12/29/97	10.0	ND	11.1	ug/l	70.0-130	**111**	15.0	**4.61**	
Toluene	"	10.0	ND	10.1	"	70.0-130	**101**	15.0	**3.12**	
Ethylbenzene	"	10.0	ND	9.64	"	70.0-130	**96.4**	15.0	**0.729**	
Xylenes (total)	"	30.0	ND	27.8	"	70.0-130	**92.7**	15.0	**0.323**	
Surrogate: 4-BFB (PID)	"	*48.0*		*43.8*	"	*50.0-150*	*91.2*			

North Creek Analytical, Inc.

**Refer to end of report for text of notes and definitions.*

Joy B Chang, Project Manager

NORTH CREEK ANALYTICAL
Environmental Laboratory Services

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PORTLAND ▪ (503) 643-9200 ▪ FAX 644-2202

Fluor Daniel - GTI, Inc. - Kent	Project:	Sthl/14392/9 Nickerson Way	Sampled: 12/23/97
19033 West Valley Hwy, D-104	Project Number:	Not Provided	Received: 12/24/97
Kent, WA 98032	Project Manager:	Stan Haskins	Reported: 12/31/97 09:56

Notes and Definitions

#	Note
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
Recov.	Recovery
RPD	Relative Percent Difference

North Creek Analytical, Inc.

Joy B Chang, Project Manager

18939 120th Avenue N.E., Suite 101, Bothell, WA 98011-9508
East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
9405 S.W. Nimbus Avenue, Beaverton, OR 97008-7132

NORTH CREEK ANALYTICAL

18939 120th Avenue N.E., Suite 101, Bothell, WA 98011-9508 (206) 481-9200 FAX 485-2992
East 11115 Montgomery, Suite B, Spokane, WA 98206-4779 (509) 924-9200 FAX 924-9290
15055 S.W. Sequoia Parkway, Suite 110, Portland, OR 97224-7155 (503) 624-9800 FAX 684-3782

CHAIN OF CUSTODY REPORT

B712529

CLIENT: Floor Daniel GTI
ADDRESS: 19033 W. Valley HWY #D-104
Kent, WA 98032
PHONE: (425) 251-5441 FAX: (425) 251-8452
PROJECT NAME: STLD #14392
PROJECT NUMBER:
SAMPLED BY: Chris

REPORT TO: Stan Hastins
BILLING TO: Connie Hoffman
P.O. NUMBER:
NCA QUOTE #:

SAME DAY RUSH	(+150%)
NEXT BUSINESS DAY RUSH	(+100%)
2 BUSINESS DAY RUSH	(+80%)
3 BUSINESS DAY RUSH	(+60%)
5 BUSINESS DAY RUSH	(+40%)
10 BUSINESS DAY STANDARD	(LIST PRICE)
5 BUS. DAY HYDROCARBONS	(LIST PRICE) X

SAMPLE IDENTIFICATION: (NUMBER OR DESCRIPTION)	SAMPLING DATE / TIME	MATRIX (W,S,O)	# OF CONT.	Analysis Request: BTEX, TPH-G	COMMENTS & PRESERVATIVES USED	NORTH CREEK SAMPLE NUMBER
1. MW-1	12/23/97 10:31	W	2	X		B712529-01
2. MW-2	10:09	|	|	|		-02
3. MW-3	10:02	|	|	|		-03
4.						
5.						
6.						
7.						
8.						
9.						
10.						

RELINQUISHED BY: Stan
FIRM: FDGTI
DATE:
TIME:
RECEIVED BY: K Barker
FIRM: NCA
DATE: 12/24/97
TIME: 1005

RELINQUISHED BY: K Barker
FIRM: NCA
DATE: 12/24/97
TIME: 1200
RECEIVED BY: Dana Hay
FIRM: NCA-B 8.4
DATE: 12/24/97
TIME: 12:00

ADDITIONAL REMARKS: Washington Methods w/o c.s

APPENDIX B

LABORATORY REPORTS - SOIL

STLD #14392 PROJECT
Seattle, Washington
Fluor Daniel GTI

Gasoline (NWTPH-Gx) & BTEX (EPA 8020) Analyses for Soils

Sample Number	Date Analyzed	Benzene mg/kg	Toluene mg/kg	Eth Benz mg/kg	Xylene mg/kg	Gasoline mg/kg	Recovery (%)
Meth. Blank	10/15/97	nd	nd	nd	nd	nd	103
GB-1A	10/15/97	nd	nd	0.76	3.16	372	97
GB-1B	10/15/97	nd	nd	nd	nd	nd	98
GB-1C	10/15/97	nd	nd	nd	nd	nd	104
GB-2A	10/15/97	nd	nd	0.50	0.85	39	98
GB-2A Dup	10/15/97	nd	nd	0.46	0.84	41	101
Meth. Blank	10/16/97	nd	nd	nd	nd	nd	101
GB-2B	10/16/97	nd	nd	nd	nd	nd	94
GB-2C	10/16/97	nd	nd	nd	nd	nd	110
GB-3A	10/16/97	nd	nd	nd	nd	nd	105
GB-3B	10/16/97	nd	nd	nd	nd	nd	106
GB-3B Dup	10/16/97	nd	nd	nd	nd	nd	102
GB-3C	10/16/97	nd	nd	nd	nd	nd	97
GB-4	10/16/97	nd	nd	nd	nd	nd	109
GB-5	10/16/97	nd	nd	nd	nd	nd	108
GB-6	10/16/97	nd	nd	nd	nd	nd	109
GB-7A	10/16/97	nd	nd	nd	nd	15	104
GB-7B	10/16/97	nd	nd	nd	nd	nd	108
Detection Limits		0.05	0.05	0.05	0.05	10	

"nd" Indicates not detected at the listed detection limits.
"int" Indicates that interferences prevent determination.

FLUOR DANIEL GTI

RECEIVED
MAY 06 1998
DEPT. OF ECOLOGY

LETTER OF TRANSMITTAL

To: WDOE/LUST GROUP NW
3190 160th Avenue SE
Bellevue, WA 98008-5452

Date: May 5, 1998

Attn: Brian Sato

Re: Southland site #14392
9 Nickerson Street, Seattle, WA

We are sending you: X Attached _Under separate cover, the following:
_Technical Literature _Proposal/Contract _Plans _Samples
_Specifications _Copy of letter _Change Order

Enclosure(s): One copy of " Remediation Progress Report , October through December 1997" for the above-referenced site.

These are transmitted as checked below:
_As requested X For your use _For approval _For review and comment
_For bids due_____19_

Comments:

If enclosures received are not as listed above, notify at once.

Signed: Pamela L. Kelli (425) 228-9645

555 South Renton Village Place, Suite 700 / Renton, WA 98055 USA (425) 228-9645 FAX (425) 228-9793