


# 2008 GROUNDWATER MONITORING REPORT

## NORTH BAY PROPERTY

PREPARED FOR  
TESORO ALASKA COMPANY



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## Acronyms and Abbreviations

µg/L	micrograms per liter
AS	air sparge
BTEX	benzene, toluene, ethylbenzene, and xylenes
DRO	diesel-range organics
EDC	1,2-dichloroethane
GRO	gasoline-range organics
KSI	Kent & Sullivan, Inc.
MCL	maximum contaminant level
TA	TestAmerica
RPD	relative percent difference
SGS	SGS Environmental Services, Inc.
SVE	soil vapor extraction
Tesoro	Tesoro Alaska Company

## 1.0 INTRODUCTION

This report documents the field activities and results of the groundwater monitoring performed during May and October 2008 at the North Bay property located at mile 15.4 on the Kenai Spur Highway north of Kenai, Alaska (Figure 1). The site includes a former Tesoro Alaska Company (Tesoro) service station located along the highway and a commercial office property situated between the service station site and the Cook Inlet bluff.

A narrow plume of dissolved-phase hydrocarbon was delineated in the upper part of the unconfined aquifer underlying the North Bay site. Benzene and 1,2-dichloroethane (EDC) are the primary contaminants of concern in the plume. The plume has never been more than 60 feet wide and extended approximately 950 feet downgradient from the service station prior to beginning remediation activities in July 2000.

## 2.0 FIELD ACTIVITIES

### 2.1 GROUNDWATER MONITORING

The 2008 groundwater monitoring program was conducted in accordance with the 2008 workplan. Monitoring events were conducted in May and October 2008.

Site monitoring wells were gauged on May 12, 2008 and October 13, 2008. An electronic water level meter was used to measure the depth to water in the wells. Table 1 provides the gauging data and calculated potentiometric surface elevations for these gauging event.

All site monitoring wells were sampled between May 19 and 22, 2008. Monitoring wells B-12, B-22, B-36, and B-50 were sampled again on October 13, 2008. No-purge sampling was performed using disposable bailers.

The groundwater samples were analyzed for BTEX (benzene, toluene, ethylbenzene, and xylenes), GRO (gasoline range organics), and EDC. SGS Environmental Services (SGS) in Anchorage, Alaska performed the BTEX, GRO, and EDC analyses. Table 2 summarizes the analytical results; Table 3 is a summary of historical hydrocarbon data; and Appendix A contains the laboratory reports, chain of custody and sample receipt forms.

### 2.2 REMEDIATION SYSTEM OPERATION

The groundwater remediation air sparge (AS) and soil vapor extraction (SVE) systems were not operated in 2008. The remediation system was removed from the site in late fall of 2008.

Fifteen monitoring wells and three air sparge points previously approved for abandonment (2008 Well Abandonment Plan, KSI) were abandoned on August 11 and 12, 2008.

*Need Tesoro/K&S to inform us of the date when turned off in 2007 or 2008?*

*report? we have the report?*

*point 7-15-09*

### 3.0 QUALITY CONTROL SUMMARY

This QA summary includes a review, where appropriate, of holding times, blanks, matrix spike (MS) and laboratory control sample (LCS) recoveries, duplicate sample relative percent differences (RPDs), reporting limits, and overall assessment of data in the sample event. Each analysis that was performed is evaluated in the following subsections.

Field samples were reviewed to determine overall precision of sampling and analysis as well as matrix heterogeneity for BTEX, GRO, and EDC.

Laboratory data were evaluated using laboratory-supplied control criteria. In the following method-specific discussions, only the criteria exceedances that impact data qualification or require assessment beyond laboratory documentation are discussed.

Twenty-one samples, were submitted in one batch on May 23, 2008. Sample DUP-1 was collected as a duplicate of sample B-022, sample Dup-2 was collected as a duplicate of sample B-037. Sample B-040 was designated as a matrix spike/matrix spike duplicate (MS/MSD) sample. Five samples, including one duplicate sample and one trip blank, were submitted in one laboratory batch on October 14, 2008. Sample Dup-1 was collected as a duplicate of sample B-50. Sample B-12 was designated as a matrix spike/matrix spike duplicate (MS/MSD) sample.

May samples are reported under SGS job number 1082237, and October samples are reported under job number 1085632.

All samples were received by SGS in good condition. May samples were shipped without a trip blank. October samples were received below the recommended  $4\pm 2^{\circ}\text{C}$  at  $1.4/1.9^{\circ}\text{C}$ . Ice was not noted in any of the samples; therefore, no further action was taken.

#### 3.1 GRO/BTEX BY AK101

All data elements/indicators are in conformance with the project criteria, with the following exceptions:

May samples:

- A trip blank was not submitted with the May samples.
- Benzene relative percent difference (RPD) in the May samples between Dup-1 and B-022 exceeds 30% at 33.4%. The affected analytes are J-flagged to indicate that the results are estimated.

October samples:

- The MSD recovery for o-xylene (84%) was below the laboratory QC limits (85-120%). The LCS/LCSD was within limits; no qualifications were made.

### 3.2 EDC BY EPA 8260

All data elements/indicators are in conformance with the project criteria, with the following exception for May samples:

- A trip blank was not submitted with this batch of samples.

### 3.3 OVERALL ASSESSMENT

The following summary highlights the data evaluation findings for this sampling event:

- The completeness objectives (greater than 85 percent complete) for this project are met.
- The precision and accuracy of the laboratory data, as measured by laboratory quality control indicators, suggest that the data are useable as qualified for the purposes of this project.
- The precision measurements for result comparisons between primary and duplicate field samples are acceptable as qualified for the purpose of this project.

## 4.0 DISCUSSION

Figures 2 and 3 are potentiometric surface elevation contour maps based on the May and October 2008 gauging data, respectively. The data show that groundwater flow patterns and gradients were similar to those observed during previous gauging events. Water levels are a little over one-half foot lower than last year (Figure 4). Well B-8 has anomalous water levels and is not used in either of the groundwater contour maps.

- Figure 5 is a map showing May 2008 and October 2008 benzene and EDC concentrations. The principal results of the sampling are discussed in the following paragraphs.
- Contaminant concentrations in monitoring wells B-12, B-36, and B-50 have continued to decline and are now below the laboratory detection limit.
- BTEX, GRO and EDC concentrations are below clean up criteria and continue to decline in monitoring well B-22.
- All wells have met ADEC groundwater criteria since October 2007.
- The site is now eligible for a "cleanup complete" determination by ADEC.

## 5.0 2009 PROPOSED ACTIVITIES

Tesoro plans to remove all remaining monitoring and remediation wells upon receiving approval from ADEC. A final report will be submitted to document all work that has been performed at the site and the final well abandonments.

Table 1  
**Groundwater Level Measurements**  
 North Bay Property  
 May and October 2008

Well No	Gauge Date	Elevation TOC (ft MLLW)	DTW (feet)	Potentiometric Surface Elevation (ft MLLW)
B-001	12-May-08	85.35	54.29	31.06
	13-Oct-08	85.35	54.62	30.73
B-008	12-May-08	85.81	60.83	24.98
	13-Oct-08	85.81	61.23	24.58
B-012	12-May-08	85.47	59.57	25.90
	13-Oct-08	85.47	59.82	25.65
B-013	12-May-08	84.74	57.48	27.26
	13-Oct-08	84.74	57.77	26.97
B-014	12-May-08	84.91	53.78	31.13
	13-Oct-08	84.91	54.10	30.81
B-021	12-May-08	85.07	51.92	33.15
B-022	12-May-08	85.11	57.66	27.45
	13-Oct-08	85.11	57.91	27.20
B-023	12-May-08	85.6	62.41	23.19
B-024	12-May-08	85.89	62.92	22.97
B-025	12-May-08	84.17	67.60	16.57
B-028	12-May-08	85.52	63.88	21.64
B-029	12-May-08	84.85	63.94	20.91
B-030	13-Oct-08	85.73	dry	dry
B-031	12-May-08	85.21	61.74	23.47
B-032	12-May-08	86.12	62.32	23.80
B-033	12-May-08	85.51	60.44	25.07
B-034	12-May-08	85.48	52.90	32.58
B-035	12-May-08	84.2	66.15	18.05
B-036	12-May-08	84.93	55.68	29.25
	13-Oct-08	84.93	55.97	28.96
B-037	12-May-08	85.3	63.40	21.90
B-038	12-May-08	84.99	63.02	21.97
B-039	12-May-08	84.97	65.03	19.94

**Table 1**  
**Groundwater Level Measurements**  
 North Bay Property  
 May and October 2008

Well No	Gauge Date	Elevation TOC <i>(ft MLLW)</i>	DTW <i>(feet)</i>	Potentiometric Surface Elevation <i>(ft MLLW)</i>
B-040	12-May-08	84.14	66.56	17.58
B-050	12-May-08	88.76	58.89	29.87
	13-Oct-08	88.76	59.15	29.61

Notes:

- DTW    Depth to water
- ft. MLLW    Elevation relative to mean lower low water (feet.)
- TOC    Top of casing



Table 2  
**Summary of BTEX, GRO, and EDC Data**  
 May and October 2008  
 North Bay Project

Sample Source	Sample Date	Benzene (5)	Ethylbenzene (700)	Toluene (1,000)	Xylenes (10,000)	GRO (1,300)	EDC (5)
B-012	19-May-08	<b>0.55</b>	2 U	2 U	4 U	100 U	<b>0.58</b>
	13-Oct-08	0.5 U	2 U	2 U	2 U	100 U	0.5 U
B-021✓	21-May-08	0.5 U	2 U	2 U	4 U	100 U	<b>1.17</b>
B-022	19-May-08	<b>1.25 J</b>	<b>187</b>	2 U	4 U	<b>363</b>	<b>2.35</b>
	13-Oct-08	<b>0.518</b>	<b>90.2</b>	2 U	<b>2.57</b>	<b>158</b>	<b>1.24</b>
B-023 ✓	21-May-08	0.5 U	2 U	2 U	4 U	100 U	0.5 U
B-024 ✓	20-May-08	0.5 U	2 U	2 U	4 U	100 U	0.5 U
B-025✓	22-May-08	0.5 U	2 U	2 U	4 U	100 U	0.5 U
B-028✓	20-May-08	0.5 U	2 U	2 U	4 U	100 U	0.5 U
B-029✓	21-May-08	0.5 U	2 U	2 U	4 U	100 U	0.5 U
B-031✓	20-May-08	0.5 U	2 U	2 U	4 U	100 U	<b>1.27</b>
B-032✓	20-May-08	0.5 U	2 U	2 U	4 U	100 U	0.5 U
B-033✓	22-May-08	0.5 U	2 U	2 U	4 U	100 U	0.5 U
B-034 ✓	22-May-08	0.5 U	2 U	2 U	4 U	100 U	0.5 U
B-035✓	22-May-08	0.5 U	2 U	2 U	4 U	100 U	0.5 U
B-036	19-May-08	0.5 U	2 U	2 U	4 U	100 U	0.5 U
	13-Oct-08	0.5 U	2 U	2 U	2 U	100 U	0.5 U
B-037✓	21-May-08	0.5 U	2 U	2 U	4 U	100 U	<b>1.57</b>
B-038	21-May-08	0.5 U	2 U	2 U	4 U	100 U	<b>2.26</b>
B-039 ✓	21-May-08	0.5 U	2 U	2 U	4 U	100 U	<b>3.02</b>
B-040 ✓	22-May-08	0.5 U	2 U	2 U	4 U	100 U	<b>1.29</b>
B-050	19-May-08	<b>1.05</b>	2 U	2 U	4 U	100 U	<b>0.61</b>
	13-Oct-08	0.5 U	2 U	2 U	2 U	100 U	0.5 U

Concentrations are reported in ug/L.

**Bold** Analyte was detected.

EDC 1,2-Dichloroethane by EPA Method 8260.

GRO Gasoline range organics by AK101

J Estimated concentration.

U Analyte was not present in a concentration above the detection level shown on the table.

Table 3  
**Summary of Historical Hydrocarbon Data (ug/L)**  
 North Bay Project

B-001?  
B-008?

Well No.	Project Phase	Sample Date (Criteria):	Benzene (5)	Toluene (1,000)	Ethylbenzene (700)	Xylenes (10,000)	GRO (1,300)	EDC (5)
B-012	OASIS	10/10/1997	1700	840	330	1150	9000	0.5 U
	Oasis98	5/7/1998	1130	418	218	727	--	0.2 U
	OASIS	8/7/1998	835 H	356	203	679	--	17.8 H
	OASIS	10/5/1999	190	56	97	214	--	14
	KSI, 2000	5/24/2000	480	100	170	404	--	20 Y
	KSI, 2000	8/23/2000	913	161	100 U	590	--	--
	KSI, 2000	11/29/2000	520	98	150	330	--	--
	KSI, 2001	4/30/2001	560	13	160	280	--	10 U
	KSI, 2001	8/15/2001	4.2	1 U	8.4	3.2	--	--
	KSI, 2001	10/31/2001	52	1 U	10	2.3	--	--
	KSI, 2002	5/2/2002	1.1	1 U	1.9	1 U	--	--
	KSI, 2002	10/16/2002	23	1 U	1 U	1 U	--	--
	KSI, 2003	5/14/2003	1 U	1 U	1 U	1 U	--	--
	03R2	10/2/2003	0.5 U	0.5 U	0.5 U	1 U	80 U	4.55
	04R1	6/2/2004	0.5 U	0.5 U	0.5 U	1.5 U	50 U	5.15
	04R2	11/2/2004	0.5 U	0.5 U	0.5 U	1.5 U	50 U	2.14
	05R1	5/4/2005	0.5 U	0.5 U	0.5 U	1.5 U	50 U	1.81
	05R2	10/18/2005	0.5 U	0.5 U	0.5 U	1.5 U	50 U	1.12
	06R1	5/3/2006	1 U	1 U	1 U	2 U	50 U	2.64
	06R2	11/9/2006	0.5 U	0.5 U	0.5 U	1.5 U	50 U	1.04
07R1	5/8/2007	0.647	0.5 U	0.5 U	1.5 U	50 U	0.9	
07R2	10/3/2007	0.616	0.5 U	0.5 U	1.5 U	50 U	1 U	
08R1	5/19/2008	0.55	2 U	2 U	4 U	100 U	0.58	
08R2	10/13/2008	0.5 U	2 U	2 U	2 U	100 U	0.5 U	
B-014	OASIS	10/10/1997	26	0.5 U	0.5 U	4.6 J	520	0.5 U
	Oasis98	5/7/1998	86.8	0.2 U	0.2 U	0.4 U	--	0.2 U
	OASIS	8/7/1998	112 H	0.2 U	0.65	0.41	--	0.62
	OASIS	10/5/1999	25	0.5 U	0.5 U	0.5 U	--	0.5 U
	05R1	5/4/2005	0.5 U	0.5 U	0.5 U	1.5 U	50 U	0.5 U
B-021	Oasis98	5/7/1998	739	0.51	137	246	--	0.2 U
	OASIS	8/8/1998	410 H	0.38	78.4	173	--	17.6 H
	OASIS	10/6/1999	410	0.5 U	120	124	--	34
	KSI, 2000	5/24/2000	330	1 U	150	160	--	22 J
	KSI, 2000	8/23/2000	295	100 U	100 U	158	--	--
	KSI, 2002	10/16/2002	1 U	1 U	42	1.1	--	--
	KSI, 2003	5/14/2003	1 U	1 U	38	1 U	--	--
	03R2	10/2/2003	0.5 U	0.5 U	11.8	1 U	80 U	2.55

B-013?

Table 3  
**Summary of Historical Hydrocarbon Data (ug/L)**  
 North Bay Project

Well No.	Project Phase	Sample Date (Criteria):	Benzene (5)	Toluene (1,000)	Ethylbenzene (700)	Xylenes (10,000)	GRO (1,300)	EDC (5)
B-021	04R1	6/2/2004	0.5 U	0.5 U	27.9	1.5 U	74.7	1.41
	04R2	11/2/2004	0.5 U	0.5 U	16.1	1.5 U	50 U	1.29
	05R1	5/4/2005	0.5 U	0.5 U	23.3	1.5 U	70.9	1.45
	05R2	10/18/2005	0.5 U	0.5 U	21.7	1.5 U	67.7	1.22
	08R1	5/21/2008	0.5 U	2 U	2 U	4 U	100 U	1.17
			<i>Abandoned August 2008</i>					
B-022	OASIS	8/7/1998	240 H	98.7	34	54.6	--	4.07
	OASIS	10/6/1999	950	950	350	1150	--	66
	KSI, 2000	5/24/2000	1600	1900	580	2160	--	69 Y
	KSI, 2000	8/23/2000	1520	999	100 U	1603	--	--
	KSI, 2000	11/30/2000	2900	1200	600	1970	--	83
	KSI, 2001	4/30/2001	2600	680	390	1340	--	50 U
	KSI, 2001	8/15/2001	2800	820	540	1920	--	--
	KSI, 2001	10/31/2001	3500	1200	680	2400	--	--
	KSI, 2002	5/2/2002	3400	2100	800	2970	--	--
	03R2	10/2/2003	1160	579	715	1800	10800	35
	04R1	6/2/2004	1450	2770	1030	3560	17800	--
	04R2	11/2/2004	695	1340	727	2650	12800	30.7
	05R1	5/4/2005	983 J	3420	1120	4200	24700	39.5
	05R2	10/18/2005	194 J	28.2	459	856	5760	11.2
	06R1	5/3/2006	13.6 J	0.5 U	19.2 J	32.3 J	359 J	10 U
	06R2	11/9/2006	22.2	5 U	277	47.5	1680	4.34 J
		2/7/2007	37.4	5 U	239	15 U	1920	6.5 J
	07R1	5/8/2007	11.9	2.5 U	205	7.5 U	1070	3.48
	07R2	10/3/2007	4.88	2.5 U	273	7.5 U	826	3.14
	08R1	5/19/2008	1.25 J	2 U	187	4 U	363	2.35
08R2	10/13/2008	0.518	2 U	90.2	2.57	158	1.24	
B-030	OASIS	4/1/1999	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U
	OASIS	8/31/1999	18	34	24	112	--	0.5 U
	05R1	5/4/2005	0.5 U	0.5 U	0.5 U	1.5 U	50 U	0.5 U
B-031	OASIS	9/26/1999	820	2.5	230	162	--	72
	OASIS	10/5/1999	1100	79	280	452	--	110
	KSI, 2000	5/25/2000	740	78	320	510	--	40 J
	KSI, 2000	8/23/2000	294	100 U	100 U	181	--	--
	KSI, 2001	1/2/2001	820	100 U	420	380	--	--
	KSI, 2001	4/30/2001	20	1 U	1 U	1 U	--	17
	KSI, 2001	8/15/2001	320	1 U	95	95	--	--
	KSI, 2001	10/31/2001	140	1 U	79	78	--	--

Table 3  
**Summary of Historical Hydrocarbon Data (ug/L)**  
 North Bay Project

Well No.	Project Phase	Sample Date (Criteria):	Benzene (5)	Toluene (1,000)	Ethylbenzene (700)	Xylenes (10,000)	GRO (1,300)	EDC (5)
B-031	KSI, 2002	5/2/2002	70	1 U	41	19	--	--
	KSI, 2002	10/16/2002	12	1 U	30	1 U	--	--
	KSI, 2003	5/14/2003	9.7	1 U	60	1 U	--	--
	03R2	10/2/2003	0.5 U	0.5 U	0.5 U	1 U	80 U	7.05
	04R1	6/2/2004	0.629	0.605	21.2	1.5 U	75.1	4.72
	04R2	11/2/2004	0.5 U	0.5 U	20.2	1.5 U	63.5	6.89
	05R1	5/4/2005	0.5 U	0.5 U	3.11	1.5 U	50 U	5.54
	05R2	10/18/2005	0.5 U	0.5 U	18.3	1.5 U	58.2	3.67
	06R2	11/9/2006	0.5 U	0.5 U	26.8	1.9	75.2	1.68
	07R2	10/3/2007	--	--	--	--	--	3.4
	08R1	5/20/2008	0.5 U	2 U	2 U	4 U	100 U	1.27
			<i>Abandoned August 2008</i>					
B-036	OASIS	10/30/1999	240	76	86	215	--	12
	KSI, 2000	11/30/2000	790	13	54	130	--	--
	KSI, 2002	5/2/2002	350	1.2	11	6.5	--	--
	05R1	5/4/2005	39.5	0.5 U	21.8	1.5 U	200	1.29
	06R1	5/3/2006	0.5 U	0.5 U	0.5 U	1.5 U	50 U	1 U
	06R2	11/9/2006	0.5 U	0.5 U	0.5 U	1.5 U	50 U	0.5 U
	07R1	5/8/2007	2.82	0.5 U	8.61	9.55	84.2	0.68
	07R2	10/3/2007	2.47	0.5 U	0.5 U	1.5 U	50 U	1 U
	08R1	5/19/2008	0.5 U	2 U	2 U	4 U	100 U	0.5 U
	08R2	10/13/2008	0.5 U	2 U	2 U	2 U	100 U	0.5 U
B-037	OASIS	10/30/1999	630	3	33	29	--	47
	KSI, 2000	5/4/2000	460	1.5	32	34	--	19
	KSI, 2000	8/23/2000	5.8	1 U	1 U	7.9	--	--
	KSI, 2000	11/28/2000	1 U	1 U	1 U	1 U	--	2.3
	KSI, 2001	5/1/2001	1 U	1 U	1 U	1 U	--	--
	KSI, 2002	5/2/2002	1 U	1 U	1 U	1 U	--	--
	05R1	5/4/2005	0.725	0.5 U	0.5 U	1.5 U	50 U	1
	08R1	5/21/2008	0.5 U	2 U	2 U	4 U	100 U	1.57
			<i>Abandoned August 2008</i>					
B-039	OASIS	10/30/1999	1100	110	180	361	--	76
	KSI, 2000	5/25/2000	130	1 U	50	32	--	10 J
	KSI, 2000	8/3/2000	6.8	1 U	1 U	48.7	--	--
	KSI, 2000	8/23/2000	1 U	1 U	1 U	1 U	--	--
	KSI, 2000	11/28/2000	1 U	1 U	1 U	1 U	--	12
	KSI, 2001	4/30/2001	1 U	1 U	1 U	1 U	--	1 U
	KSI, 2001	8/15/2001	1 U	1 U	1 U	1 U	--	--
	KSI, 2001	10/31/2001	1 U	1 U	1 U	1 U	--	--

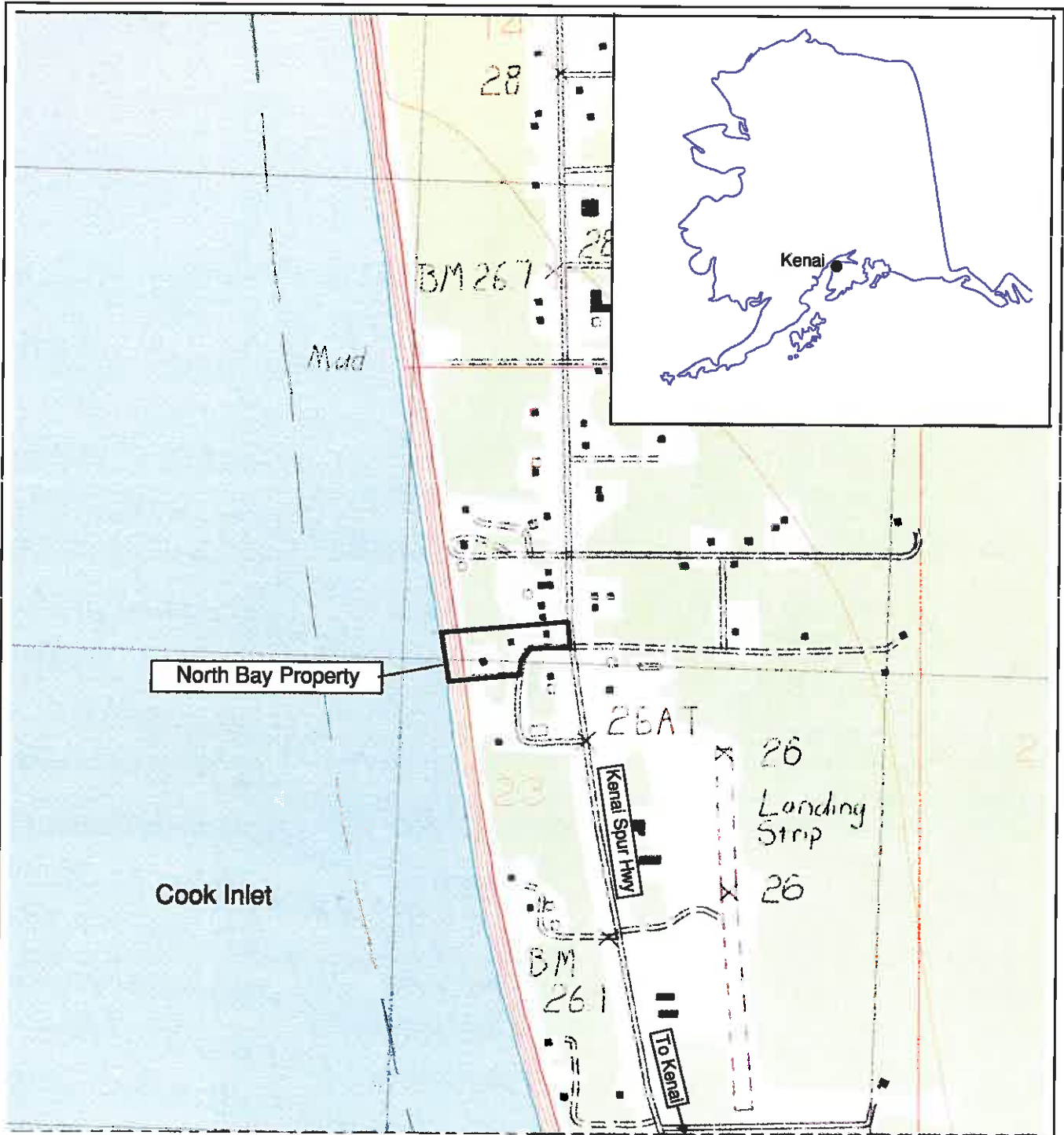
Table 3  
**Summary of Historical Hydrocarbon Data (ug/L)**  
 North Bay Project

Well No.	Project Phase	Sample Date (Criteria):	Benzene (5)	Toluene (1,000)	Ethylbenzene (700)	Xylenes (10,000)	GRO (1,300)	EDC (5)
B-039	KSI, 2002	5/2/2002	1 U	1 U	1 U	1 U	--	--
	KSI, 2002	10/16/2002	1.1	1 U	1 U	1 U	--	9.2
	KSI, 2003	5/14/2003	1 U	1 U	1 U	1 U	--	--
	03R2	10/2/2003	0.5 U	0.5 U	0.5 U	1 U	80 U	4.69
	04R1	6/2/2004	0.5 U	0.5 U	0.5 U	1.5 U	50 U	2.99
	04R2	11/2/2004	0.5 U	0.5 U	0.5 U	1.5 U	50 U	2.2
	05R1	5/4/2005	0.5 U	0.5 U	0.5 U	1.5 U	50 U	1.81
	05R2	10/18/2005	0.5 U	0.5 U	0.5 U	1.5 U	50 U	0.7
	08R1	5/21/2008	0.5 U	2 U	2 U	4 U	100 U	3.02
B-050	05R1	5/4/2005	118	0.5 U	59.9	62.6	739	9.9
	06R1	5/3/2006	0.5 U	0.954	0.512	10.1	50 U	1.18
	06R2	11/9/2006	0.5 U	0.5 U	0.5 U	1.78	50 U	0.5 U
	07R1	5/8/2007	4.41	0.5 U	12.7	14	138	0.94
	07R2	10/3/2007	2.38	0.5 U	0.5 U	1.5 U	50 U	1 U
	08R1	5/19/2008	1.05	2 U	2 U	4 U	100 U	0.61
	08R2	10/13/2008	0.5 U	2 U	2 U	2 U	100 U	0.5 U

*Abandoned August 2006*

Criterion Groundwater cleanup criteria contained in 18 AAC 75.  
**BOLD** The analyte was detected.  
 The concentration exceeds the criterion.  
 - Not analyzed.

EDC 1,2-Dichloroethane.  
 GRO Gasoline range organics.  
 J The concentration is estimated.  
 U Undetected at the level shown.  
 Y The concentration is estimated due to co-elution with benzene - possible high bias.



North Bay Property

Cook Inlet

BM 267

Kenai Spur Hwy

TO Kenai

26AT

26  
Landing Strip

BM 261

28

14

23

2

**Site Location Map**  
~ North Bay Property ~

**TESORO ALASKA COMPANY**

Date: 9/21/00

Drawn by: BKJ

Proj. No.: 01-59

Checked by:

File: S:\01-59 North Bay\Site Location Map.dwg

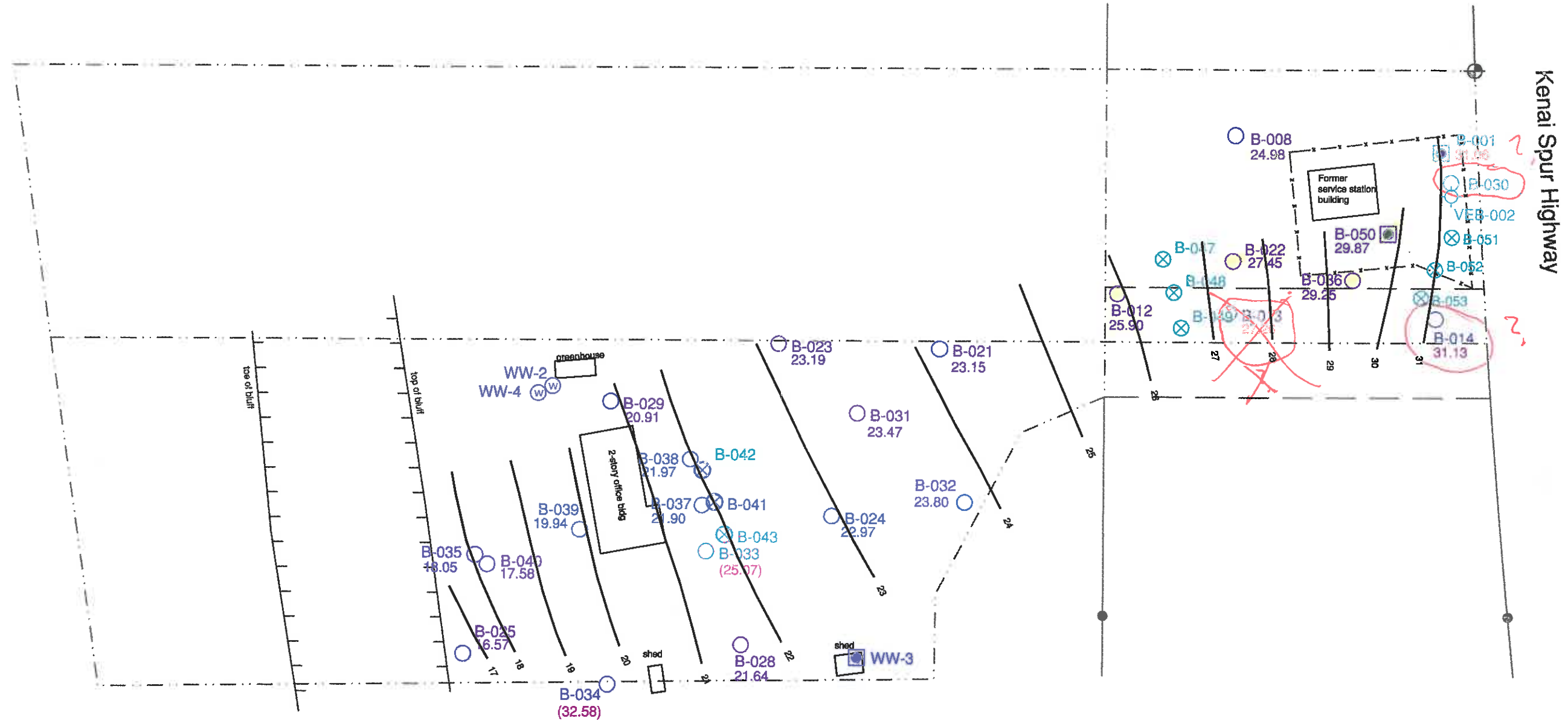
FIGURE

**1**



Base Map: USGS Quadrangle Map, Kenai C4 SW, Scale 1:24,000

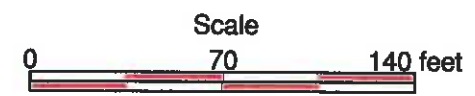
**KENT & SULLIVAN, INC.**



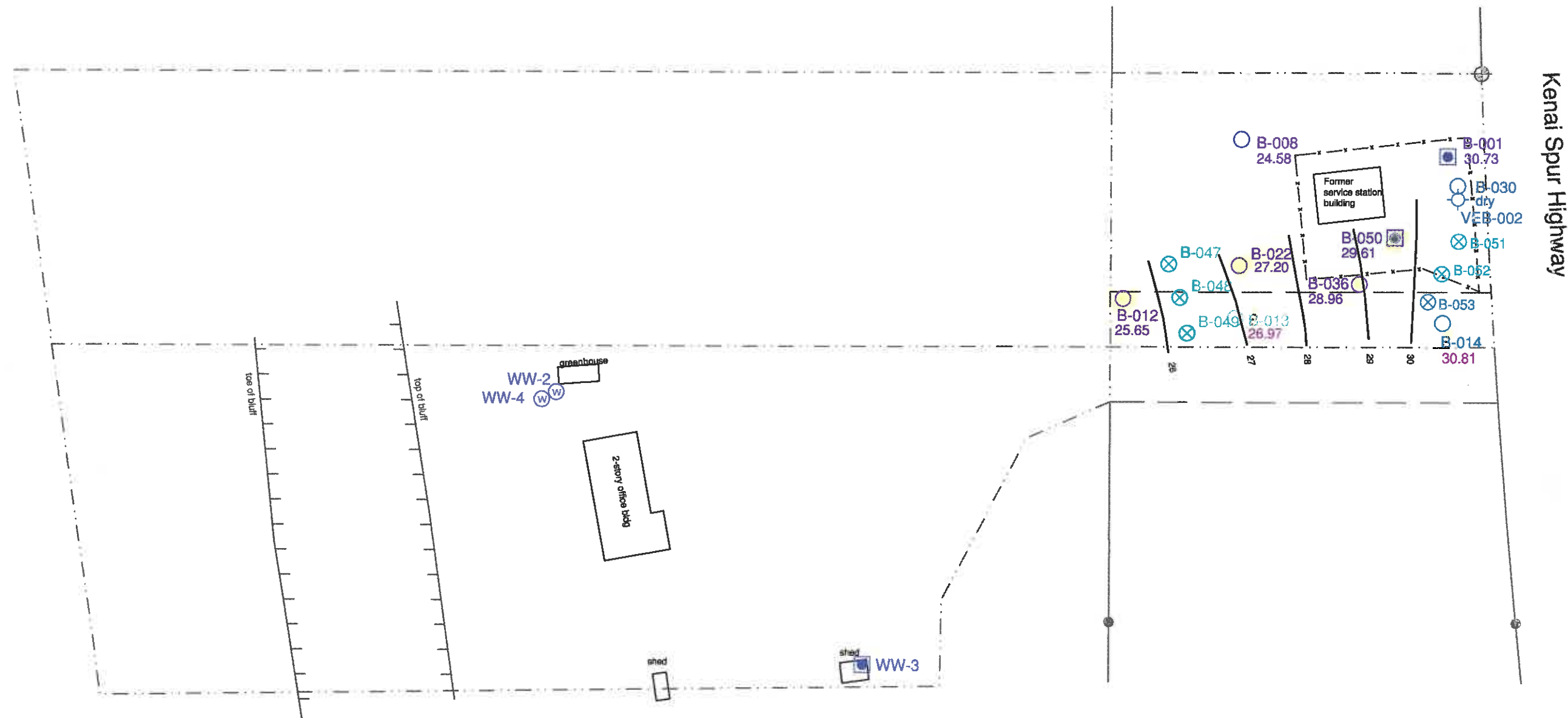
Kenai Spur Highway

**EXPLANATION**

- B-035 ○ Monitoring well location
- B-001 ◼ Monitoring well location - approximate
- B-048 ⊗ Air sparging well location
- VEB-002 ⊕ Vapor extraction well location
- WW-2 ⊕ Water well location
- 46.73 Water table elevation - May 8, 2008  
(in parentheses if not used for contouring)
- ~ Water table contour (1-foot interval)

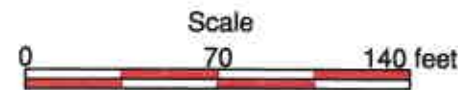


<b>Water Level Contour Map</b> <b>May 12, 2008</b> ~North Bay Property~		FIGURE  <b>2</b>
TESORO ALASKA COMPANY		
Date: 12/08/2008 Proj. No.: 01-59 File: 01-59 North Bay/2008 May.dwg	Drawn by: BKJ Checked by:	
<b>KENT &amp; SULLIVAN, INC.</b>		



**EXPLANATION**

- B-035 ○ Monitoring well location
- B-001 ■ Monitoring well location - approximate
- B-048 ⊗ Air sparging well location
- VEB-002 ⊕ Vapor extraction well location
- WW-2 ⊕ Water well location
- 46.73 Water table elevation - October 13, 2008  
(in parentheses if not used for contouring)
- ~ Water table contour (1-foot interval)



**Water Level Contour Map**  
**October 13, 2008**  
 ~North Bay Property~

TESORO ALASKA COMPANY

Date: 12/08/2008

Drawn by: BKJ

Proj. No.: 01-59

Checked by:

File: 01-59 North Bay/May 2008 .dwg

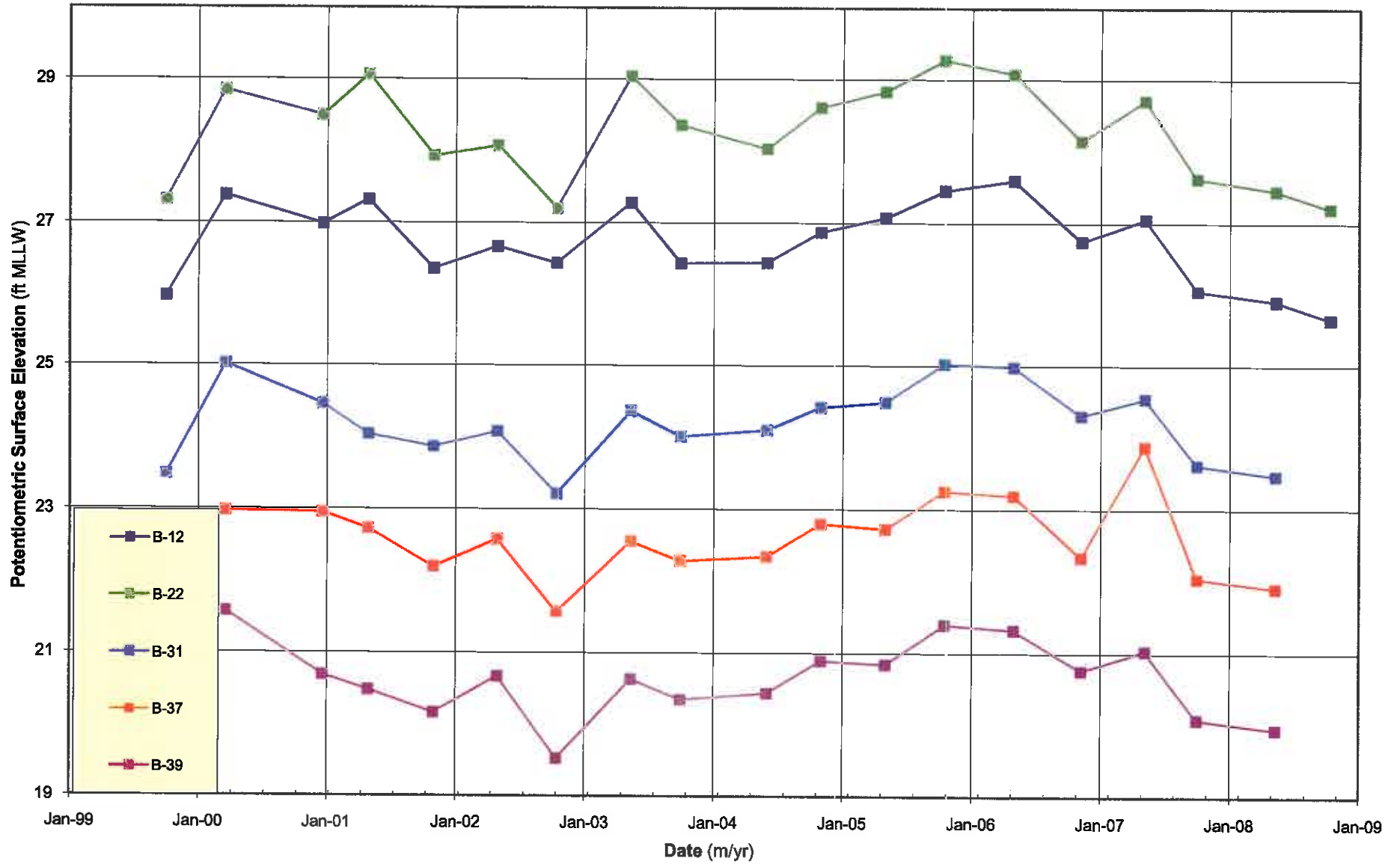
FIGURE

**3**

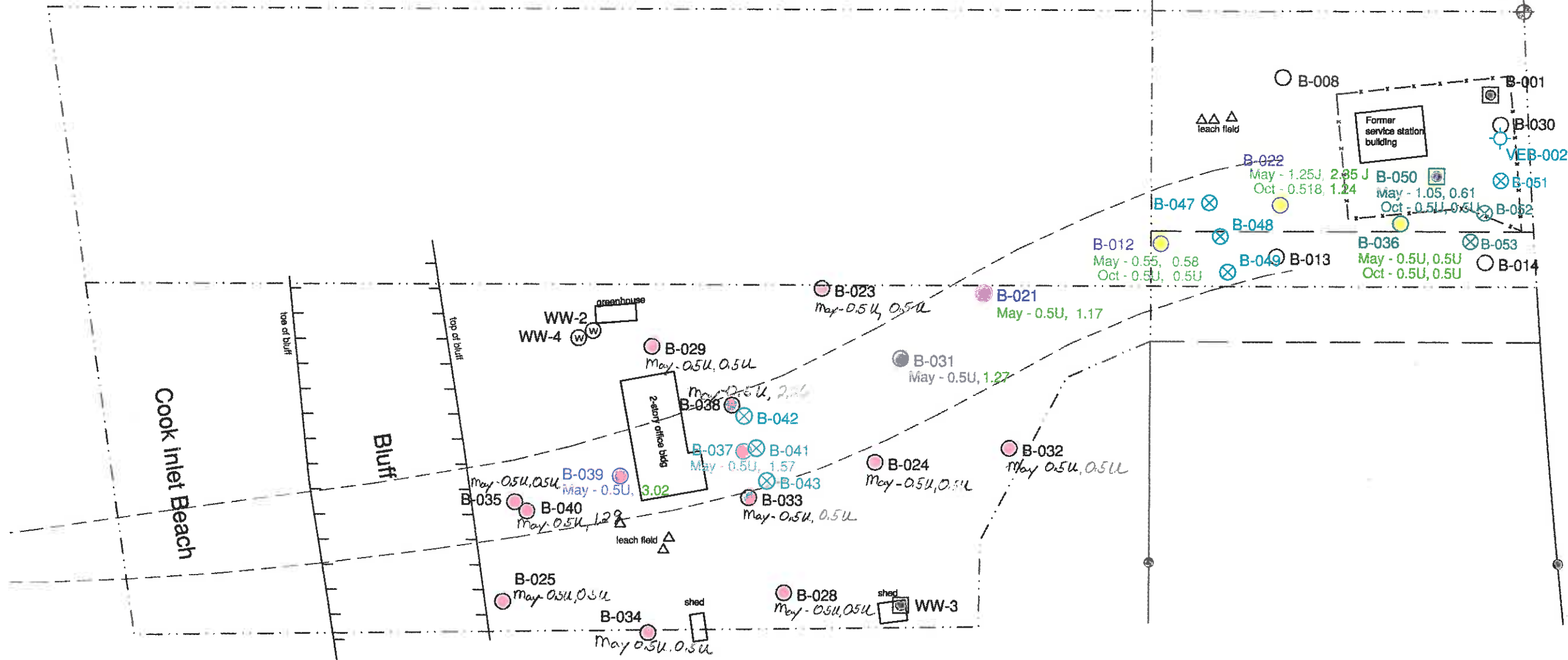
**KENT & SULLIVAN, INC.**



### Hydrographs October 1999 to October 2008



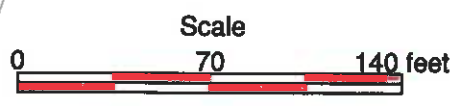
Kenai Spur Highway



**EXPLANATION**

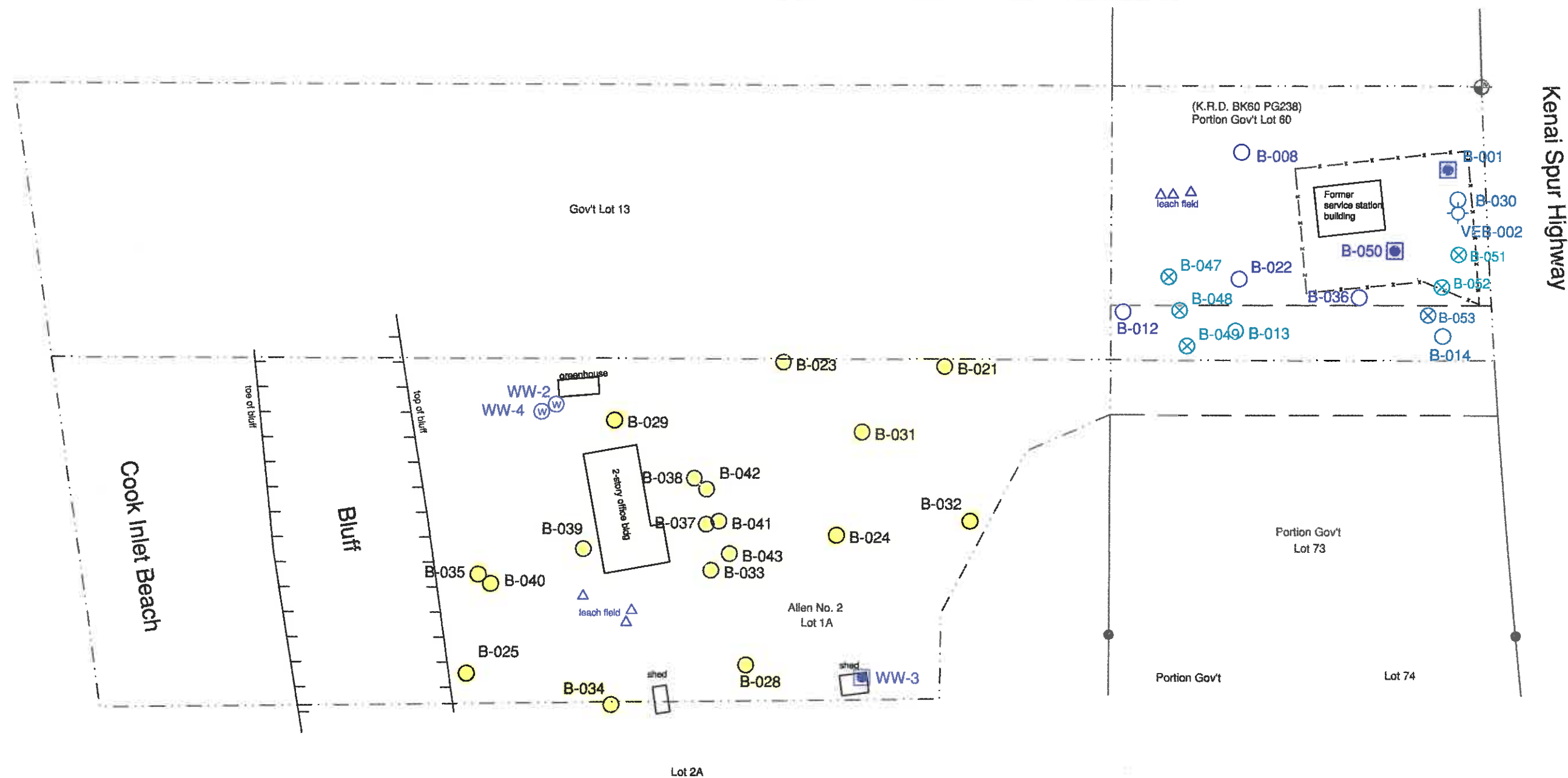
- B-035 ○ Monitoring well sampled in 2008
- B-001 ■ Monitoring well location - approximate
- B-025 ○ Monitoring well location
- B-048 ⊗ Air sparging well location
- VEB-002 ⊕ Vapor extraction well location
- WW-2 ⊕ Water well location
- Oct 4 - 1U, 2.55 Sample month - Benzene, EDC concentrations (µg/L). Bold text indicates the concentration is above ADEC groundwater criteria. NA = not analyzed
- Approximate extent of groundwater plume before remediation March 2000

- Note:**
- B-041, 42, 43 Phase - 1 Air Sparge System
  - B-047, 48, 49 Phase - 2 Air Sparge System
  - B-051, 52, 53 Phase - 3 Air Sparge System
  - Wells sampled May and Oct
  - Wells sampled in May Only



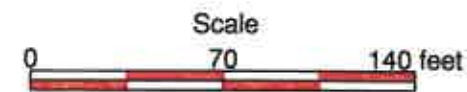
<b>2008 Benzene and EDC Concentrations Map</b>	
~North Bay Property~	
<b>TESORO ALASKA COMPANY</b>	
Date: 12/08/2008	Drawn by: BKJ
Proj. No.: 01-59	Checked by:
File: 01-59 North Bay/2008 report.dwg	
<b>KENT &amp; SULLIVAN, INC.</b>	

FIGURE  
**5**



**EXPLANATION**

- B-021 ● Wells selected for abandonment
- B-030 ○ Monitoring well location
- B-001 ◼ Monitoring well location - approximate
- B-048 ⊗ Air sparging well location
- VEB-002 ⊕ Vapor extraction well location
- WW-2 ⊗ Water well location



15 mu's 3 AS wells  
**Wells Selected for Abandonment**

~North Bay Property~

TESORO ALASKA COMPANY

Date: 1/17/2008

Drawn by: BKJ

Proj. No.: 01-59

Checked by:

File: 01-59 North Bay/2007 May.dwg

FIGURE

**6**

**KENT & SULLIVAN, INC.**