2004 Monitoring Report

Hot Oil Pipeline Release
Nikiski, Alaska

ADEC Spill No. 1987230126701

Prepared for
Tesoro Alaska Company

Prepared by
Kent & Sullivan, Inc.
Environmental Consultants

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1.0 FIELD ACTIVITIES AND FINDINGS

This report presents the results of monitoring performed since 2001at a release area referred to as the Hot Oil Pipeline Release. The pipeline is owned by Tesoro Alaska Company and is located on the ConocoPhillips (Phillips) property located approximately eleven miles north of Kenai, Alaska (Figure 1). A previous report[1] provides a comprehensive summary of the release and findings from subsequent investigations.

Tesoro has monitored the area since 2001, which has included monitoring Cook Inlet beach area for seeps, measuring depth to water in two monitoring wells (Figure 2), and collecting representative groundwater samples. The work that has been performed is summarized in the following paragraphs.

1.1 COOK INLET SEEP INSPECTIONS

Tesoro personnel inspect the Cook Inlet beach on a monthly basis while performing other unrelated monitoring activities. Beach seeps have not been observed below the hot oil release area since 1997.

1.2 GROUNDWATER GAUGING

Depth to water and light non-aqueous phase liquid (LNAPL) are gauged in monitoring wells B-1 and B-2 on a biannual basis. Biannual gauging in well B-2 was discontinued in 2002 because Phillips installed a fence between the two wells which made access to well B-2 difficult. Table 1 is a tabulation of the gauging data, and Figure 3 is a time-series graph of the potentiometric surface elevations and LNAPL thickness.

1.3 GROUNDWATER SAMPLING

Groundwater samples were collected from source area well B-1 and downgradient well B-2 on November 20, 2001, April 2, 2003, and May 19, 2004. The samples were collected by purging a minimum of three well volumes from each well, measuring groundwater field parameters (pH, temperature, and conductivity), and then collecting groundwater using a new disposable bailer. The samples were stored in 40-ml glass vials and one-liter glass jars preserved with hydrochloric acid (HCl). The sample bottles were placed in a cooled sample container and shipped under chain-of-custody procedures to the analytical laboratory.

The 2001 samples were submitted to Analytical Resources, Inc. (ARI) in Seattle, Washington for analysis of benzene, toluene, ethylbenzene, and xylenes (BTEX) using method 8021 and polyaromatic hydrocarbons (PAH) using method 610; the 2003 samples were submitted to SGS Laboratory in Anchorage for BTEX and PAH; and the 2004 samples were submitted to North Creek Analytical in Anchorage for diesel-range organics (DRO) using method AK 102.

[1] Kent & Sullivan, Inc., 2001, *1997 Release Investigation Report, Hot Oil Pipeline,* prepared for Tesoro Alaska Company, May 7, 2001.

Table 2 summarizes the groundwater field parameters for the three sampling events, and Tables 3 and 4 provide the laboratory data for wells B-1 and B-2, respectively. Appendix A contains the laboratory report and a data quality review summary.

2.0 FINDINGS

The principal findings from the monitoring activities between 2001 and 2004 include the following:

- Up to 0.3 feet LNAPL was measured in upgradient well B-1 in 1997, but LNAPL has not been present in well B-1 since July 2000 (Table 1 and Figure 3).
- Groundwater samples from upgradient well B-1 in 2001 or 2003 did not contain detectable BTEX analytes and contained only trace concentrations (~three orders of magnitude below the Alaska groundwater criteria contained in 18 AAC 75) of three PAH analytes (fluorene, naphthalene, and phenanthrene) in 2003. Currently, groundwater in well B-1 contains a DRO concentration (9,230 µg/L) that exceeds the Alaska DRO groundwater criteria (1,500 µg/L).
- DRO concentrations in groundwater samples from downgradient well B-2 decreased from 2,670 µg/L in 2001, to non-detectable this year. Samples from well B-2 did not contain detectable BTEX or PAH analytes in 2001 or 2003.
- The water level rise of more than seven feet at well B-2 in early 2000 is the result of an unrelated upgradient groundwater injection system that started operation in December 1999. The water levels at well B-1 did not show a concomitant change and this is likely because these wells are located in a hydrogeologically complex and faulted area causing heterogeneous responses to the aquifer stresses.

3.0 DISCUSSION AND RECOMMENDATIONS

The following monitoring data show that the pipeline spill area is attenuating under natural conditions:

- Measurable LNAPL has not been present in upgradient well B-1 for approximately four years.
- DRO concentrations in downgradient well B-2 have decreased from 2,670 µg/L in 2001 to non-detect this year.

Water quality in downgradient well B-2 meets the Alaska groundwater criteria contained in 18 AAC 75 indicating that contaminated groundwater is unlikely to discharge to Cook Inlet or to seeps below the bluff.

Water quality in well B-1 should continue to be monitored annually and water levels biannually until DRO concentrations meet the State of Alaska DRO criteria.

Table 1

Historical Water Level Data

Well No	Gauge Date	Elevation TOC (ft MLLW)	DTW (feet)	DTO (feet)	Potentiometric Surface Elevation (ft MLLW)	LNAPL Thickness (feet)
B-1						
	29-May-97	92.63	52.35	52.06	40.52	0.29
	07-Jul-97	92.63	52.42	52.17	40.42	0.25
	23-Oct-97	92.63	53.17	52.94	39.65	0.23
	01-Nov-97	92.63	53.10	52.88	39.71	0.22
	15-Jan-98	92.63	53.09	52.88	39.71	0.21
	17-Apr-98	92.63	53.43	53.22	39.37	0.21
	06-Jul-98	92.63	53.64	53.37	39.21	0.27
	16-Oct-98	92.63	54.02	53.90	38.71	0.12
	30-Jun-99	92.63	52.49	-	40.14	-
	27-Oct-99	92.63	51.52	-	41.11	-
	09-Dec-99	92.63	50.86	-	41.77	-
	20-Jul-00	92.63	50.14	50.13	42.50	0.01
	27-Oct-00	92.63	50.35	-	42.28	-
	19-Mar-01	92.63	50.46	-	42.17	-
	11-Jul-01	92.63	48.60	-	44.03	-
	17-Apr-02	92.63	50.45	-	42.18	-
	18-Sep-02	92.63	49.50	-	43.13	-
	04-Mar-03	92.63	48.44	-	44.19	-
	26-Aug-03	92.63	49.45	-	43.18	-
B-2						
	29-May-97	95.58	58.23	-	37.35	-
	07-Jul-97	95.58	58.64	-	36.94	-
	23-Oct-97	95.58	60.26	-	35.32	-
	01-Nov-97	95.58	60.25	-	35.33	-
	15-Jan-98	95.58	60.57	-	35.01	-
	17-Apr-98	95.58	62.30	-	33.28	-
	06-Jul-98	95.58	63.62	-	31.96	-
	16-Oct-98	95.58	64.61	-	30.97	-
	18-Jan-99	95.58	64.99	-	30.59	-
	30-Jun-99	95.58	65.41	-	30.17	-
	27-Oct-99	95.58	65.37	-	30.21	-
	09-Dec-99	95.58	65.29	-	30.29	-
	20-Jul-00	95.58	57.82	-	37.76	-
	27-Oct-00	95.58	57.54	-	38.04	-
	19-Mar-01	95.58	58.30	-	37.28	-
	11-Jul-01	95.58	56.29	-	39.29	-
	17-Apr-02	95.58	57.12	-	38.46	-

Water level elevations are corrected for the presence of LNAPL assuming a product density of 0.83.

- \- Not present.
- ft MLLW Feet above mean lower low water.
- DTO Depth to oil (in feet below TOC).
- DTW Depth to groundwater (in feet below TOC).
- TOC Top of casing.

Table 2

Groundwater Field Parameters

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Well ID	Sample Date	pH	Temperature	Conducitivty
B-1	11/20/2001	6.01	4.3	520
	5/19/2004	5.78	6.1	462
B-2	11/20/2001	6.58	4.6	630
	5/19/2004	6.27	7.8	796

Table 3

Compilation of Analytical Results - Well B-1

Analyte	Alaska GW Criteria	11/20/2001	4/2/03	5/19/04
BTEX				
Benzene	*5*	1 U	0.4 U	--
Ethylbenzene	*700*	1 U	1 U	--
Toluene	*1000*	1 U	1 U	--
Xylenes	*10000*	1 U	2 U	--
PAH				
1,2-Dichlorobenzene	*600*	--	1 U	--
1,3-Dichlorobenzene		--	1 U	--
1,4-Dichlorobenzene	*75*	--	0.5 U	--
Acenaphthene	*2200*	--	0.5 U	--
Acenaphthylene		--	0.5 U	--
Anthracene	*11000*	--	0.2 U	--
Benzo(a)anthracene	*1*	--	0.2 U	--
Benzo(a)pyrene	*2*	--	0.2 U	--
Benzo(b)fluoranthene	*1*	--	0.2 U	--
Benzo(ghi)perylene		--	0.2 U	--
Benzo(k)fluoranthene	*10*	--	0.2 U	--
Chlorobenzene	*100*	--	0.5 U	--
Chrysene	*100*	--	0.2 U	--
Dibenz(a,h)anthracene	*0.1*	--	0.2 U	--
Fluoranthene	*1460*	--	0.2 U	--
Fluorene	*1460*	--	**2.62**	--
Indeno(1,2,3-cd)pyrene	*1*	--	0.2 U	--
Naphthalene	*1460*	--	**1.9**	--
Phenanthrene		--	**1.99**	--
Pyrene	*1100*	--	0.2 U	--
Total Hydrocarbons				
DRO	*1500*	--	--	**9230**

Concentrations are reported in ug/L.

Bold Analyte was detected.

-- Not analyzed.

Table 4

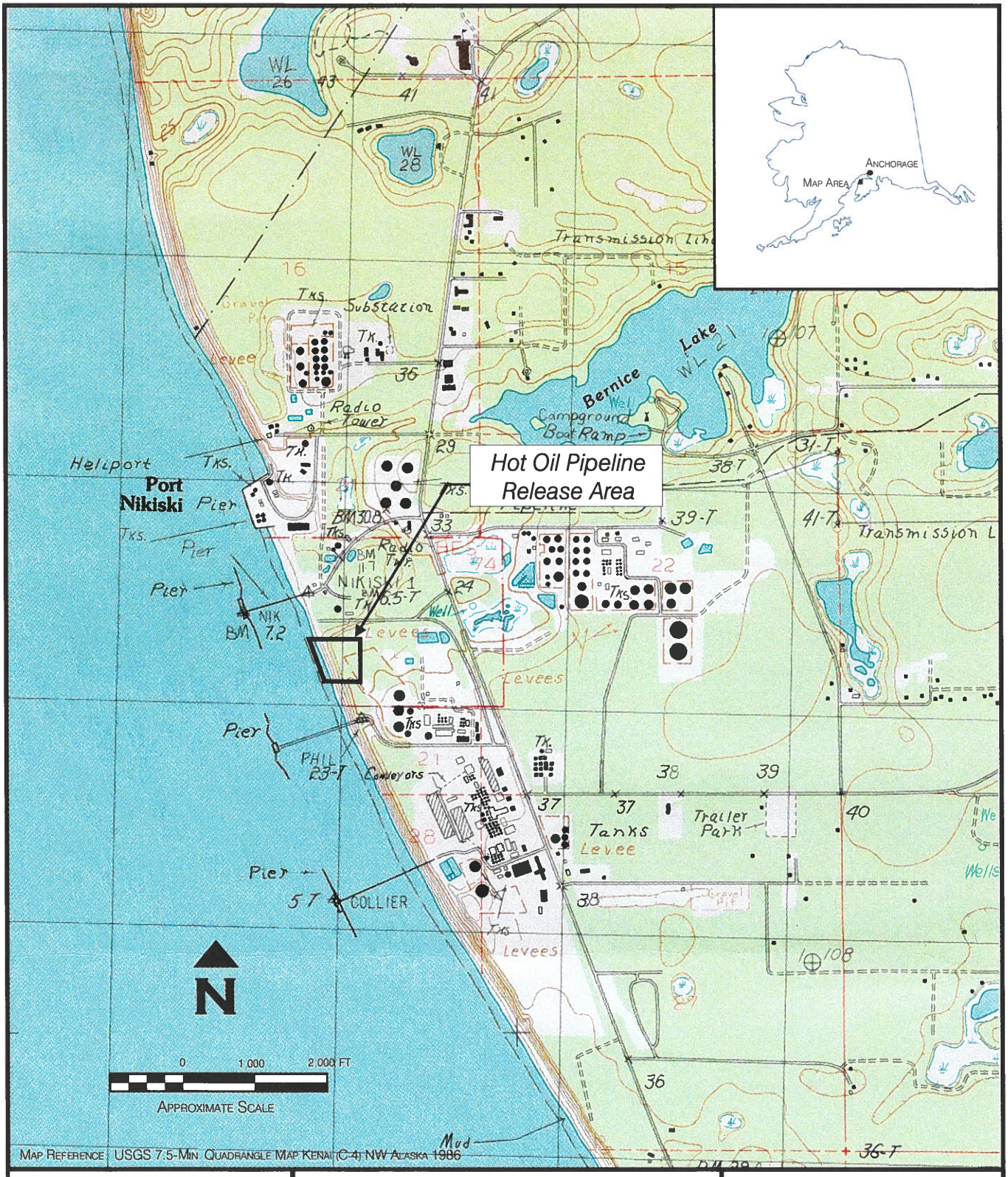
Compilation of Analytical Results - Well B-2

Analyte	Alaska GW Criteria	1/25/2001	11/20/2001	4/2/03	5/19/04
BTEX					
Benzene	*5*	0.5 U	1 U	0.4 U	--
Ethylbenzene	*700*	2 U	1 U	1 U	--
Toluene	*1000*	2 U	1 U	1 U	--
Xylenes	*10000*	2 U	1 U	2 U	--
PAH					
1,2-Dichlorobenzene	*600*	--	--	1 U	--
1,3-Dichlorobenzene		--	--	1 U	--
1,4-Dichlorobenzene	*75*	--	--	0.5 U	--
Acenaphthene	*2200*	--	1.8 U	0.556 U	--
Acenaphthylene		--	5.3 U	0.556 U	--
Anthracene	*11000*	--	0.66 U	0.222 U	--
Benzo(a)anthracene	*1*	--	0.05 U	0.222 U	--
Benzo(a)pyrene	*2*	--	0.07 U	0.222 U	--
Benzo(b)fluoranthene	*1*	--	0.04 U	0.222 U	--
Benzo(ghi)perylene		--	0.11 U	0.222 U	--
Benzo(k)fluoranthene	*10*	--	0.06 U	0.222 U	--
Chlorobenzene	*100*	--	--	0.5 U	--
Chrysene	*100*	--	0.15 U	0.222 U	--
Dibenz(a,h)anthracene	*0.1*	--	0.1 U	0.222 U	--
Fluoranthene	*1460*	--	0.49 U	0.222 U	--
Fluorene	*1460*	--	0.46 U	0.222 U	--
Indeno(1,2,3-cd)pyrene	*1*	--	0.07 U	0.222 U	--
Naphthalene	*1460*	--	2.5 U	0.556 U	--
Phenanthrene		--	0.64 U	0.222 U	--
Pyrene	*1100*	--	0.27 U	0.222 U	--
Total Hydrocarbons					
DRO	*1500*	**2670**	--	--	500 U
GRO	*1300*	90 U	--	--	--
RRO	*1100*	500 U	--	--	--

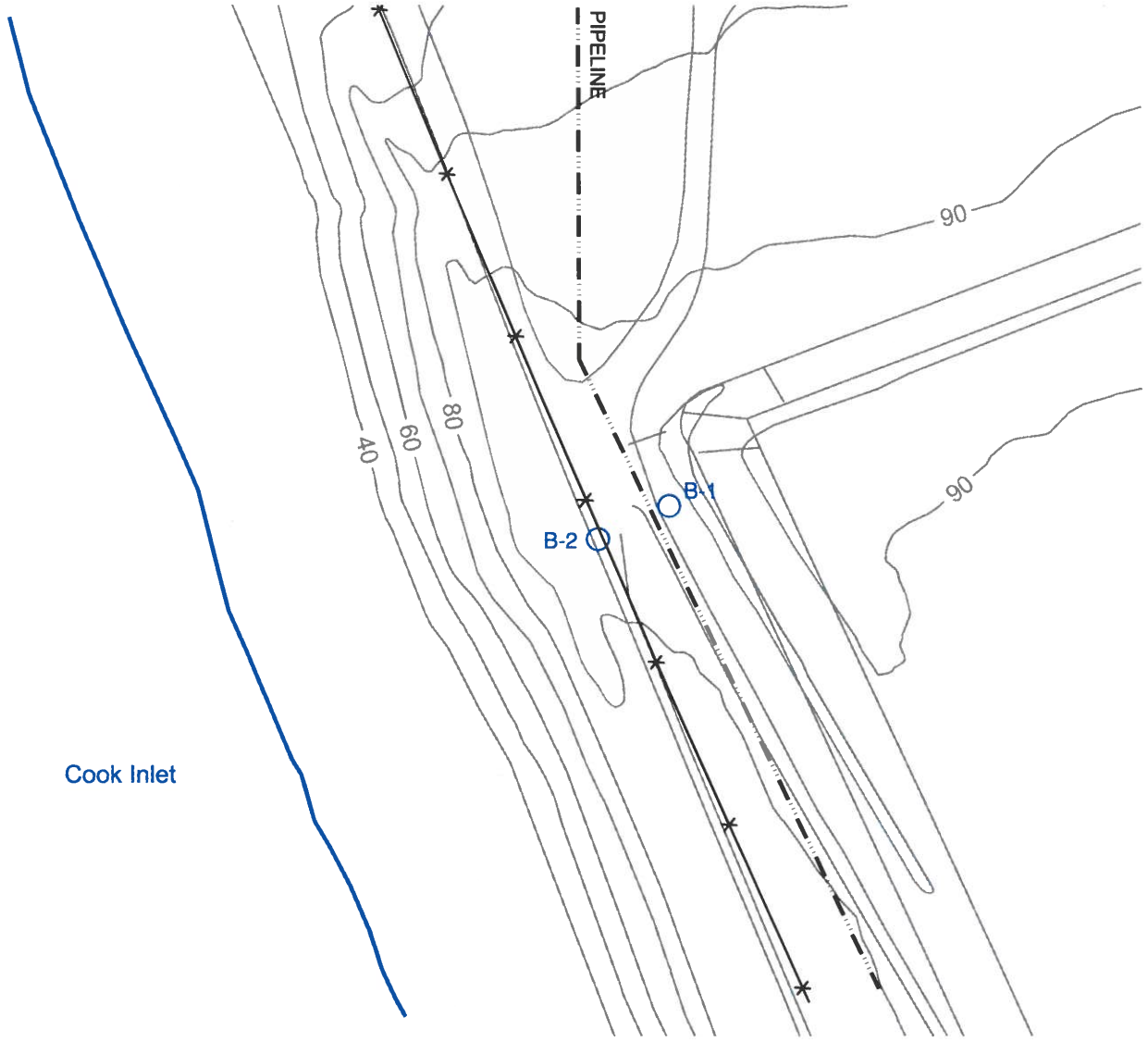
Concentrations are reported in ug/L.

Bold Analyte was detected.
-- Not analyzed.

BTEX Benzene, toluene, ethylbenzene, xylenes
DRO Diesel-range organics
GRO Gasoline-range organics
PAH Polyaromatic hydrocarbons
RRO Residual-range organics



KENT & SULLIVAN, INC.	HOT OIL PIPELINE RELEASE	FIGURE 1
Project No. 01-28 S:\01-28\HotOilInv\Apr01Edits	TESORO ALASKA COMPANY	SITE LOCATION MAP



EXPLANATION

B-1 ○ Monitoring well

NORTH

Scale

0 100 200 feet

Well Location Map
Hot Oil Pipeline Release

TESORO ALASKA COMPANY

Date: 06/3/2004 Drawn by: BKJ

Proj. No.: 01-28 Checked by:

File: S:\01-28\Hot oil well location

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FIGURE 2

Figure 3

Historical Water Level and LNAPL Thickness Time Series

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