

2006 AND 2007 GROUNDWATER MONITORING REPORT
HOT OIL PIPELINE RELEASE
NIKISKI, ALASKA

ADEC SPILL NO. 1987230126701

PREPARED FOR
TESORO ALASKA COMPANY

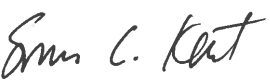
PREPARED BY

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1.0 FIELD ACTIVITIES

This report presents the results of monitoring performed in 2006 and 2007 for 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 report¹ provides a comprehensive summary of the release and findings from subsequent investigations.

Tesoro has monitored the area since 2001, which has included inspecting Cook Inlet beach area for seeps, measuring depth to water in two monitoring wells (Figure 2), and collecting representative groundwater samples. The work that was performed in 2006 and spring 2007 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. Table 1 is a tabulation of all gauging data, and Figure 3 is a time-series graph of the potentiometric surface elevations and LNAPL thickness in these wells.

1.3 GROUNDWATER SAMPLING

Groundwater samples were collected from source area well B-1 in the spring of 2006, and samples were collected from wells B-1 and B-2 in the spring of 2007. The samples were collected after first purging three well volumes of groundwater. The samples were stored in 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 samples were submitted to the laboratory for diesel-range organics (DRO) using method AK 102.

Table 2 summarizes the historical DRO data for wells B-1 and B-2, including the results from the 2006 and 2007 sampling events, and Figure 4 is a time-series graph of the DRO concentrations. Appendix A contains the laboratory reports.

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

2.0 QUALITY ASSURANCE 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 events.

Field samples were reviewed to determine overall precision of sampling and analysis as well as matrix heterogeneity for DRO analyses.

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.

Two samples, including one duplicate sample, were submitted as part of a larger sample group to Analytical Resources, Incorporated (ARI) in Seattle, Washington, in the spring of 2006. These samples were collected as part of the quarterly sampling event at Tesoro's Niksiki refinery. Sample DW-8 was collected as a duplicate of sample B-1. A sample from the refinery samples was selected for DRO matrix spike/matrix spike duplicate (MS/MSD) analysis. These samples are reported under ARI job number JF18.

Three samples, including one duplicate sample, were submitted in one laboratory batch to TestAmerica Analytical Testing Corporation (TestAmerica) in the spring of 2007. Sample DW-17 was collected as a duplicate of sample B-1. Extra sample bottles were submitted with sample B-2 for MS/MSD analysis. These samples are reported under TestAmerica Job number AQC 0022.

2.1 DRO BY AK102

The samples were analyzed using method AK102 for DRO. All data elements/indicators are in conformance with the project criteria, with the following exceptions:

- Field surrogates were diluted out of sample B-1 and DW-8 in the 2006 sample batch due to high analyte concentration. No action was taken since all other surrogates in the batch were within control limits.
- The MS/MSD recoveries were slightly below criteria in the 2006 sample batch. No action was taken since the LCS/LCSD criteria were within control limits.

2.2 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 for the purpose of this project.

3.0 DISCUSSION

The well B-1 samples contained DRO concentrations greater than 40 mg/L in both 2006 and 2007. This represents a substantial increase compared to samples collected since measurable free product disappeared from the well in 2000. The reason for this increase is not known but may be due to the presence of LNAPL sheens on groundwater in well B-1. However, downgradient water quality in well B-2 continues to show no impact from the presence of DRO in the well B-1 area.

Water quality in well B-1 will continue to be monitored annually and water levels semiannually. Water levels will continued to be measured semi-annually in the spring and fall, and samples will be collected again in spring 2008. A monitoring report will be submitted to the Alaska Department of Environmental Conservation after the spring sample results are received.

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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	--
	17-Mar-05	92.63	49.75	--	42.88	--
	27-Apr-05	92.63	49.33	--	43.30	--
	23-Jun-05	92.63	49.59	--	43.04	--
	19-Oct-05	92.63	49.12	--	43.51	--
	13-Apr-06	92.63	51.14	--	41.49	--
	31-Oct-06	92.63	50.06	--	42.57	--
	14-Mar-07	92.63	50.91	--	41.72	--
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	--
	17-Mar-05	95.58	55.85	--	39.73	--
	27-Apr-05	95.58	55.98	--	39.60	--

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-2	19-Oct-05	95.58	53.70	--	41.88	--
	13-Apr-06	95.58	55.95	--	39.63	--
	31-Oct-06	95.58	56.53	--	39.05	--
	14-Mar-07	95.58	56.86	--	38.72	--
E-128	03-Jan-96	93.80	63.28	--	30.52	--
	01-Apr-96	93.80	64.08	--	29.72	--
	30-Jul-96	93.80	66.34	--	27.46	--
	07-Oct-96	93.80	66.84	--	26.96	--
	08-Jan-97	93.80	67.57	--	26.23	--
	31-Mar-97	93.80	dry	--	dry	--
	29-May-97	93.80	68.09	--	25.71	--
	07-Jul-97	93.80	dry	--	dry	--
	15-Oct-97	93.80	68.12	--	25.68	--
	23-Oct-97	93.80	68.20	--	25.60	--
	01-Nov-97	93.80	68.13	--	25.67	--
	15-Jan-98	93.80	dry	--	dry	--
	17-Apr-98	93.80	dry	--	dry	--
	06-Jul-98	93.80	dry	--	dry	--
	28-Sep-98	93.80	dry	--	dry	--
	16-Oct-98	93.80	dry	--	dry	--
	08-Dec-98	93.80	68.17	--	25.63	--
	18-Jan-99	93.80	dry	--	dry	--
	30-Apr-99	93.80	63.70	--	30.10	--
	30-Jun-99	93.80	dry	--	dry	--
	02-Sep-99	93.80	67.90	--	25.90	--
	09-Sep-99	93.80	dry	--	dry	--
	28-Oct-99	93.80	64.76	--	29.04	--
	09-Dec-99	93.80	65.08	--	28.72	--
	29-Dec-99	93.80	65.10	--	28.70	--
	04-Jan-00	93.80	64.13	--	29.67	--
	05-Jan-00	93.80	63.64	--	30.16	--
	06-Jan-00	93.80	63.44	--	30.36	--
	10-Jan-00	93.80	62.62	--	31.18	--
	12-Jan-00	93.80	62.46	--	31.34	--
	13-Jan-00	93.80	62.42	--	31.38	--
	17-Jan-00	93.80	62.15	--	31.65	--
	25-Jan-00	93.80	61.37	--	32.43	--
	04-Feb-00	93.80	61.30	--	32.50	--
	25-Feb-00	93.80	60.47	--	33.33	--
	03-Mar-00	93.80	61.33	--	32.47	--
	10-Mar-00	93.80	61.17	--	32.63	--
	17-Mar-00	93.80	61.31	--	32.49	--
	07-Apr-00	93.80	61.02	--	32.78	--
	23-May-00	93.80	60.32	--	33.48	--
	20-Jul-00	93.80	61.43	--	32.37	--
	26-Oct-00	93.80	61.45	--	32.35	--

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)
E-128	08-Jan-01	93.80	61.65	--	32.15	--
	19-Mar-01	93.80	60.87	--	32.93	--
	11-Jul-01	93.80	59.80	--	34.00	--
	04-Oct-01	93.80	60.20	--	33.60	--
	28-Jan-02	93.80	60.99	--	32.81	--
	17-Apr-02	93.80	62.12	--	31.68	--
	01-Aug-02	93.80	59.56	--	34.24	--
	18-Sep-02	93.80	60.52	--	33.28	--
	05-Dec-02	93.80	59.27	--	34.53	--
	04-Mar-03	93.80	59.79	--	34.01	--
	07-Jul-03	93.80	59.81	--	33.99	--
	26-Aug-03	93.80	60.37	--	33.43	--
	19-Sep-03	93.80	60.31	--	33.49	--
	27-Jan-04	93.80	60.11	--	33.69	--
	05-Mar-04	93.80	59.11	--	34.69	--
	09-Jul-04	93.80	57.85	--	35.95	--
	11-Oct-04	93.80	58.39	--	35.41	--
	26-Jan-05	93.80	58.02	--	35.78	--
	27-Apr-05	93.80	58.82	--	34.98	--
	23-Jun-05	93.80	58.15	--	35.65	--
	19-Oct-05	93.80	57.35	--	36.45	--
	16-Dec-05	93.80	57.43	--	36.37	--
	13-Apr-06	93.80	60.08	--	33.72	--
	10-Jul-06	93.80	57.53	--	36.27	--
	09-Aug-06	93.80	59.58	--	34.22	--
	21-Aug-06	93.80	59.56	--	34.24	--
	31-Oct-06	93.80	59.75	--	34.05	--
	08-Dec-06	93.80	60.47	--	33.33	--
	27-Mar-07	93.80	61.24	--	32.56	--
	24-Apr-07	93.80	61.37	--	32.43	--

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. Summary of DRO data.

Sample Date	B-1	B-2
25-Jan-01	--	2670
19-May-04	9230	500 U
17-Mar-05	20800 R	397 U
13-Oct-05	6570	--
27-Mar-06	44000	--
05-Apr-06	--	250 U
14-Mar-07	41600	397 U

Concentrations are reported in ug/L.

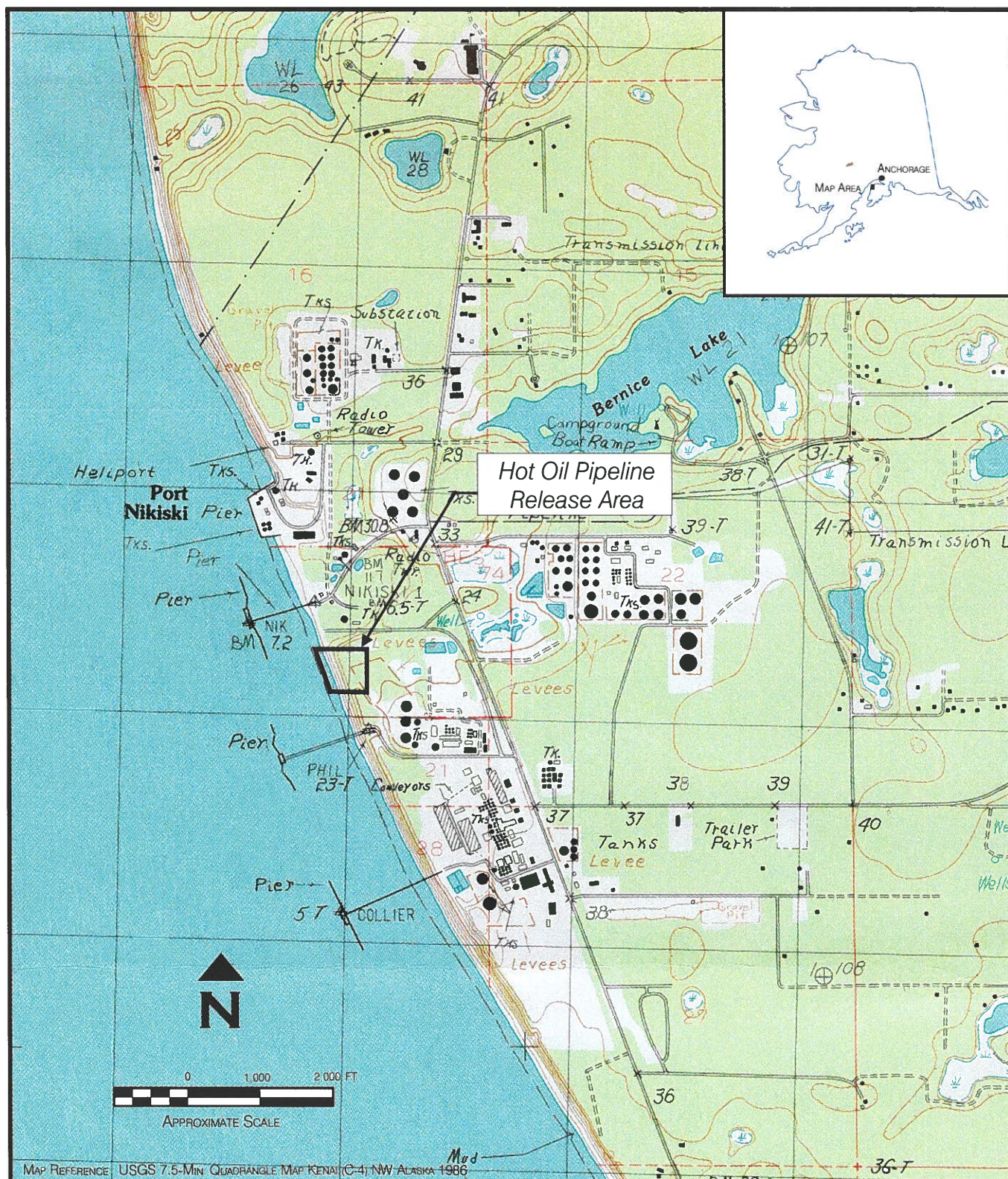
-- Not analyzed.

BOLD The analyte was detected.

DRO Diesel-range organics.

R The data are rejected due to serious quality issues.

U The analyte was not detected above the concentration shown in the table.



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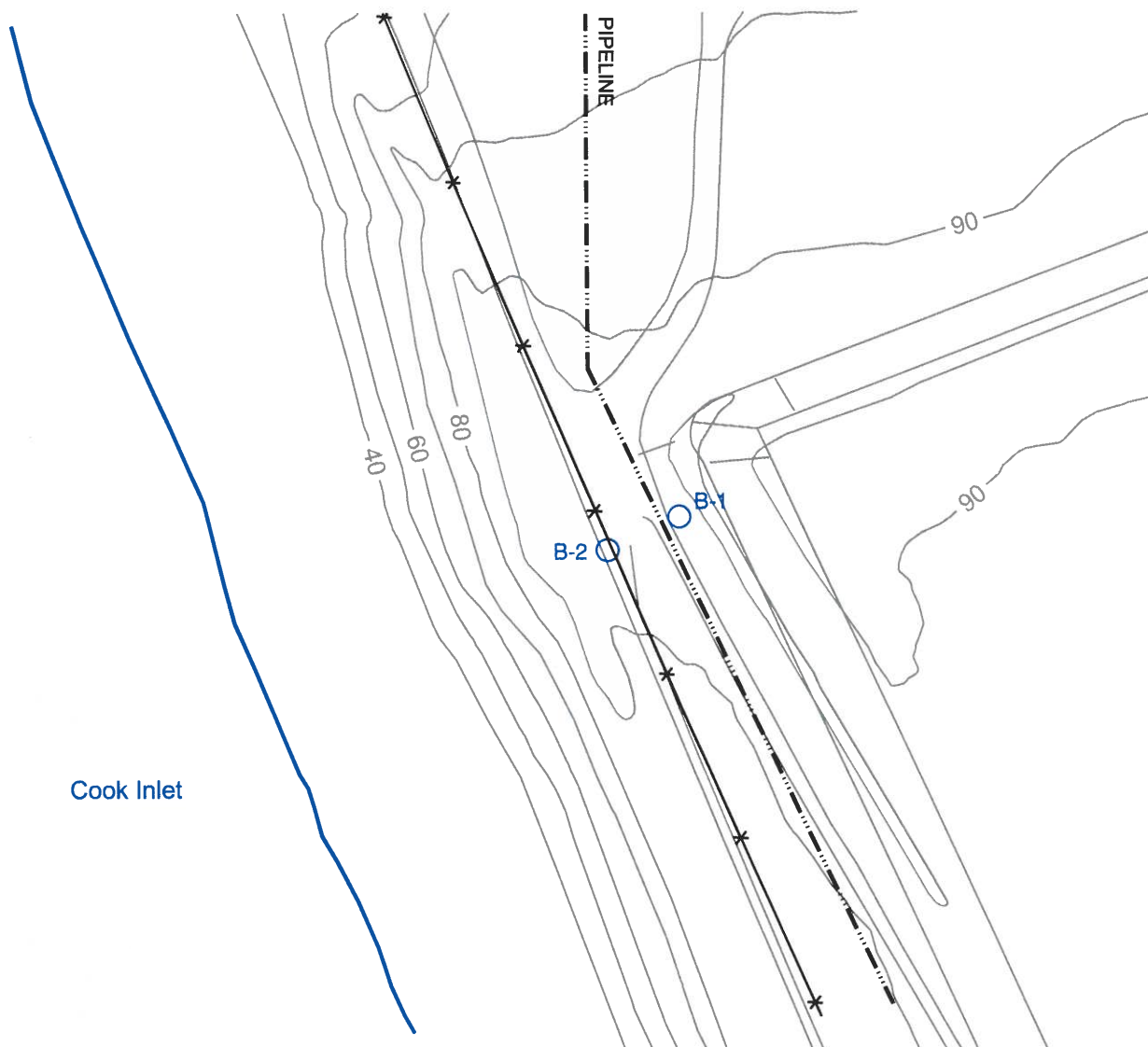
HOT OIL PIPELINE RELEASE

FIGURE 1

Project No. 01-28
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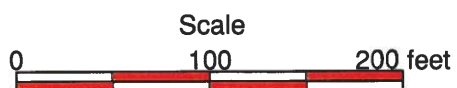
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SITE LOCATION MAP



EXPLANATION

B-1 ○ Monitoring well



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

FIGURE

2

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Figure 3. Water Level and LNAPL Thickness Trends

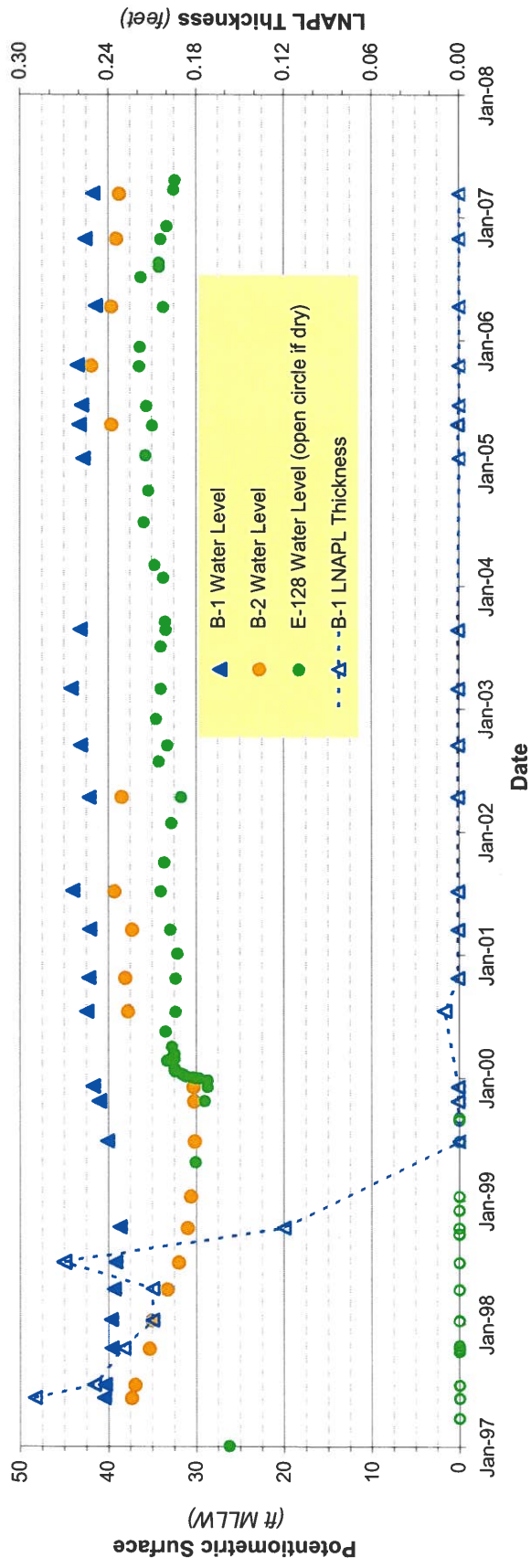


Figure 4. DRO Concentration Trends

