



**DCP Midstream**  
370 17<sup>th</sup> Street, Suite 2500  
Denver, CO 80202  
303-595-3331  
303-605-2226 FAX

June 11, 2012

Mr. Leonard Lowe  
Environmental Engineer  
New Mexico Oil Conservation Division  
1220 S. St. Francis Dr.  
Santa Fe, NM 87505

**RE: 1st 2012 Semi Annual Groundwater Monitoring Results  
DCP C-Line Pipeline Release (1RP-401-0)  
Lea County, NM (Unit O Section 31, T19S, R37E )**

Dear Mr. Lowe:

DCP Midstream, LP (DCP) is pleased to submit for your review, one copy of the 1st 2012 Semi Annual Groundwater Monitoring Results for the DCP C-Line Pipeline Release Site located in Lea County, New Mexico (Unit O Section 31, T19S, R37E, Latitude 32° 31' 29.7" N Longitude 103° 17' 11.7 W).

If you have any questions regarding the report, please call me at 303-605-1718.

Sincerely

**DCP Midstream, LP**

Stephen Weathers, PG  
Principal Environmental Specialist

cc: Larry Johnson, OCD Hobbs District Office (Copy on CD)  
Environmental Files

RECEIVED OCD  
2012 JUN 12 P 12:50

# First Half 2012 Semi-Annual Groundwater Monitoring Summary Report

## C-Line 50602 Pipeline Release Lea County, New Mexico 1RP-401-0

Prepared for:



370 17<sup>th</sup> St., Suite 2500  
Denver, CO 80202

*Prepared by:*



Tasman Geosciences

5690 Webster Street  
Arvada, CO 80002

**May 4, 2012**

## Table of Contents

1.	Introduction .....	1
2.	Site Location and Background.....	1
3.	Groundwater Monitoring.....	2
3.1	Groundwater and LNAPL Elevation Monitoring .....	2
3.2	Groundwater Quality Monitoring .....	2
3.3	Data Quality Assurance / Quality Control.....	3
4.	Remediation Activities .....	3
5.	Conclusions .....	4
6.	Recommendations .....	4

### Tables

1	First Half 2012 Semi-Annual Summary of Groundwater Elevation Data
2	First Half 2012 Semi-Annual Summary of BTEX Concentrations in Groundwater

### Figures

1	Site Location
2	Site Map
3	First Half 2012 Semi-Annual Groundwater Elevation Contour Map - March 12, 2012
4	First Half 2012 Semi-Annual Analytical Results Map – March 12, 2012

### Appendices

A	Benzene Concentration versus Time and Groundwater Elevation Graphs
B	Laboratory Analytical Results

## 1. Introduction

Tasman Geosciences, LLC (Tasman) is submitting to DCP Midstream (DCP) the results of the first half 2012 semi-annual groundwater monitoring activities conducted March 12, 2012, at the C-Line 50602 Pipeline Release (Site) in Lea County, New Mexico (Figure 1). The field activities described herein were performed with the purpose of monitoring groundwater flow and quality conditions and assessing the presence of light non-aqueous phase liquid (LNAPL) hydrocarbons in the Site subsurface. The data collected herein were used to develop groundwater elevation maps, and benzene concentration versus time graphs to evaluate current conditions at the Site.

## 2. Site Location and Background

The Site is located in the southeastern quarter of the southeastern quarter of Section 31, Township 20 South, Range 37 East approximately 6.25 miles south and 1.25 miles west of the town of Monument in Lea County, New Mexico. The approximate field coordinates are 32.5250 degrees north, 103.2867 degrees west. The surrounding area is predominantly uninhabited and used for oil and gas extraction and some ranching. Several underground transfer pipelines traverse the Site, two of which are owned by DCP (Figure 2).

Based on review of historical reports from previous site investigations, the original condensate release occurred in early 2002. Environmental Plus Incorporated (EPI) completed remediation activities between April and June 2002, which included excavation of impacted soil, compacted clay barrier installation, and investigative soil boring advancements. These activities were conducted at three Site locations described as C-Line 50602, C-line 52102, and C-Line 52302. Monitoring well MW-1 was installed at or near the original C-Line 50602 pipeline release location to delineate the vertical extent of hydrocarbon impacts. Additional remediation activities including down-gradient monitoring well installation (MW-2 through MW-6), groundwater monitoring and sampling, and investigative remediation tests to evaluate LNAPL removal were conducted between November and December 2002. These activities are described in detail in the February 6, 2003 *Characterization Report: C-Line 50602, 52102, and 52302 Releases* submitted by Remediacon Incorporated.

During the spring of 2003, three additional monitoring wells (MW-7, MW-8 and MW-9) were installed to the southeast of the original release location to further delineate the extent of hydrocarbon migration. MW-1 was also re-drilled and converted from a two-inch diameter to a four-inch diameter LNAPL recovery well. An LNAPL recovery system was installed in mid-November 2003 and operation was initiated on November 26, 2003. In early October 2004 a soil vapor extraction (SVE) system was added to the LNAPL recovery system at MW-1 to facilitate recovery of vapor phase hydrocarbons. Between November 2003 and December 2004 a reported 1,212 gallons of LNAPL was extracted by the recovery system. In 2005, LNAPL recovery and SVE was expanded to MW-4 to further enhance remediation at the Site. Through 2006 a significant decline in LNAPL recovery was observed in wells MW-1 and MW-4 and the remediation system was shut down on June 26, 2006. Ancillary components of the system remain in place and MW-1 and MW-4 are currently utilized as monitoring well locations.

### **3. Groundwater Monitoring**

This section describes the groundwater field and laboratory activities performed during the first half 2012 semi-annual monitoring event. Monitoring activities included Site-wide groundwater gauging, LNAPL gauging, and groundwater sampling. Figure 2 illustrates the groundwater monitoring network utilized to perform these activities at the Site.

#### **3.1 Groundwater and LNAPL Elevation Monitoring**

Groundwater levels were measured in order to evaluate hydraulic characteristics and provide information regarding seasonal fluctuations in groundwater elevations at the Site. During the first half 2012, groundwater levels were measured at eight Site monitoring well locations. LNAPL was not detected within any Site monitoring wells.

Groundwater levels were measured on the north side of the well casing to the nearest 0.01-foot using an oil-water interface probe (IP). Measured groundwater levels are presented in Table 1. Groundwater level data were later converted to elevation (feet above mean sea level [AMSL]) by subtracting the measured groundwater level from top of casing elevation survey datum.

Groundwater elevation measurements collected during the first half 2012 monitoring event are presented in Table 1, and a first half 2012 groundwater elevation contour map is illustrated on Figure 3. Groundwater elevations ranged from 3,449.49 feet AMSL at monitoring well MW-9 to 3,451.34 feet AMSL at monitoring well MW-2. As illustrated on Figure 3, groundwater flow at the Site generally trends to the east-southeast with a gradient of approximately 0.005 foot per foot between monitoring wells MW-2 and MW-9.

#### **3.2 Groundwater Quality Monitoring**

Depth to groundwater and total well depth were measured at each of the Site monitoring wells as previously described. A minimum of three well casing volumes of groundwater, (calculated from total depth of the well and groundwater level measurements) were purged from the subject well prior to collecting groundwater samples. Groundwater samples were collected using dedicated polyethylene bailers, placed in clean laboratory-supplied containers for the selected analytical methods, packed in an ice-filled cooler, and maintained at approximately four (4) degrees Celsius ( $^{\circ}\text{C}$ ) for transportation. Groundwater samples were then shipped under chain-of-custody procedures to Accutest Laboratories (Accutest) in Wheat Ridge, Colorado, for analysis.

Groundwater samples were collected from monitoring wells MW-1 through MW-5, and MW-7 through MW-9. Monitoring well MW-6 was not sampled and has been removed from the groundwater monitoring plan due to historically exhibiting non-detect concentrations of constituents of concern.

Water quality samples were submitted to be analyzed for benzene, toluene, ethylbenzene, and xylene (BTEX) by United States Environmental Protection Agency (USEPA) Method 8260B.

Table 2 summarizes BTEX concentrations in groundwater samples collected during the first half 2012 event. Laboratory analytical reports for the event are included in Appendix B, and analytical results are summarized on Figure 4.

Benzene was detected in monitoring well MW-1 at a concentration of 0.089 mg/L, which exceeded the New Mexico Water Quality Control Commission (NMWQCC) groundwater standard of 0.01 mg/L. Although toluene and ethylbenzene were also detected in MW-1, concentrations did not exceed their respective NMWQCC standard.

Water quality parameters were collected during the first half 2012 sampling event. Since Site monitoring wells did not require collection of more than three (3) purge volumes to achieve parameter stabilization, the analytical data are considered representative of Site conditions in that a minimum of three purge volumes were removed from all monitoring wells.

### **3.3 Data Quality Assurance / Quality Control**

The data were reviewed for compliance with the analytical method and the associated quality assurance/quality control (QA/QC) procedures. All samples were analyzed using the correct analytical methods and within the correct holding times. Chain of custody forms were in order and properly executed and indicate that samples were received at the proper temperature with no headspace. All data were reported using the correct method number and reporting units. A trip blank, matrix spike or matrix spike duplicate (MS/MSD) and field duplicate sample from well MW-3 were collected during the sampling event. The trip blank was fully in control, having no detections of targets.

A duplicate sample collected from MW-3 was in compliance with QA/QC standards, returning results for benzene of 0.0071 µg/l and 0.0067 µg/l.

The overall QA/QC assessment of the data, based on the data review, indicate that both field precision and overall data precision and accuracy are acceptable.

## **4. Remediation Activities**

LNAPL recovery and SVE at the Site appears to have sufficiently addressed hydrocarbon impacts so that dissolved phase concentrations in groundwater are stable and/or decreasing over time. Natural attenuation continues to provide effective control of the groundwater plume on Site, as evidenced by the sampling results for point of compliance (POC) wells MW-7, MW-8 and MW-9, which continue to exhibit non-detect dissolved-phase BTEX concentrations in groundwater.

## 5. Conclusions

While the dissolved phase benzene impacts exceeded the NMWQCC standard in one of the sampled monitoring wells (MW-1), BTEX concentrations continue to decline across the Site. Benzene concentrations versus time and groundwater elevation graphs are included in Appendix A for monitoring wells MW-1, MW-3, and MW-4. As illustrated by the graphs in Appendix A, it does not appear that there is a relationship between groundwater elevation and the presence of LNAPL or fluctuations in benzene concentrations. These graphs also illustrate that benzene concentrations continue to decline across the Site. Comparison of the first half 2012 monitoring data and historic information provides the following general observations:

- LNAPL has not been detected in any of the monitoring wells since March 14, 2007.
- Based on historic groundwater elevations, the groundwater elevation surface beneath the Site has shown a declining trend since monitoring was initiated. There has not been significant deviation from this trend during this monitoring period.
- Dissolved phase benzene concentrations above regulatory standards continue to be observed at MW-1 with steady or decreasing concentrations.
- Dissolved phase BTEX concentrations have continued to decrease over time, likely due to previous LNAPL recovery and SVE, as well as attenuation factors.

## 6. Recommendations

Based on evaluation of the first quarter 2012 and historical Site observations and monitoring results, recommendations have been developed for future activities, as included below:

- Continue semi-annual groundwater monitoring and sampling at monitoring well locations MW-1, MW-2, MW-3, MW-4, MW-5, MW-7, MW-8, and MW-9.
- Evaluation of a near-term Site closure strategy that may include implementation of a polishing technique to reduce dissolved phase benzene concentrations to below regulatory thresholds.

## Tables

**TABLE 1**  
**FIRST HALF 2012 SEMI-ANNUAL**  
**SUMMARY OF GROUNDWATER ELEVATION DATA**  
**C-LINE 50602 PIPELINE RELEASE, LEA COUNTY, NEW MEXICO**

Location	Date	Depth to Groundwater (1) (feet)	Depth to Product (feet)	Free Phase Hydrocarbon Thickness (feet)	Total Depth (2) (feet)	TOC Elevation (feet amsl)	Groundwater Elevation (feet amsl)	Change in Groundwater Elevation Since Previous Event (3) (feet)
MW-1	3/22/2010					3541.21	3451.47	0.56
MW-1	9/16/2010					3541.21	3451.31	-0.16
MW-1	4/25/2011	91.25				3541.21	3449.96	-1.35
MW-1	9/18/2011	91.57			99.80	3541.21	3449.64	-0.32
MW-1	3/12/2012	91.63			99.80	3541.21	3449.58	-0.06
MW-2	3/22/2010					3540.91	3451.73	-0.01
MW-2	9/16/2010					3540.91	3451.55	-0.18
MW-2	4/25/2011	89.24				3540.91	3451.67	0.12
MW-2	9/18/2011	89.44			99.86	3540.91	3451.47	-0.2
MW-2	3/12/2012	89.57			99.86	3540.91	3451.34	-0.13
MW-3	3/22/2010					3541.41	3451.02	0.1
MW-3	9/16/2010					3541.41	3450.96	-0.06
MW-3	4/25/2011	90.41				3541.41	3451.00	0.04
MW-3	9/18/2011	90.84			102.40	3541.41	3450.57	-0.43
MW-3	3/12/2012	90.86			102.40	3541.41	3450.55	-0.02
MW-4	3/22/2010					3541.40	3451.26	0.4
MW-4	9/16/2010					3541.40	3450.8	-0.46
MW-4	4/25/2011	90.34				3541.40	3451.06	0.26
MW-4	9/18/2011	90.84			99.10	3541.40	3450.56	-0.5
MW-4	3/12/2012	90.90			99.10	3541.40	3450.50	-0.06
MW-5	3/22/2010					3541.45	3450.97	0.25
MW-5	9/16/2010					3541.45	3450.69	-0.28
MW-5	4/25/2011	90.40				3541.45	3451.05	0.36
MW-5	9/18/2011	90.92			101.35	3541.45	3450.53	-0.52
MW-5	3/12/2012	90.98			101.35	3541.45	3450.47	-0.06
MW-6	9/23/2009					3543.98	3447.81	-0.31
MW-6	3/22/2010					3543.98	3447.89	0.08
MW-6	9/16/2010					3543.98	3447.85	-0.04
MW-6	4/25/2011	95.78			NM	3543.98	3448.20	0.35
MW-7	3/22/2010					3542.42	3450.47	0.13
MW-7	9/16/2010					3542.42	3450.28	-0.19
MW-7	4/25/2011	91.95				3542.42	3450.47	0.19
MW-7	9/18/2011	92.23			100.34	3542.42	3450.19	-0.28
MW-7	3/12/2012	92.45			100.34	3542.42	3449.97	-0.22
MW-8	3/22/2010					3540.29	3450.47	0.13
MW-8	9/16/2010					3540.29	3450.28	-0.19
MW-8	4/25/2011	90.24				3540.29	3450.05	-0.23
MW-8	9/18/2011	90.64			100.60	3540.29	3449.65	-0.4
MW-8	3/12/2012	90.76			100.60	3540.29	3449.53	-0.12
MW-9	3/22/2010					3539.62	3449.74	0.17
MW-9	9/16/2010					3539.62	3449.66	-0.08
MW-9	4/25/2011	89.51				3539.62	3450.11	0.45
MW-9	9/18/2011	89.95			100.52	3539.62	3449.67	-0.44
MW-9	3/12/2012	90.13			100.52	3539.62	3449.49	-0.18
Average Change in groundwater elevation since the previous monitoring event								-0.11

Notes:

- 1- Depths measured from the north edge of the well casing.
  - 2- Total depths were collected and recorded during the first half 2012 semi-annual monitoring event.
  - 3- Changes in groundwater elevation calculated by subtracting the measurement collected during the previous monitoring event from the measurement collected during the most recent monitoring event.
  - Monitoring well location MW-6 has been removed from the sampling program due to exhibiting non-detect concentrations.
  - Data presented for all well locations includes previous four sampling events, when available. Historic groundwater elevation data for these locations are available upon request.
- Sample locations are shown on Figure 2 and a groundwater elevation contour map is shown on Figure 3
- amsl - feet above mean sea level.
- TOC - top of casing.
- NM - Not Measured.

**TABLE 2**  
**FIRST HALF 2012 SEMI-ANNUAL**  
**SUMMARY OF BTEX CONCENTRATIONS IN GROUNDWATER**  
**C-LINE 50602 PIPELINE RELEASE, LEA COUNTY, NEW MEXICO**

Location Identification	Sample Date	Benzene (mg/l)	Toluene (mg/l)	Ethylbenzene (mg/l)	Total Xylenes (mg/l)	Comments
<b>New Mexico Water Quality Control Commission Groundwater Standards (mg/L)</b>		<b>0.01</b>	<b>0.75</b>	<b>0.75</b>	<b>0.62</b>	
MW-1	3/22/2010	0.276	0.016	0.0147	0.0557	
MW-1	9/16/2010	0.127	0.0319	0.0334	0.0399	
MW-1	4/25/2011	0.125	0.0416	0.0315	0.171	
MW-1	9/18/2011	0.0638	<0.002	0.0105	0.0093	
MW-1	3/12/2012	0.089	0.0024	0.0333	0.0246	
MW-2	3/22/2010	<0.002	<0.002	<0.002	<0.006	
MW-2	9/16/2010	<0.001	<0.002	<0.002	<0.004	
MW-2	4/25/2011	<0.001	<0.002	<0.002	<0.002	
MW-2	9/18/2011	<0.001	<0.002	<0.002	<0.004	
MW-2	3/12/2012	<0.001	<0.002	<0.002	<0.004	
MW-3	3/22/2010	2.615	1.475	0.218	0.5415	
MW-3	9/16/2010	0.9555	0.1785	0.0916	0.1197	
MW-3	4/25/2011	0.0798	<0.02	0.0111	0.0249	
MW-3	9/18/2011	0.0219	<0.002	<0.002	<0.004	Duplicate sample collected
MW-3	3/12/2012	0.0071	<0.002	<0.002	<0.004	Duplicate sample collected
MW-4	3/22/2010	0.0129	0.0255	0.0107	0.0574	
MW-4	9/16/2010	<0.001	<0.002	<0.002	0.0921	
MW-4	4/25/2011	0.00925	0.02905	0.00365	0.102	
MW-4	9/18/2011	0.0024	<0.004	<0.004	<0.008	
MW-4	3/12/2012	0.00041	<0.002	<0.002	<0.004	
MW-5	3/22/2010	<0.002	0.0037	<0.002	0.0076	
MW-5	9/16/2010	<0.001	<0.002	<0.002	<0.004	
MW-5	4/25/2011	0.0017	0.0028	0.00043	0.0109	
MW-5	9/18/2011	<0.001	<0.002	<0.002	<0.004	
MW-5	3/12/2012	<0.001	<0.002	<0.002	<0.004	
MW-6	3/22/2010	NS	NS	NS	NS	
MW-6	9/16/2010	NS	NS	NS	NS	
MW-6	4/25/2011	<0.001	<0.002	<0.002	<0.002	
MW-6	9/18/2011	NS	NS	NS	NS	
MW-6	3/12/2012	NS	NS	NS	NS	
MW-7	3/22/2010	<0.002	<0.002	<0.002	<0.006	
MW-7	9/16/2010	<0.001	<0.002	<0.002	<0.004	
MW-7	4/25/2011	<0.001	<0.002	<0.002	<0.002	
MW-7	9/18/2011	<0.001	<0.002	<0.002	<0.004	
MW-7	3/12/2012	<0.001	<0.002	<0.002	<0.004	
MW-8	3/22/2010	<0.002	<0.002	<0.002	<0.006	
MW-8	9/16/2010	<0.001	<0.002	<0.002	<0.004	
MW-8	4/25/2011	<0.001	<0.002	<0.002	<0.002	
MW-8	9/18/2011	<0.001	<0.002	<0.002	<0.004	
MW-8	3/12/2012	<0.001	<0.002	<0.002	<0.004	
MW-9	3/22/2010	<0.002	<0.002	<0.002	<0.006	
MW-9	9/16/2010	<0.001	<0.002	<0.002	<0.004	
MW-9	4/25/2011	<0.001	<0.002	<0.002	<0.002	
MW-9	9/18/2011	<0.001	<0.002	<0.002	<0.004	
MW-9	3/12/2012	<0.001	<0.002	<0.002	<0.004	

Notes:

- 1.) The environmental cleanup standards for groundwater that are applicable to the C-Line Pipeline Release site are the New Mexico Water Quality Control Commission (NMWQCC) Groundwater Standards.
- 2.) Monitoring well location MW-6 has been removed from the sampling program due to exhibiting non-detect concentrations.
- 3.) Data presented for all other well locations includes previous four sampling events, when available. Historic groundwater analytical results for these locations are available upon request.

**Bold red values indicate an exceedance of the NMWQCC groundwater standards for the Site.**

Sample locations are shown on Figure 2 and analytical results are illustrated on Figure 4.

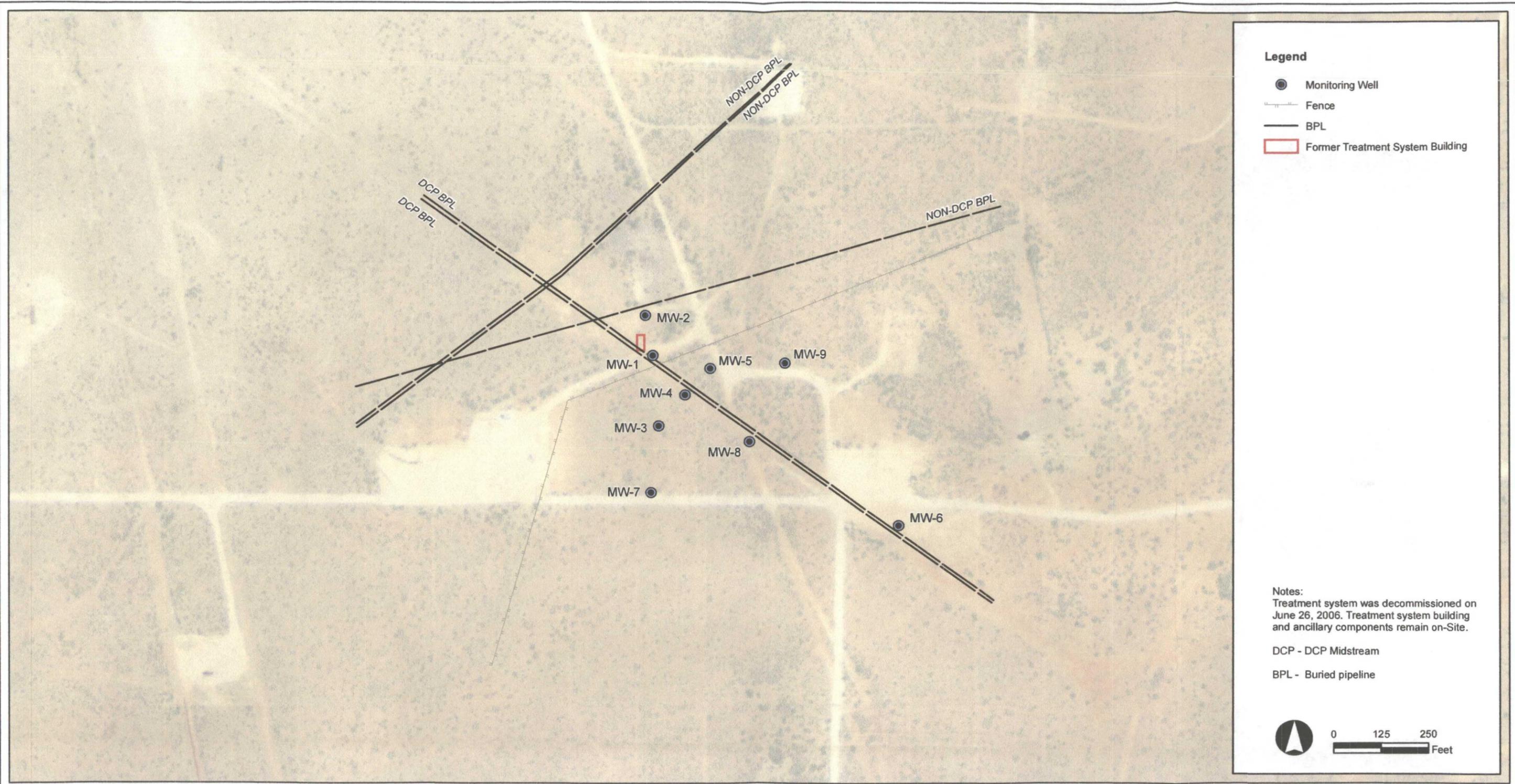
LNAPL = Light Non-Aqueous Phase Liquid

NS = Not sampled.

mg/L = milligrams per liter.

## Figures





DESIGNED BY: S. Scott  
 DRAWN BY: J. Clonts  
 SHEET CHK'D BY: \_\_\_\_\_  
 CROSS CHK'D BY: \_\_\_\_\_  
 APPROVED BY: \_\_\_\_\_  
 APPROVED BY: \_\_\_\_\_



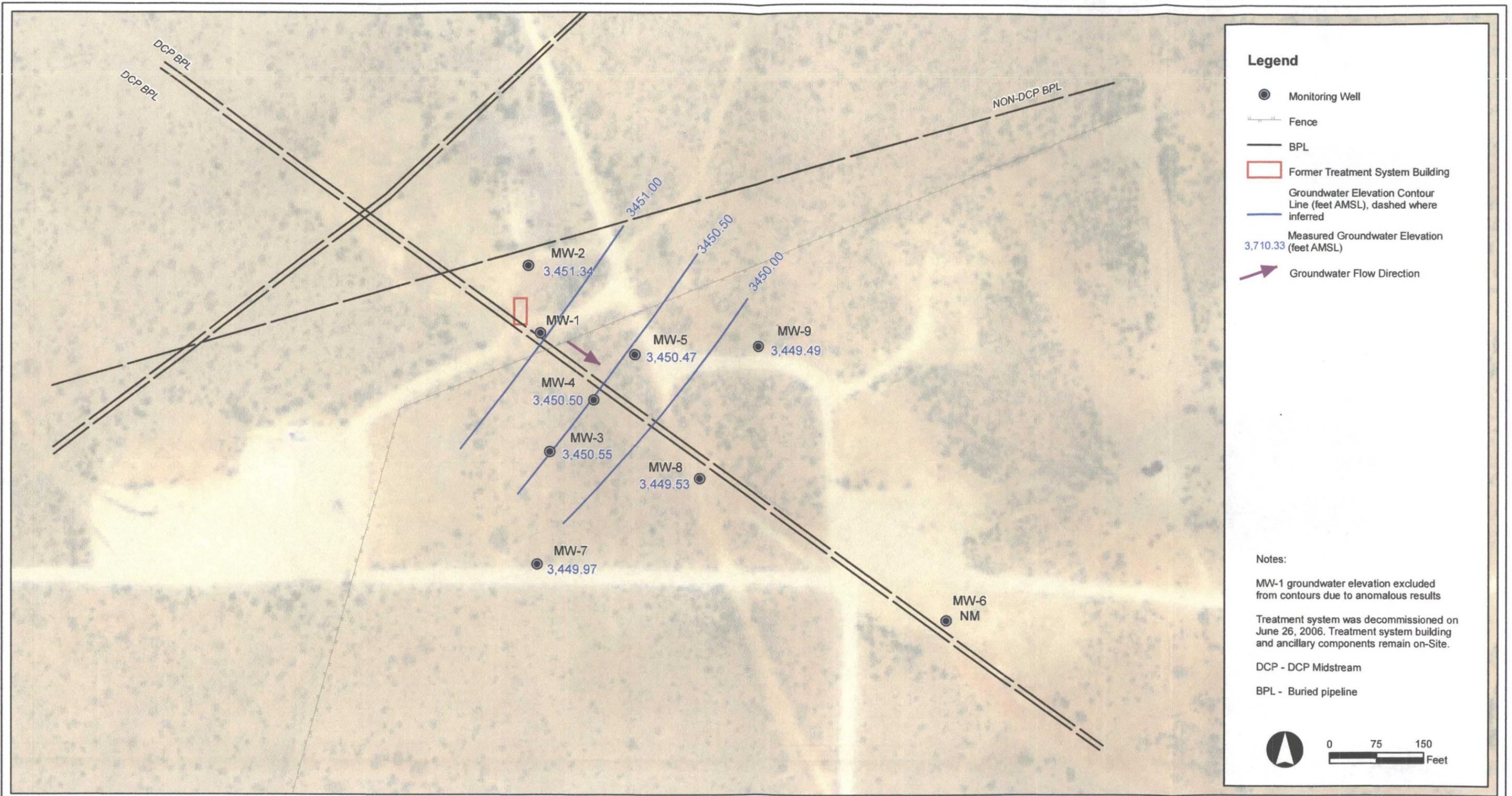
Tasman Geosciences, LLC  
 5690 Webster St.  
 Arvada, CO 8002  
 720-988-2024

**Tasman Geosciences**

**C-LINE PIPELINE RELEASE**  
*First Half 2012 Semi-Annual  
 Groundwater Monitoring  
 Summary Report*

**SITE MAP**

**FIGURE  
 2**



DESIGNED BY: S. Scott  
 DRAWN BY: J. Clonts  
 SHEET CHK'D BY: \_\_\_\_\_  
 CROSS CHK'D BY: \_\_\_\_\_  
 APPROVED BY: \_\_\_\_\_  
 APPROVED BY: \_\_\_\_\_

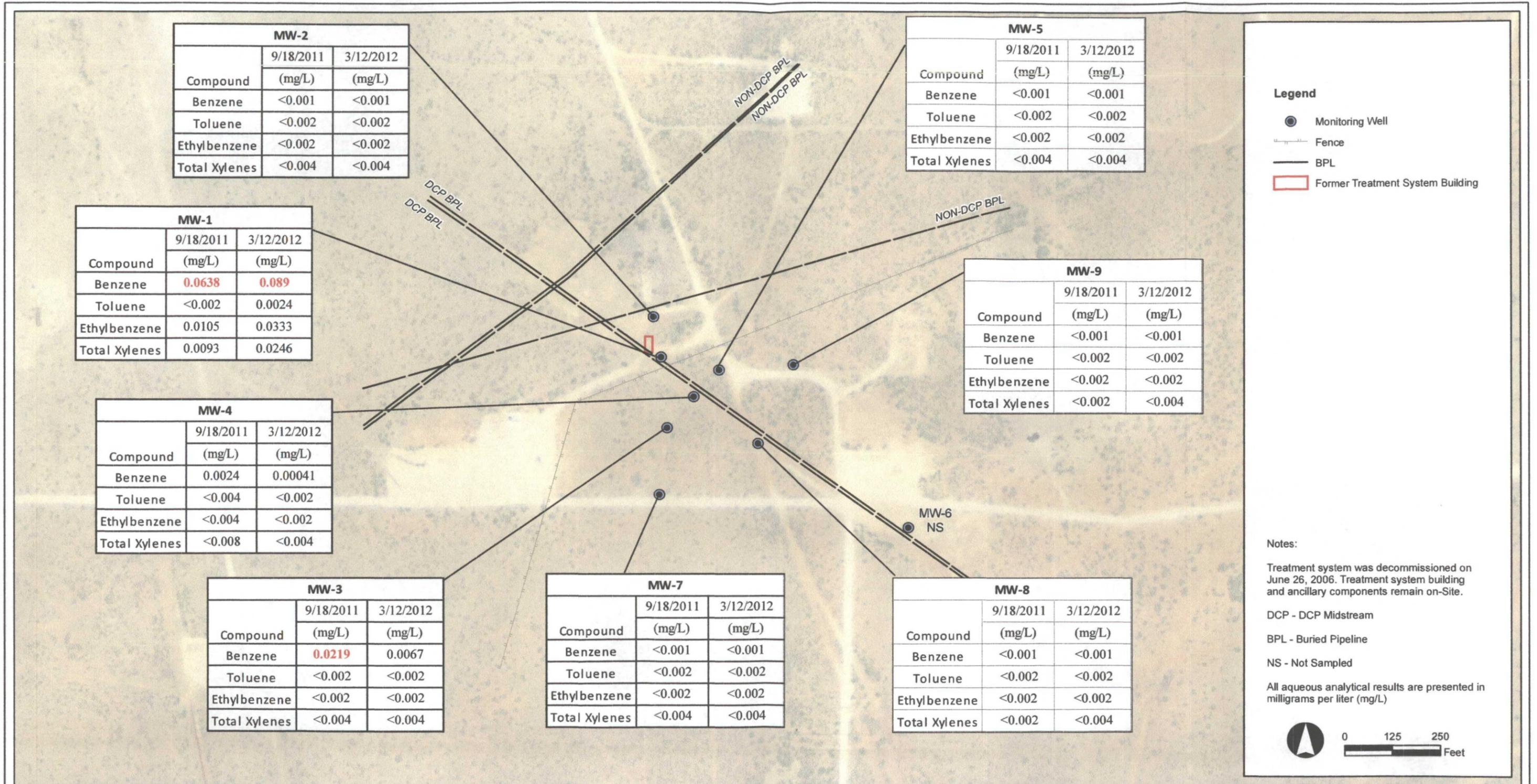


Tasman Geosciences, LLC  
 5690 Webster St.  
 Arvada, CO 8002  
 720-988-2024

**C-LINE PIPELINE RELEASE**  
*First Half 2012 Semi-Annual  
 Groundwater Monitoring  
 Summary Report*

**GROUNDWATER ELEVATION  
 CONTOUR MAP  
 (MARCH 12, 2012)**

**FIGURE  
 3**



DESIGNED BY: S. Scott

DRAWN BY: J. Clonts

SHEET CHK'D BY: \_\_\_\_\_

CROSS CHK'D BY: \_\_\_\_\_

APPROVED BY: \_\_\_\_\_

APPROVED BY: \_\_\_\_\_



Tasman Geosciences, LLC  
5690 Webster St.  
Arvada, CO 8002  
720-988-2024

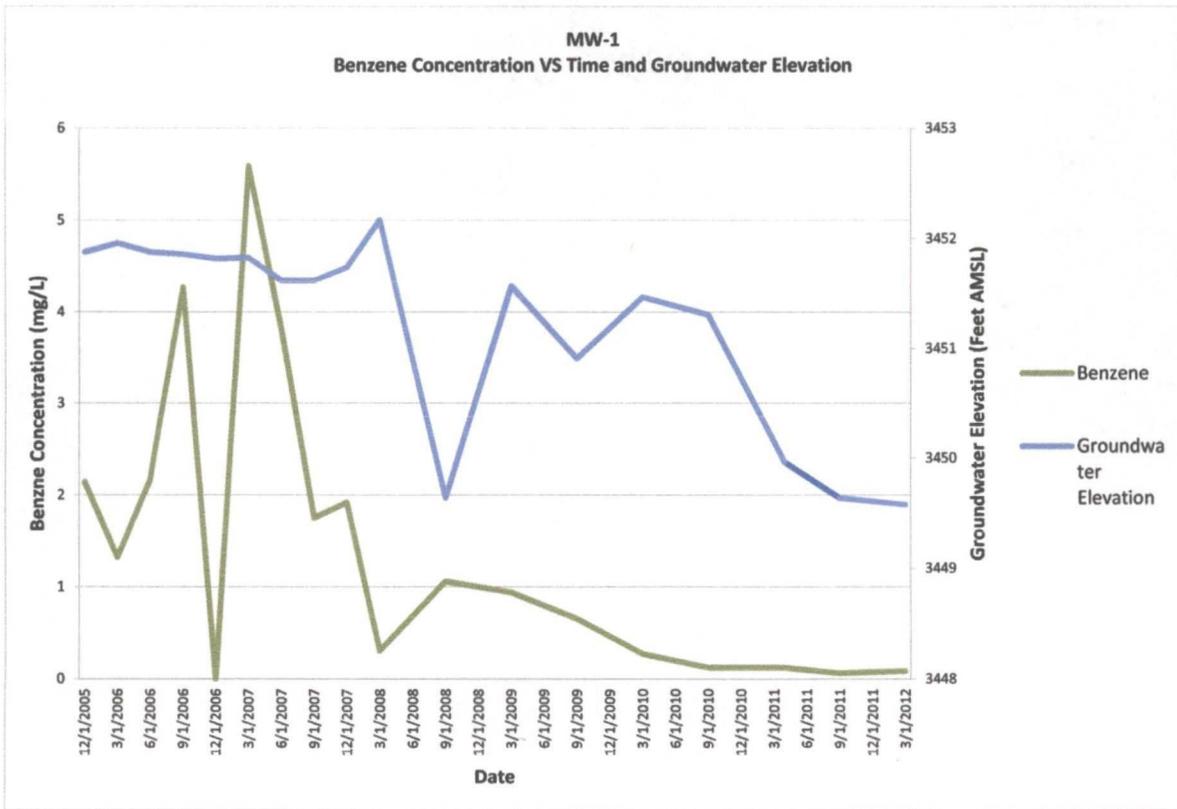
**C-LINE PIPELINE RELEASE**  
*First Half 2012 Semi-Annual  
Groundwater Monitoring  
Summary Report*

**ANALYTICAL RESULTS  
MAP**

**FIGURE  
4**

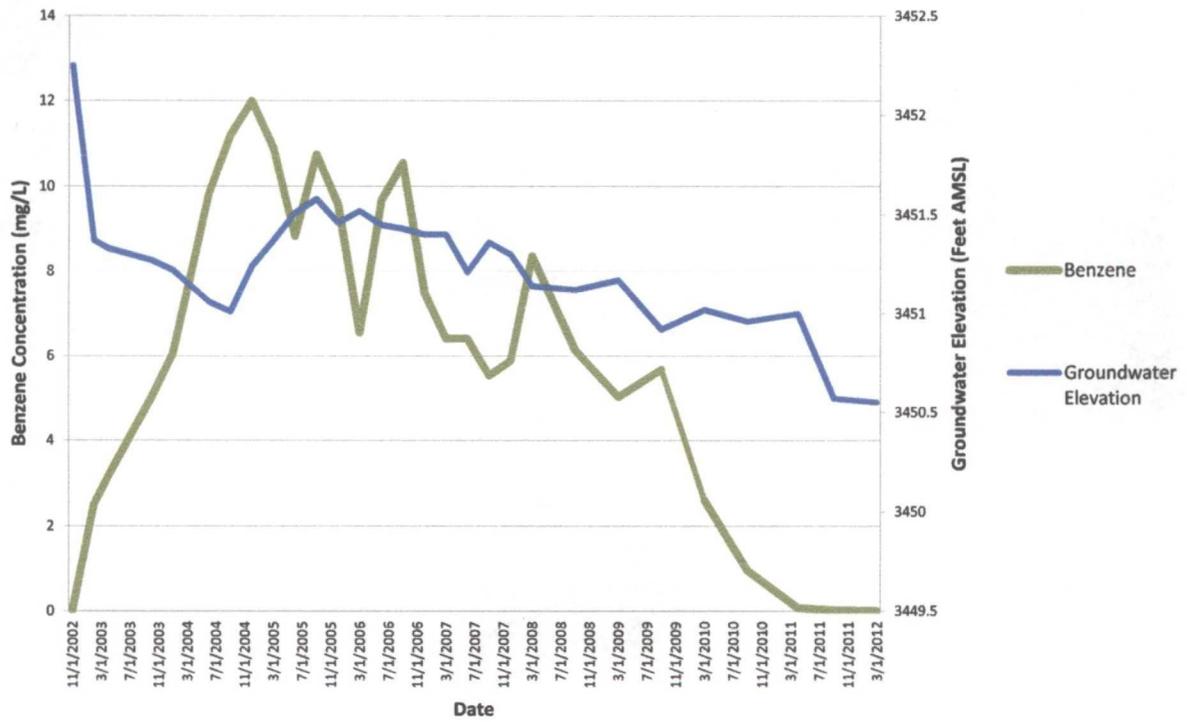
## **Appendix A**

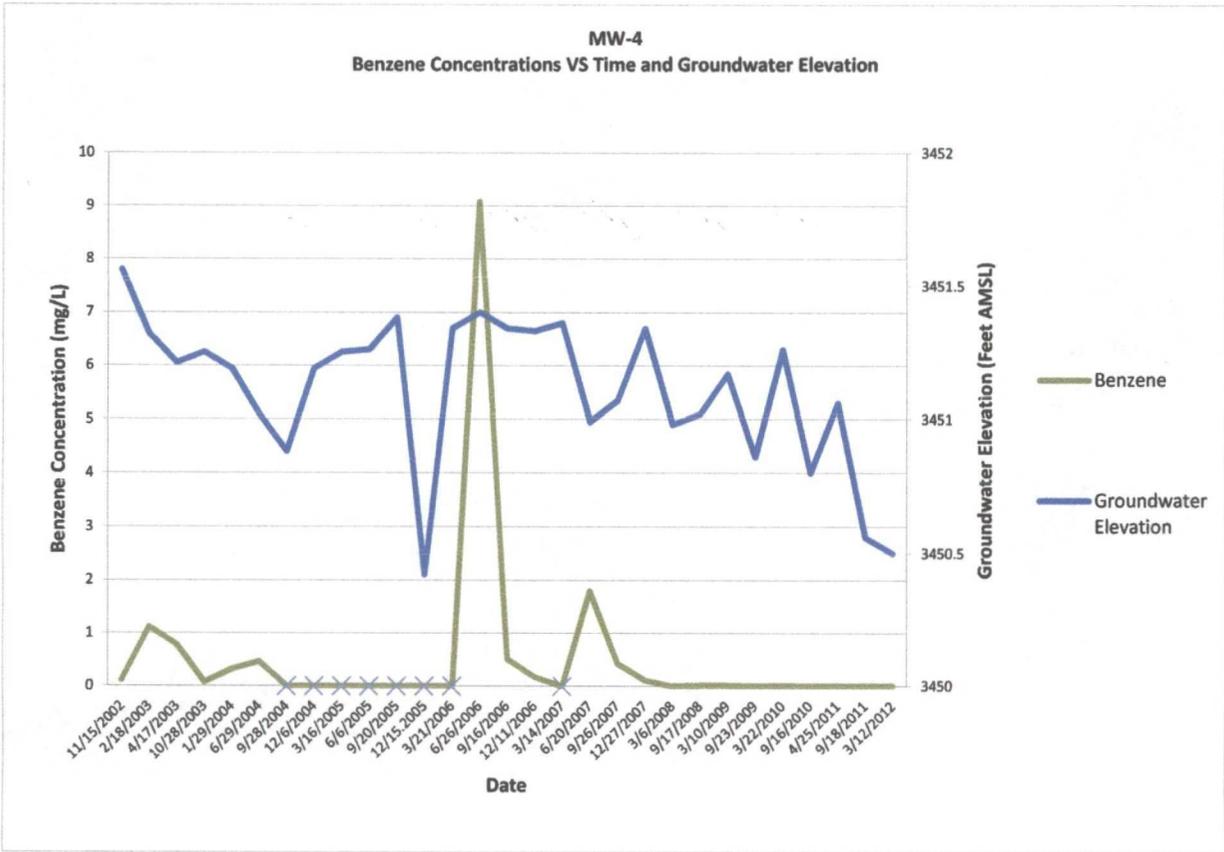
### **Benzene Concentration versus Time and Groundwater Elevation Graphs**



Note:  
LNAPL had been historically detected in MW-1 between November 15, 2002 and September 20, 2005.

MW-3  
Benzene Concentration VS Time and Groundwater Elevation





**Note:**  
 Dates that are marked with an X indicate that LNAPL was detected in the well and therefore, the well was not sampled.

**Appendix B**

**Laboratory Analytical Report**