EnviroGroup Limited
Vapor Intrusion Solutions

CLIENT MEMO

To: Cherrie Perkins, WDEQ

From: EnviroGroup Limited

Project: Casper PCE Plumes Orphan Site **Date:** June 21, 2010

Subject: **Soil, Groundwater, and Surface Water Investigation Procedures and Results Technical Memo**

cc: WQ-0664

This technical memorandum presents a summary of procedures and results for the soil, groundwater, and surface water investigation described in the Sampling and Analysis Plan (SAP) approved by the Wyoming Department of Environmental Quality (DEQ) on September 28, 2009. The first phase of this investigation was implemented from October 2009 to December 2009 by EnviroGroup Limited (EnviroGroup) to evaluate the nature and extent of the tetrachloroethene (PCE) plumes previously identified in Casper, Wyoming by Huntingdon Engineering & Environmental, Inc. (Huntingdon) in 1994 and to evaluate the potential for vapor intrusion. This technical memorandum is intended to provide DEQ with interim information prior to completion of the study and final report.

Investigation Procedures

Soil, groundwater, and surface water investigation and analytical procedures used in Casper, Wyoming are described below.

Soil Investigation Procedures

Between November 10, 2009 and November 12, 2009, 10 boreholes were advanced by Site Services, Inc. under the oversight of EnviroGroup personnel, from ground surface to an approximate depth of 16 to 41 feet below ground surface (bgs) using a direct-push rig (i.e. Geoprobe®) for the purpose of soil sample collection and monitor well installation. Soil cores were collected using an acetate sleeve from each borehole from ground surface to the total depth of each borehole and soil lithologies were continuously logged by an experienced geologist. A miniRAE 2000 organic vapor analyzer (photo-ionization detector (PID)) was used as a field screening tool to measure organic vapor concentrations, at a minimum of 5 foot increments, at each borehole. Soil samples were collected from soil cuttings from each borehole with a freshly gloved hand based on visual observation and elevated PID measurements. Four of the soil samples collected were packed tightly (to minimize head space) into clean 4 ounce glass jars with Teflon lids (laboratory-supplied), labeled, logged onto chain of custody documents, and stored on ice for submittal to TestAmerica-Denver for VOC analysis using United States Environmental Protection Agency (USEPA) Method 8260B. The remaining soil core and samples not submitted to the laboratory

were placed into 55 gallon drums and stored at the Casper DEQ building pending analytical results and eventual disposal at the Casper landfill.

Groundwater Investigation Procedures

Well Installation

Immediately upon completion of borehole advancement, all 10 boreholes were completed as monitoring wells. Seven boreholes were completed as shallow monitoring wells to evaluate current PCE concentrations near the water table. Three boreholes were completed as deeper monitoring wells to evaluate the vertical extent of PCE in groundwater and evaluate the potential for higher PCE concentrations at depth. Shallow monitoring wells (EMW-01, EMW-02, EMW-03S, EMW-04S, EMW-05, EMW-06S, and EMW-07) were constructed with 2 inch I.D., schedule 40 flush joint threaded PVC materials ranging in depth from 15 to 26 feet bgs. Well screens were 5 feet in length with a slot size of 0.020 inch. The filter material (10/20 Colorado Silica Sand) was placed in the annulus of each borehole to a level of approximately 2 feet above the top of the screen interval. Following installation of the filter material, a bentonite seal (bentonite chips) was placed on top of the filter material to a minimum thickness of two feet. Distilled water was added to ensure proper hydration of the bentonite. Additional bentonite chips were placed in the annular space to approximately one-half foot bgs in all wells and hydrated. Deeper monitoring wells (EMW-03D, EMW-04D, and EMW-06D), ranging in depth from 30.5 to 41 feet, were constructed similar to shallow monitoring wells, except for the use of 10 foot screens. All monitoring wells were completed with an eight inch diameter flush-mount well vault.

Monitoring wells were constructed in accordance with applicable DEQ groundwater rules and regulations (Chapter 11, Part G – Well Construction and Abandonment). Well completion information is summarized on Table 1. Monitoring well locations are presented on Figure 1.

Well Development

Prior to groundwater sampling activities, all 10 newly installed monitoring wells were developed and two existing monitoring wells (MW-7A and MW-2) were re-developed between November 16, 2009 and November 18, 2009. Wells were developed utilizing a 3 foot weighted slug, 1.5 inch dedicated, disposable polyethylene bailers, and a GeoSub SS submersible pump. Prior to well development, the static water level was measured using an electronic water-sensing probe to allow calculation of the wetted casing volume (i.e., the volume of groundwater standing in the casing under steady-state conditions). The wetted casing volume was calculated based on the static water level, well diameter (2 inch), and well depth. Following recording of initial water levels from each well, the wells were developed by surging the water column with a slug to flush the fine particles from the sand filter surrounding the well screen. Development continued by purging groundwater containing the suspended particulates from the well casing with a submersible pump. Surging and purging continued until a minimum of ten wetted casing volumes were removed. Purge water was containerized at each well location and temporarily placed into a 150 gallon polyethylene tank mounted in the back of the field vehicle. Purge water was transferred into

55 gallon drums and placed at the Casper DEQ building pending analytical results and eventual disposal at the Casper Waste Water Treatment Plant.

Groundwater Sample Collection

Groundwater samples from new and existing monitoring wells were collected using Low-Flow Purge (LFP) methods. This method relies on the removal of groundwater at a rate similar to the well's rate of recharge (i.e., the groundwater column height during pumping should not vary more than approximately 10 percent from its steady-state condition or by keeping the drawdown at a minimal level (e.g., 0.33 feet); and is documented in the USEPA's Groundwater Sampling Guidelines for Superfund and RCRA Project Managers (Yeskis, D. and Zavala, B, 2002).

During the initial site visit on October 8, 2009 and October 9, 2009, groundwater samples were collected from 2 existing monitoring wells (CG-1, CG-4A) in the North Casper Plume and 3 existing monitoring wells (HC-3, HC-11, and HC-12) in Plume #1 on the Burlington Northern railroad property using LFP methods. Additionally, one groundwater grab sample was collected from the tap at a private water well (PW-1) located at 925 N. Washington St. after 5 minutes of purging the well.

Upon completion of monitoring well development activities in November 2009, wells were allowed to rest a minimum of one week to recharge. Groundwater samples were collected on December 1 and December 2, 2009 from eight newly installed monitoring wells (EMW-03D, EMW-03S, EMW-04D, EMW-04S, EMW-05, EMW-06D, EMW-06S, and EMW-07) and one existing monitoring well (MW-1054-2) in Plume #1, and two existing monitoring wells (MW-2 and MW-7A) in the North Casper Plume. Additionally, groundwater samples were collected on December 1, 2009 from shallow monitoring wells EMW-01 and EMW-02 in Plume #2 and Plume #3, respectively.

Prior to sampling activities, the static water level was measured using an electronic water-sensing probe. A stainless steel submersible pump was placed in the well to a depth determined to be the center of the screened interval. Purge volumes were calculated based on the pump, flow-through cell, and tubing diameters and lengths. Water levels were continuously measured during purging to ensure drawdown did not exceed 0.33 feet. Field water quality parameters (pH, temperature, specific conductance, oxidation-reduction potential, and dissolved oxygen) were measured during purging using a flow-through cell. Once three successive readings of two or more field water quality parameters stabilized, samples were collected directly from the discharge port of the pump prior to passing through the flow cell into laboratory-supplied containers. Groundwater samples were labeled, logged onto chain of custody documents, and stored on ice for submittal to TestAmerica–Denver for VOC analysis using USEPA Method 8260B.

To minimize cross contamination of groundwater samples, the submersible pump and cable were cleaned (decontaminated) between sample locations with a solution of alconox/deionized water (DI) followed by a DI water rinse, and dedicated, disposable polyethylene tubing (not requiring decontamination) was used at each well. Purge water was containerized at each well location and temporarily placed into a 150

gallon polyethylene tank mounted in the back of the field vehicle. Purge water was transferred into 55 gallon drums and placed at the Casper DEQ building pending analytical results and eventual disposal at the Casper Waste Water Treatment Plant.

Monitor Well Survey

The Northing, Easting, ground surface elevation, and top of casing elevation of all sampled wells were surveyed and referenced to a consistent site datum by licensed surveyor WLC-Casper on January 22, 2010.

Surface Water Investigation Procedures

On December 2, 2009 three surface water samples were collected from the North Platte River to determine if PCE is present in groundwater discharging from the North Casper Plume into the river. One sample (ESW-01) was collected upstream and one sample (ESW-03) was collected downstream of the estimated discharge zone. A third sample (ESW-02) was collected closer to the upstream discharge zone since it was the safest location to access the river based upon the current winter conditions. Surface water samples were collected from a depth of approximately one foot using a freshly-gloved hand directly into laboratory-supplied containers. Samples were labeled, logged onto chain of custody documents, and stored on ice for submittal to TestAmerica–Denver for VOC analysis using USEPA Method 8260B. Surface water locations are presented on Figure 1.

Investigation Results

The results of soil, groundwater, and surface water sampling and analyses are described below.

Soil Analytical Results

Organic vapor headspace monitoring was performed with a PID meter at each borehole location during drilling activities. Elevated organic vapor concentrations were measured in 7 boreholes located in Plume #1, Plume #2, and Plume #3 in downtown Casper. Elevated PID readings in boreholes EMW-01 and EMW-02 (Plume #1 and Plume #2) are consistent with hydrocarbons present in the soil based on the staining and strong odors noted in lithologic descriptions. The remaining 5 boreholes (EMW-03D, EMW-03S, EMW-04D, EMW-04S and EMW-05) are within or immediately adjacent to the historic groundwater PCE plume boundary (Huntingdon, 1994). Organic vapor headspace monitoring results are summarized on Table 2.

During drilling activities, soil samples were collected from soil cuttings from each borehole based on visual observation and elevated PID measurements. Three soil samples (EMW-04D(15.5-16.0’), EMW-04D(24.0-25.0’) and EMW-05(6.5-7.5’)) were collected on November 12, 2009 and submitted for VOC analysis. One soil sample (EMW-05(7.5-8.4’)) was collected as a laboratory quality assurance/quality control (QA/QC) sample. Although PID readings were higher for soil samples collected from boreholes EMW-01, EMW-02, EMW-03D, and EMW-03S, samples from EMW-04D and EMW-05 were selected for analysis based on concurrent soil vapor sample results and borehole location within the historic Plume

#1 boundary. Soil analytical results indicated the presence of PCE at 0.0031 milligrams per kilogram (mg/kg) in sample EMW-04D(15.5-16.0') exceeding the PCE Migration to Groundwater Cleanup Level of 0.000052 mg/kg (DEQ Voluntary Remediation Program (VRP) Fact Sheet #12, Soil Cleanup Level Look-Up Table, 2009). Acetone, trichloroethene (TCE), and total xylenes were detected in one or more samples below the DEQ cleanup levels. All other compounds were not detected at the reporting limit (RL). Soil results are summarized on Table 3.

Groundwater Analytical Results

Groundwater Flow

The depth to water was measured in each well during sampling activities and is presented on Table 1. Groundwater elevations were contoured to assess groundwater flow direction. Based on 2009 water levels, shallow groundwater generally appears to flow across downtown and north Casper in a northeasterly direction toward the North Platt River as presented on Figure 1. Additionally, shallow groundwater in Plume #2 and Plume #3 may flow to the north and northwest into the North Platte River.

Groundwater Analyses

Groundwater samples were collected from 5 existing monitor wells (CG-1, CG-4A, HC-3, HC-11, HC-12) and one private water well (PW-1) during the initial site visit on October 8 and October 9, 2009. Thirteen groundwater samples, were collected on December 1 and December 2, 2009 from 10 newly installed (EMW-01, EMW-02, EMW-03D, EMW-03S, EMW-04D, EMW-04S, EMW-05, EMW-06D, EMW-06S, EMW-07) and 3 existing monitor wells (MW-1054-2, MW-2 and MW-7A). Two laboratory prepared trip blanks (TB100909 and TB120109), two duplicate (EMW-05 DUP and EMW-06D DUP) samples, and one replicate (MW-2 REP) sample were collected for QA/QC purposes. Field water quality parameters were measured for each well and are presented on Table 4. A summary of groundwater analytical results is presented on Table 5.

A summary of laboratory analytical results indicates concentrations of PCE above the EPA Primary Drinking Water Standard Maximum Contaminant Levels (EPA MCLs) (EPA, 2003) and DEQ Groundwater Cleanup Levels (DEQ GCLs) (DEQ VRP Fact Sheet #13, 2009) of 5 micrograms per liter (µg/L) in 16 of 22 groundwater samples, with concentrations ranging from 6.3 µg/L to 420 µg/L. TCE and Methylene Chloride concentrations exceeding DEQ GCLs were also detected in sample EMW-04S. All other compounds were reported below DEQ GCLs or were not detected at the RL.

PCE concentrations in groundwater exceeding DEQ GCLs were observed within the historic groundwater PCE plume boundaries (Huntingdon, 1994). PCE was not detected in groundwater wells EMW-01 and EMW-02 in Plume #2 and Plume #3, respectively. With the exception of 3 wells (EMW-03S, EMW-04S and EMW-05) in the downtown area of Plume #1, PCE concentrations were generally lower than observed in 1994. Geoprobe® results from 1994 in the areas of EMW-03S, EMW-04S and EMW-05 had lower concentrations of PCE in groundwater than in 2009; however they still exceeded the DEQ GCLs.

Surface Water Analytical Results

Following groundwater sample collection on December 2, 2009, 3 surface water samples (ESW-01, ESW-02 and ESW-03) were collected from the south bank of the North Platte River for VOC analysis. Additionally, one replicate (ESW-03 REP) sample was collected for QA/QC purposes. Field water quality parameters were measured at each location and are presented on Table 4. A summary of surface water analytical results is presented on Table 6.

Surface water analytical results indicated the presence of PCE and acetone in samples ESW-02 and ESW-03 below EPA MCLs and DEQ GCLs. PCE was not detected at the RL at upstream location ESW-01 and all other compounds were not detected at the RL in all samples. Based on the results, groundwater containing PCE is likely discharging from the North Casper Plume into the river; however, groundwater is most likely being diluted by surface water in the river.

Recommendations

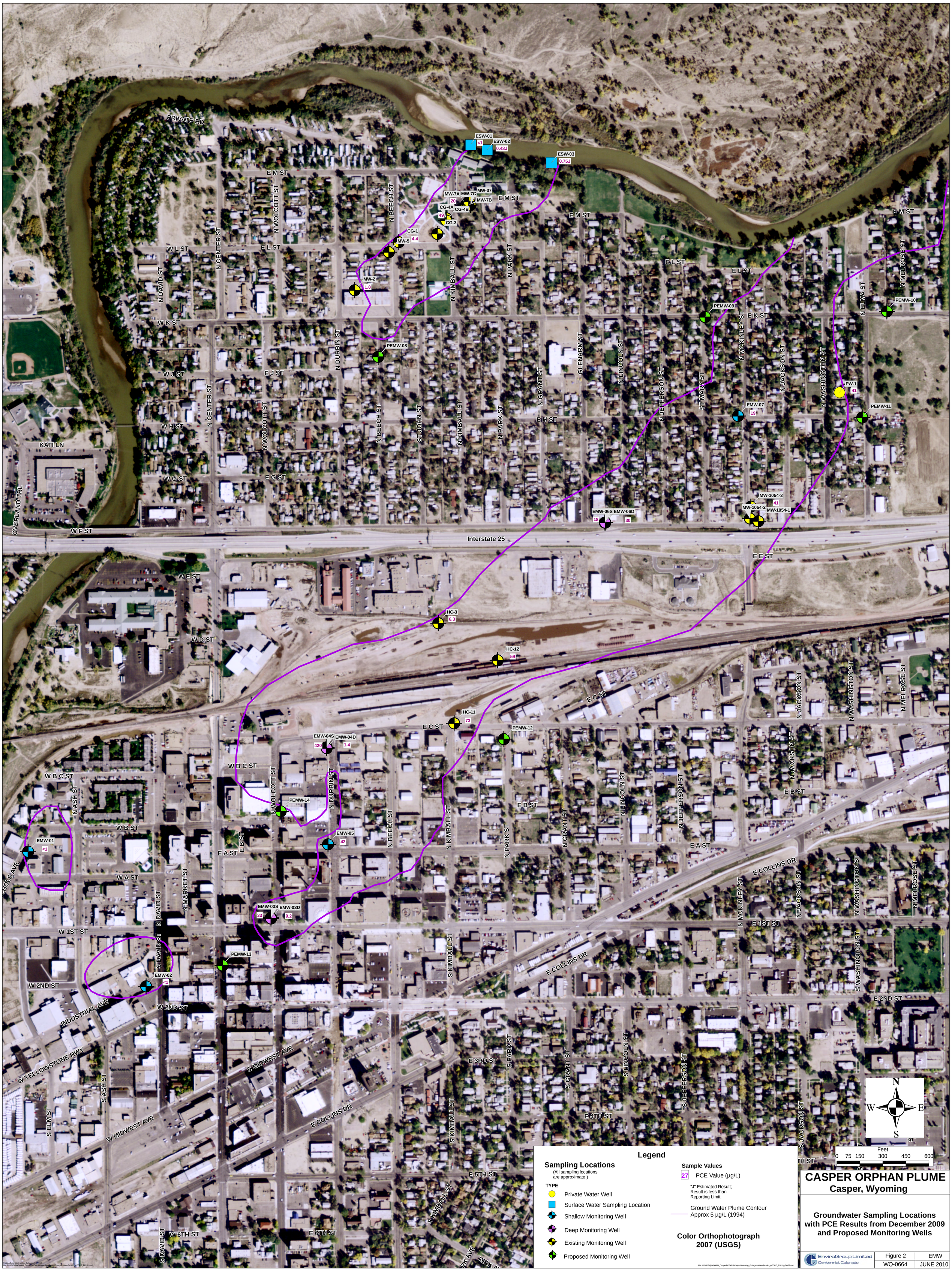
In November 2009, groundwater monitor well locations were selected based on historic soil vapor PCE plume boundaries (Huntingdon, 1994) and access to existing monitoring wells. Groundwater analytical results indicate concentrations of PCE exceeding EPA MCLs and DEQ GCLs in monitor wells in the North Casper Plume and Plume #1. All groundwater results exceeding screening levels were within these two historic plume boundaries. Proposed monitor well locations to further evaluate the groundwater plume boundaries are presented on Figure 2.

In the North Casper Plume, groundwater PCE concentrations are considerably lower than in 1994 and appear to be concentrated in the north east area of the historic plume boundary. However, soil vapor concentrations of PCE exceed 39,000 µg/m3 in ESV-06 at the intersection of E. K. Street and N. Beech Street. One up-gradient, shallow (20-25' bgs) monitor well is proposed south of ESV-06 to provide groundwater data to further evaluate the plume boundary around the highest soil vapor PCE concentration measured in November 2009.

Two shallow monitor well locations are proposed to the east and northeast of the PW-1 water well (PCE concentration of 41 µg/L in October 2009) and one monitor well location is proposed at the intersection of E. K Street and S. Mary Street to confirm if the groundwater plume has migrated from the historic plume boundary and to help evaluate the north-western and eastern extent of the plume.

South of I-25 (i.e., downtown area), 3 shallow monitor wells are proposed to define the current south-western and eastern plume boundaries around wells with PCE concentrations exceeding EPA MCLs and DEQ GCLs. All three proposed wells are located within 150 feet of the historic plume boundary. Two wells are proposed to further evaluate background groundwater conditions near EMW-03S and to further evaluate the eastern plume boundary near HC-11. The third well is proposed up-gradient of the former dry cleaner building on N. Durbin St. and EMW-04S (the well that had the highest groundwater PCE concentration of all wells sampled (420 µg/L)).

Utilities will be marked prior to monitor well installation by Site Services, Inc. and monitor wells will be developed and allowed to rest a minimum of overnight prior to sample collection. Groundwater samples will be collected using LFP methods and submitted to TestAmerica-Denver for laboratory analysis using USEPA Method 8260B (VOCs). Field procedures will be conducted as outlined in the approved SAP. EnviroGroup will provide DEQ with a separate cost estimate for additional investigation activities.



Legend

Sampling Locations

(All sampling locations are approximate.)

TYPE

- Private Water Well
- Surface Water Sampling Location
- Shallow Monitoring Well
- Deep Monitoring Well
- Existing Monitoring Well
- Proposed Monitoring Well

Sample Values

27 PCE Value (µg/L)

"J" Estimated Result; Result is less than Reporting Limit.

Ground Water Plume Contour Approx 5 µg/L (1994)

Color Orthophotograph 2007 (USGS)

CASPER ORPHAN PLUME

Casper, Wyoming

Groundwater Sampling Locations with PCE Results from December 2009 and Proposed Monitoring Wells

EnviroGroup Limited
Centennial, Colorado

Figure 2	EMW
WQ-0664	JUNE 2010

TABLE 5

Groundwater Analytical Results - October and December 2009

Casper PCE Plumes Orphan Site
Casper, WY

Analytical Parameter	WDEQ Groundwater Cleanup Levels	EPA MCL	Sample ID	CG-1	CG-4A	EMW-01	EMW-02	EMW-03S	EMW-03D	EMW-04S	EMW-04D	EMW-05	EMW-05 DUP	EMW-06S	EMW-06D	EMW-06D DUP	EMW-07	HC-3	HC-11	HC-12	MW-2	MW-2 REP	MW-7A	MW-1054-2	PW-1
			Sample Date	10/9/2009	10/9/2009	12/1/2009	12/1/2009	12/1/2009	12/1/2009	12/1/2009	12/1/2009	12/1/2009	12/1/2009	12/2/2009	12/1/2009	12/1/2009	12/2/2009	10/9/2009	10/9/2009	10/9/2009	12/1/2009	12/1/2009	12/1/2009	12/1/2009	10/8/2009
			Units																						
1,1,1,2-Tetrachloroethane	3.27	---	ug/L	<1	<1	<1	<1	<1	<1	<20	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<2	<1
1,1,1-Trichloroethane	200	200	ug/L	<1	<1	<1	<1	<1	<1	<20	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<2	<1
1,1,2,2-Tetrachloroethane	0.425	---	ug/L	<1	<1	<1	<1	<1	<1	<20	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<2	<1
1,1,2-Trichloroethane	5	5	ug/L	<1	<1	<1	<1	<1	<1	<20	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<2	<1
1,1-Dichloroethane	7,290	---	ug/L	<1	<1	<1	<1	<1	<1	<20	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<2	<1
1,1-Dichloroethene	7	7	ug/L	<1	<1	<1	<1	<1	<1	<20	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<2	<1
1,1-Dichloropropene	---	---	ug/L	<1	<1	<1	<1	<1	<1	<20	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<2	<1
1,2,3-Trichlorobenzene	---	---	ug/L	<1	<1	<1	<1	<1	<1	<20	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<2	<1
1,2,3-Trichloropropane	219	---	ug/L	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<50	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2	<2.5	<2.5	<2.5	<2.5	<2	<2.5
1,2,4-Trichlorobenzene	70	70	ug/L	<1	<1	<1	<1	<1	<1	<20	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<2	<1
1,2,4-Trimethylbenzene	365	---	ug/L	<1	<1	<1	**55**	**0.18** J	<1	<20	**0.2** J	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<2	<1
1,2-Dibromo-3-chloropropane (DBCP)	0.2	0.2	ug/L	<5	<5	<5	<5	<5	<5	<100	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<2.5	<5	<10	<5
1,2-Dibromoethane (EDB)	0.05	0.05	ug/L	<1	<1	<1	<1	<1	<1	<20	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<2	<1
1,2-Dichlorobenzene	600	600	ug/L	<1	<1	<1	<1	<1	<1	<20	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<2	<1
1,2-Dichloroethane	5	5	ug/L	<1	<1	<1	<1	<1	<1	<20	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<2	<1
1,2-Dichloroethene (total)	---	---	ug/L	<1	<1	<1	<1	<1	<1	<20	<1	<1	<1	<1	<1	<1	<1	**2.9**	<2	<1	<1	<1	<1	<2	<1
1,2-Dichloropropane	5	5	ug/L	<1	<1	<1	<1	<1	<1	<20	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<2	<1
1,3,5-Trimethylbenzene	1,820	---	ug/L	<1	<1	<1	**8.3**	<1	<1	<20	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<2	<1
1,3-Dichlorobenzene	320	---	ug/L	<1	<1	<1	<1	<1	<1	<20	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<2	<1
1,3-Dichloropropane	729	---	ug/L	<1	<1	<1	<1	<1	<1	<20	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<2	<1
1,4-Dichlorobenzene	75	75	ug/L	<1	<1	<1	<1	<1	<1	<20	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<2	<1
2,2-Dichloropropane	---	---	ug/L	<5	<5	<5	<5	<5	<5	<100	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<1	<5	<10	<5
2-Butanone (MEK)	21,900	---	ug/L	<6	<6	<6	<6	<6	<6	<120	<6	<6	<6	<6	<6	<6	<6	<6	<12	<6	<6	<10	<6	<12	<6
2-Chlorotoluene	729	---	ug/L	<1	<1	<1	<1	<1	<1	<20	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<2	<1
2-Hexanone	---	---	ug/L	<5	<5	<5	<5	<5	<5	<100	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<10	<5	<10	<5
4-Chlorotoluene	2,550	---	ug/L	<1	<1	<1	<1	<1	<1	<20	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<2	<1
4-Isopropyltoluene	---	---	ug/L	<1	<1	<1	<1	<1	<1	<20	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<2	<1
4-Methyl-2-pentanone	2,920	---	ug/L	<5	<5	<5	<5	<5	<5	<100	<5	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5	<10	<5	<10	<5
Acetone	32,800	---	ug/L	<10	**2.6** J B	<10	**50**	<10	<10	<200	**59**	<10	<10	<10	<10	<10	<10	<10	<20	<10	<10	<10	**7.6** J	<20	<10
Benzene	5	5	ug/L	<1	<1	<1	**3.1**	<1	<1	<20	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<2	<1
Bromobenzene	729	---	ug/L	<1	<1	<1	<1	<1	<1	<20	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<2	<1
Bromochloromethane	---	---	ug/L	<1	<1	<1	<1	<1	<1	<20	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<2	<1
Bromodichloromethane	80	80	ug/L	<1	<1	<1	<1	<1	<1	<20	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<2	<1
Bromoform	80	80	ug/L	<1	<1	<1	<1	<1	<1	<20	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<2	<1
Bromomethane	51	---	ug/L	<2	<2	<2	<2	<2	<2	<40	<2	<2	<2	<2	<2	<2	<2	<2	<4	<2	<2	<1	<2	<4	<2
Carbon tetrachloride	5	5	ug/L	<1	<1	<1	<1	<1	<1	<20	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<2	<1
Chlorobenzene	100	100	ug/L	<1	<1	<1	<1	<1	<1	<20	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<2	<1
Chloroethane	---	---	ug/L	<2	<2	<2	<2	<2	<2	<40	<2	<2	<2	<2	<2	<2	<2	<2	<4	<2	<2	<1	<2	<4	<2
Chloroform	80	80	ug/L	<1	<1	<1	<1	<1	<1	<20	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<2	<1
Chloromethane	5	---	ug/L	<2	<2	<2	<2	<2	<2	<40	<2	<2	<2	<2	<2	<2	<2	<2	<4	<2	<2	<1	<2	<4	<2
cis-1,2-Dichloroethene	70	70	ug/L	<1	<1	<1	<1	<1	<1	<20	<1	<1	<1	<1	<1	<1	<1	**2.9**	<2	<1	<1	<1	<1	<2	<1
cis-1,3-Dichloropropene	---	---	ug/L	<1	<1	<1	<1	<1	<1	<20	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<2	<1
Dibromochloromethane	80	80	ug/L	<1	<1	<1	<1	<1	<1	<20	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<2	<1
Dibromomethane	365	---	ug/L	<1	<1	<1	<1	<1	<1	<20	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<2	<1
Dichlorodifluoromethane	7,290	---	ug/L	<2	<2	<2	<2	<2	<2	<40	<2	<2	<2	<2	<2	<2	<2	<2	<4	<2	<2	<1	<2	<4	<2
Ethylbenzene	700	700	ug/L	<1	<1	<1	**3.4**	<1	<1	<20	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<2	<1
Hexachlorobutadiene	1.09	---	ug/L	<1	<1	<1	<1	<1	<1	<20	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<2	<1
Isopropylbenzene	3,600	---	ug/L	<1	<1	<1	**14**	<1	<1	<20	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<2	<1
Methyl tert-butyl ether	47.3	---	ug/L	<5	<5	<5	<5	<5	<5	<100	**3.3** J	<5	<5	<5	<5	<5	<5	**0.78** J	<10	<5	<5	<1	**0.51** J	<10	<5
Methylene chloride	5	5	ug/L	<5	<5	**0.35** J B	<5	**0.34** J B	**0.32** J B	**21** J B	**0.35** J B	**0.41** J B	**0.42** J B	**0.41** J B	**0.39** J B	**0.4** J B	**0.39** J B	<5	<10	<5	**0.44** J B	<1	**0.41** J B	<10	<5
m-Xylene & p-Xylene	72,900	---	ug/L	<2	<2	<2	**6.7**	<2	<2	<40	<2	<2	<2	<2	<2	<2	<2	<2	<4	<2	<2	---	<2	<4	<2
Naphthalene	729	---	ug/L	<1	<1	<1	**13**	**0.38** J	<1	<20	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<10	<1	<2	<1
n-Butylbenzene	---	---	ug/L	<1	<1	<1	**4.6**	<1	<1	<20	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<2	<1
n-Propylbenzene	---	---	ug/L	**0.2** J	<1	<1	**19**	<1	<1	<20	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<2	<1
o-Xylene	2	---	ug/L	<1	<1	<1	**0.2** J	<1	<1	<20	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	---	<1	<2	<1
sec-Butylbenzene	---	---	ug/L	<1	<1	<1	**4.2**	<1	<1	<20	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<2	<1
Styrene	100	100	ug/L	<1	<1	<1	<1	<1	<1	<20	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<2	<1
tert-Butylbenzene	---	---	ug/L	<1	<1	<1	<1	<1	<1	<20	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<2	<1
Tetrachloroethene (PCE)	5	5	ug/L	**4.4**	**49**	<1	<1	**33**	**9.2**	**420**	**1.4**	**42**	**42**	**18**	**30**	**31**	**19**	**6.3**	**73**	**59**	**1.8**	**1.9**	**20**	**41**	**41**
Toluene	1,000	1,000	ug/L	<1	<1	<1	<1	<1	<1	<20	**0.22** J	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<2	<1
trans-1,2-Dichloroethene	100	100	ug/L	<1	<1	<1	<1	<1	<1	<20	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<2	<1
trans-1,3-Dichloropropene	---	---	ug/L	<3	<3	<3	<3	<3	<3	<60	<3	<3	<3	<3	<3	<3	<3	<3	<6	<3	<3	<1	<3	<6	<3
Trichloroethene (TCE)	5	5	ug/L	<1	**1.1**	<1	<1	**1**	**0.27** J	**7** J	<1	**0.3** J	**0.3** J	<1	**0.27** J	**0.28** J	<1	**1.1**	**0.74** J	**1.1**	<1	<1	**0.98** J	**0.34** J	**4.5**
Trichlorofluoromethane	10,900	---	ug/L	<2	<2	<2	<2	<2	<2	<40	<2	<2	<2	<2	<2	<2	<2	<2	<4	<2	<2	<1	<2	<4	<2
Vinyl chloride	2	2	ug/L	<1	<1	<1	<1	<1	<1	<20	<1	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1	<1	<1	<2	<1
Xylenes (total)	10,000	10,000	ug/L	<2	<2	<2	**6.9**	<2	<2	<40	<2	<2	<2	<2	<2	<2	<2	<2	<4	**0.44** J	<2	<3	**0.3** J	<4	<2

Notes:
1) Wyoming Department of Enviornmental Quality (WDEQ) Groundwater Cleanup Levels based on Voluntary Remediation Program (VRP) Fact Sheet #13, revised 2009.
2) EPA MCL - Environmental Protection Agency (EPA) National Primary Drinking Water Standard, Maximum Contaminant Level.
3) ug/L - Micrograms per liter.
4) --- - Not available or not analyzed.
5) < - Not detected at the reporting limit (RL).
6) J - Estimate result. Result is less than RL.
7) B - Method Blank Contamination. The associated method blank contains the target analyte at a reportable level.
8) **Bold** - Detected Result.
9) Yellow Highlight - Result exceeds WDEQ Groundwater Cleanup Levels and/or EPA MCL.