From:	Greg Creer
To:	"robert.beierle@state.co.us"; "alex.fischer@state.co.us"
Cc:	Peg Young; Kerry A. McCowen
Subject:	RE: Facility ID 428915
Date:	Monday, August 26, 2013 7:47:58 AM
Attachments:	Walden Waterflood Facility - Response Letter.pdf image001.png

Mr. Fisher and Mr. Beierle:

Attached is response from LT Environmental regarding the benzene plume located on Praxair's property in the area of MW-4 and MW-11. As you can see from the response, it is believed that the benzene plume may have been caused by leaks in the lines running to and from the Praxair facility. The plume was not caused by active oil well field operations as CB&I alleged because there is no oil and gas related infrastructure in the vicinity. LT Environmental is recommending additional assessment to determine the full extent of the plume.

Bonanza Creek will continue to investigate this matter. If you have any questions, please do not hesitate to contact me.

Thank you.

Greg Creer
Corporate Counsel
Bonanza Creek Energy, Inc.
410 17th Street, Suite 1400
Denver, CO 80202
Office: 720-440-6184
Cell: 303-514-3436
GCreer@bonanzacrk.com

BONANZA CREEK

From: Greg Creer
Sent: Monday, August 12, 2013 4:51 PM
To: 'robert.beierle@state.co.us'; 'alex.fischer@state.co.us'
Cc: Peg Young; Kerry A. McCowen
Subject: Facility ID 428915

Mr. Fischer and Mr. Beierle:

Bonanza Creek has received your recent update on the Praxair facility and your inquiry as to whether Bonanza Creek will take responsibility for the cleanup of the benzene plume located on Praxair's property in the area of MW-4 and MW-11.

Bonanza Creek is still investigating the matter and cannot accept responsibility at this time. Further details of Bonanza Creek's investigation will hopefully be provided to you within the next week or two.

If you have any questions, please do not hesitate to contact me at (720) 440-6184.

Sincerely,

Greg Creer
Corporate Counsel
Bonanza Creek Energy, Inc.
410 17th Street, Suite 1400
Denver, CO 80202
Office: 720-440-6184
Cell: 303-514-3436
GCreer@bonanzacrk.com

COMPLIANCE / ENGINEERING / REMEDIATION

LT Environmental Inc.
4600 W. 60th Avenue
Arvada, Colorado 80003
T 303.433.9788 / F 303.433.1432

August 23, 2013

Mr. Greg Creer
Corporate Counsel
Bonanza Creek Energy, Inc.
410 17th Street, Suite 1400
Denver, Colorado 80203

Re: Review of *Project Update* Report Prepared by CB&I Company
Walden Water Flood Facility
COGCC Facility ID 428915
SENW & NESW 2-T9N-R79W
Jackson County, Colorado

Dear Mr. Creer:

As requested, LT Environmental, Inc. (LTE) has reviewed the Project Update letter report prepared by CB&I Company (CB&I) on behalf of Praxair, Inc. (Praxair) dated July 26, 2013. The letter report, which was submitted to the Colorado Department of Environmental Health and Environment (CDPHE), discusses the results of a joint groundwater monitoring event conducted in May 2013 at the neighboring Bonanza Creek Energy, Inc. (Bonanza Creek) and Praxair facilities. The Project Update report also presents some conclusions regarding the nature, extent, and origin of the groundwater impacts based on CB&I and Praxair's interpretation of the May 2013 groundwater results.

LTE installed five additional monitoring wells (MW17 through MW21) at the site in July 2013 and conducted a quarterly monitoring event for all the Bonanza Creek site wells in August 2013. A Groundwater Analytical Results map showing the locations of the new wells and the benzene concentrations for the August 2013 monitoring event is attached as Figure 1. A summary of the quarterly groundwater monitoring results is presented in Table 1. Based on our review of the CB&I Project Update report and the available assessment data and findings, LTE has reached the following conclusions regarding the extent and nature of the petroleum hydrocarbon impacts at the site and the information presented in the CB&I letter report:

- Bonanza Creek had the 16 monitoring wells located on their facility in May 2013 professionally surveyed to allow collection of accurate relative groundwater elevation data from these monitoring wells. LTE concurs that the predominant groundwater flow direction across the site is to the northwest and this flow direction does not vary significantly on a seasonal basis.

- On page 2, paragraph 1 of the Update Report, with regard to the benzene detection of 164 micrograms per liter (ug/L) in MW-8, it states, "CB&I believes the source is off-site, possibly attributable to the active well field operations." However, Bonanza Creek has indicated that at present and in the past there has been no oil and gas related infrastructure located in the vicinity of MW-8. Furthermore, MW-8 is located down-gradient of MW-6, which is located on the Praxair facility and has historically had benzene concentrations as high as 368 ug/L.

- On page 2, paragraph 2, CB&I references the benzene and total BTEX isoconcentration maps generated using the combined results from the Praxair and Bonanza Creek May 2013 groundwater monitoring event. Citing the isoconcentration maps and northwesterly groundwater flow direction it is concluded that, "petroleum hydrocarbon contamination from Bonanza has migrated onto the Praxair property in the vicinity of MW-4 and MW-11."

    - Accordingly to the analytical results table presented in the Update Report, MW-4 was first sampled in November 2007. BTEX concentrations in MW-4 were below the laboratory reporting limits in November 2007, but jumped to 16,600 ug/L benzene and 12,700 ug/L toluene in May 2008. The sudden and steep rise in concentrations, suggest a nearby release source and not the gradual migration of contamination on to the site from the Bonanza Creek facility.

    - It is Bonanza Creek's understanding that MW-4 is located in the vicinity of an underground exhaust pipe that surfaces near MW-4 to vent excess gas from Praxair's carbon dioxide extraction plant. LTE believes that petroleum hydrocarbon liquids condensing and dropping out of the exhaust air within this underground pipeline is a potential source of the groundwater impacts present in MW-4. Benzene isoconcentration contours generated using the May 2013 (Praxair) and August 2013 (Bonanza Creek) groundwater results are shown on Figure 1.

    - A Utility Location Map is attached as Figure 2. The utility map illustrates the locations of the various lines that carry product to and from the Praxair facility to Bonanza Creek's water flood facility. The return line from Praxair to Bonanza Creek runs generally west to east past Praxair's MW-11 and Bonanza Creek's MW03/MW03R and MW08/MW08R. The entire length of this line was recently replaced and MW03 and MW-11 were destroyed in the process. Given the location of this return line and the other lines running between the co-located facilities, it is not possible to conclude at this time precisely which line may have leaked and at which point along the line a leak may have occurred. The presence of these utility corridors, which are located directly above the static water level, offer preferential pathways or conduits

for the pressurized contents of these lines, once released, to migrate against or cross-gradient.

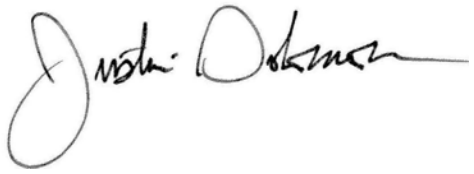
- It should also be noted that prior to replacing the return line, as described above, that a pressure test was conducted on the line in May 2012. During the pressure test the return line failed and petroleum hydrocarbons (condensate and produced water) surfaced above the line on the east side of the Praxair plant where the return line exits the structure. To our knowledge, this leak/release has never been investigated and it remains a potential source for the impacts present in MW-11.

Recommendations:

LTE believes addition assessment soil borings, completed as groundwater monitoring wells, are necessary to determine the full extent of the groundwater plume(s). The proposed monitoring well locations are depicted on Figure 1. The wells would be installed on the Praxair facility and would assess whether the impacts in MW-4 are connected with the larger plume to the east of MW-4 (~200 feet) or if they are associated with a separate release resulting from operations at the Praxair facility. The proposed monitoring wells would also help determine the origin(s) of the impacts present in MW-11.

If you have any questions regarding our review of the Update Report and the available site data and findings, please contact our office at (303) 433-9788.

Sincerely,
LT ENVIRONMENTAL, INC.



Justin Solomon
Project Environmental Scientist

Reviewed by

John Cocroft
Client Manager

Attachments:
Figure 1 – Groundwater Analytical Results
Figure 2 – Utility Location Map
Table 1 – Groundwater Analytical data

ATTACHMENTS

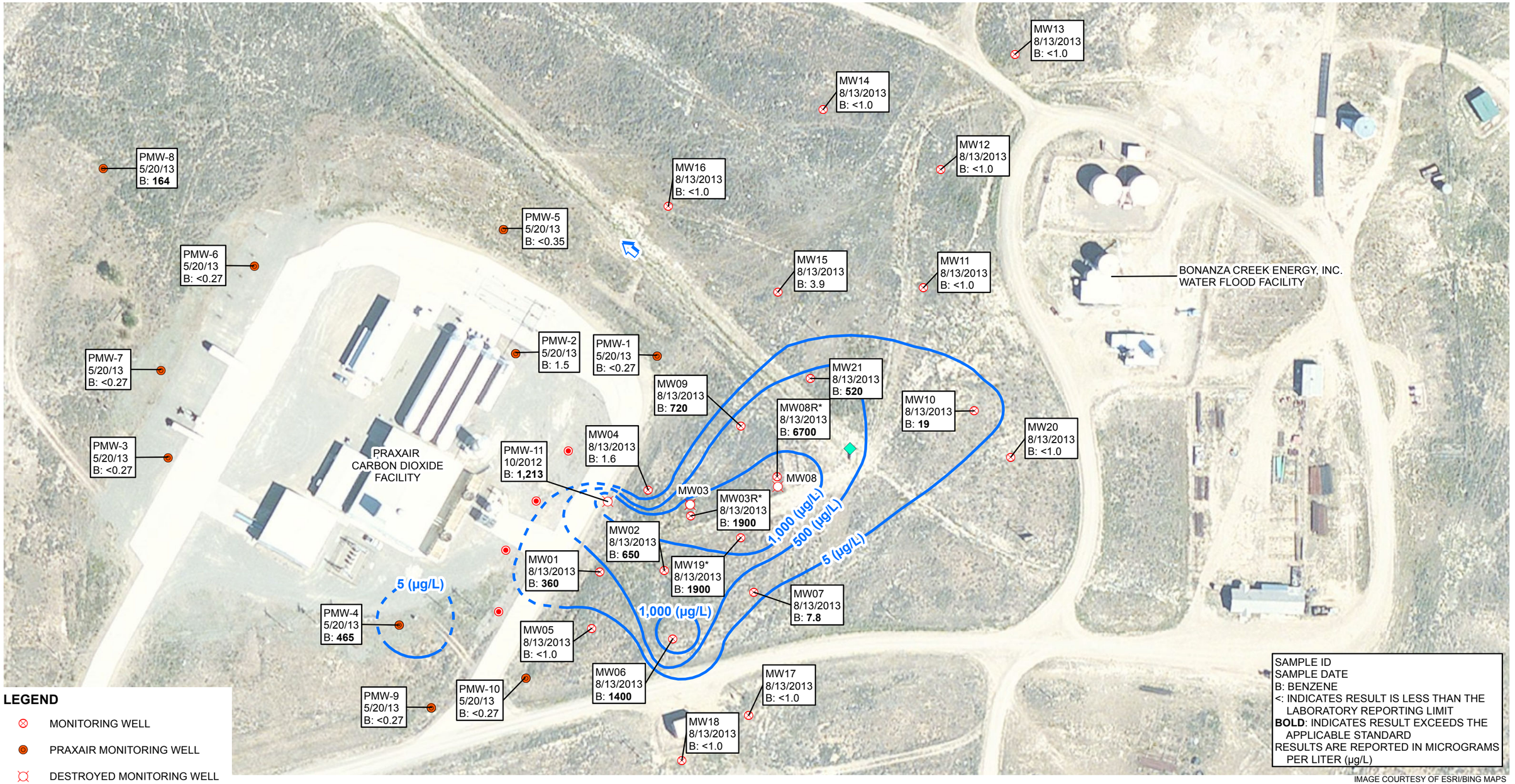


IMAGE COURTESY OF ESRI/BING MAPS

LEGEND

- MONITORING WELL
- PRAXAIR MONITORING WELL
- DESTROYED MONITORING WELL
- PROPOSED SOIL BORING / MONITORING WELL
- INJECTION WELL
- ESTIMATED GROUNDWATER FLOW DIRECTION
- BENZENE ISOCONCENTRATION CONTOUR (µg/L)
- DASHED WHERE INFERRED

*MW03R, MW08R, AND MW19 ARE 2 INCH WELLS

0 100 200
Feet

N

FIGURE 1
GROUNDWATER ANALYTICAL RESULTS - AUGUST 2013
WALDEN WATER FLOOD FACILITY
SENW & NESW SEC 2-T9N-R79W
JACKSON COUNTY, COLORADO
BONANZA CREEK ENERGY, INC.

P:\Bonanza Creek Energy\GIS\MXD\034512007_WALDEN\034512007_FIG01_GW_ANALY_BEN_2013_Q3.mxd

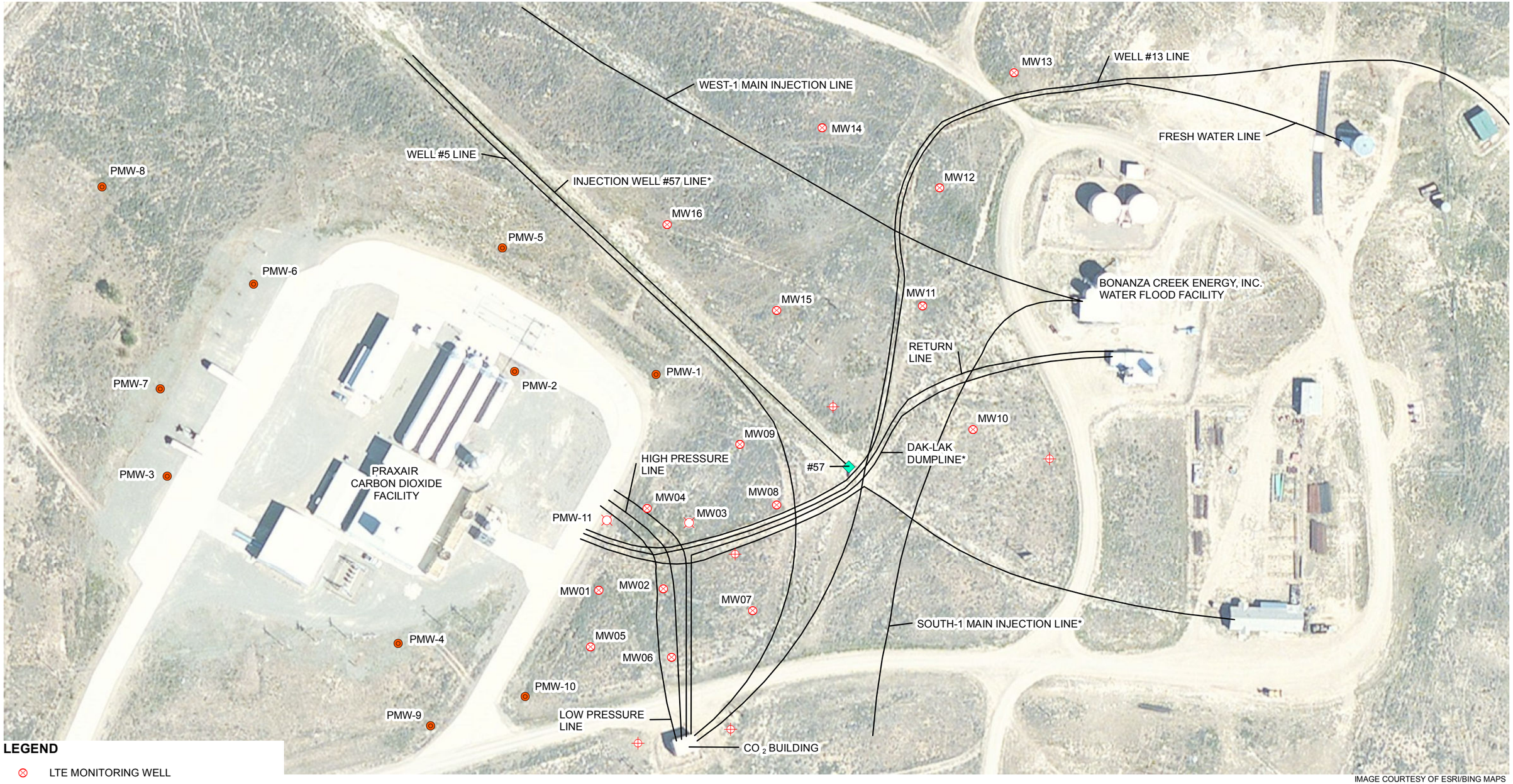


IMAGE COURTESY OF ESRI/BING MAPS

LEGEND

- LTE MONITORING WELL
- PRAXAIR MONITORING WELL
- DESTROYED MONITORING WELL
- PROPOSED SOIL BORING/MONITORING WELL
- INJECTION WELL
- UNDERGROUND UTILITY LINE
- *PRESSURE TESTED LINE

0 100 200
Feet

N

FIGURE 2
UTILITY LOCATION MAP
WALDEN WATER FLOOD FACILITY
SENW & NESW SEC 2-T9N-R79W
JACKSON COUNTY, COLORADO
BONANZA CREEK ENERGY OPERATING COMPANY LLC

P:\Bonanza Creek Energy\GIS\MXD\034512007_WALDEN\034512007_FIG03_UTIL_LOC_2013_Q2.mxd

TABLE 1
GROUNDWATER SAMPLE ANALYTICAL DATA
WALDEN WATER FLOOD FACILITY
BONANZA CREEK ENERGY OPERATING COMPANY LLC

SAMPLE ID	SAMPLE DATE	DTW (feet bgs)	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYLBENZENE (ug/L)	XYLENES (Total) (ug/L)
MW01	8/22/2012	9.03	**810**	1.3	400	840
	11/7/2012	10.30	**810**	<1.0	160	910
	2/28/2013	10.16	**790**	<1.0	210	570
	5/21/2013	8.96	**620**	<1.0	160	440
	8/13/2013	9.90	**360**	<1.0	150	240
MW02	8/22/2012	9.46	**2,100**	1.7	670	**5,400**
	11/7/2012	10.00	**2,400**	<1.0	**700**	**5,400**
	2/28/2013	10.15	**3,200**	<1.0	**740**	**4,300**
	5/21/2013	9.33	**790**	<1.0	150	960
	8/13/2013	10.09	**650**	<1.0	210	1,100
MW03	8/22/2012	8.96	**560**	100	480	**2,500**
	11/7/2012	9.84	**Product**	**Product**	**Product**	**Product**
	2/28/2013	Frozen	-	-	-	-
	5/21/2013	Destroyed	-	-	-	-
MW03R*	8/13/2013	10.37	**1,900**	25	290	**1,500**
MW04	8/22/2012	9.13	**6.6**	7.9	200	410
	11/7/2012	10.50	2.5	<1.0	62	60
	2/28/2013	9.85	4.1	<1.0	66	58
	5/21/2013	8.88	<1.0	<1.0	6.4	6.1
	8/13/2013	9.82	1.6	<1.0	19	13
MW05	8/22/2012	14.13	<1.0	<1.0	<1.0	2.2
	11/7/2012	8.00	<1.0	<1.0	<1.0	<1.0
	2/28/2013	10.18	<1.0	<1.0	<1.0	<1.0
	5/21/2013	9.40	<1.0	<1.0	<1.0	<1.0
	8/13/2013	10.16	<1.0	<1.0	<1.0	<1.0
MW06	8/22/2012	10.16	**1,200**	4.9	300	1,200
	11/7/2012	10.72	**9.8**	1.6	200	540
	2/28/2013	10.76	**1,100**	1.2	170	360
	5/21/2013	10.01	**1,300**	3.0	210	710
	8/13/2013	10.70	**1,400**	5.2	280	1,200
MW07	8/22/2012	9.74	1.5	1.2	4.6	33
	11/7/2012	9.90	2.0	<1.0	1.2	8.7
	2/28/2013	10.44	2.3	<1.0	<1.0	<1.0
	5/21/2013	9.77	2.8	<1.0	1.0	5.4
	8/13/2013	10.44	7.8	<1.0	1.1	2.3
MW08	8/22/2012	10.09	**7,000**	**13,000**	**830**	**7,800**
	11/7/2012	10.43	**Product**	**Product**	**Product**	**Product**
	2/28/2013	10.66	**Product**	**Product**	**Product**	**Product**
	5/21/2013	9.76	**8,000**	**11,000**	440	**6,700**
MW08R*	8/13/2013	10.50	**6,700**	**8,600**	520	**4,900**
MW09	8/22/2012	9.47	**1,400**	**1,700**	200	**1,700**
	11/7/2012	11.41	**4,100**	**4,600**	430	**3,500**
	2/28/2013	10.01	**7,200**	**6,700**	680	**5,100**
	5/21/2013	9.09	**5,100**	**5,000**	440	**3,900**
	8/13/2013	9.96	**720**	470	67	360
MW10	8/22/2012	7.88	**100**	<1.0	3.5	14
	11/7/2012	8.66	**120**	5.2	5.1	30
	2/28/2013	10.75	**120**	<1.0	2.0	<1.0
	5/21/2013	7.38	**70**	2.6	<1.0	3.0
	8/13/2013	8.18	**19**	<1.0	<1.0	<1.0

TABLE 1
GROUNDWATER SAMPLE ANALYTICAL DATA
WALDEN WATER FLOOD FACILITY
BONANZA CREEK ENERGY OPERATING COMPANY LLC

MW11	8/22/2012	14.18	<1.0	<1.0	<1.0	<1.0
	11/7/2012	9.75	<1.0	<1.0	<1.0	<1.0
	2/28/2013	6.87	**10**	<1.0	2.8	16
	5/21/2013	6.63	**<1.0**	<1.0	<1.0	<1.0
	8/13/2013	8.04	<1.0	<1.0	<1.0	<1.0
MW12	8/22/2012	Dry	Dry	Dry	Dry	Dry
	11/7/2012	7.42	<1.0	<1.0	<1.0	<1.0
	2/28/2013	7.52	<1.0	<1.0	<1.0	<1.0
	5/21/2013	6.62	<1.0	<1.0	<1.0	<1.0
	8/13/2013	9.02	<1.0	<1.0	<1.0	<1.0
MW13	8/22/2012	Dry	Dry	Dry	Dry	Dry
	11/7/2012	9.01	<1.0	<1.0	<1.0	<1.0
	2/28/2013	9.27	<1.0	<1.0	<1.0	<1.0
	5/21/2013	7.86	<1.0	1.2	<1.0	<1.0
	8/13/2013	8.27	<1.0	<1.0	<1.0	<1.0
MW14	8/22/2012	Dry	Dry	Dry	Dry	Dry
	11/7/2012	10.12	1.1	<1.0	<1.0	<1.0
	2/28/2013	10.01	<1.0	<1.0	<1.0	<1.0
	5/21/2013	7.74	<1.0	<1.0	<1.0	<1.0
	8/13/2013	8.84	<1.0	<1.0	<1.0	<1.0
MW15	8/22/2012	10.51	4.7	<1.0	<1.0	<1.0
	11/7/2012	8.37	**16**	<1.0	<1.0	<1.0
	2/28/2013	9.04	**19**	<1.0	<1.0	<1.0
	5/21/2013	7.79	**5.9**	<1.0	<1.0	<1.0
	8/13/2013	9.09	3.9	<1.0	<1.0	<1.0
MW16	8/22/2012	8.67	<1.0	<1.0	<1.0	<1.0
	11/7/2012	9.16	2.9	<1.0	<1.0	<1.0
	2/28/2013	8.99	2.6	<1.0	<1.0	<1.0
	5/21/2013	7.87	2.1	<1.0	<1.0	<1.0
	8/13/2013	9.08	<1.0	<1.0	<1.0	<1.0
MW17	8/13/2013	11.62	<1.0	<1.0	<1.0	<1.0
MW18	8/13/2013	11.31	<1.0	<1.0	<1.0	<1.0
MW19	8/13/2013	10.09	**1,900**	41	470	**1,500**
MW20	8/13/2013	8.43	<1.0	<1.0	<1.0	<1.0
MW21	8/13/2013	9.31	**520**	<1.0	47	18
The Basic Standards for Groundwater			5	560	700	1,400

Notes:
DTW - Depth to Water
ug/L - Micrograms per liter
bgs - below ground surface

Results noted in bold exceed Colorado Department of Public Health and Environment (CDPHE)-Water Quality Control Commission (WQCC) Regulation 41-The Basic Standards for Groundwater