Eco & Associates, Inc. ▪ 1855 W. Katella Ave. ▪ Suite 340 ▪ Orange ▪ CA ▪ 92867 ▪ phone (714) 289-0995 ▪ fax (714) 289-0965

January 28, 2013

Ms. Carol Wies-Brewer
U.S. Army Corps of Engineers, Albuquerque District
4101 Jefferson Plaza, NE
Albuquerque, NM 87109-3435

SUBJECT: FINAL AUGUST 2012 GROUNDWATER SAMPLING AND ANALYSIS REPORT FOR CITY WELLS, BROWN & BRYANT SUPERFUND SITE 600 S. DERBY STREET, ARVIN, CALIFORNIA CONTRACT NO. W912PL-10-D-0014 TASK ORDER 0013

Dear Ms. Wies-Brewer:

This letter presents a summary of the August 2012 monthly sampling results for City Well numbers CW-1, CW-5, CW-6, CW-8, CW-9, and CW-10. This report contains the results of the 11th monthly sampling event for these wells since the first event in October 2011. This work has been conducted in general accordance with the USACE Contract No. W912PP-10-D-0014 Task Order 0013.

OBJECTIVE

The objective of sampling and analysis of water from all City Wells in Arvin, CA is to identify presence of B&B Superfund Site Contaminants of Concern (COCs). Results of this water sampling will allow an assessment of regional concentrations of these contaminants, if present in the deeper zone being pumped by the City Wells.

WATER SAMPLING

The Arvin Water District operates 10 wells (CW-1 through CW-10) in the Arvin, California area; see Site Vicinity Map, Figure 1. The locations of the city wells are shown on Figure 2. Six of the ten wells (CW-1, CW-5, CW-6, CW-8, CW-9, and CW-10) were sampled on August 27, 2012. The remaining four wells (CW-2, CW-3, CW-4, and CW-7) were not available for sampling: the first three have been abandoned and CW-7 has not been operational since the sampling was started in October 2011. The wells were sampled by using a faucet at the well outlet. The sampling procedure was in accordance with the Site-Specific Work Plan [Monthly Groundwater Sampling & Analysis — City Wells] dated September 9, 2011.

The sample container type, size, and preservatives for each specific analysis are provided in Table 1.

TABLE 1: SAMPLE CONTAINERS, SIZES & PRESERVATIVES

Contaminants of Concern	EPA Analytical Method	Container Type	Container Size	Volume Required	Preservative
Chloroform	8260B or 8260 SIM	Glass (VOA vial)	40 mL	120 mL (3 vials)	HCl
1,2-Dibromo-3-Chloropropane (DBCP)					
1,2-Dichloropropane (1,2-DCP)					
1,3-Dichloropropane					
1,2,3-Trichloropropane (TCP)					
Ethylene Dibromide (EDB)					
Dinoseb	8151A	Amber glass	1 L	1 L	None

Notes:
VOA volatile organic analysis
mL milliliter
L liter
HCl hydrochloric acid

At each sampling location, all bottles designated for a particular analysis were filled sequentially before bottles designated for the next analysis were filled. If a matrix spike and matrix spike duplicate sample was to be collected at this location, all bottles designated for a particular analysis for both sample designations were filled sequentially before bottles for another analysis were filled.

Because the City wells are municipal supply wells and are in service during the sampling event, no purging of the well was necessary. Groundwater samples were collected at each well location by turning the faucet on and letting it run for 30 to 60 seconds. This allowed clearing of the sampling faucet prior to sampling and the development of a steady discharge for sampling. The water was then put into the appropriate sample containers with preservative (if required). The samples were chilled and processed for shipment to the laboratory.

Vials for volatile organic compound (VOC) analysis were filled first to minimize aeration of water in the well. The vials were inverted and checked for air bubbles to ensure zero headspace. If any air bubbles appeared, the vial contents were emptied into the container and transferred to the portable on-site storage tank. The vial was discarded and a new sample collected.

SAMPLE ANALYSES

All groundwater samples collected were analyzed for the seven COCs as well as any other constituents reported for each analytical method. EMAX Laboratories, Inc. (EMAX), accredited under the National Environmental Laboratory Accreditation Program (NELAP), performed the laboratory analytical services. The COCs and test methods are provided in Table 2.

All samples were collected using approved techniques following proper chain-of-custody protocols.

TABLE 2: ANALYTICAL METHODS FOR CONTAMINATION OF CONCERN

Contamination of Concern	EPA Analytical Method
Chloroform	8260B
1,2-Dibromo-3-Chloropropane (DBCP)	8260 SIM
1,2-Dichloropropane (1,2-DCP)	8260B
1,3-Dichloropropane	8260B
1,2,3-Trichloropropane (TCP)	8260 SIM
Ethylene Dibromide (EDB)	8260 SIM
Dinoseb	8151A

QUALITY CONTROL SAMPLES

A field duplicate was collected for the samples collected from City well (CW-1). The field duplicate is used to measure the sampling and analytical variability (precision) associated with the sample concentrations. The field duplicate was submitted as a "blind" sample to the laboratory. The relative percent difference (RPD) between the original sample and field duplicate was calculated for each parameter as part of the data evaluation. Both the sample and the corresponding field duplicate sample were reported as non-detected.

A matrix spike and matrix spike duplicate (MS/MSD) was performed on the sample collected from CW-6. The MS/MSD is used to monitor the precision and accuracy of the results of the laboratory's analytical procedures. Analytical results for the MS/MSD were reviewed and the results were evaluated to be acceptable.

A trip blank was also submitted along with the remaining samples of water collected during this sampling event.

DATA VALIDATION

The water samples analytical results were subject to data validation. The data were delivered in one package as Level III and Level IV deliverables. Ten percent (10%) of the data were subjected to validation to equivalent of EPA Level IV data validation. Raw data for one sample from this sample group (08-27-12-CW-6) was submitted at level IV for all the requested analytical methods. Level III data validation examines quality assurance/quality control (QA/QC) elements such as holding time, (both extraction and analysis), critical quality control measures, extraction logs, instrument injection logs, completeness of the results, and summaries of initial and continuing calibrations for the analytical methods. The analytical results, QC results, initial calibration, and related continuing calibration data were then comprehensively compared with the corresponding raw data and chromatograms presented for Level IV data validation.

The Data Validation Report is presented in Attachment 3 of this report.

The sample analytical data were reported to be acceptable for all of the EPA analysis methods used. The data were found reliable for use on the project.

SUMMARY OF THE ANALYTICAL RESULTS

The field notes taken during sampling are presented in Attachment 1, the laboratory analytical results in Attachment 2, and as stated above, the Data Validation and ADR information in Attachment 3. Site photographs taken during well sampling are presented in Attachment 4. A summary of the laboratory data results are provided in Table 4.

1,2,3-TCP and 1,2-DCP were the only COCs reported in concentrations above their respective laboratory detection limits. 1,2-DCP was reported in the CW-9 sample at 0.39 micrograms per liter (µg/L) (J-flagged). This compound has been reported in samples from this well for all five events when the well has been sampled at similar concentrations below its B-zone Comparative Level of 5 µg/L. 1,2,3-TCP was reported in water samples from CW-1, CW-5, CW-6, CW-8, and CW-9 at concentrations summarized in Table 3 below. All of these concentrations are above the drinking water Notification Level of 0.005 µg/L for 1,2,3-TCP. Notification levels are health-based advisory levels established by the California Department of Public Health (CDPH) for chemicals in drinking water that lack maximum contaminant levels (MCLs). More information on this subject is available at the following CDPH website: http://www.cdph.ca.gov/certlic/drinkingwater/Pages/123tcp.aspx. In CW-8, 1,2,3-TCP was not reported above laboratory detection limits from October 2011 through December 2011 or in May 2012 when the well was returned to service. For CW-8, 1,2,3-TCP is reported above its Notification Level in the last three sampling events —June 2012, July 2012, and August 2012. The CW-8 statistics below are for the last three months only.

TABLE 3: SUMMARY OF RESULTS FOR 1,2,3-TCP

Well No.	August 2012 Result	Mean of Results	95 Percent Upper Confidence Limit for the Mean Concentration
	µg/L		
CW-1	0.055	0.0900	0.1094
CW-5	0.110	0.0719	0.0847
CW-6	0.037	0.0245	0.0292
CW-8	0.012	0.0090	N/A
CW-9	0.400	0.3233	0.3883

Note: µg/L = micrograms per liter

Figure 3 presents plots of the 1,2,3-TCP results for running mean and 95% Upper Confidence Limit of the mean for the sampling events.

If you have any questions or wish to discuss this report, please feel free to contact me at (714) 228-1286.

Sincerely,
ECO & ASSOCIATES, INC.

Mitra Fiuzat, Ph.D.
Project Manager

Table 4

Figures
Attachments: 1 – Field Notes
2 – Laboratory Analytical Results
3 – Data Validation and Automatic Data Review Reports
4 – Photographs of the City Wells

TABLE

TABLE 4: CONTAMINANTS OF CONCERN IN CITY WELLS GROUNDWATER
(Sampling through August 2012)

Well No.	Constituent	DATE SAMPLED & CONCENTRATION (µg/L)											B-zone Comparative Number (µg/L)	Comparative Basis
		Oct 2011	Nov 2011	Dec 2011	Jan 2012	Feb 2012	Mar 2012	Apr 2012	May 2012	Jun 2012	Jul 2012	Aug 2012		
CW-1	1,2-DCP	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	5	FNPDWS
	1,3-DCP	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.5	CSDRA
	1,2,3-TCP	0.072	0.099	0.098	0.097	0.11	0.13	0.12	0.11	0.054	0.045	0.055	0.005*	CDPH
	Chloroform	**0.63J**	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	80	FNPDWS
	Dinoseb	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	7	FNPDWS
	DBCP	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.2	FNPDWS
	EDB	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.05	FNPDWS
CW-2	1,2-DCP	Well Abandoned in 1995	Well Abandoned in 1995	Well Abandoned in 1995	Well Abandoned in 1995	Well Abandoned in 1995	Well Abandoned in 1995	Well Abandoned in 1995	Well Abandoned in 1995	Well Abandoned in 1995	Well Abandoned in 1995	Well Abandoned in 1995	5	FNPDWS
	1,3-DCP												0.5	CSDRA
	1,2,3-TCP												0.005*	CDPH
	Chloroform												80	FNPDWS
	Dinoseb												7	FNPDWS
	DBCP												0.2	FNPDWS
	EDB												0.05	FNPDWS
CW-3	1,2-DCP	Well Abandoned in 1989	Well Abandoned in 1989	Well Abandoned in 1989	Well Abandoned in 1989	Well Abandoned in 1989	Well Abandoned in 1989	Well Abandoned in 1989	Well Abandoned in 1989	Well Abandoned in 1989	Well Abandoned in 1989	Well Abandoned in 1989	5	FNPDWS
	1,3-DCP												0.5	CSDRA
	1,2,3-TCP												0.005*	CDPH
	Chloroform												80	FNPDWS
	Dinoseb												7	FNPDWS
	DBCP												0.2	FNPDWS
	EDB												0.05	FNPDWS
CW-4	1,2-DCP	Well Abandoned in 1998	Well Abandoned in 1998	Well Abandoned in 1998	Well Abandoned in 1998	Well Abandoned in 1998	Well Abandoned in 1998	Well Abandoned in 1998	Well Abandoned in 1998	Well Abandoned in 1998	Well Abandoned in 1998	Well Abandoned in 1998	5	FNPDWS
	1,3-DCP												0.5	CSDRA
	1,2,3-TCP												0.005*	CDPH
	Chloroform												80	FNPDWS
	Dinoseb												7	FNPDWS
	DBCP												0.2	FNPDWS
	EDB												0.05	FNPDWS
CW-5	1,2-DCP	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	5	FNPDWS
	1,3-DCP	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.5	CSDRA
	1,2,3-TCP	0.068	0.058	0.049	0.049	0.063	0.068	0.076	0.087	0.096	0.067	0.11	0.005*	CDPH
	Chloroform	**0.40J**	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	80	FNPDWS
	Dinoseb	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	7	FNPDWS
	DBCP	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.2	FNPDWS
	EDB	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.05	FNPDWS
CW-6	1,2-DCP	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	5	FNPDWS
	1,3-DCP	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.5	CSDRA
	1,2,3-TCP	0.022	0.019	0.018	0.019	0.018	0.024	0.023	0.032	0.035	0.023	0.037	0.005*	CDPH
	Chloroform	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	80	FNPDWS
	Dinoseb	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	7	FNPDWS
	DBCP	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.2	FNPDWS
	EDB	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.05	FNPDWS
CW-7	1,2-DCP	Not Sampled; Well not in operation.	Not Sampled; Well not in operation.	Not Sampled; Well not in operation.	Not Sampled; Well not in operation.	Not Sampled; Well not in operation.	Not Sampled; Well not in operation.	Not Sampled; Well not in operation.	Not Sampled; Well not in operation.	Not Sampled; Well not in operation.	Not Sampled; Well not in operation.	Not Sampled; Well not in operation.	5	FNPDWS
	1,3-DCP												0.5	CSDRA
	1,2,3-TCP												0.005*	CDPH
	Chloroform												80	FNPDWS
	Dinoseb												7	FNPDWS
	DBCP												0.2	FNPDWS
	EDB												0.05	FNPDWS

TABLE 4: CONTAMINANTS OF CONCERN IN CITY WELLS GROUNDWATER
(Sampling through August 2012)

Well No.	Constituent	DATE SAMPLED & CONCENTRATION (µg/L)											B-zone Comparative Number (µg/L)	Comparative Basis
		Oct 2011	Nov 2011	Dec 2011	Jan 2012	Feb 2012	Mar 2012	Apr 2012	May 2012	Jun 2012	Jul 2012	Aug 2012		
CW-8	1,2-DCP	<0.2	<0.2	<0.2	<0.2	Not Sampled; Well was under repair.	Not Sampled; Well was under repair.	Not Sampled; Well was under repair.	<0.2	<0.2	<0.2	<0.2	5	FNPDWS
	1,3-DCP	<0.2	<0.2	<0.2	<0.2				<0.2	<0.2	<0.2	<0.2	0.5	CSDRA
	1,2,3-TCP	<0.0025	<0.0025	<0.0025	<0.0025				<0.0025	0.0063	0.0086	0.012	0.005*	CDPH
	Chloroform	**0.24J**	<0.2	<0.2	<0.2				<0.2	<0.2	<0.2	<0.2	80	FNPDWS
	Dinoseb	<0.2	<0.2	<0.2	<0.2				<0.2	<0.2	<0.2	<0.2	7	FNPDWS
	DBCP	<0.02	<0.02	<0.02	<0.02				<0.02	<0.02	<0.02	<0.02	0.2	FNPDWS
	EDB	<0.02	<0.02	<0.02	<0.02				<0.02	<0.02	<0.02	<0.02	0.05	FNPDWS
CW-9	1,2-DCP	Not Sampled; Well not in operation.	Not Sampled; Well not in operation.	Not Sampled; Well not in operation.	Not Sampled; Well not in operation.	Not Sampled; Well not operational & insufficient notice to start.	**0.35J**	**0.39J**	**0.35J**	**0.39J**	**0.36J**	**0.39J**	5	FNPDWS
	1,3-DCP						<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.5	CSDRA
	1,2,3-TCP						0.23	0.27	0.35	0.35	0.34	0.4	0.005*	CDPH
	Chloroform						<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	80	FNPDWS
	Dinoseb						<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	7	FNPDWS
	DBCP						<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.2	FNPDWS
	EDB						<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.05	FNPDWS
CW-10	1,2-DCP	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	5	FNPDWS
	1,3-DCP	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.5	CSDRA
	1,2,3-TCP	**0.0032J**	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	0.005*	CDPH
	Chloroform	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	80	FNPDWS
	Dinoseb	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	7	FNPDWS
	DBCP	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.2	FNPDWS
	EDB	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.05	FNPDWS

Notes:

Contaminants of Concern & Basis for Comparative Number:

FNPDWS = *Federal National Primary Drinking Water Standards - 40 Code of Federal Regulations, Part 141 or 40CFR141*

CSDRA = *California Safe Drinking Water Act (CCR, Title 22, Sec 64444)*

* = Drinking Water *Notification Level set by California Department of Public Health (CDPH)*

1,2-DCP = 1,2-Dichloropropane
1,3- DCP = 1,3-Dichloropropane
1,2,3-TCP = 1,2,3-Trichloropropane
Chloroform: *Total trihalomethanes (sum of bromodichloromethane, dibromochloromethane, bromoform and chloroform)*

DBCP = 1,2-Dibromo-3-chloropropane
EDB = Ethylene dibromide, also called 1,2-Dibromoethane

Analytical Methods:

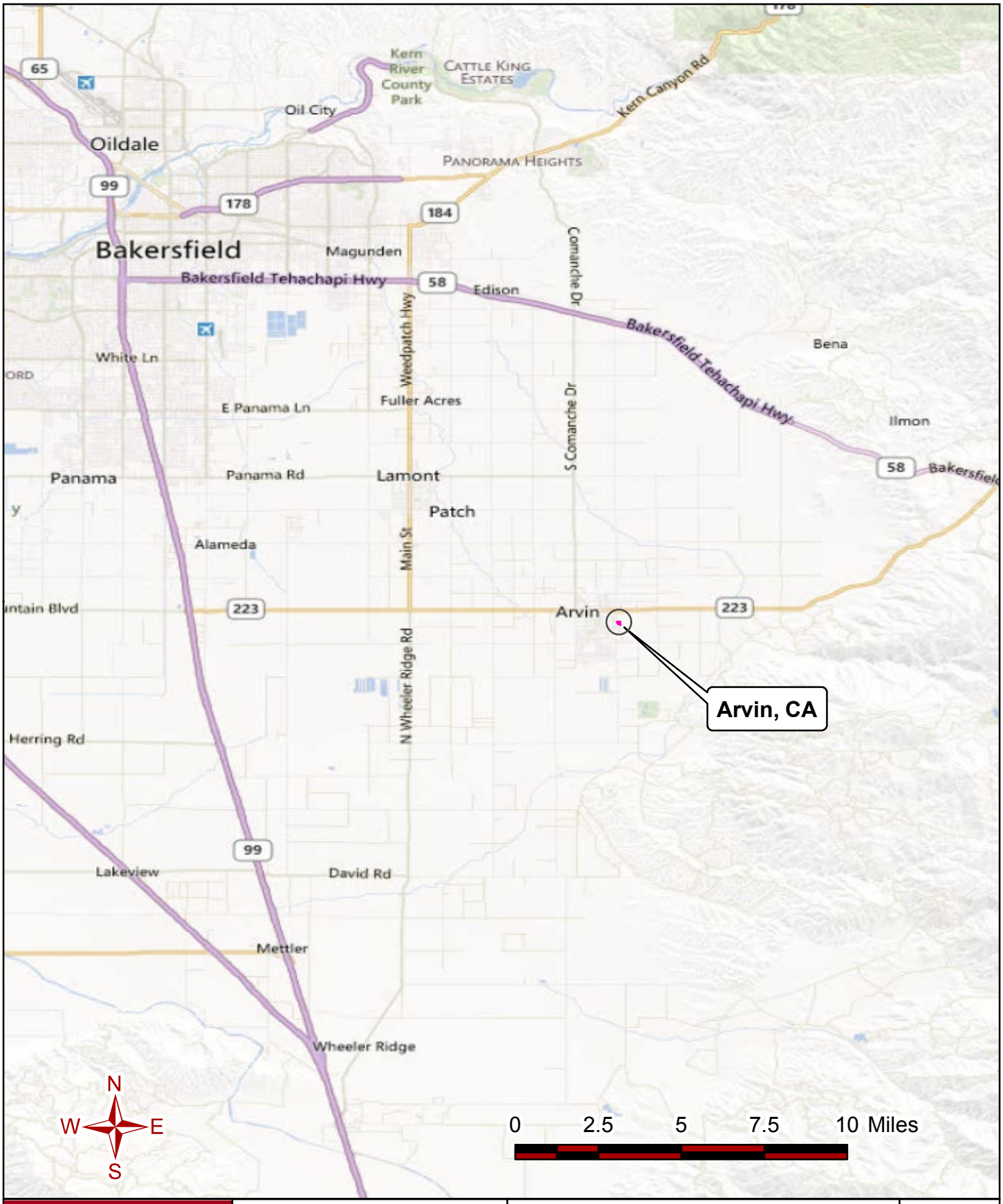
Method 8260 – 1,2-DCP & 1,3-DCP
Method 8151 – Dinoseb
Method 8260SIM – 1,2,3-TCP, DBCP, & EDB

Results:

Reported results in white on black font are in excess of compound Comparative Number.
Reported results in bold font are laboratory reported results above detection limits.
"ND <" = non-detect analytes are reported as less than the method detection limit (MDL).
J = Laboratory reported qualifier: estimated concentration below the method reporting limit
µg/L = micrograms per liter

Analyses performed by EMAX Laboratories, Inc.

FIGURES



Environmental Excellence

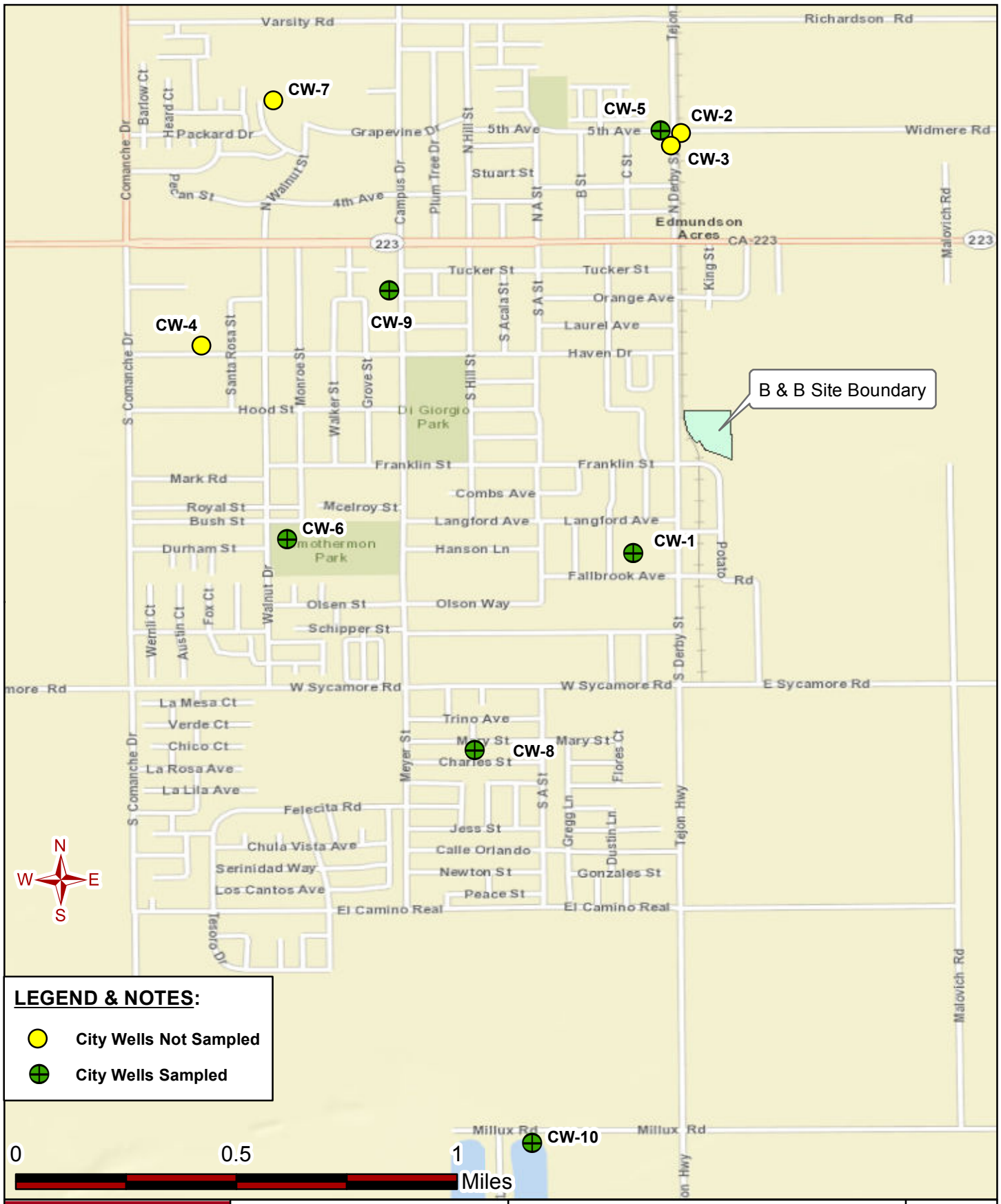
Eco & Associates, Inc.
1855 W. Katella Avenue, Suite 340
Orange, California 92867

Phone: 714.289.0995 Fax: 714.289.0965

REGIONAL MAP
Brown & Bryant Superfund Site
600 South Derby Street
Arvin, CA

Project No. Eco-11-482.1 | Dated August 2012

FIGURE
1



LEGEND & NOTES:

- City Wells Not Sampled
- City Wells Sampled

Environmental Excellence

Eco & Associates, Inc.
1855 W. Katella Avenue, Suite 340
Orange, California 92867
Phone: 714.289.0995 Fax: 714.289.0965

MUNICIPAL WATER SUPPLY WELLS IN ARVIN AREA

Brown & Bryant Superfund Site
600 South Derby Street, Arvin, CA

Project No. Eco-11-482.1 | Dated August 2012

FIGURE 2

Figure 3: 1,2,3-TCP Results for CW-1. CW-5, CW-6 & CW-9

B&B Superfund Site - Monthly City Well Sampling (June 2012)

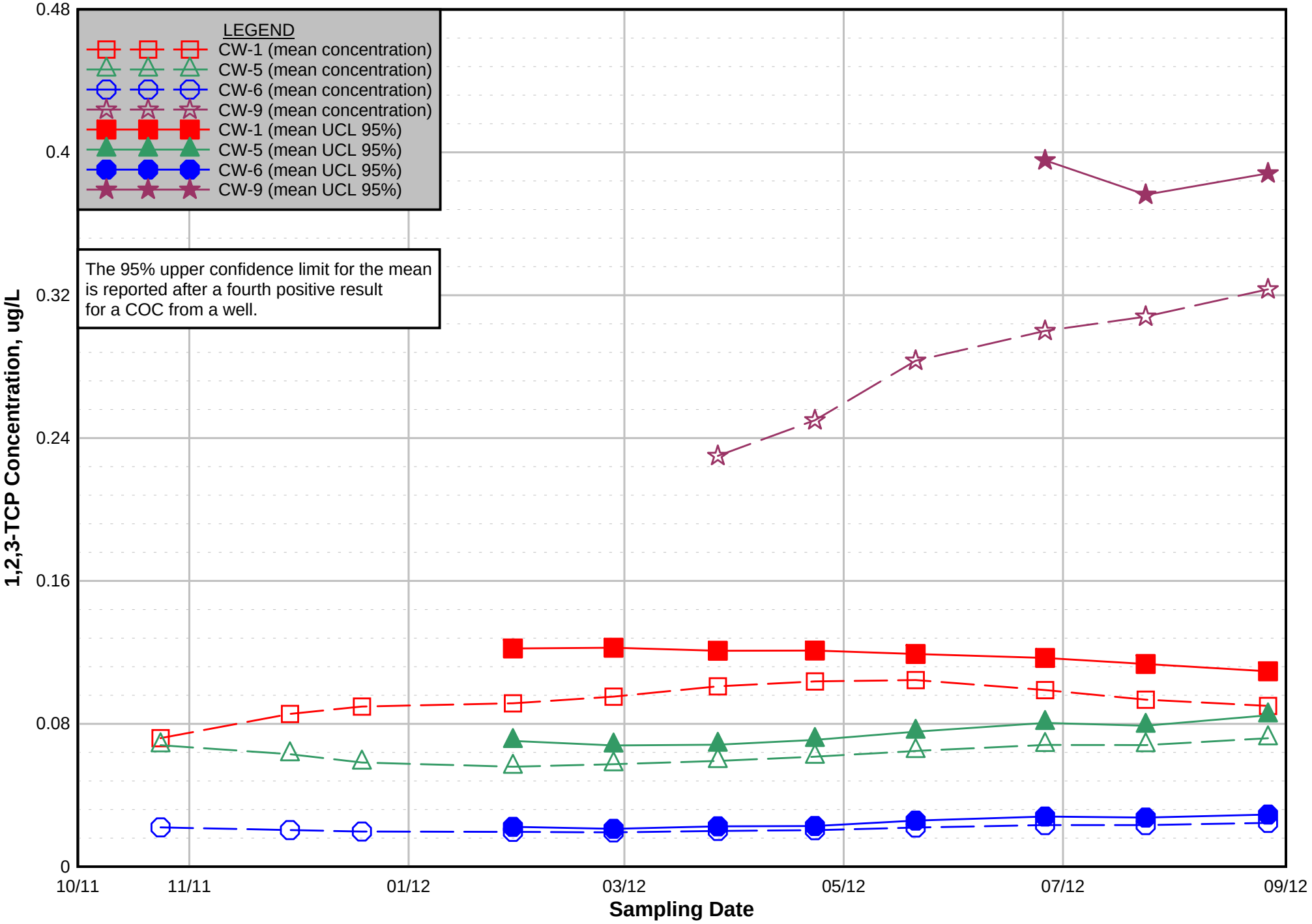


figure 3.grf

ATTACHMENT 1

FIELD NOTES

ECO & ASSOCIATES, INC. – QUALITY CONTROL REPORT

DAILY LOG OF ACTIVITIES

ECO PROJECT:	**Eco-11-482**	**REPORT NO.:**	**10**
PROJECT LOCATION:	**Brown & Bryant Superfund Site**	**DATE:**	**07-24-2012**
DESCRIPTION:	**Monthly City Well Sampling**	**CONTRACT NO.:**	**W912PP-10-D-0014**
ONSITE PERSONNEL:	**Omar Argueta, Jack Collender**	**TASK ORDER NO.:**	**0009**
SIGNATURE:		**WEATHER CONDITION:**	Sunny 85 F

1. ANY DELAYS IN WORK PROGRESS TODAY? ☑ No ☐ Yes If yes, explain:

2. ANY VERBAL INSTRUCTION GIVEN BY THE GOVERNMENT, REGULATOR, OR CLIENT? •☑ No ☐ Yes If yes, to whom and explain:

3. ANY CONDITION DEVELOPED WHICH MIGHT LEAD TO A CHANGE ORDER OR CLAIM OR FINDINGS OF FACTS?

☑ No ☐ Yes If yes, explain:

ANY POTENTIAL CHANGE ORDER OR CLAIM MUST BE REPORTED TO THE PROJECT DIRECTOR/MANAGER.

4. ANY DEFICIENCIES, ACTIONS TAKEN TO CORRECT THE DEFICIENCIES? ☑ No ☐ Yes If yes, explain:

5. SAFETY MEETING/TAILGATE MEETING HELD TODAY? ☐ No ☑ Yes

ANY LOST TIME ACCIDENT TODAY? ☑ No ☐ Yes If yes, attach an accident report.

6. PRIME CONTRACTOR AND SUBCONTRACTOR WORK FORCE SIGN IN AND OUT IN THE SPACE BELOW.

NAME	INITIAL	COMPANY	TRADE	IN	OUT	IN	OUT	TOTAL HOURS
Omid Rabbani	OR	Eco & Associates	Tech	9:00	1150			
Steven Saunders	SS	Eco & Associates	Geologist	9:00	1150			

7A. CUMULATIVE HOURS WORKED PREVIOUSLY:	**7B. TOTAL HOURS WORKED TODAY:**	**TOTAL HOURS WORKED TO DATE (7A+7B):**

JOBSITE SAFETY INSPECTION CHECKLIST

Note: The following jobsite safety inspection checklist is to be used only at locations where Eco & Associates, Inc. (Eco) controls the work jobsite. It is not to be used at locations where others control the work and/or site.

Project Name/Number: B & B Superfund/Eco-11-482 Others: .

Location: Brown & Bryant Superfund Site Project Manager: Mitra Fiuzat

Date: August 27, 2012 Inspector: Omid Rabbani

Check "Yes" For Items Complete	Yes	No	N/A
HOUSEKEEPING			
1. Material storage yard:	☐	☐	☐
a. Stacked neatly and properly	☐	☐	■
b. Aisle, walkways, roads clear	☐	☐	■
2. Check work areas for:	☐	☐	☐
a. Loose and waste materials	■	☐	☐
b. Vicinity of ladders, stairs, ramps, and machinery	■	☐	☐
c. Empty bottles, containers, papers, trash, bands, brick-bats, etc.	■	■	☐
d. Trash cans, dumpsters available and emptied regularly	■	☐	☐
e. Trash chutes and surrounding areas clear	☐	☐	■
f. Nails, boards, debris removed	☐	☐	■
g. Trash receptacles provided for drinking cups	☐	☐	■
PERSONAL PROTECTIVE EQUIPMENT (PPE)			
1. Hard hats	■	☐	☐
2. Safety shoes/boots	■	☐	■
3. Eye/face protection	☐	☐	■
4. Safety belts/lanyards	☐	☐	■
5. Ear Protection	☐	☐	☐
a. Noise level areas of 90 dBA and above identified	☐	☐	☐
b. Signs notifying personnel of "Hearing Protection Required" posted as required	☐	☐	☐
6. Specialized equipment	■	☐	☐
a. Gloves	■	☐	☐
b. Respirators	☐	☐	■
c. Chemical-resistant clothing	☐	☐	■
7. Tools	■	☐	☐
a. Handles in good shape	■	☐	☐
b. Tool guards in place	■	☐	☐

ECO & ASSOCIATES, INC. – QUALITY CONTROL REPORT

DAILY LOG OF CONSTRUCTION ACTIVITIES

8. VISITOR'S LOG

NAME	INITIAL	COMPANY	IN	OUT	IN	OUT	IN	OUT
Joe Carlos	JC	Arvin (ACSO)	900	1150				

9. WELL STATUS QUESTIONNAIRE.

Well No.	Operational ? (Y or N)	Reason for nonoperation	Can the well be put into operation for sampling?	If not, give reason	Well visited today?	Comments and/or Description

TIME	DESCRIPTION							
0920	Arrive at well CW-5							
0925	Run water for 60s, measure parameters							
0927	First reading							
0929	Second reading							
	Third reading	**pH**	**COND**	**TURB**	**DO**	**TEMP**	**TDS**	**ORP**
0930	Sample collected at CW-5	--	mS/cm	NTU	mg/L	°C	g/L	mV
		8.46	0.466	100	9.81	23.37	0.2	202
		6.40	0.484	135	8.33	23.92	0.2	221
		6.33	0.470	146	7.32	24.11	0.2	214

0945	Arrive at well CW-1	**pH**	**COND**	**TURB**	**DO**	**TEMP**	**TDS**	**ORP**
0945	Run water for 60s, measure parameters	--	mS/cm	NTU	mg/L	°C	g/L	mV
0947	First reading	6.71	0.397	272	16.11	24.6	0.2	169
0949	Second reading	6.74	0.395	215	11.08	24.91	0.2	167
0951	Third reading	6.77	0.393	123	7.76	25.07	0.2	164
0951	Sample collected at CW-1							
0952	Duplicate sampling							
1006	Arrive at well CW-10	**pH**	**COND**	**TURB**	**DO**	**TEMP**	**TDS**	**ORP**
1007	Run water for 60s, measure parameters	--	mS/cm	NTU	mg/L	°C	g/L	mV
1008	First reading	8.81	0.703	164	6.72	25.06	0.3	166
1009	Second reading	6.94	0.648	224	4.80	25.01	0.3	148
1010	Third reading	7.07	1.01	224	5.96	25.69	0.5	138
1012	Sample Collected at CW-10							
1028	Arruve at wekk CW-8	**pH**	**COND**	**TURB**	**DO**	**TEMP**	**TDS**	**ORP**
1029	Run water for 60s, measure parameters	--	mS/cm	NTU	mg/L	°C	g/L	mV
1031	First reading	7.13	0.789	133	16.32	25.64	0.4	133
1033	Second reading	7.25	0.881	155	11.71	25.92	0.4	127
1035	Third reading	7.27	0.875	130	8.75	25.97	0.4	123
1036	Sample collected at CW-8							
1047	Arrive at well CW-6	**pH**	**COND**	**TURB**	**DO**	**TEMP**	**TDS**	**ORP**
1049	Run water for 60s, measure parameters	--	mS/cm	NTU	mg/L	°C	g/L	mV
1050	First reading	7.36	0.646	282	17.65	25.83	0.3	127
1052	Second reading	7.39	0.644	232	12.25	25.93	0.3	126
1054	Third reading	7.41	0.639	245	6.16	26.02	0.3	124
1055	Sample collected at CW-6							
1117	Arrive at well CW-9							
1132	Run water for 60s, measure parameters							
1133	First reading							
1135	Second reading							
1137	Third reading							
1138	Sample collected at CW-9							
	The pump was off, start purging out at 1118	**pH**	**COND**	**TURB**	**DO**	**TEMP**	**TDS**	**ORP**

1150	Finish with sampling	6.97	0.554	12.7	12.43	26.86	0.3	87
		6.9	0.617	1.8	9.69	25.98	0.3	-6
		6.85	0.622	3.9	8.18	25.79	0.3	-17

(Use additional sheets as needed.)

ATTACHMENT 2

LABORATORY ANALYTICAL RESULTS

ATTACHMENT 2 – LABORATORY ANALYTICAL RESULTS

Note: The Laboratory Analytical Results are included on CD-ROM with this report.

ATTACHMENT 3

DATA VALIDATION AND AUTOMATED DATA REVIEW

ATTACHMENT 3 – DATA VALIDATION AND AUTOMATED DATA REVIEW

Note: The **Automated Data Review** is included on CD-ROM with this report.

Data Validation Report

Monthly
Groundwater Monitoring Data

for
Brown & Bryant

Arvin, CA
Project No.: Eco-11-482

SDG#: 12H184

LEVEL III & IV

Prepared for:

Eco & Associate, Inc.
1855 W. Katella Ave, Suite 340
Orange, CA, 92867

By
ZIBA HOSSEINI

14343 Peach Hill Rd.
Moorpark, California

August, 2012

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EXECUTIVE SUMMARY

This data validation report presents the evaluation and validation of the analytical data for eight (8) ground water samples collected on 08-27-2012 as part of monthly city wells groundwater monitoring at Brown and Bryant, Arvin, California (CA). EMAX Laboratory in Torrance, California performed the chemical analysis of the samples. The United States Army Corps of Engineers and the State of California have certified EMAX Laboratory to perform the analysis described within this project. (Eco & Associates Inc., April2011).

On 08-27-2012, eight ground water samples, which included one field duplicate sample and one trip blank sample, were collected. EMAX Laboratory received the samples on 08-27-2012. Trip blank sample accompanied the samples for volatile organic compounds analysis and was analyzed for EPA Method 8260B only. The data was delivered in one package as Level III and Level IV deliverables. 10% of the data was subjected to comprehensive evaluation equivalent to EPA Level IV data validation. Raw data for one sample from this sample group (08-27-12-CW-5) was submitted at level IV deliverable for all the requested analytical methods. Raw data for designated sample as MS/MSD (08-27-12-CW-6) together with all other QC samples were also submitted.

Level III data validation examined quality assurance/quality control (QA/QC) elements and critical quality control measures such as holding time, (both extraction and analysis), extraction logs, instrument injection logs, completeness of the results and summaries of initial and continuing calibration tables for the following EPA methods of analysis:

Volatile Organic Compounds by EPA Method 8260B
Fumigants (EDB, DBCP and 1, 2, 3-Trichloropropane) by EPA Method 8260B SIM
Dinoseb by EPA Method 8151A

The sample designated as level IV in the chain of custody (08-27-12-CW-5) went through EPA level IV data validation. The analytical results, QC results, initial calibration and related continuing calibration data were comprehensively compared with the corresponding raw data and chromatograms presented for Level IV data validation.

All samples were analyzed for each of the components listed in the corresponding EPA Methods. The evaluation indicated that all the analytical work was performed as requested on the chain of custody. The extraction and analytical holding times were met for all samples in each method and subsequent dilutions if any.

Generally, data presented with this data package was considered acceptable and met quality control acceptance limits for each requested EPA Method with some technical variations. The deviations are discussed in section 4.0 for each method. The results of sample analysis are tabulated in Appendix A.

1.0 INTRODUCTION

This report presents the evaluation and validation of analytical data collected as part of monthly groundwater monitoring at Brown and Bryant Superfund Site at Arvin, CA.

1.1 Objectives and Scope of Data Validation

The main objective of this report is to evaluate the acceptability of the data generated for groundwater samples. The data validation was performed according to the analytical requirements of the method in the *Quality Assurance Project Plan, final Draft, Brown and Bryant, Arvin, CA,* (Project No: Eco-11-482, Eco & Associates Inc. April 2011), EM 200-1-10 Guidance for Evaluation Performance-based Chemical Data, US Army Corps of Engineers (USACE), June 2005, *USEPA Analytical Operations/Data Quality Center (AOC) National Functional Guidelines for Organic Data Review* (USEPA, August 2002) and Department of Defense Quality Systems Manual (DoD QSM) Version 4.2, 2010 .

1.2 Organization of the Report

Section 2.0 describes the components of the data review. Section 3.0 provides the qualitative quality assurance objectives. Section 4.0 summarizes the findings and conclusions of the data validation.

2.0 DATA REVIEW AND VALIDATION

Data validation is a systematic method for reviewing and qualifying the presented analytical data for their intended use. The objective of this data validation report is to identify any unacceptable or faulty measurements, as reported by the laboratory.

EMAX Laboratory in Torrance, California performed the chemical analysis of the samples. Army Corps of Engineers and the State of California have certified EMAX laboratory to perform the EPA Methods of analysis described within this report.

Eight (8) ground water samples, which included one field duplicate sample and one trip blank sample, were collected on 08-27-2012. EMAX Laboratory received the samples on 08-27-2012.

2.1 Data Reporting

The data was delivered in one package as Level III and Level IV deliverables. Ten percent of the data was subjected to validation to the equivalent of EPA Level IV. EMAX Laboratory provided the following information in one data package for both LEVEL III and LEVEL IV deliverable.

- Field sample identification number;
- Project name and location
- Laboratory sample identification number
- Date of sample collection;
- Sample matrix type;
- Analysis method;
- Target lists and results of analysis;
- Quantitation limits and/or Reporting Limits;
- Laboratory qualifiers and qualifier definitions;
- Copies of sample logs and chain-of-custody logs;
- Sample preparation log (with the sample extraction date)
- Sample Analysis log (Instrument injection log)

- Summary of initial calibration, initial calibration verification and continuing calibration tables;
- Quality control results with corresponding control limits.
- Case narrative for each method.
- Raw data for all the initial calibration standards, Initial calibration verification standards (ICV), continuing calibration standards (CCV), scans for positive results, internal standard area counts and retention time window width, where applicable. Raw data for one sample designated as level IV (08-27-12-CW-5) as well as sample designated as MS/MSD (08-27-12-CW-6), together with the associated QC samples were also included.

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Data validation was performed in three stages: first an initial review of the analytical reports and QA/QC information was performed using summary results and summary tables only. Then, a full review of all analytical reports, QA/QC information, as well as the corresponding raw and analytical data was carried out. Finally, summary tables and corresponding raw data of initial and continuing calibration standards, the extraction log, and injection (sequence) log were fully reviewed. Overall review assessed the effects of QA/QC results on the data usability. The review included such parameters as holding times, initial and continuing calibration method requirements, equipment performance check standards (tune check and degradation standards), surrogate recoveries, method blank results, lab control sample (LCS) and matrix spike/matrix spike duplicate (MS/MSD) for accuracy and precision.

Level IV review compared the reported analytical results with those obtained from the raw data. Raw data was submitted for one sample at Level IV data deliverable for all the analytical methods requested on the chain of custody. Calculations and corresponding equations, as well as analyte identification criteria were all verified.

2.2 Data Evaluation

The following parameters were evaluated in the preliminary data review:

- Analysis performed and sample identifications were verified to be in accordance with the information provided on the chain-of-custody (COC);

- Technical holding times were confirmed for all samples with regard to the requested method of analysis (collection to extraction and extraction to analysis);
- Reported quantitation limits were compared with the project measurement objectives;
- Equipment performance standards (tuning check standard and system performance check standards) were evaluated;
- Initial and continuing calibration standards were evaluated;
- Field and laboratory blank results were evaluated;
- LCS/LCSD and MS/MSD results were evaluated;
- Field and laboratory matrix duplicate results, trip blank results as well as surrogate recoveries, internal standard area counts and corresponding retention time window width were evaluated; and
- Chromatograms and mass spectrum results were evaluated

The following is a list of sample identifications and corresponding laboratory sample identification numbers:

CLIENT ID	EMAX ID#
08-27-12- CW-1	H184-01
08-27-12- CW-5	H184-02
08-27-12- CW-6	H184-03
08-27-12- CW-8	H184-04
08-27-12- CW-9	H184-05
08-27-12- CW-10	H184-06
08-27-12- FDUP-1	H184-07
08-27-12- TB-1	H184-08
08-27-12- CW-6 MS	H184-03 MS
08-27-12- CW-6 MSD	H184-03 MSD

Field duplicate and associated sample	
08-27-12-FDUP-1	08-27-12- CW-1

Table 2-1 below shows the specified analysis for constituents in the water samples, the corresponding Environmental Protection Agency (EPA) analytical method, the corresponding

practical quantitation limits (PQL/RL), regulatory levels, and the effluent discharge limits of specific constituents if available.

TABLE 2-1
Summary of Analytical Parameters
Brown & Bryant, Arvin, California

MATRIX	CONSTITUENT	EPA METHOD	RLs (µg/L)	REGULATORY LEVEL (µg/L)	EFFLUENT DISCHARGE LIMITS (µg/L)
Water	Volatile Organic Compounds	8260B	1	NA	NA
	Fumigants (EDB, DBCP and 1,2,3-Trichloropropane)	8260B SIM	0.05-0.05 0.005(1,2,3-TCP)	NA	NA
	Herbicides (Dinoseb)	8151A	0.40	NA	NA

Notes:
RL = Reporting Limit,
NA = Not Available
µg/L = microgram/Liter

2.2.1 Holding Times

Technical holding times are defined as the maximum time allowed between sample collection, extraction and analysis. A 14-day collection-to-analysis holding time was used for EPA Method 8260B and 8260B SIM. Sample containers for 8260B and 8260BSIM were preserved with Hydrochloric acid. A 7-day holding time from collection to extraction, and 40-day holding time from extraction-to-analysis was met, for EPA Method 8151A. Table 2-2 presents the summary of holding time requirements with qualifications if applied.

TABLE 2-2
Summary of Analytical Methods and Holding Time Requirements
Brown & Bryant, Arvin, California

ANALYSIS Method	MATRIX	HOLDING TIME REQUIREMENT	DATA QUALIFIED AS "J"	DATA QUALIFIED AS "R"
EPA Method 8260B	Water	14 days to analysis	None. Holding times were met	None. Holding times were met
EPA Method 8260B SIM	Water	14 days to analysis	None. Holding times were met	None. Holding times were met
EPA Method 8151A	Water	7 days to extraction, 40 days to analysis	None. Holding times were met	None. Holding times were met

2.2.2 Laboratory and Field Blanks

The objective of laboratory and field blanks is to determine the presence and extent of contamination resulting from laboratory or field activities. Blanks reported here included method and/or extraction blanks and trip blank. The result of analysis of method blank is discussed in section 4.0 for each method. All samples were transported in three ice preserved coolers and were stored in a refrigerator upon arrival to the laboratory. The temperatures of the coolers were recorded as 2.0˚C to 4.4˚C for each upon arrival. All samples were received intact and in good condition. The trip blank sample was associated with the samples for volatile organic compounds analysis by EPA method 8260B.

3.0 QUALITY ASSURANCE OBJECTIVES

Quality assurance (QA) objectives define analytical parameters that validate the conclusions drawn from the results. Quality assurance was assessed through the following means: precision, accuracy, representativeness, completeness, and comparability (PARCC).

3.1 Qualitative QA Objectives

Qualitative aspects of QA for analytical data are characterized by completeness and representativeness.

3.1.1 Comparability

Comparability defines the level of confidence with which one data set can be compared with another. Comparability is related to accuracy and precision. It is also a measure of the data's reliability. All units for comparability are in accordance with standard procedures so that the results could be compared with other laboratories if necessary.

3.1.2 Representativeness

Representativeness is a quantity, which presents whether the results of analysis accurately portray the actual site conditions. Representativeness is a qualitative parameter, which signifies the extent of accuracy and precision, to which the data represent a characteristic population, parameter variations at a sampling point, process condition, or environmental conditions. The sampling procedures described within the approved QAPP (Eco & Associates, Inc., final version, April 2011) are designed to provide samples representative of the site conditions.

3.2 Quantitative QA Objectives

Quantitative QA Objectives for analytical data are defined as precision, accuracy, completeness, and method quantitation limits. These quantitative parameters are established in order to monitor the overall quality of analytical data produced by the laboratory. The laboratory performing the analytical methods specified in Table 2-1, and the case narratives, which is included in the data package from the laboratory, ensures the quality of the analytical data.

3.2.1 Precision

Precision is a measure of the closeness with which multiple analyses of a given sample agree with each other. It describes the agreement between two or more measurements that have been made in exactly the same way. Precision is measured through matrix spike/matrix spike duplicate samples, surrogate standards, and laboratory control samples. The relative percent difference (RPD) is calculated as a means of quantifying precision. The following equation is used for this purpose:

$$RPD = \frac{R_1 - R_2}{(R_1 + R_2)/2} \times 100$$

Where:

RPD = Relative percent difference

R_1 = Result of the first duplicate or measured sample concentration

R_2 = Result of the second duplicate or known sample or duplicate concentration

When analytes are present at concentrations below or near the quantitation limit, precision is measured, using MS/MSD, and/or LCS/LCSD results.
Precision results are discussed in Section 4.0 of this report.

3.2.2 Accuracy

Accuracy indicates the closeness of the measurement to its true or accepted value. Accuracy measures agreement between a result and its true value. Method-specific QA objectives for precision and accuracy were based on the quality control limits developed by the laboratory for the analytical methods, specified in Table 2-1. These procedures may affect the accuracy of the data presented. Additionally, initial and continuing calibrations were used to verify that the analytical instrument accurately measured the compound concentrations. Calculations were independently verified for the response factors and percent differences (%Ds).

3.2.3 Completeness

Completeness is defined as the percentage of total measurements, which are judged to be valid. The completeness objective is to obtain a sufficient amount of valid data to enable the goals and objectives of the project to be achieved.

Completeness is quantified by computing the fraction of reports, which remained valid after the sampling procedures were reviewed and the results conformed to QA/QC protocols. The following equation was used to calculate completeness:

$$\text{Completeness} = \frac{\text{Number of valid field samples analyzed}}{\text{Number of requested field samples collected}} \text{X } 100$$

Completeness is affected by anything that reduces the number of samples analyzed (such as a sample bottle breaking), as well as acceptance or non-acceptance of analytical results.

4.0 DATA VALIDATION

This data review covers eight (8) water samples listed on page 8 including dilutions and reanalysis if applicable. The analyses were according to the following EPA Methods:
EPA Method 8260B for volatile organic compounds
EPA Method 8260B SIM for fumigants (EDB, DBCP and 1, 2, 3-Trichloropropane)
EPA Method 8151A for Chlorinated Herbicides (Dinoseb only)

This review follows USEPA Analytical Operations/Data Quality Center (*AOC) National Functional Guidelines for Organic Data Review* (USEPA, August 2002); and EM 200-1-10 Guidance for Evaluating Performance-based Chemical Data, US Army Corps of Engineers (USACE), June 2005. The following subsections correlate to the above guidelines.

A summary table summarizing all data and qualification, if any is provided at the end of this report. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

The following are definitions of the data qualifiers:

U Indicates the compound was analyzed for but not detected at or above the stated limit.
J Indicates an estimated value.
R Quality control indicates the data is not usable.
N Presumptive evidence of presence of the constituent
UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
A Indicates the finding is based upon technical validation criteria.
P Indicates the finding is related to a protocol/contractual deviation.
None indicates the finding did not significantly impact the data; therefore qualification was not required.

4.1. VOC (EPA Method 5030B/8260B)

Technical Holding Times

A 14-day technical holding time requirement was met for all ground water samples. A total of eight (8) water samples were collected on 08-27-12. Samples were all analyzed on 08-30-12. Samples and QC samples were analyzed with reference to one analytical batch (preparation batch: VO05G26).

The chain-of-custody was reviewed for documentation of sample information and method of analysis.

Table 1 in appendix A summarizes the list of samples with the results and qualification notations.

Tuning criteria

Performance of the instrument was checked by injection of a single component tune check standard (BFB: Bromofluorobenzene) prior to initial calibration analysis on 08-15-12 and at the start of analytical batch, before sample analysis on 08-30-12. All the mass ratios were within method assigned criteria.

Initial Calibration

Ground water samples were analyzed with reference to one set of initial calibration. Initial calibration curve was generated on 08-15-12 using instrument ID # T-O06 for analysis. A multilevel calibration curve ranging from 0.3µg/L to 100µg/L was used for this purpose. Internal standard curve type was used for initial calibration. Minimum response factor for system performance check compounds (SPCCs) were within the method acceptable limits. Response factors at each level were randomly recalculated and all agreed with the response factors submitted in the initial calibration summary table.

Minimum average response factors for the system performance check compounds (SPCCs) for each instrument were recognized according to the following tables:

Table 4.1.1: System Performance Check Compounds (Initial calibration)

System Performance check compounds (SPCCs)	Min. Ave. Response Factor (Method limits)	Ave. Res. Factor 08-15-12 (Calculated) Instrument ID#: T-O06
Chloromethane	≥ 0.10	0.310
1,1 -dichloroethane	≥ 0.10	0.637
Bromoform	≥ 0.10	0.348
Chlorobenzene	≥ 0.30	0.939
1,1,2,2-Tetrachloroethane	≥ 0.30	0.625

Average response factor curve fit was mainly used to show linearity within initial calibration levels for each compound. Maximum 15% RSD limit was met for most of the target compounds.

Least square linear regression curve fit was used for the following compounds where %RSD exceeded the maximum15 percent limit.

Target Analytes	Least Square Linear Regression (CCF) 08-15-12 Instrument ID#: T-O06
Methylene chloride	0.9963
Tetrahydrofuran	0.9958
Bromoform	0.9971

Calibration check compounds (CCCs) met the acceptance criteria for %RSD among the response factors calculated for each level. The method acceptance limits and the calculated %RSD among the response factors for initial calibration are listed in table 4.1.2.

Table 4.1.2 Calibration Check Compounds (CCCs): Initial Calibration

Calibration Check Compounds (CCCs)	Response Factors %RSD (Limit)	Response Factors %RSD 08-15-12 Instrument ID#: T-O06
1,1-Dichloroethene	-≤ 30%	4.54
Chloroform	-≤ 30%	6.39
1,2-Dichloropropane	-≤ 30%	4.61
Toluene	-≤ 30%	6.76
Ethyl benzene	-≤ 30%	9.90
Vinyl chloride	-≤ 30%	13.2

Initial Calibration Verification and Continuing Calibration (Daily Calibration)

The initial calibration was verified by a second source standard at the end of calibration and before sample analysis on 08-16-12. Percent differences (%D) between initial calibration average response factors (RRFs) and the initial calibration verification response factors (RFs) were less than or equal to 20% for all target compounds.

One continuing calibration check standard was analyzed at the beginning of analytical shift on 08-30-12. Prior to analysis of continuing calibration standard, **instrument performance check standard** (BFB tune check) was carried out. It passed all the method tuning criteria.

The minimum average response factors for the system performance check compounds (SPCCs) calculated for continuing calibration standards were within the method limits. Average response factors are listed in the following table for system performance check compounds.

Table 4.1.3: System Performance Check Compounds: ICV and CCV (Daily calibration)

System Performance Check compounds (SPCCs)	**Minimum response factor (Method limits)**	**Second source Std. (ICV)** Response factors (Calculated) 08-16-12	**Continuing cal.** Response factors (Calculated) CCRF 08-30-12
Chloromethane	≥ 0.10	0.325	0.304
1,1-Dichloroethane	≥ 0.10	0.608	0.652
Chlorobenzene	≥ 0.10	0.936	0.957
Bromoform	≥ 0.30	0.393	0.377
1,1,2,2-Tetrachloroethane	≥ 0.30	0.672	0.704

Calculated percent differences (%drift) between initial calibration RRFs (average response factors) and the continuing calibration response factors (CCRF) for each analyte were less than or equal to 20% for all the Calibration Check Compounds (CCCs). The area counts for all internal standards were within ± 50-150 percent of the same level in the initial calibration. The calculated % difference between RFs from continuing calibration and average response factors from initial calibration is summarized in Table 4.1.4 for continuing calibration compounds as follows:

Table 4.1.4 Calibration Check Compounds (CCCs): ICV and Daily Calibration

Calibration Check Compounds (CCCs)	%Deviation From Initial calibration (Acceptance Limit)	Deviation from Initial calibration 2nd source (ICV) (08-16-12)	Deviation from Initial calibration Daily calibration (08-30-12)
Vinyl chloride	-≤ 20%	3.0%	1.7%
1,1-Dichloroethene	-≤ 20%	1.3%	3.4%
Chloroform	-≤ 20%	2.8%	0.90%
1,2-Dichloropropane	-≤ 20%	0.3%	3.6%
Toluene	-≤ 20%	1.3%	0.8%
Ethyl benzene	-≤ 20%	0.60%	4.2%

.

Deviation from the initial calibration was less than 20 percent for the rest of VOC target list.

Quality Control: The QC samples reported consisted of one method blank, one set of LCS/LCSD and MS/MSD. Client's designated sample (08-27-12-CW-6) was spiked for precision as MS/MSD. The full list of target compounds were spiked and reported for LCS/LCSD. Percent recoveries and percent RPDs for all the QC samples reported were within the project acceptance limits for all of the reported compounds.

The results, percent recoveries and RPDs were recalculated randomly and all agreed with the reported QC summary table.

Method blank: One method blank was presented with the data package (batch # VO06H15) analyzed on 08-30-12. Method blank was reported as non-detected for all the analytes in the target list.

Field duplicate sample and its associated sample: Sample 08-27-12-FDUP-1 was identified as field duplicate of sample 08-27-12-CW-1. Both sample and associated field duplicate sample were reported as non-detected for all volatile organic compounds.

Surrogate recoveries were all within the method's acceptance limits. The reported results for each sample are incorporated in table 1 in appendix A.

Raw data for one sample (08-27-12-CW-5) was submitted for level IV data validation. Raw data for all associated QC samples were also included as Level IV data deliverable. The results calculated from the raw data, agreed with all the results reported in data summary reports. The sample results together with the surrogate recoveries are tabulated in table 1 appendix A. Tetrachloroethene was detected in samples 08-27-12-CW-6 (0.30 µg/L) and 08-27 -12-CW-9 (3.8 µg/L). A trace of 1,2-Dichloropropane was detected in sample 08-27-12-CW-9 (0.39µg/L). A trace of Benzene (0.54µg/L) was reported for sample 08-27-12-CW-8.

4.2. EPA Method 5030B/8260B SIM (FUMIGANTS)

Technical Holding Times

A 14-day technical holding time requirement was met for all the samples. A total of seven (7) ground water samples were collected on 08-27-12. All samples and QC samples were analyzed with one analytical batch on 08-31-12. Samples, QC samples and sample dilutions were analyzed with reference to one preparation batch (VO05H34).

The chain-of-custody was reviewed for documentation of sample information and method of analysis. Samples were analyzed for three fumigants; 1, 2-Dibromomethane (EDB), 1,2,3-Trichloropropane (TCP), and 1,2-Dibromo-3-chloropropane (DBCP). A Mass selective detector at Selected Ion Monitoring mode (SIM) was used to achieve low detection limits required for the target compounds.

Table 2 in appendix A summarizes the list of samples with the results and qualification notations.

Tuning criteria

Performance of the instrument was checked by injection of a single component tune check standard (BFB: Bromofluorobenzene) prior to generation of initial calibration curve on 07-28-12, and at the start of analytical batch before sample analysis on 08-31-12. All the instrument mass ratios were within the assigned criteria.

Initial Calibration

Ground water samples were analyzed with reference to one set of initial calibration using purge and trap together with GC/MSD at selected ion monitoring mode (SIM). Initial calibration curve was generated on 07-28-12, using instrument ID # T-O05 for analysis. A multilevel calibration curve ranging from 5.0ng/L (ppt) to 1000ng/L (ppt) was used for this purpose.
(1,2 Dibromo-3-chloropropane was calibrated from 20ng/L to 1000ng/L). Instrument performance check standard (BFB) was analyzed prior to initial calibration. It passed all the tuning criteria. Modified version of SW-846 8260B (SIM) was used for generation of calibration curve and data. Internal standard curve type was used for initial calibration. Minimum response factors for all the target compounds were within the method acceptable limits. Average response factor curve fit was used to show linearity. Percent relative standard deviation (%RSD) among response factors was less than 15% for all target analytes.

Response factors at each level were randomly recalculated and all agreed with the response factors submitted in the initial calibration summary table.

Initial Calibration Verification and Continuing Calibration (Daily calibration)

Initial calibration was verified by a second source standard at the end of calibration on 07-29-12. Quality control criteria regarding minimum response factors were within method's acceptance limits. Percent differences (%D) between initial calibration average response factors (RRFs) and the initial calibration verification response factors (RFs) were less than or equal to 20% for all target compounds.

One continuing calibration check standard was analyzed at the beginning of analytical shift on 08-31-12. Prior to analysis of continuing calibration standard, instrument performance check standard (BFB tune check) was analyzed and evaluated. It passed all the method tuning criteria.

Calculated % difference (%D) between response factors from continuing calibration (CCRF) and average response factors from initial calibration is summarized in Table 4.2.1 for the targets of interest in this method as follows:

Table 4.2.1: Percent difference from initial calibration: (Daily calibration)

Target Compounds	% Deviation From Initial Calibration Method Criteria	% Deviation From Initial Calibration 2nd Source St. (Calculated) (**07-29-12**)	% Deviation From Initial Calibration Daily St. (Calculated) (**08-31-12**)
1,2-Dibromomethane (EDB)	≤ 20%	0.40	8.3
1,2,3-Trichloropropane(TCP)	≤ 20%	9.8	15.8
1,2-Dibromo-3-chloroporopane (DBCP)	≤ 20%	5.6	8.7

Calculated percent differences (%drift) between initial calibration RRFs (average response factors) and the continuing calibration response factors (CCRF) were less than or equal to 20% for all target analytes. The area counts for all internal standards were within ± 50-150 percent of the same level in the initial calibration.

Quality Control: The QC samples reported consisted of one method blank, one set of LCS/LCSD and MS/MSD. Client's designated sample (08-27-12-CW-6) was spiked for precision as MS/MSD. All three target compounds were spiked and reported for LCS/LCSD and MS/MSD. Percent recoveries and percent RPDs for all the QC samples reported were within the project acceptance limits for all reported compounds.

The results, percent recoveries and RPDs were recalculated randomly and all agreed with the reported QC summary table.

Method blank: One method blank was presented with the data package (QC batch # VO05H34 analyzed on 08-31-12). Method blank was reported as non-detected for all analytes in the target list.

Surrogate recoveries were all within the method's acceptance limits. The reported results for each sample are incorporated in table 2 in appendix A.

Field duplicate sample and its associated sample: Sample 08-27-12-FDUP-1 was identified as field duplicate of sample 08-27-12-CW-1. Results of positive response for each sample and its corresponding duplicate are shown in the following table:

	08-27-12 FDUP-1 µg/L	08-27-12 CW-1 µg/L	**%RPD**
1,2-Dibromomethane (EDB)	ND	ND	<1%
1,2,3-Trichloropropane (TCP)	**0.051**	**0.055**	**7.55%**
1,2-Dibromo-3-chloroporopane (DBCP)	ND	ND	<1%

Raw data for one sample designated as level IV (08-27-12-CW-5) was submitted for level IV data validation. Raw data for all associated QC samples were also included as Level IV data deliverable. Samples and QC samples went through comprehensive level IV data validation. The results calculated from the raw data, agreed with all the results reported in data summary reports. The sample results together with the surrogate recoveries are tabulated in table 2 Appendix A.

4.3 DINOSEB BY GC/ECD (EPA Method 8151A)

Technical Holding Times

A 7-day technical holding time from sample collection to extraction and 40-day from extraction to analysis was met for all samples. A total of seven ground water samples were collected on 08-27-12. Samples were extracted with one preparation batch on 08-29-12 (preparation batch # HEH006W). Sample extracts were analyzed on 08-30-12 and 08-31-12.

EPA Method 8151A uses GC equipped with two Electron Capture Detectors (ECDs) and two non-similar columns. Columns are connected to the same injection port through a guard column for analysis. Results and raw data generated from both columns were submitted. Dinoseb (a Chlorinated Herbicide), was determined by this method.

Initial Calibration

Samples were analyzed with reference to one initial calibration generated on 08-30-12.

Seven calibration levels (20-200 µg/L) were used in initial calibration. Channel A and B were both calibrated. External standard curve type was used for calibration. Calibration factor (area for each compound versus concentration) was used for calculation. Average response factor was used to show linearity for each channel. Percent relative standard deviation (%RSD) among calibration factors (CFs) for both channel A and B were less than 20%. Retention time window width was (0.02 to 0.04 minutes) established by using initial calibration standards at each level. All further sample and QC analysis identification were based on the assigned time windows set by initial calibration for each peak. The instrument was calibrated for the full list of Herbicides, both for initial calibration and continuing (daily calibrations), yet, the result of analysis was reported for Dinoseb only.

Initial Calibration Verification (ICV) and Continuing (Daily) Calibration

Initial calibration was verified by a second source standard at the end of calibration and prior to sample analysis on 08-30-12. Percent difference between mean calibration factors from initial calibration and calibration factors calculated from the second source were less than 20% for both Dinoseb and 2, 4-DCPAA (used as surrogate). Data was presented for both channel A and B.

Three continuing calibration standards with 10-sample injection interval were analyzed with samples and all the QC samples. Analysis was carried out on 08-30-12 and 08-31-12. Percent difference between initial calibration average response factors and the response factors calculated for each analyte (Dinoseb and 2, 4-DCPAA) from continuing calibrations were less than 20% for primary column in all standards. However, %difference exceeded the 20% acceptance limit for Dinoseb in the second and third continuing calibration standards for the confirmation column (column B). The results for Dinoseb were all reported from the primary column (Column A). Results for surrogate recoveries and QC samples were reported from both channel A and B.

Quality Control samples consisted of one method blank, one set of LCS/LCSD and MS/MSD for preparation batch #HEH006W. Client designated sample 08-27-12-CW-6 was spiked for accuracy and precision. Full herbicide list was spiked for LCS and MS/MSD, but only

Dinoseb and MCPP (as surrogate) were reported for precision and accuracy. Percent recoveries (%R) were within the project established QC limits for LCS/LCSD and MS/MSD. Calculated %RPD was less than 30% acceptance limit.

Method blank was reviewed for each component and no herbicide was found in the method blank for the extraction batch #HEH006W.

Surrogate recoveries were all within the method's acceptable limits. The calculated result for each sample is incorporated in table 3 in Appendix A. .

Field duplicate sample and its associated sample: Sample 08-27-12-FDUP-1 was identified as field duplicate of sample 08-27-12-CW-1. Both sample and corresponding field duplicate sample were reported as non-detected.

Raw data for one sample (08-27-12-CW-5) with related QC samples were submitted at level IV deliverable. This sample and QC samples were validated at EPA level IV data validation criteria. Raw data responses were used in recalculation and all verified the reported values.

5.0 Conclusion

Overall, the data presented for this sample group is generally regarded as acceptable for all the EPA methods listed in the chain of custody. The data can reliably be used for the purpose of this project.

6.0 References

1. *USEPA Analytical Operations/Data Quality Center (AOC) National Functional Guidelines for Organic Data Review* (USEPA, August 2002).

2. *Quality Assurance Project Plan, final Draft, Brown & Bryant, CA,* (Project No. Eco-11-482, Eco & Associates Inc., April 2011)

3. U.S. Environmental Protection Agency, Dec. 1996, *SW846 Laboratory Manual Physical/Chemical Methods.* Revision 3, Washington, D.C. 20460.

4. EM 200-1-10 Guidance for Evaluation Performance-based Chemical Data, US Army Corps of Engineers (USACE), June 2005.

5. Department of Defense Quality System Manual (DOD QSM), Version 4.2, 2010

6. EPA Methods for Chemical Analysis of Water and Wastes. EPA -600-4-79-020. Revised; March 1983.

7.0 APPENDIX A

Table 1-Volatile Organic Compounds component List: EPA Method 8260B

ANALYTE	RLs µg/L	08-27-12-CW-1 µg/L	08-27-12-CW-5 µg/L	08-27-12-CW-6 µg/L	08-27-12-CW-8 µg/L	08-27-12-CW-9 µg/L
Acetone	10	U	U	U	U	U
Benzene	1.0	U	U	U	**0.54J**	U
Bromobenzene	1.0	U	U	U	U	U
Bromochloromethane	1.0	U	U	U	U	U
Bromodichloromethane	1.0	U	U	U	U	U
Bromoform	1.0	U	U	U	U	U
Bromomethane	1.0	U	U	U	U	U
2-Butanone	10	U	U	U	U	U
n-Butylbenzene	1.0	U	U	U	U	U
sec-Butylbenzene	1.0	U	U	U	U	U
tert-Butylbenzene	1.0	U	U	U	U	U
Carbon Disulfide	1.0	U	U	U	U	U
Carbon Tetrachloride	1.0	U	U	U	U	U
Chlorobenzene	1.0	U	U	U	U	U
Chloroethane	1.0	U	U	U	U	U
2-Chloroethyl vinylether	1.0	U	U	U	U	U
Chloroform	1.0	U	U	U	U	U
Chloromethane	1.0	U	U	U	U	U
2-Chlorotoluene	1.0	U	U	U	U	U
4-Chlorotoluene	1.0	U	U	U	U	U
1,2Dibromo3Chloropropane	1.0	U	U	U	U	U
Dibromochloromethane	1.0	U	U	U	U	U
1,2-Dibromoethane(EDB)	1.0	U	U	U	U	U
Dibromomethane	1.0	U	U	U	U	U
1,2-Dichlorobenzene	1.0	U	U	U	U	U
1,3-Dichlorobenzene	1.0	U	U	U	U	U
1,4-Dichlorobenzene	1.0	U	U	U	U	U
Dichlorodifluoromethan	1.0	U	U	U	U	U
1,1-Dichloroethane	1.0	U	U	U	U	U
1,2-Dichloroethane	1.0	U	U	U	U	U
1,1-Dichloroethene	1.0	U	U	U	U	U
Cis-1,2-Dichloroethene	1.0	U	U	U	U	U
trans-1,2-Dichloroethene	1.0	U	U	U	U	U
1,2-Dichloropropane	1.0	U	U	U	U	**0.39J**
1,3-Dichloropropane	1.0	U	U	U	U	U
2,2-Dichloropropane	1.0	U	U	U	U	U
1,1-Dichloropropene	1.0	U	U	U	U	U
cis-1,3-Dichloropropene	1.0	U	U	U	U	U
trans-1,3-Dichloropropene	1.0	U	U	U	U	U
Ethylbenzene	1.0	U	U	U	U	U
Hexachlorobutadiene	1.0	U	U	U	U	U
2-Hexanone	10	U	U	U	U	U
Isopropylbenzene	1.0	U	U	U	U	U

ANALYTE	RLs µg/L	08-27-12-CW-1 µg/L	08-27-12-CW-5 µg/L	08-27-12-CW-6 µg/L	08-27-12-CW-8 µg/L	08-27-12-CW-9 µg/L
p-Isopropyltoluene	1.0	U	U	U	U	U
MTBE	1.0	U	U	U	U	U
4-Methyl-2-Pentanone	10.0	U	U	U	U	U
Methylene chloride	1.0	U	U	U	U	U
Naphthalene	1.0	U	U	U	U	U
n- Propylbenzene	1.0	U	U	U	U	U
Styrene	1.0	U	U	U	U	U
1,1,1,2-Tetrachloroethane	1.0	U	U	U	U	U
1,1,2,2-Tetrachloroethane	1.0	U	U	U	U	U
Tetrachloroethene	1.0	U	U	**0.30J**	U	**3.8**
Toluene	1.0	U	U	U	U	U
1,2,3-Trichlorobenzene	1.0	U	U	U	U	U
1,2,4-Trichlorobenzene	1.0	U	U	U	U	U
1,1,1-Trichloroethane	1.0	U	U	U	U	U
1,1,2-Trichloroethane	1.0	U	U	U	U	U
Trichloroethene	1.0	U	U	U	U	U
Trichlorofluoromethane	1.0	U	U	U	U	U
1,2,3-Trichloropropane	1.0	U	U	U	U	U
1,2,4-Trimethylbenzene	1.0	U	U	U	U	U
1,3,5-Trimethylbenzene	1.0	U	U	U	U	U
Vinyl Chloride	1.0	U	U	U	U	U
o-Xylene	1.0	U	U	U	U	U
m-& p-Xylenes	1.0	U	U	U	U	U
Surrogate (Limits)	**(Limits)**	% **Recovery**	% **Recovery**	% **Recovery**	% **Recovery**	% **Recovery**
1,2Dichloroeth-d4	70-120	113	113	108	111	113
4-Bromofluorbenze	75-120	97.0	98.2	99.8	99.3	98.8
Toluene-d8	85-120	109	107	107	108	109
Dibromofluoromethane	85-115	108	110	107	109	111

Table 1-Volatile Organic Compounds component List: EPA Method 8260B

ANALYTE	RLs µg/L	08-27-12-CW-10 µg/L	08-27-12-FDUP-1 µg/L µg/L	08-27-12-TB-1 µg/L		
Acetone	10	U	U	U		
Benzene	1.0	U	U	U		
Bromobenzene	1.0	U	U	U		
Bromochloromethane	1.0	U	U	U		
Bromodichloromethane	1.0	U	U	U		
Bromoform	1.0	U	U	U		
Bromomethane	1.0	U	U	U		
2-Butanone	10	U	U	U		
n-Butylbenzene	1.0	U	U	U		
sec-Butylbenzene	1.0	U	U	U		
tert-Butylbenzene	1.0	U	U	U		
Carbon Disulfide	1.0	U	U	U		
Carbon Tetrachloride	1.0	U	U	U		
Chlorobenzene	1.0	U	U	U		
Chloroethane	1.0	U	U	U		
2-ChloroethylVinylether	1.0	U	U	U		
Chloroform	1.0	U	U	U		
Chloromethane	1.0	U	U	U		
2-Chlorotoluene	1.0	U	U	U		
4-Chlorotoluene	1.0	U	U	U		
1,2Dibromo3Chloropropane	1.0	U	U	U		
Dibromochloromethane	1.0	U	U	U		
1,2-Dibromoethane(EDB)	1.0	U	U	U		
Dibromomethane	1.0	U	U	U		
1,2-Dichlorobenzene	1.0	U	U	U		
1,3-Dichlorobenzene	1.0	U	U	U		
1,4-Dichlorobenzene	1.0	U	U	U		
Dichlorodifluoromethan	1.0	U	U	U		
1,1-Dichloroethane	1.0	U	U	U		
1,2-Dichloroethane	1.0	U	U	U		
1,1-Dichloroethene	1.0	U	U	U		
Cis-1,2-Dichloroethene	1.0	U	U	U		
trans-1,2-Dichloroethene	1.0	U	U	U		
1,2-Dichloropropane	1.0	U	U	U		
1,3-Dichloropropane	1.0	U	U	U		
2,2-Dichloropropane	1.0	U	U	U		
1,1-Dichloropropene	1.0	U	U	U		
cis-1,3-Dichloropropene	1.0	U	U	U		
trans-1,3-Dichloropropene	1.0	U	U	U		

ANALYTE	RLs µg/L	08-27-12-CW-10 µg/L	08-27-12-FDUP-1 µg/L µg/L	08-27-12-TB-1 µg/L		
Ethylbenzene	1.0	U	U	U		
Hexachlorobutadiene	1.0	U	U	U		
2-Hexanone	10	U	U	U		
Isopropylbenzene	1.0	U	U	U		
p-Isopropyltoluene	1.0	U	U	U		
MTBE	1.0	U	U	U		
4-Methyl-2-Pentanone	10.0	U	U	U		
Methylene chloride	1.0	U	U	U		
Naphthalene	1.0	U	U	U		
n- Propylbenzene	1.0	U	U	U		
Styrene	1.0	U	U	U		
1,1,1,2-Tetrachloroethane	1.0	U	U	U		
1,1,2,2-Tetrachloroethane	1.0	U	U	U		
Tetrachloroethene	1.0	U	U	U		
Toluene	1.0	U	U	U		
1,2,3-Trichlorobenzene	1.0	U	U	U		
1,2,4-Trichlorobenzene	1.0	U	U	U		
1,1,1-Trichloroethane	1.0	U	U	U		
1,1,2-Trichloroethane	1.0	U	U	U		
Trichloroethene	1.0	U	U	U		
Trichlorofluoromethane	1.0	U	U	U		
1,2,3-Trichloropropane	1.0	U	U	U		
1,2,4-Trimethylbenzene	1.0	U	U	U		
1,3,5-Trimethylbenzene	1.0	U	U	U		
Vinyl Chloride	1.0	U	U	U		
o-Xylene	1.0	U	U	U		
m-& p-Xylenes	1.0	U	U	U		
Surrogate (Limits)		% **Recovery**	% **Recovery**	% **Recovery**		
1,2Dichloroeth-d4	70-120	117	118	111		
4-Bromofluorbenze	75-120	97.6	101	100		
Toluene-d8	85-120	109	107	108		
Dibromofluoromethane	85-115	112	113	111		

Table 2-Fumigants (EDB, DBCP & 1, 2, 3-Trichloropropane): EPA Method 8260B (SIM)

ANALYTE	RLs µg/L	08-27-12-CW-1 µg/L	08-27-12-CW-5 µg/L	08-27-12-CW-6 µg/L	08-27-12-CW-8 µg/L	08-27-12-CW-9 µg/L	08-27-12-CW-10 µg/L	08-27-12-FDUP-1 µg/L
EDB	0.05	ND	ND	ND	ND	ND	ND	ND
DBCP	0.05	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichloropropane	0.005	**0.055**	**0.11**	**0.037**	**0.012**	**0.40**	ND	**0.051**
Surrogate parameters	**Limits**	% **Recovery**	% **Recovery**	% **Recovery**	% **Recovery**	% **Recovery**	% **Recovery**	% **Recovery**
Toluene d8	80-120	100	101	99.4	93.7	92.9	95.0	102

Table 3-Herbicides (Dinoseb): EPA Method 8151A

ANALYTE	RLs µg/L	08-27-12-CW-1 µg/L	08-27-12-CW-5 µg/L	08-27-12-CW-6 µg/L	08-27-12-CW-8 µg/L	08-27-12-CW-9 µg/L	08-27-12-CW-10 µg/L	08-27-12-FDUP-1 µg/L
Dinoseb	0.05	ND	ND	ND	ND	ND	ND	ND
Surrogate parameters	**Limits**	% **Recovery**	% **Recovery**	% **Recovery**	% **Recovery**	% **Recovery**	% **Recovery**	% **Recovery**
MCPP (Surrogate)	80-120	81.5	79.2	84.4	89.3	76.7	84.4	84.7

ATTACHMENT 4

PHOTOGRAPHS OF THE CITY WELLS

Attachment 4 - Photographs taken during Sampling on August 27, 2012
August 2012 Groundwater Sampling and Analysis Report for City Wells - B&B Superfund, 600 S. Derby Street, Arvin,

Figure 1: A view of CW-5 during the August sampling event.

Figure 2: Draining water from the well faucet prior to sampling at CW-5.

Figure 3: Collecting water for measurement of water quality parameters.

Figure 4: Cooler to store water samples.

Attachment 4 - Photographs taken during Sampling on August 27, 2012
August 2012 Groundwater Sampling and Analysis Report for City Wells - B&B Superfund, 600 S. Derby Street, Arvin,

Figure 5: Draining the water at CW-10 prior to sampling.

Figure 6: A view of CW-10 during the August sampling event.

Figure 7: A view of CW-8 during the August 2012 sampling event.

Figure 8: Draining the water prior to sampling at CW-8.

Attachment 4 - Photographs taken during Sampling on August 27, 2012
August 2012 Groundwater Sampling and Analysis Report for City Wells - B&B Superfund, 600 S. Derby Street, Arvin,

Figure 9: Using the Horiba instrument to measure water quality parameters.

Figure 10: A view of CW-6 during the August 2012 sampling event.

Figure 11: Draining water through the faucet prior to sampling at CW-6.

Figure 12: A view of CW-9 during the August 2012 sampling event.

Attachment 4 - Photographs taken during Sampling on August 27, 2012
August 2012 Groundwater Sampling and Analysis Report for City Wells - B&B Superfund, 600 S. Derby Street, Arvin,

Figure 13: Water discharge to the street during the sampling at CW-9.

Figure 14: Draining the water prior to sampling at CW-9.