288-F ASH BASIN GROUNDWATER MONITORING REPORT FOR 2009 (U)
SRNS-TR-2009-00454
JANUARY

Introduction

In accordance with SRS 288-F Ash Basin Industrial Solid Waste Permit, #025800-1601, the wells shown on figure 1 are monitored for the parameters listed below:

pH
Specific Conductance
Temperature
Turbidity
Water level
Barium
Chromium
Copper
Lead
Nickel
Nitrate/Nitrite as Nitrogen
Sulfate
Zinc

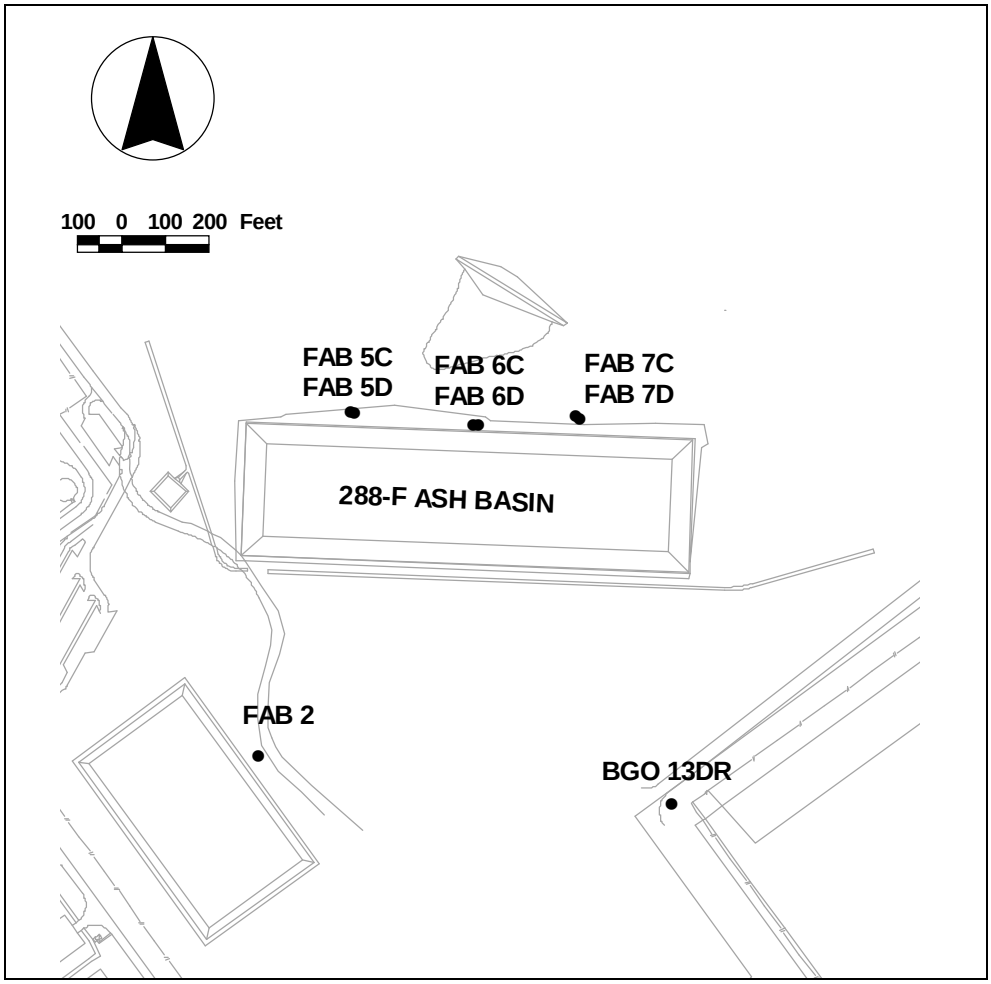

Figure 1. Well locations.

The six downgradient wells were installed during the third quarter of 2004. They are: FAB 5C, FAB 5D, FAB 6C, FAB 6D, FAB 7C, FAB 7D. The "D" wells are in the Upper Aquifer Zone (UAZ) of the Upper Three Runs Aquifer (above the "tan clay"). These wells do not usually contain enough water to yield samples. The "C" wells are in the Lower Aquifer Zone (LAZ) of that aquifer (just below the "tan clay"). Upgradient wells FAB 2 and BGO 13DR are both in the UAZ and have been in service for many years.

Sampling took place during the second and fourth quarters of 2009. The well sampling and analyses were conducted in accordance with Procedure Manual 3Q5, Hydrogeologic Data Collection. Wells FAB 5D, FAB 6D and FAB 7D could not be pumped due to insufficient water.

Flow Direction and Rate

Water elevation data for the UAZ are plotted on maps in figures 2 and 3. There is too little data to allow contouring or estimations of flow velocity. However, estimates of the rate and direction of flow in the LAZ can be made using water level data from FAB 5C, 6C and 7C and other surrounding LAZ wells (figures 2 and 3). The flow rate can be estimated using the following equation:

$$\text{Flow(ft/day)} = \frac{\text{Hydraulic Conductivity (ft/day)}}{\text{Porosity (unitless)}} \times \frac{\text{dh(ft)}}{\text{dl(ft)}}$$

For the LAZ, with the hydraulic conductivity at 8 ft/day (estimates vary from .8 to 16 ft/day), the effective porosity value at 30 percent, and the gradient at .006 in second quarter and .005 in fourth quarter (from contours on figure 4 and 5), the calculations are as follows:

$$\frac{8 \text{ ft/day}}{0.30} \times .006 = 0.16 \text{ ft/day or } 58.4 \text{ ft/year for second quarter}$$

$$\frac{8 \text{ ft/day}}{0.31} \times .005 = 0.13 \text{ ft/day or } 47.5 \text{ ft/year for fourth quarter}$$

Analytical results

Downgradient monitoring results were compared to background as represented by upgradient results and by the upper tolerance limits previously submitted in the *Groundwater Monitoring Plan for the 288-F Ash Basin* . None of the downgradient results exceeded background.

Conclusions

The monitoring network around the 288 F Ash Basin was sampled during the second and fourth quarters of 2009. Wells screened just above the "tan clay" could not be pumped due to insufficient water. None of the downgradient results exceeded background.

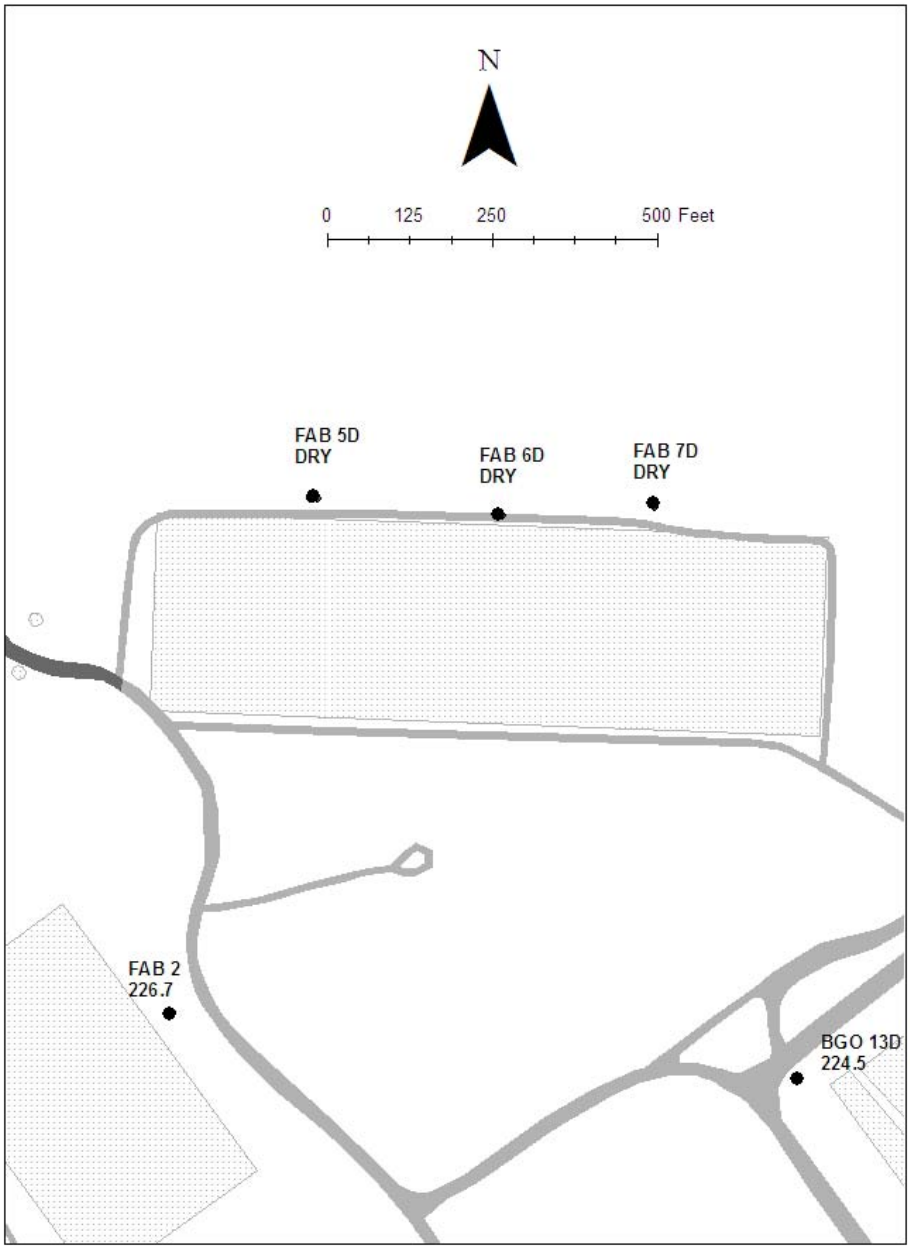

Figure 2. Water elevations for the Upper Aquifer Zone during the second quarter of 2009.

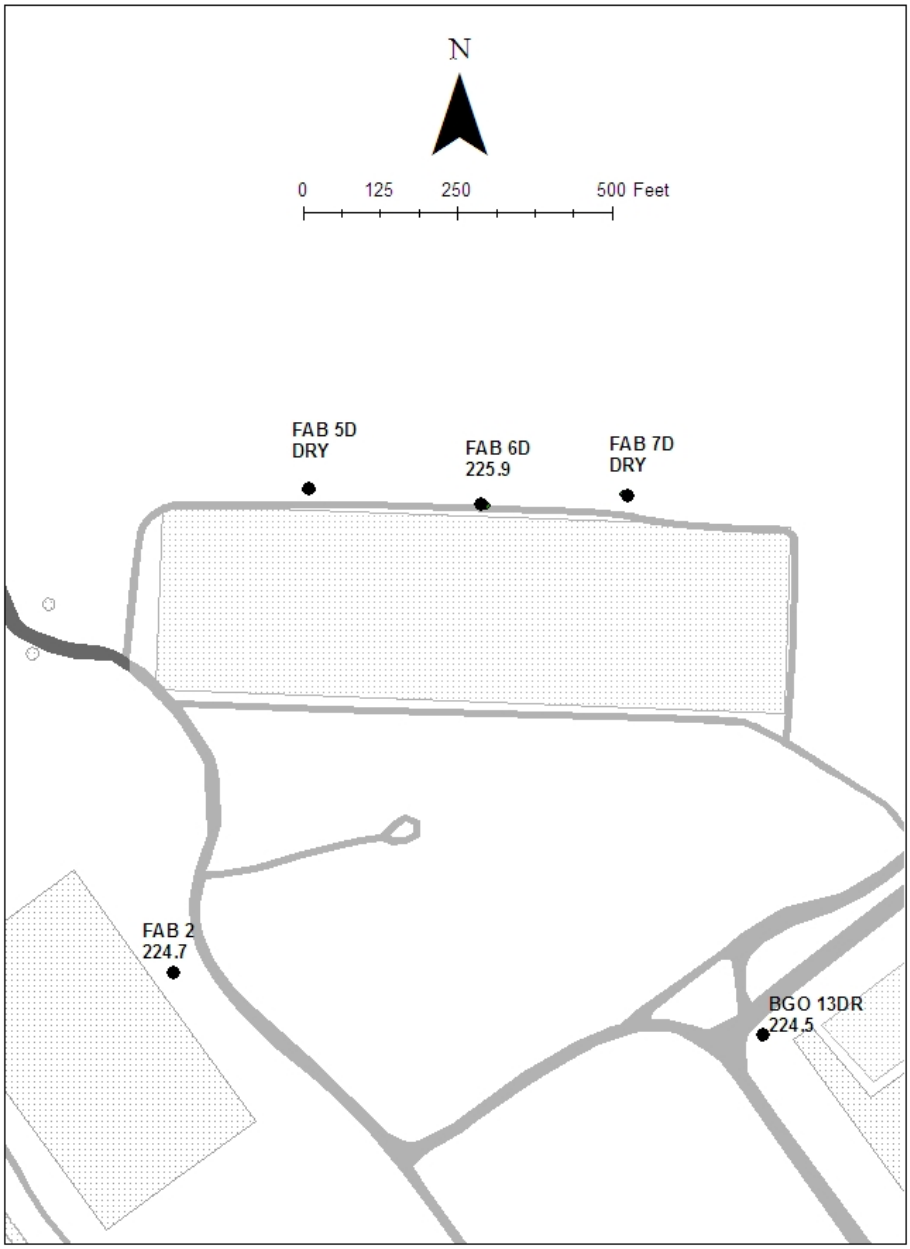

Figure 3. Water elevations for the Upper Aquifer Zone during the fourth quarter of 2009.

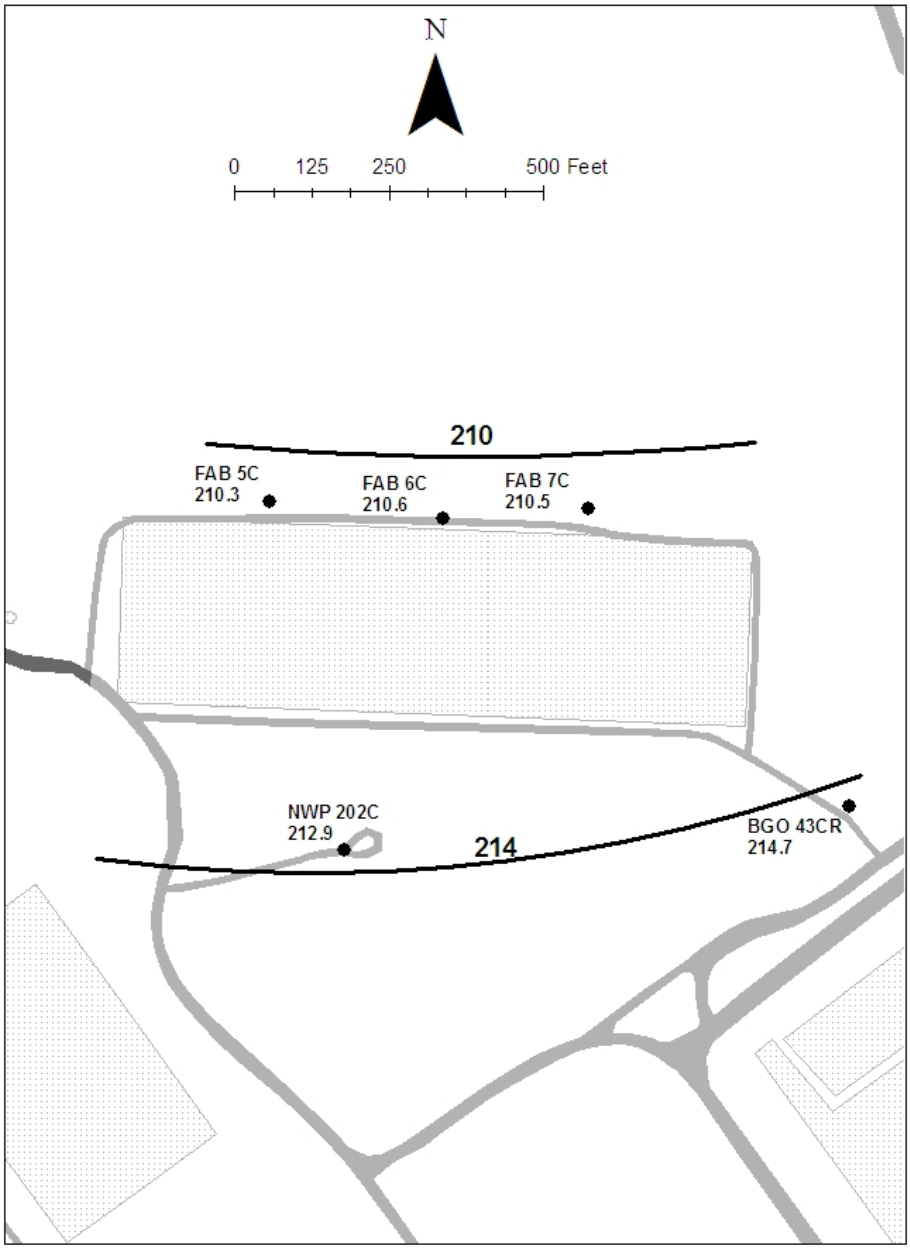

Figure 4. Water elevations for the Lower Aquifer Zone during the second quarter of 2009.

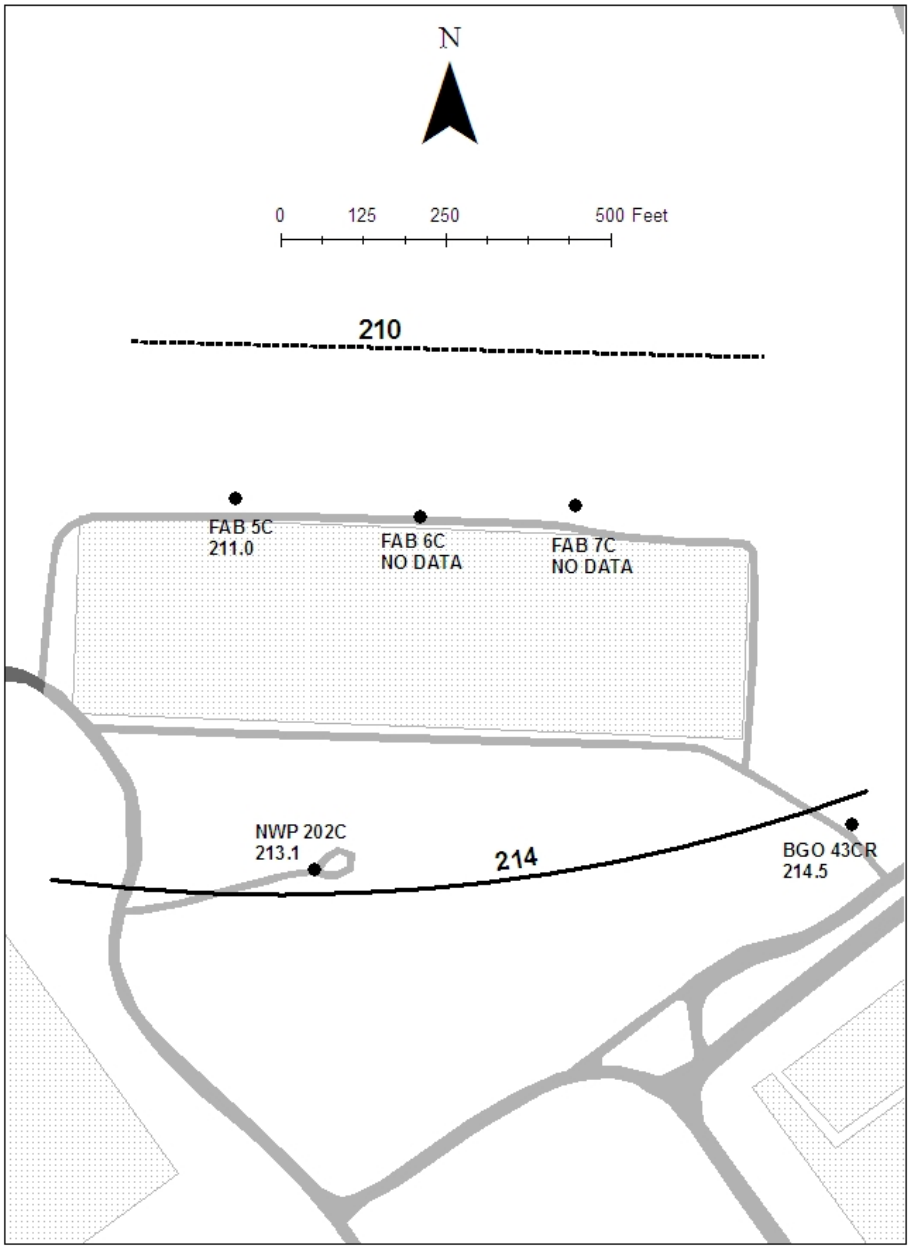

Figure 5. Water elevations for the Lower Aquifer Zone during the fourth quarter of 2009.

Table 1. Monitoring data.

WELL	DATE	ANALYTE	METHOD	MDL	PQL	LAB CODE	RESULT	UNITS
BGO 13DR	5/13/2009	BARIUM	EPA6010C	1	10		66.9	ug/L
BGO 13DR	10/13/2009	BARIUM	EPA6010C	1	10		55.7	ug/L
BGO 13DR	10/13/2009	BARIUM	EPA6010C	1	10		55.9	ug/L
FAB 2	5/13/2009	BARIUM	EPA6010C	1	10		22.9	ug/L
FAB 5C	5/12/2009	BARIUM	EPA6010C	1	10		50.3	ug/L
FAB 5C	10/13/2009	BARIUM	EPA6010C	1	10		46.3	ug/L
FAB 6C	5/12/2009	BARIUM	EPA6010C	1	10	J	2.35	ug/L
FAB 6C	10/13/2009	BARIUM	EPA6010C	1	10	J	2.48	ug/L
FAB 7C	5/13/2009	BARIUM	EPA6010C	1	10	J	8.29	ug/L
FAB 7C	10/13/2009	BARIUM	EPA6010C	1	10	J	3.82	ug/L
BGO 13DR	5/13/2009	CHROMIUM	EPA6010C	1	10	U	10	ug/L
BGO 13DR	10/13/2009	CHROMIUM	EPA6010C	1	10	U	10	ug/L
BGO 13DR	10/13/2009	CHROMIUM	EPA6010C	1	10	U	10	ug/L
FAB 2	5/13/2009	CHROMIUM	EPA6010C	1	10	J	3.69	ug/L
FAB 5C	5/12/2009	CHROMIUM	EPA6010C	1	10		11.4	ug/L
FAB 5C	10/13/2009	CHROMIUM	EPA6010C	1	10		10.7	ug/L
FAB 6C	5/12/2009	CHROMIUM	EPA6010C	1	10	J	1.51	ug/L
FAB 6C	10/13/2009	CHROMIUM	EPA6010C	1	10	J	1.59	ug/L
FAB 7C	5/13/2009	CHROMIUM	EPA6010C	1	10	J	1.39	ug/L
FAB 7C	10/13/2009	CHROMIUM	EPA6010C	1	10	U	10	ug/L
BGO 13DR	5/13/2009	COPPER	EPA6010C	1	10	J	2.55	ug/L
BGO 13DR	10/13/2009	COPPER	EPA6010C	1	10	U	10	ug/L
BGO 13DR	10/13/2009	COPPER	EPA6010C	1	10	U	10	ug/L
FAB 2	5/13/2009	COPPER	EPA6010C	1	10		2550	ug/L
FAB 5C	5/12/2009	COPPER	EPA6010C	1	10		11.4	ug/L
FAB 5C	10/13/2009	COPPER	EPA6010C	1	10	J	9.18	ug/L
FAB 6C	5/12/2009	COPPER	EPA6010C	1	10	U	10	ug/L
FAB 6C	10/13/2009	COPPER	EPA6010C	1	10		64.6	ug/L
FAB 7C	5/13/2009	COPPER	EPA6010C	1	10	U	10	ug/L
FAB 7C	10/13/2009	COPPER	EPA6010C	1	10	U	10	ug/L
BGO 13DR	5/13/2009	DEPTH TO WATER					95	FT
BGO 13DR	10/13/2009	DEPTH TO WATER					95	FT
FAB 2	5/13/2009	DEPTH TO WATER					103	FT
FAB 2	10/13/2009	DEPTH TO WATER					105	FT
FAB 5C	5/12/2009	DEPTH TO WATER					102.9	FT
FAB 5C	10/13/2009	DEPTH TO WATER					102.2	FT
FAB 6C	5/12/2009	DEPTH TO WATER					100	FT
FAB 6D	10/13/2009	DEPTH TO WATER					84.9	FT
FAB 7C	5/13/2009	DEPTH TO WATER					100.5	FT
BGO 13DR	5/13/2009	LEAD	EPA6010C	2	20	J	4.05	ug/L
BGO 13DR	10/13/2009	LEAD	EPA6010C	7	70	U	70	ug/L
BGO 13DR	10/13/2009	LEAD	EPA6010C	7	70	U	70	ug/L
FAB 2	5/13/2009	LEAD	EPA6010C	2	20		673	ug/L
FAB 5C	5/12/2009	LEAD	EPA6010C	2	20	J	8.57	ug/L
FAB 5C	10/13/2009	LEAD	EPA6010C	7	70	J	9.24	ug/L
FAB 6C	5/12/2009	LEAD	EPA6010C	2	20	U	20	ug/L
FAB 6C	10/13/2009	LEAD	EPA6010C	7	70	J	10.9	ug/L
FAB 7C	5/13/2009	LEAD	EPA6010C	2	20	U	20	ug/L

WELL	DATE	ANALYTE	METHOD	MDL	PQL	LAB CODE	RESULT	UNITS
FAB 7C	10/13/2009	LEAD	EPA6010C	7	70	U	70	ug/L
BGO 13DR	5/13/2009	NICKEL	EPA6010C	1	10	U	10	ug/L
BGO 13DR	10/13/2009	NICKEL	EPA6010C	1	10	U	10	ug/L
BGO 13DR	10/13/2009	NICKEL	EPA6010C	1	10	U	10	ug/L
FAB 2	5/13/2009	NICKEL	EPA6010C	1	10	J	8.69	ug/L
FAB 5C	5/12/2009	NICKEL	EPA6010C	1	10	J	4.23	ug/L
FAB 5C	10/13/2009	NICKEL	EPA6010C	1	10	J	3.8	ug/L
FAB 6C	5/12/2009	NICKEL	EPA6010C	1	10	U	10	ug/L
FAB 6C	10/13/2009	NICKEL	EPA6010C	1	10	J	2.04	ug/L
FAB 7C	5/13/2009	NICKEL	EPA6010C	1	10	J	1.03	ug/L
FAB 7C	10/13/2009	NICKEL	EPA6010C	1	10	U	10	ug/L
BGO 13DR	5/13/2009	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.05	0.25		0.545	mg/L
BGO 13DR	10/13/2009	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.1	0.5		1.02	mg/L
BGO 13DR	10/13/2009	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.1	0.5		1.05	mg/L
FAB 2	5/13/2009	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.1	0.5		2.89	mg/L
FAB 5C	5/12/2009	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.05	0.25		0.795	mg/L
FAB 5C	10/13/2009	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.05	0.25		0.81	mg/L
FAB 6C	5/12/2009	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.05	0.25		0.338	mg/L
FAB 6C	10/13/2009	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.05	0.25		0.369	mg/L
FAB 7C	5/13/2009	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.05	0.25	J	0.227	mg/L
FAB 7C	5/13/2009	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.05	0.25	J	0.237	mg/L
FAB 7C	10/13/2009	NITRATE-NITRITE AS NITROGEN	EPA353.2	0.05	0.25		0.328	mg/L
BGO 13DR	5/13/2009	PH					8.3	PH
BGO 13DR	10/13/2009	PH					7.6	PH
FAB 2	5/13/2009	PH					6.3	PH
FAB 5C	5/12/2009	PH					6.2	PH
FAB 5C	10/13/2009	PH					7	PH
FAB 6C	5/12/2009	PH					6	PH
FAB 6C	10/13/2009	PH					6.3	PH
FAB 7C	5/13/2009	PH					7.2	PH
FAB 7C	10/13/2009	PH					5.1	PH
BGO 13DR	5/13/2009	SPEC. CONDUCTANCE					91	us/cm
BGO 13DR	10/13/2009	SPEC. CONDUCTANCE					151	us/cm
FAB 2	5/13/2009	SPEC. CONDUCTANCE					206	us/cm
FAB 5C	5/12/2009	SPEC. CONDUCTANCE					124	us/cm
FAB 5C	10/13/2009	SPEC. CONDUCTANCE					128	us/cm
FAB 6C	5/12/2009	SPEC. CONDUCTANCE					26.1	us/cm
FAB 6C	10/13/2009	SPEC. CONDUCTANCE					26.7	us/cm
FAB 7C	5/13/2009	SPEC. CONDUCTANCE					25	us/cm
FAB 7C	10/13/2009	SPEC. CONDUCTANCE					25	us/cm
BGO 13DR	5/13/2009	SULFATE	EPA9056A	0.1	0.4		0.557	mg/L

WELL	DATE	ANALYTE	METHOD	MDL	PQL	LAB CODE	RESULT	UNITS
BGO 13DR	10/13/2009	SULFATE	EPA9056A	0.1	0.4		2.18	mg/L
BGO 13DR	10/13/2009	SULFATE	EPA9056A	0.1	0.4		2.18	mg/L
FAB 2	5/13/2009	SULFATE	EPA9056A	0.1	0.4		19.4	mg/L
FAB 5C	5/12/2009	SULFATE	EPA9056A	0.1	0.4		2.48	mg/L
FAB 5C	10/13/2009	SULFATE	EPA9056A	0.1	0.4		2.63	mg/L
FAB 6C	5/12/2009	SULFATE	EPA9056A	0.1	0.4		0.898	mg/L
FAB 6C	10/13/2009	SULFATE	EPA9056A	0.1	0.4		0.672	mg/L
FAB 7C	5/13/2009	SULFATE	EPA9056A	0.1	0.4		2.17	mg/L
FAB 7C	10/13/2009	SULFATE	EPA9056A	0.1	0.4		2.19	mg/L
BGO 13DR	5/13/2009	TURBIDITY					1.5	NTU
BGO 13DR	10/13/2009	TURBIDITY					1.5	NTU
FAB 2	5/13/2009	TURBIDITY					18	NTU
FAB 5C	5/12/2009	TURBIDITY					80	NTU
FAB 5C	10/13/2009	TURBIDITY					50	NTU
FAB 6C	5/12/2009	TURBIDITY					0.8	NTU
FAB 6C	10/13/2009	TURBIDITY					1.1	NTU
FAB 7C	5/13/2009	TURBIDITY					5.7	NTU
FAB 7C	10/13/2009	TURBIDITY					1.9	NTU
BGO 13DR	5/13/2009	WATER TEMP.					17.8	degrees C
BGO 13DR	10/13/2009	WATER TEMP.					20.8	degrees C
FAB 2	5/13/2009	WATER TEMP.					17.8	degrees C
FAB 5C	5/12/2009	WATER TEMP.					24.6	degrees C
FAB 5C	10/13/2009	WATER TEMP.					21	degrees C
FAB 6C	5/12/2009	WATER TEMP.					22.5	degrees C
FAB 6C	10/13/2009	WATER TEMP.					23.3	degrees C
FAB 7C	5/13/2009	WATER TEMP.					17.4	degrees C
FAB 7C	10/13/2009	WATER TEMP.					21	degrees C
BGO 13DR	5/13/2009	ZINC	EPA6010C	1	10	U	10	ug/L
BGO 13DR	10/13/2009	ZINC	EPA6010C	1	10	J	2.26	ug/L
BGO 13DR	10/13/2009	ZINC	EPA6010C	1	10	J	2.51	ug/L
FAB 2	5/13/2009	ZINC	EPA6010C	1	10		94.9	ug/L
FAB 5C	5/12/2009	ZINC	EPA6010C	1	10		29.8	ug/L
FAB 5C	10/13/2009	ZINC	EPA6010C	1	10		25.8	ug/L
FAB 6C	5/12/2009	ZINC	EPA6010C	1	10	J	4.03	ug/L
FAB 6C	10/13/2009	ZINC	EPA6010C	1	10		102	ug/L
FAB 7C	5/13/2009	ZINC	EPA6010C	1	10	J	3.95	ug/L
FAB 7C	10/13/2009	ZINC	EPA6010C	1	10	J	2.96	ug/L

Definitions:

MDL	method detection limit
PQL	practical quantitation limit
LAB QUALIFIER	USEPA Functional Guideline Codes applied by labs.

USEPA Functional Guideline Codes

J	The detected analyte was positively identified but the result is approximate.
NJ	The detected analyte was only tentatively identified and the result is approximate. All usable TIC results receive this code.
U	The analyte was analyzed for, but not detected. The sample detection and quantitation limits (MDL & SQL) are valid unless blank contamination is indicated.
UJ	The analyte was analyzed for, but not detected. The MDL & SQL are approximate, and may be inaccurate or imprecise.
R	The sample result is rejected as unusable due to serious deficiencies in meeting quality control criteria. The analyte may be present or absent.