AVOCET
ENVIRONMENTAL, INC.

April 28, 2008 Project No. 1155.006

Ms. Jennifer L. Wiley, PG, CEM
THE BOEING COMPANY
Environment, Health & Safety – Environmental Remediation
4501 Conant Street
Long Beach, California 90808

**Field Data Report**
**April 2008 Monthly WDR Sampling**
**Former Building 1/36 WDR Biorecirculation Pilot Test**
**Waste Discharge Requirements Order No. R4-2007-0040;**
Boeing Corporate Real Estate Former C-6 Facility
Los Angeles, California

Dear Ms. Wiley:

This report has been prepared by Avocet Environmental, Inc. (Avocet) to summarize and present the field data collected during the April 2008 monthly Building 1/36 Waste Discharge Requirements (WDR) groundwater monitoring event. The monitoring was conducted pursuant to and in accordance with the following:

Avocet Environmental, Inc., April 15, 2008, Technical Memorandum, April 2008 Groundwater Sampling and Analysis Plan, Building 1/36 WDR Quarterly Monitoring, Building 2 WDR Baseline Monitoring, and Site-Wide Annual Monitoring, Boeing Corporate Real Estate Former C-6 Facility, Los Angeles, California (Attachment 1).

California Regional Water Quality Control Board, Los Angeles Region (LARWQCB), February 15, 2008, Approval of Revised Monitoring and Reporting Program CI9310, Individual Waste Discharge Requirements Order No. R4-2007-0040, Boeing Corporate Real Estate, Former C-6 Facility, 19503 South Normandie, Los Angeles, California (File No. 95-036; SLIC No. 0410; Site ID No. 1846000).

Field activities performed during the April 2008 Monitoring Program are discussed in the following section. Figure 1 (Attachment 1) presents the locations of the groundwater monitoring wells included as part of this program.

## GROUNDWATER SAMPLING ACTIVITIES

All 11 wells scheduled for groundwater level measurement were gauged for depth to water and total depth on April 22, 2008 using Solinst water level and depth sounders. The wells were also inspected for any damage or missing materials. All eleven wells were in good condition, but all were missing the bolts that secure the lids. The wells are frequently accessed during the pilot test and it is suspected that the bolts were temporarily removed by the remediation contractor.

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Five wells were purged and sampled on April 22, 2008 using dedicated low-flow bladder pumps and a QED MP20 flow-through cell. These wells were purged for sampling using the low-flow (0.22-0.34 liters/minute) method. Ferrous iron testing was performed in all wells using a HACH DR/890 Colorimeter. The field instruments were calibrated prior to the event and the calibration data sheets are included in Attachment 2.

At the completion of low-flow purging, groundwater samples were collected in laboratory supplied containers, properly labeled, identified on the chain-of-custody, and submitted to TestAmerica Laboratory, an appropriately certified environmental testing laboratory located in Irvine, California. A normal 10-day turn-around time was requested for the lab analyses. The samples were analyzed for the following:

- Volatile organic compounds (VOCs) by EPA Method 8260B,
- Total organic carbon (TOC) by EPA Method 9060,
- Volatile fatty acids (VFAs) by IC Method 8M23G (subcontracted by TestAmerica to Microseeps, Inc., Pittsburg, PA),
- Dissolved gases (ethane, ethane, and methane) by RSK 175 (subcontracted by TestAmerica to Air Technology Laboratory, Inc., City of Industry, CA),
- Dissolved minerals (sulfate, nitrate, nitrite, and chloride) by EPA Method 300 Series, and
- Total Alkalinity by EPA Method 310.1.

Purge water (approximately 18 liters) was placed in an appropriately labeled 55-gallon drum located adjacent to the treatment compound. The analytical results will be used to profile the purge water for transport to an appropriate off-site facility for treatment and disposal. Management, containerization, staging, profiling, and transportation will be conducted in accordance with procedures established by Boeing Corporate Real Estate.

If you have any questions regarding this field data report or require additional information, please do not hesitate to call.

Respectfully submitted,

AVOCET ENVIRONMENTAL, INC.

Michael A. Rendina

Michael A. Rendina, C.Hg.
Principal

MAR:sh
Attachments:
Attachment 1: April 2008 Groundwater Sampling and Analysis Plan
Attachment 2: Field Data Forms

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AVOCET ENVIRONMENTAL, INC.

# *Attachment 1*

*April 2008 Groundwater Sampling and Analysis Plan*

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April 15, 2008 Project No. 1155.006

Ms. Jennifer Wiley, P.G. (via electronic mail only)
THE BOEING COMPANY
Environment, Health & Safety –
Environmental Remediation
4501 East Conant Street, M/C D851-0097
Long Beach, California 90808

**Technical Memorandum**
**April 2008 Monthly WDR Sampling and Analysis Plan**
**April 2008 Monitoring - Building 1/36 Area**
**Waste Discharge Requirements Order No. R4-2007-0040**
Boeing Corporate Real Estate Former C-6 Facility
Los Angeles, California

Dear Ms. Wiley:

This memorandum has been prepared by Avocet Environmental, Inc. (Avocet) and presents the sampling and analysis plan (SAP) for the April 2008 required monitoring at Boeing Corporate Real Estate's (BCRE's) Former C-6 Facility in Los Angeles, California. This monitoring is being conducted pursuant to and in accordance with California Regional Water Quality Control Board, Los Angeles Region (LARWQCB) *Approval of Revised Monitoring and Reporting Program CI-9310, Individual Waste Discharge Requirements (WDR) Order No. R4-2007-0040* (the WDR Order) issued February 15, 2008. This memorandum discusses the ground water monitoring activities to be conducted and the analyses to be performed as pertains to the WDR Order. Additional details are provided in the *2008 Groundwater Monitoring Work Plan* (the Work Plan; Avocet, February 4, 2008).

## Field Activities

In accordance with the WDR Order, seven wells are to be monitored during April of 2008. These seven wells consist of the two Group A1 Wells (gauged for water level measurement only) and the five Group B1 Wells (gauged for water level measurement and sampled). Since the Group A2 Wells have not been used for amendment injection (C-6 Weekly Status Reports, Camp Dresser McKee, Inc., various dates through April 14, 2008), gauging of the Group A2 Wells and gauging and sampling of the Group B2 Wells is not required. However, comments received from Camp Dresser McKee, Inc. (electronic mail, February 21, 2008) recommend gauging of the four Group A2 and Group B2 Wells, so these wells were added to the April 2008 gauging program. A list of the WDR wells to be monitored (and not monitored), broken out by Group, is provided in Table 1. A map showing the well locations is provided in Figure 1. The scope of work will include all tasks associated with collecting the field measurements and laboratory

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samples required to comply with the WDR Order. In brief, these activities will include water level measurements, groundwater well purging and sampling using low-flow methods, and sample analyses. Additional activities such as pre-field documentation, waste management, and reporting are addressed in the Work Plan. Overall, the ground water monitoring activities associated with the WDR Order are as follows:

- Prior to any ground water disturbance, depth to water measurements will be taken from each of the eleven wells using a Solinst (or equivalent) well sounder. To minimize disturbance of the water column in wells scheduled for sampling, total depths in these wells will be verified after purging using a weighted depth sounder.
- Groundwater samples will be collected from five wells during the April 2008 monitoring event (Table 1). Prior to sampling, the wells will be purged using low-flow methods to assure representative samples are collected from the formation. During purging, the flow rate at each location will be maintained between 0.1 and 0.5 L/min, dependent on site-specific and well-specific factors as drawdown is not to exceed 0.3 feet in any well.
- During well purging, biogeochemical parameters including pH, temperature, electric conductivity (EC), dissolved oxygen (DO), and oxygen-reduction potential (ORP) will be periodically measured using a flow-thru cell and QED multiparameter meter. In addition, turbidity will be measured using a standard turbidimeter, ferrous iron (Fe(II)) will be measured using a Hach DR890 Colorimeter, and the QED dissolved oxygen measurements will be confirmed using a CHEMetrics, Inc. test kit. Purging will continue until three consecutive measurements are within +/-0.2 for pH, +/-3% for EC, +/-10% for DO, and +/-20 mV for ORP (ATSM, 2002).
- At the completion of purging, groundwater samples will be collected in laboratory-supplied containers, labeled in accordance with Boeing's Data Management Plan (CH2M Hill, 2007), placed on ice in a cooler, identified on the chain-of-custody, submitted to appropriately certified environmental testing laboratories, and analyzed, according to the WDR Order, for the following:
    - volatile organic compounds (EPA Method 8260B);
    - total organic carbon (EPA 9060);
    - volatile fatty acids by IC Method 8M23G (Microseeps, Inc., Pittsburg, PA);
    - dissolved hydrocarbon gases (ethene, ethane, and methane by RSK 175);
    - dissolved minerals (sulfate, nitrate, nitrite, and chloride by EPA Method 300 Series) and
    - total alkalinity (EPA Method 310.1).

A summary of the analytical program is presented in Table 1.

## Closing Remarks

Ground water monitoring is scheduled to take place at the site on Tuesday, April 22, 2008. Avocet Environmental, Inc. appreciates the opportunity to be of service to Boeing Corporate Real Estate. If you have any questions, please do not hesitate to call.

Respectfully submitted,

AVOCET ENVIRONMENTAL, INC.

Michael A. Rendina

Michael A. Rendina, P.G.
Principal

MAR:sh
Enclosure

cc: Mr. Joe Weidmann – Haley & Aldrich
Mr. Ravi Subramanian - CDM

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# *Table*

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**Table 1**
**April 2008 WDR Groundwater Monitoring Program**
BCRE Former C-6 Facility,
Los Angeles, California

| Well Information | | | Field Program | | | | Laboratory Program | | | | | | | | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Well Name | Sampling Group | Hydrostratigraphic Unit | Total VOCs Concentration (µg/l) | Sampling Order | Water Level Measurement | Field Parameters | VOCs EPA 8260B | TOC EPA 9060 Modified | Volatile Fatty Acids IC Method 8M23G (Microseeps) | Dissolved Hydrocarbon Gases (DHGs) Methane, Ethane, Ethene RSK 175 | Alkalinity EPA 310.1 | Anions ($NO_3$, $NO_2$, Cl, $SO_4$) EPA 300.0 | Total Dissolved Solids EPA 160.1 | DHC 16S rRNA gene and functional genes tceA, bvcA, and vcrA: by qPCR analysis (North Wind) | |
| **Group A Wells** | | | | | | | | | | | | | | | |
| AW0066UB | A1 | B-Sand | - - | 4 | x | | | | | | | | | | Water level measurement only |
| AW0067UB | A1 | B-Sand | - - | 7 | x | | | | | | | | | | Water level measurement only |
| AW0064UB | A2 | B-Sand | - - | 10 | x | | | | | | | | | | Water level measurement only |
| AW0065UB | A2 | B-Sand | - - | 9 | x | | | | | | | | | | Water level measurement only |
| **Group B Wells** | | | | | | | | | | | | | | | |
| AW0075UB | B1 | B-Sand | 200,141 | 12 | x | x | x | x | x | x | x | x | - | - | |
| AW0076UB | B1 | B-Sand | 186,270 | 8 | x | x | x | x | x | x | x | x | - | - | |
| AW0077UB | B1 | B-Sand | 18,481 | 6 | x | x | x | x | x | x | x | x | - | - | |
| EWB002 | B1 | B-Sand | 12,725 | 3 | x | x | x | x | x | x | x | x | - | - | |
| AW0073C | B1 | B-Sand | 6,628 | 1 | x | x | x | x | x | x | x | x | - | - | |
| WCC_06S | B2 | B-Sand | - - | 5 | x | | | | | | | | | | Water level measurement only |
| AW0074UB | B2 | C-Sand | - - | 2 | x | | | | | | | | | | Water level measurement only |
| **Group C Wells** | | | | | | | | | | | | | | | |
| TMW_07 | C | B-Sand | - | - | | | | | | | | | | | Not monitored in April |
| WCC_12S | C | B-Sand | - | - | | | | | | | | | | | Not monitored in April |
| **Group D Well** | | | | | | | | | | | | | | | |
| AW0055UB | D | B-Sand | - | - | | | | | | | | | | | Not monitored in April |
| **Quality Control Samples** | | | | | | | | | | | | | | | |
| Duplicates (1 per 20 wells) | | | | | | | x (est. 1) | | | | | | | | |
| Rinsate Blanks (1 per day) | | | | | | | x (est. 1) | | | | | | | | |
| Trip Blanks (1 per cooler) | | | | | | | x (est. 1) | | | | | | | | |
| | | | Totals: | | 11 | 5 | 8 | 5 | 5 | 5 | 5 | 5 | 0 | 0 | |

Notes: Field Parameters = pH, DO, ORP, EC, temp, turb, and ferrous iron.
pH = Potential of Hydrogen
DO = Dissolved Oxygen
ORP = Oxidation Reduction Potential
EC = Electrical Conductivity
Temp = Temperature
Turb = Turbidity
µg/l = Micrograms per liter
Total VOCs Concentration - B1 Wells February 2008 monitoring.

VOCs = Volatile organic compounds
EPA = U.S. Environmental Protection Agency
TOC = Total Organic Carbon
DHGs = Dissolved hydrocarbon gases
$NO_3$ = Nitrate, $NO_2$ = Nitrite, Cl = Chloride, $SO_4$ = Sulfate
DHC = *dehalococcoides spp.* strains
qPCR = Quantitative Polymerase Chain Reaction



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# *Figure*

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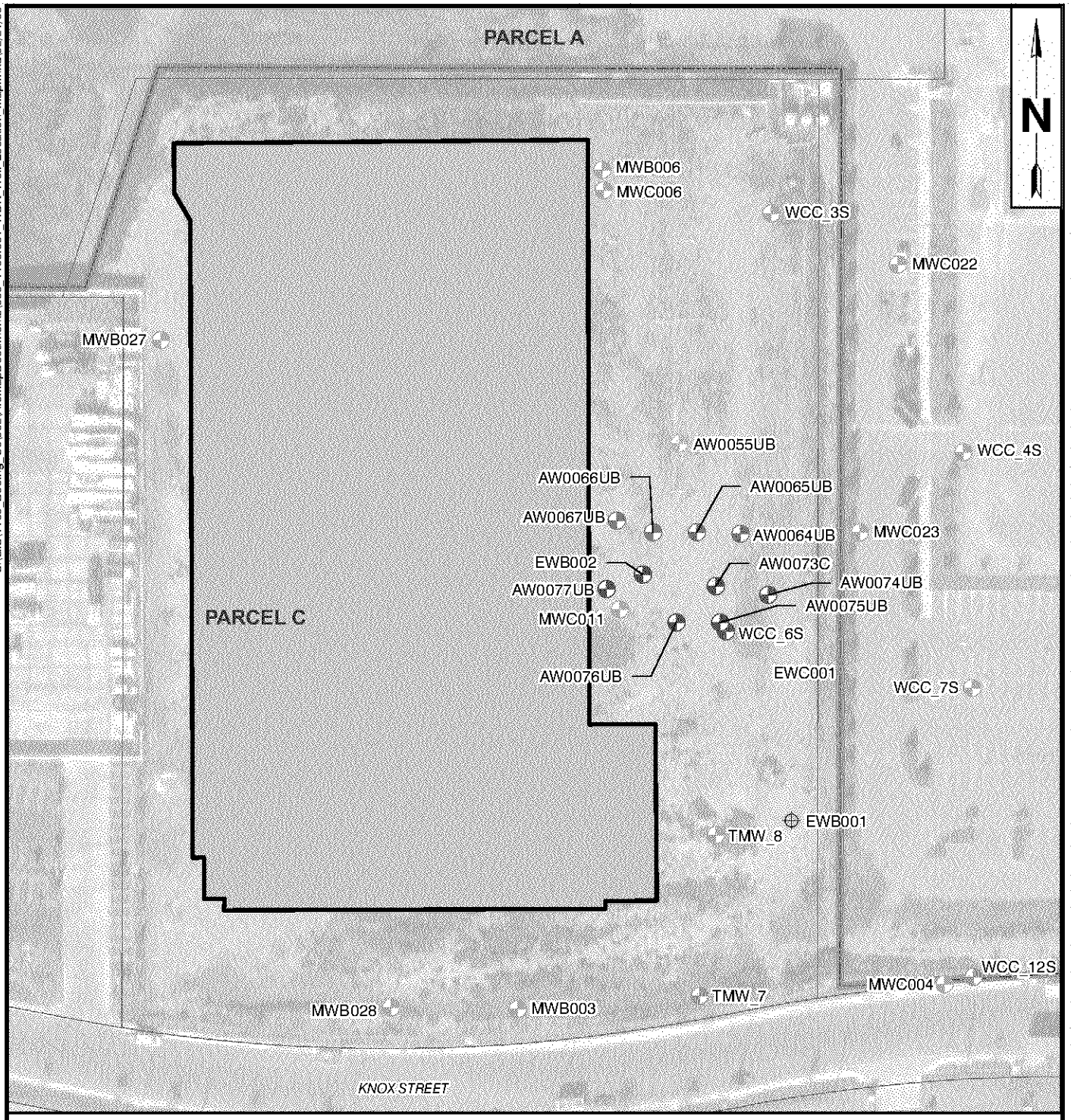
S:\GIS\1155_Boeing_C6\02\ArcMapDocuments\006_1155.001_WDR_Well_Location_Map.mxd\02/21/08




## LEGEND

- Group A1 WDR Monitoring Well
- Group A2 WDR Monitoring Well
- Group B1 WDR Monitoring Well
- Group B2 WDR Monitoring Well
- Group C WDR Monitoring Well
- Group D WDR Monitoring Well
- Non-WDR Groundwater Monitoring Well
- Pilot Test Groundwater Extraction Well
- 1451 Knox St.
- Parcel Boundary

0 100 200

SCALE

FIGURE 1

**WDR WELL LOCATION MAP**

BOEING CORPORATE REAL ESTATE
FORMER C-6 FACILITY
LOS ANGELES, CALIFORNIA

AVOCET ENVIRONMENTAL, INC.

# *Attachment 2*

*Field Data Forms*

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# GROUNDWATER SAMPLING DATA SHEET

| | | | |
|---|---|---|---|
| Project Name: | BCRE Former C-6 Facility | Date: | 4/22/08 |
| Project No.: | 1155.006 | Prepared by: | BCB |
| Well Identification: | AW0077UB | Weather: | Clear / Warm |
| Measurement Point Description: | TOC-N | Pump Intake: | 60' |
| | | Screen: | |

| A | B | C | D = C - B | E = B - A | G = D x F | H = «ScrenLength» x F | I = (top screen-B) x F | |
|---|---|---|---|---|---|---|---|---|
| Depth to LNAPL (ft-bmp) | Depth to Static Water Level (ft-bmp) | Well Total Depth (ft-bmp) | Water Column Height (ft) | LNAPL Thickness (ft) | One Casing Volume (gallons) | Screen Volume (gallons) | Above Screen Volume (gal.) | Total Purge Volume (gal.) |
| – | 60.57 | 86.00 | 25.43 | – | N/A | N/A | N/A | N/A |

| | Gallons/Foot | | | |
|---|---|---|---|---|
| Well Diameter (inches) | 0.75 | (2) | 4 | 6 |
| F - Gallons per foot of casing | 0.02 | 0.16 | 0.65 | 1.47 |

Field Equipment: QED
Purge Method: Micropurge
Well Condition: Good

| Time | Flow Controller Settings | Volume Purged (Liters) | Flow Rate (mL/min) | Water Level (ft-bmp) | Temperature (°C) [+/- 10%] | Conductivity (mS/cm) [+/- 10%] | Dissolved Oxygen (mg/L) [+/- 10%] | pH [+/- 0.1 pH] | ORP (mV) [+/- 10%] | Turbidity (NTU) [+/- 10%] | Observations |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0820 | w/5s @ 135psi | – | 200 | 60.57 | 21.21 | 2.86 | 2.55 | 6.31 | -138 | 57.2 | light yellow |
| 0823 | | 600 | | 61.14 | 21.54 | 3.40 | 0.42 | 6.03 | -176 | 26.8 | " color |
| 0826 | | 1200 | | 61.19 | 21.50 | 3.35 | 0.39 | 6.04 | -182 | 25.9 | " |
| 0829 | | 1800 | | 61.23 | 21.55 | 2.99 | 0.39 | 5.99 | -190 | 13.8 | " |
| 0832 | | 2400 | | 61.25 | 21.56 | 2.85 | 0.44 | 5.95 | -195 | 11.1 | " |
| 0835 | | 3000 | | 61.41 | 21.54 | 2.79 | 0.51 | 5.96 | -203 | 9.74 | " |
| 0838 | | 3600 | | 61.45 | 21.50 | 2.92 | 0.50 | 5.97 | -205 | 7.07 | " |

| Purge Start Time | Purge End Time | Average Flow (mL/min) | Total Volume Purged (Liters) | Total Casing Volumes Purged | 80% Recovery Water Level Depth (Dx0.20) + B | Water Level at Sampling Time (ft bmp) | Sample Collection Time | Sample Identification |
|---|---|---|---|---|---|---|---|---|
| 0820 | 0838 | 200 | 3.6 | N/A | NA | 61.45 | 0838 | AW0077UB_WG20080422_01 |

DUP:
DRUM NO:

Notes: (units) [stabilization criteria]

Ferrous Iron 0.72

PID 24.7ppm

AVOCET ENVIRONMENTAL, INC.

# GROUNDWATER SAMPLING DATA SHEET

| | | | |
|---|---|---|---|
| **Project Name:** | BCRE Former C-6 Facility | **Date:** | 4/22/08 |
| **Project No.:** | 1155.006 | **Prepared by:** | BCB |
| **Well Identification:** | EWB002 | **Weather:** | Clear/Warm |
| **Measurement Point Description:** | TOC-N | **Pump Intake:** | COS |
| | | **Screen:** | |

| A | B | C | D = C - B | E = B - A | G = D x F | H = «ScrenLength» x F | I = (top screen-B) x F | |
|---|---|---|---|---|---|---|---|---|
| **Depth to LNAPL** (ft-bmp) | **Depth to Static Water Level** (ft-bmp) | **Well Total Depth** (ft-bmp) | **Water Column Height** (ft) | **LNAPL Thickness** (ft) | **One Casing Volume** (gallons) | **Screen Volume** (gallons) | **Above Screen Volume** (gal.) | **Total Purge Volume** (gal.) |
| — | 60.31 | 90.00 | 29.69 | — | N/A | N/A | N/A | N/A |

| | Gallons/Foot | | | |
|---|---|---|---|---|
| **Well Diameter** (inches) | 0.75 | 2 | 4 | 6 |
| *F* - **Gallons per foot of casing** | 0.02 | 0.16 | 0.65 | 1.47 |

**Field Equipment:** QED
**Purge Method:** Micropurge
**Well Condition:** Good

| Time | Flow Controller Settings | Volume Purged (Liters) | Flow Rate (mL/min) | Water Level (ft-bmp) | Temperature (°C) [+/- 10%] | Conductivity (mS/cm) [+/- 10%] | Dissolved Oxygen (mg/L) [+/- 10%] | pH [+/- 0.1 pH] | ORP (mV) [+/- 10%] | Turbidity (NTU) [+/- 10%] | Observations |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1031 | 10/5s @ 140 psi | — | 200 | 60.31 | 23.40 | 2.36 | 1.74 | 6.41 | -143 | 42.9 | colorless |
| 1034 | ↓ | 600 | ↓ | 60.47 | 21.70 | 3.12 | 0.25 | 6.23 | -179 | 37.2 | " |
| 1037 | | 1200 | | 60.50 | 21.67 | 3.11 | 0.26 | 6.24 | -200 | 5.05 | " |
| 1040 | | 1800 | | 60.52 | 21.64 | 3.12 | 0.27 | 6.25 | -208 | 3.27 | " |
| 1043 | | 2400 | | 60.52 | 21.65 | 3.13 | 0.28 | 6.25 | -210 | 1.54 | " |
| 1046 | | 3000 | | 60.52 | 21.66 | 3.13 | 0.28 | 6.25 | -213 | 0.77 | " |
| 1049 | | 3600 | | 60.52 | 21.64 | 3.14 | 0.29 | 6.26 | -214 | 0.32 | " |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

| Purge Start Time | Purge End Time | Average Flow (mL/min) | Total Volume Purged (Liters) | Total Casing Volumes Purged | 80% Recovery Water Level Depth (Dx0.20) + B | Water Level at Sampling Time (ft bmp) | Sample Collection Time | Sample Identification |
|---|---|---|---|---|---|---|---|---|
| 1031 | 1049 | 200 | 3.6 | N/A | NA | 60.52 | 1049 | EWB002_WG20080422_01 |

**Notes:** (units) [stabilization criteria]

Ferrous Iron 1.42

PID 4.1 ppm

**DUP:**
**DRUM NO:**

AVOCET ENVIRONMENTAL, INC.

# GROUNDWATER SAMPLING DATA SHEET

| | | | |
|---|---|---|---|
| **Project Name:** | BCRE Former C-6 Facility | **Date:** | 4/22/08 |
| **Project No.:** | 1155.006 | **Prepared by:** | BCB |
| **Well Identification:** | AW0073C | **Weather:** | Warm / Clear |
| **Measurement Point Description:** | TOC-N | **Pump Intake:** | COS |
| | | **Screen:** | |

| A | B | C | D = C - B | E = B - A | G = D x F | H = «ScrenLength» x F | I = (top screen-B) x F | |
|---|---|---|---|---|---|---|---|---|
| **Depth to LNAPL** (ft-bmp) | **Depth to Static Water Level** (ft-bmp) | **Well Total Depth** (ft-bmp) | **Water Column Height** (ft) | **LNAPL Thickness** (ft) | **One Casing Volume** (gallons) | **Screen Volume** (gallons) | **Above Screen Volume** (gal.) | **Total Purge Volume** (gal.) |
| – | 60.04 | 117.00 | 56.96 | – | N/A | N/A | N/A | N/A |

| | Gallons/Foot | | | |
|---|---|---|---|---|
| **Well Diameter** (inches) | 0.75 | 2 | 4 | 6 |
| F - **Gallons per foot of casing** | 0.02 | 0.16 | 0.65 | 1.47 |

**Field Equipment:** QED
**Purge Method:** Micropurge
**Well Condition:** Good

| Time | Flow Controller Settings | Volume Purged (Liters) | Flow Rate (mL/min) | Water Level (ft-bmp) | Temperature (°C) [+/- 10%] | Conductivity (mS/cm) [+/- 10%] | Dissolved Oxygen (mg/L) [+/- 10%] | pH [+/- 0.1 pH] | ORP (mV) [+/- 10%] | Turbidity (NTU) [+/- 10%] | Observations |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0936 | 10.5 s @ 140 psi | – | 200 | 60.04 | 25.25 | 2.73 | 0.98 | 6.14 | -135 | 22.9 | colorless |
| 0939 | ↓ | 600 | ↓ | 60.19 | 23.16 | 1.02 | 2.97 | 6.39 | -228 | 17.6 | " |
| 0942 | | 1200 | | 60.22 | 22.78 | 0.953 | 1.14 | 6.82 | -227 | 55.1 | cloudy |
| 0945 | | 1800 | | 60.25 | 22.62 | 0.964 | 0.62 | 6.84 | -224 | 87.0 | " |
| 0948 | | 2400 | | 60.21 | 22.58 | 0.927 | 0.38 | 6.89 | -233 | 51.2 | " |
| 0951 | | 3000 | | 60.17 | 22.58 | 0.913 | 0.27 | 6.90 | -240 | 30.1 | colorless |
| 0954 | | 3600 | | 60.17 | 22.60 | 0.907 | 0.22 | 6.89 | -245 | 75.2 | cloudy |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

| Purge Start Time | Purge End Time | Average Flow (mL/min) | Total Volume Purged (Liters) | Total Casing Volumes Purged | 80% Recovery Water Level Depth (Dx0.20) + B | Water Level at Sampling Time (ft bmp) | Sample Collection Time | Sample Identification |
|---|---|---|---|---|---|---|---|---|
| 0936 | 0954 | 200 | 3.6 | N/A | NA | 60.17 | 0954 | AW0073C_WG20080422_01 |

**Notes:** (units) [stabilization criteria] Ferrous Iron 1.11 PID 2.2 ppm

**DUP:**
**DRUM NO:**

AVOCET ENVIRONMENTAL, INC.



# GROUNDWATER SAMPLING DATA SHEET

| | | | |
|---|---|---|---|
| **Project Name:** | BCRE Former C-6 Facility | **Date:** | 4/22/08 |
| **Project No.:** | 1155.006 | **Prepared by:** | BCB |
| **Well Identification:** | AW0075UB | **Weather:** | Clear / Warm |
| **Measurement Point Description:** | TOC-N | **Pump Intake:** | COS |
| | | **Screen:** | |

| A | B | C | D = C - B | E = B - A | G = D x F | H = «ScrenLength» x F | I = (top screen-B) x F | |
|---|---|---|---|---|---|---|---|---|
| **Depth to LNAPL** (ft-bmp) | **Depth to Static Water Level** (ft-bmp) | **Well Total Depth** (ft-bmp) | **Water Column Height** (ft) | **LNAPL Thickness** (ft) | **One Casing Volume** (gallons) | **Screen Volume** (gallons) | **Above Screen Volume** (gal.) | **Total Purge Volume** (gal.) |
| – | 59.87 | 93.00 | 33.13 | – | N/A | N/A | N/A | N/A |

| | Gallons/Foot | | | |
|---|---|---|---|---|
| **Well Diameter** (inches) | 0.75 | (2) | 4 | 6 |
| *F* - **Gallons per foot of casing** | 0.02 | 0.16 | 0.65 | 1.47 |

**Field Equipment:** QED
**Purge Method:** Micropurge
**Well Condition:** Good

| Time | Flow Controller Settings | Volume Purged (Liters) | Flow Rate (mL/min) | Water Level (ft-bmp) | Temperature (°C) [+/- 10%] | Conductivity (mS/cm) [+/- 10%] | Dissolved Oxygen (mg/L) [+/- 10%] | pH [+/- 0.1 pH] | ORP (mV) [+/- 10%] | Turbidity (NTU) [+/- 10%] | Observations |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1305 | 10/5s @ 140psi | – | 200 | 59.87 | 23.37 | 2.80 | 1.89 | 6.77 | -125 | 59.5 | colorless |
| 1308 | | 600 | | 59.92 | 22.51 | 3.13 | 0.71 | 6.39 | -155 | 55.7 | " |
| 1311 | | 1200 | | 59.91 | 22.43 | 3.17 | 0.59 | 6.37 | -164 | 52.4 | " |
| 1314 | | 1800 | | 59.95 | 22.40 | 3.18 | 0.37 | 6.36 | -169 | 45.4 | " |
| 1317 | | 2400 | | 59.94 | 22.43 | 3.19 | 0.29 | 6.37 | -172 | 40.6 | " |
| 1320 | | 3000 | | 59.92 | 22.45 | 3.21 | 0.28 | 6.37 | -174 | 33.8 | |
| 1323 | | 3600 | | 59.93 | 22.46 | 3.20 | 0.27 | 6.37 | -175 | 29.7 | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

| Purge Start Time | Purge End Time | Average Flow (mL/min) | Total Volume Purged (Liters) | Total Casing Volumes Purged | 80% Recovery Water Level Depth (Dx0.20) + B | Water Level at Sampling Time (ft bmp) | Sample Collection Time | Sample Identification |
|---|---|---|---|---|---|---|---|---|
| 1305 | 1323 | 200 | 3.6 | N/A | NA | 59.93 | 1323 | AW0075UB_WG20080422_01 |

**Notes:** (units) [stabilization criteria] Ferrous Iron 1.37 PID 2.9 ppm

**DUP:** " " _02
**DRUM NO:**

AVOCET ENVIRONMENTAL, INC.



# GROUNDWATER SAMPLING DATA SHEET

| | | | |
|---|---|---|---|
| **Project Name:** | BCRE Former C-6 Facility | **Date:** | 4/22/08 |
| **Project No.:** | 1155.006 | **Prepared by:** | BCB |
| **Well Identification:** | AW0076UB | **Weather:** | Clear / Warm |
| **Measurement Point Description:** | TOC-N | **Pump Intake:** | COS |
| | | **Screen:** | |

| A | B | C | D = C - B | E = B - A | G = D x F | H = «ScrenLength» x F | I = (top screen-B) x F | |
|---|---|---|---|---|---|---|---|---|
| **Depth to LNAPL** (ft-bmp) | **Depth to Static Water Level** (ft-bmp) | **Well Total Depth** (ft-bmp) | **Water Column Height** (ft) | **LNAPL Thickness** (ft) | **One Casing Volume** (gallons) | **Screen Volume** (gallons) | **Above Screen Volume** (gal.) | **Total Purge Volume** (gal.) |
| — | 59.34 | 92.00 | 32.66 | — | N/A | N/A | N/A | N/A |

| | Gallons/Foot | | | |
|---|---|---|---|---|
| **Well Diameter** (inches) | 0.75 | 2 | 4 | 6 |
| *F* - **Gallons per foot of casing** | 0.02 | 0.16 | 0.65 | 1.47 |

**Field Equipment:** QED
**Purge Method:** Micropurge
**Well Condition:** Good

| Time | Flow Controller Settings | Volume Purged (Liters) | Flow Rate (mL/min) | Water Level (ft-bmp) | Temperature (°C) [+/- 10%] | Conductivity (mS/cm) [+/- 10%] | Dissolved Oxygen (mg/L) [+/- 10%] | pH [+/- 0.1 pH] | ORP (mV) [+/- 10%] | Turbidity (NTU) [+/- 10%] | Observations |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1229 | 10/5s @ 140psi | — | 200 | 59.34 | 23.18 | 3.23 | 3.07 | 6.67 | -113 | 92.9 | cloudy |
| 1232 | ↓ | 600 | ↓ | 60.35 | 22.28 | 3.19 | 1.27 | 6.44 | -145 | 50.4 | " |
| 1235 | | 1200 | | 60.38 | 22.23 | 3.16 | 0.73 | 6.42 | -157 | 45.7 | " |
| 1238 | | 1800 | | 60.41 | 22.17 | 3.17 | 0.42 | 6.41 | -165 | 20.1 | colorless |
| 1241 | | 2400 | | 60.40 | 22.11 | 3.21 | 0.35 | 6.41 | -167 | 14.7 | " |
| 1244 | | 3000 | | 60.40 | 22.04 | 3.25 | 0.32 | 6.40 | -169 | 10.16 | " |
| 1247 | | 3600 | | 60.40 | 22.11 | 3.30 | 0.31 | 6.41 | -169 | 7.32 | " |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

| Purge Start Time | Purge End Time | Average Flow (mL/min) | Total Volume Purged (Liters) | Total Casing Volumes Purged | 80% Recovery Water Level Depth (Dx0.20) + B | Water Level at Sampling Time (ft bmp) | Sample Collection Time | Sample Identification |
|---|---|---|---|---|---|---|---|---|
| 1229 | 1247 | 200 | 3.6 | N/A | NA | 60.40 | 1247 | AW0076UB_WG20080422_01 |

**Notes:** (units) [stabilization criteria]

Ferrous Iron 1.49

PID 5.3 ppm

**DUP:**
**DRUM NO:**

AVOCET ENVIRONMENTAL, INC.

# QA/QC SAMPLE IDENTIFICATION FORM

**Project Name:** BCRE Former C-6 Facility

**Project No.:** 1155.006

| Date | Time | QA/QC Sample Type (Duplicate, Field Blank, Equipment Blank, Split) | Sample ID | Sample Location | Primary Sample Reference | Analytical Methods | Organic-Free Water Source | Field Personnel | Comments |
|---|---|---|---|---|---|---|---|---|---|
| 4/22/08 | 13:23 | Dupl. | AW0075UB_WG20080422_ | 02 | | VOC 8260B | NA | BCB | |
| | | | ↳ | C6 | AW0075UB_WG20080422_01 | | | | |
| 4/22/8 | – | Travel Blank | TB_AV020080422_ | 01/C6 | – | VOCs 8260B | Test America | BCB | |

S:\Projects\1146 Boeing C-1\005_Ground Water Monitoring\Field Forms\[QAQC Sample ID Form.xls]Sheet1

AVOCET ENVIRONMENTAL, INC.

# INSTRUMENT CALIBRATION SHEET

| Project Name: BCRE Former C-6 Facility | Project #: 1155.006 |
|---|---|

| Date | Time | Instrument Type | Instrument Serial No. | Calibration Method | Calibrated by | Remarks |
|---|---|---|---|---|---|---|
| 4/21/08 | 1430 | QED MP20 | MP20-1585 | pH | C.J. | |
| 4/22/08 | 0730 | QED MP20 | MP20-1585 | D.O. | BCB | |

S:\Projects\1146 Boeing C-1\005_Ground Water Monitoring\Field Forms\[Instrument Calibration Sheet.xls]Sheet1

AVOCET ENVIRONMENTAL, INC.

# Groundwater Monitoring Well Gauging Sheet

**Project Name:** Boeing C-6 April 2008 Gauging Even **Project Manager:** Michael Rendina **Project No.:** 1155.006

**Location:** Torrance, CA **Field Personnel:** Brian Barsumian **Date:** 4/22/2008

**Field Conditions:**

| Well ID | Previous Measurement Date | Previous Depth to Water | Date | Time | Well Diameter | PID (ppm) | Measurement Point | Depth to Water | Depth to Water #2 | Total Depth | Comments/Well Conditon |
|---|---|---|---|---|---|---|---|---|---|---|---|
| AW0066UB | Mar-08 | 59.79 | 4/22/2008 | - | 2 | 27.1 | TOC-N | 59.37 | 59.37 | - | |
| AW0067UB | Mar-08 | 59.81 | 4/22/2008 | - | 2 | 0 | TOC-N | 58.94 | 58.94 | - | |
| AW0064UB | Mar-08 | 58.96 | 4/22/2008 | - | 4 | 0.1 | TOC-N | 58.87 | 58.87 | - | |
| AW0065UB | Mar-08 | 59.39 | 4/22/2008 | - | 2 | 19.3 | TOC-N | 59.29 | 59.29 | - | |
| WCC_06S | Mar-08 | 59.46 | 4/22/2008 | - | 4 | 0.2 | TOC-N | 59.39 | 59.39 | - | |
| AW0074UB | Mar-08 | 59.44 | 4/22/2008 | - | 2 | 2.7 | TOC-N | 59.35 | 59.35 | - | |
| AW0075UB | Mar-08 | 59.99 | 4/22/2008 | 13:05 | 2 | 2.9 | TOC-N | 59.87 | 59.87 | 93 | |
| AW0076UB | Mar-08 | 61.54 | 4/22/2008 | 12:29 | 2 | 5.3 | TOC-N | 59.34 | 59.34 | 92 | |
| AW0077UB | Mar-08 | 60.61 | 4/22/2008 | 8:20 | 2 | 24.7 | TOC-N | 60.57 | 60.57 | 86 | |
| EWB002 | Mar-08 | 60.4 | 4/22/2008 | 10:31 | 4 | 4.1 | TOC-N | 60.31 | 60.31 | 90 | |
| AW0073C | Mar-08 | 60.12 | 4/22/2008 | 9:36 | 2 | 2.2 | TOC-N | 60.04 | 60.04 | 117 | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
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