



# California Regional Water Quality Control Board

## Los Angeles Region



Linda S. Adams  
Cal/EPA Secretary

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Arnold Schwarzenegger  
Governor

August 22, 2008

Mr. Robert Scott  
Boeing Corporate Real Estate  
4501 Conant Street  
Long Beach, CA 90808

**APPROVAL OF REVISED MONITORING AND REPORTING PROGRAM CI-9310, 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)**

Dear Mr. Scott:

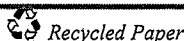
We have received the "Revised Monitoring and Reporting Program No. CI-9310" dated July 7, 2008, and "Revised Monitoring and Reporting Program No. CI-9310 (Revision No. 3)" (Letters) dated August 6, 2008, both Letters prepared by CDM. On August 9, 2007, an Individual Waste Discharge Requirements (WDR) permit was granted to Boeing Realty Corporation (Boeing) to inject electron donor amendment and bioaugmentation culture, which involves the addition of selected non-pathogenic (naturally derived, not genetically engineered) chlorinated ethene-degrading *Dehalococcoides ethenogenes* culture (referred to as Shaw's SDC-9™ culture, or SiREM's KB-1™) in select areas to facilitate reductive dechlorination of chlorinated volatile organic compounds, with groundwater extraction to remediate shallow groundwater underlying the former Building 1/36 source area. This approach is referred to as Biorecirculation.

Since the permit was issued, bioremediation injections have been initiated in the former Building 1/36 area and former Building 2 C-Sand wells, and monitoring and sampling have been conducted pursuant to the revised Monitoring and Reporting Program (MRP) CI-9310, dated February 15, 2008. The Letters propose changes to the revised MRP due to the delay in completing the bioremediation amendment injections in the existing C-Sand wells at the Building 2 area and based on the results of the MRP data collected to date. The proposed changes include minor modifications to the MRP so that monitoring and reporting are performed concurrently with routine groundwater sampling events (where feasible). No changes are proposed to the total number of sampling events. We have reviewed the Letters and the following outlines the proposed changes to the MRP:

**FORMER BUILDING 1/36 AREA**

1. The 2008 3<sup>rd</sup> and 4<sup>th</sup> quarter sampling events (reporting period for July – December 2008) are proposed to be shifted by 1 month. The August 2008 event will be shifted to September 2008 to be performed concurrently with the routine semiannual site-wide groundwater monitoring event and the November 2008 event will be shifted to December 2008.
2. The 2009 1<sup>st</sup> semiannual sampling event (reporting period for January – June 2009) are proposed to be shifted from May 2009 to March 2009 to be performed concurrently with the routine annual site-wide groundwater monitoring event.

**California Environmental Protection Agency**



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3. The 2009 2<sup>nd</sup> semiannual sampling event (reporting period for July – December 2009) is proposed to be shifted from November 2009 to September 2009 to be performed concurrently with the routine semiannual site-wide groundwater monitoring event.
4. Based on the June 2008 MRP results, the data shows that effects from the pilot test are showing up in the Group D well AW0055UB, which had been identified as the upgradient well in the MRP. After further review, this well should not have been chosen as an upgradient well due to its proximity (approximately 70 feet from the active injection wells) to the treatment area. Based on the data collected, the Letter proposes to use existing groundwater monitoring well MWB006 as the new upgradient (Group D) well. Well MWB006 is further upgradient onsite from AW0055UB and outside of the treatment zone (approximately 250 feet). Therefore, well MWB006 is not anticipated to be impacted by the treatment zone. Well AW0055UB is proposed to be changed to a Group B1 performance monitoring well.

#### **FORMER BUILDING 2 AREA**

1. Since the injections were completed in early July 2008, the first round of performance sampling (Month 1) was shifted from June 2008 to August 2008, therefore, Month 3 (August 2008), Month 6 (November 2008), Month 9 (February 2009), and Month 12 (May 2009) sampling events are all proposed to be shifted by 1 month to be completed as Month 2 (September 2008), Month 5 (December 2008), Month 8 (March 2009) and Month 11 (June 2009) sampling events, respectively. These sampling events will be performed concurrently with the routine semiannual and annual site-wide groundwater monitoring events and the Building 1/36 WDR sampling events.
2. The Building 2 semiannual reporting dates are proposed to be shifted to January and July of each year to coincide with the reporting dates for Building 1/36 WDR reports. This will allow for the submittal of one report documenting the combined activities of both areas.
3. The sampling events for the 2<sup>nd</sup> post-injection year (reporting period for July 2009 – June 2010) are proposed to be shifted from November 2009 to September 2009 to be performed concurrently with the final Building 1/36 WDR sampling event and the routine semiannual site-wide groundwater monitoring event, and from May 2010 to March 2010 for the final Building 2 sampling event to be performed concurrently with the routine annual site-wide groundwater monitoring event.

Section 13263 (e) of the California Water Code provides that all Requirements shall be reviewed periodically and, upon such review, may be revised by the Regional Board. Regional Board staff has reviewed the information provided and concurs with Boeing's proposal to revise the MRP to include all of the above referenced changes to the MRP. Attached please find Revised Monitoring and Reporting Program CI-9310 dated August 15, 2008, which supersedes the revised Monitoring and Reporting Program dated February 15, 2008. This new revised monitoring and reporting program includes the changes made to the Building 1/36 area groundwater monitoring program and the Building 2 area groundwater monitoring program including the sampling schedule, reporting frequency and figures.

Mr. Scott  
Boeing Corporate Real Estate

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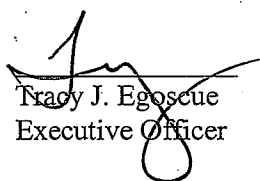
August 22, 2008

The Revised Monitoring and Reporting Program requires you to implement the monitoring program on the effective date of this Order. All monitoring reports should be sent to the Regional Board, ATTN: INFORMATION TECHNOLOGY UNIT.

When submitting monitoring or technical reports to the Regional Board per these requirements, please include a reference to **Compliance File No. CI-9310** and **Order No. R4-2007-0040**, which will assure that the reports are directed to the appropriate file and staff. Please do not combine your discharge monitoring reports with other reports. Submit each type of report as a separate document.

**Please call Ms. Ana Townsend at (213) 576-6738, or Ms. Su Han at (213) 576-6735 if you have any questions.**


Sincerely,

  
Tracy J. Egoscue  
Executive Officer

Attachment: Revised Monitoring and Reporting Program CI-9310, dated August 15, 2008

cc: Jeffrey Dhont, United States Environmental Protection Agency, Region 9  
Kurt Souza, State Department of Health Services, Drinking Water Field Operations Branch  
Brian Hooper, Los Angeles County Department of Public Works, Waste Management Division  
Carl G. Brooks, South Coast Air Quality Management District  
Mark Stuart, California Department of Water Resources, Watermaster, Central Basin,  
Ted Johnson, Water Replenishment District of Southern California  
Cheryl Ross, West Basin Municipal Water District  
Los Angeles County Department of Health Services, Environmental Health  
Alex P. Carlos, Regional Water Quality Control Board, Region 4  
Ravi Subramanian, CDM  
Joseph Weidmann, Haley & Aldrich

**California Environmental Protection Agency**

 Recycled Paper

*Our mission is to preserve and enhance the quality of California's water resources for the benefit of present and future generations.*

**STATE OF CALIFORNIA  
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
LOS ANGELES REGION**

**MONITORING AND REPORTING PROGRAM NO. CI-9310  
FOR  
BOEING CORPORATE REAL ESTATE  
(formerly BOEING REALTY CORPORATION)  
FORMER C-6 FACILITY**

**FILE NO. 95-036**

The Discharger shall implement this monitoring and reporting program on the effective date of this Order.

**I. GROUNDWATER MONITORING PROGRAM**

The former Building 1/36 biorecirculation pilot test was initiated in the First quarter of 2008 and, former Building 2 periodic slug injections were conducted in the Second and Third quarter of 2008. The following groundwater wells and amendment points will be included in the sampling program:

**Former Building 1/36 Biorecirculation Pilot Test**

Group A

Group A1: AW0066UB and AW0067UB

Group A2: AW0064UB and AW0065UB

Group B

Group B1: AW0075UB, AW0076UB, AW0077UB, EWB002, AW0055UB, and AW0073C

Group B2: WCC\_06S and AW0074UB

Group C: TMW\_07 and WCC\_12S

Group D: MWB006

Note: AW0055UB was replaced by MWB006 as the Group D well and added as a Group B1 well in August 2008. As a result, AW0055UB and MWB006 meet many of the monitoring requirements listed below prior to August 2008, but not all.

**Former Building 2 Periodic Slug Injections**

Group A: IRZC001, and IRZC0003 through IRZC0020

Group B: CMW026, IRZCMW003, IRZCMW002 and MWC024

Group C: CMW002

Group D: IRZCMW001

Figure 1 shows the location of the Site. Groundwater well and amendment point locations at the Site that will be used for the Building 1/36 pilot test are shown on attached Figure 2 and for the Building 2 periodic slug injections on attached Figures 3 and 4. Group A sampling points, for both areas, are amendment points where donor will be introduced. Due to the lower than

anticipated flow from extraction well EWB001, Group A1 sampling points are amendment points where donor is planned to be introduced initially. Group A2 sampling points are backup amendment points where donor could be introduced in the event of higher flow from EWB001 or from the contingency extraction well WCC\_06S or the addition of another extraction well (to be decided based on evaluation of system operation). Group B wells, for both areas, consist of monitoring wells that are located within the treatment zone, which will be used to evaluate electron donor consumption and distribution and the effectiveness of the biologically active zones over time. For the Building 1/36 pilot test, all Group A and B wells will be used for performance monitoring purposes as follows:

- When donor is introduced in Group A1 wells, only Group B1 wells will be monitored per the table below.
- When donor is introduced in Group A1 and Group A2 wells, then all Group B wells (B1 and B2) will be monitored per the table below.

For the Building 2 periodic slug injections, only Group B wells will be used for performance monitoring purposes, as Group A wells are not exposed to surface and therefore are not accessible for sampling. The Group C sampling points are downgradient sample locations, and Group D points are upgradient sample locations, for both areas.

Baseline sampling will take place prior to injection and will include at least one event for the Building 1/36 pilot test and the Building 2 periodic slug injections. The samples will be analyzed for field parameters (oxidation-reduction potential [ORP], dissolved oxygen [DO], pH, specific conductance, temperature, turbidity and groundwater elevation), chlorinated volatile organic compounds (VOCs), dissolved hydrocarbon gases (methane, ethane, and ethene), total organic carbon (TOC), volatile fatty acids (VFAs), alkalinity, ferrous iron by field kit, anions (sulfate and chlorides), and bacterial DNA analysis by Quantitative Polymerase Chain Reaction test (qPCR). If a tracer test is conducted, samples will be analyzed for bromide too.

The required constituents to be analyzed and the monitoring schedule for each sample group for the Building 1/36 pilot test and periodic slug injections at Building 2 are shown below.

CONSTITUENT	UNITS	TYPE OF SAMPLE	MINIMUM FREQUENCY OF ANALYSIS – BUILDING 1/36 PILOT TEST	MINIMUM FREQUENCY OF ANALYSIS – BUILDING 2 SLUG INJECTIONS
Total Daily Injections	Liters or Gallons	Measurement	Per injection	Per injection
Groundwater Elevation	Feet below ground surface (bgs)	In situ	<b>Groups A1 and B1 OR A and B:</b> Baseline, monthly following injection for first six months, quarterly for rest of Year 1 <b>Groups C and D:</b> Baseline and quarterly for Year 1 <b>Groups A1 (or A)-D:</b> Semi-annually after Year 1	<b>Group B:</b> Baseline, Month 1 and Month 2 following injection, quarterly for rest of Year 1 <b>Groups C and D:</b> Baseline and quarterly for Year 1 <b>Groups B-D:</b> Semi-annually after Year 1
Field Parameters (DO, ORP, pH, Temperature, Specific Conductance, and Turbidity)	mg/l, millivolts, pH units, degrees C, μS/cm, and NTU, respectively	Grab	<b>Group A1 OR A:</b> Baseline and quarterly post injection for Year 1 <b>Group B1 OR B:</b> Baseline, monthly following injection for first six months, quarterly for rest of Year 1 <b>Groups C and D:</b> Baseline and quarterly for Year 1 <b>Groups A1 (or A)-D:</b> Semi-annually after Year 1	<b>Group B:</b> Baseline, Month 1 and Month 2 following injection, quarterly for rest of Year 1 <b>Groups C and D:</b> Baseline and quarterly for Year 1 <b>Group B-D:</b> Semi-annually after Year 1

Chlorinated Volatile Organic Compounds (EPA Method 8260B)	µg/l	Grab	<b>Group A1 OR A:</b> Baseline and quarterly post injection for Year 1 <b>Group B1 OR B:</b> Baseline, monthly following injection for first six months, quarterly for rest of Year 1 <b>Groups C and D:</b> Baseline and quarterly for Year 1 <b>Groups A1 (or A)-D:</b> Semi-annually after Year 1	<b>Group B:</b> Baseline, Month 1 and Month 2 following injection, quarterly for rest of Year 1 <b>Groups C and D:</b> Baseline and quarterly for Year 1 <b>Groups B-D:</b> Semi-annually after Year 1
Total Organic Carbon (EPA Method 9060 Modified or equal)	mg/l	Grab	<b>Group A1 OR A:</b> Baseline and quarterly post injection for Year 1 <b>Group B1 OR B:</b> Baseline, monthly following injection for first six months, quarterly for rest of Year 1 <b>Groups C and D:</b> Baseline and quarterly for Year 1 <b>Groups A1 (or A)-D:</b> Semi-annually after Year 1	<b>Group B:</b> Baseline, Month 1 and Month 2 following injection, quarterly for rest of Year 1 <b>Groups C and D:</b> Baseline and quarterly for Year 1 <b>Group B-D:</b> Semi-annually after Year 1
Volatile Fatty Acids	mg/l	Grab	<b>Group A1 OR A:</b> Baseline and quarterly post injection for Year 1 <b>Group B1 OR B:</b> Baseline, monthly following injection for first six months, quarterly for rest of Year 1 <b>Groups C and D:</b> Baseline and quarterly for Year 1 <b>Groups A and B:</b> No analysis for Year 2 <b>Groups C and D:</b> Semi-annually after Year 1	<b>Group B:</b> Baseline, Month 1 and Month 2 following injection, quarterly for rest of Year 1 <b>Groups C and D:</b> Baseline and quarterly for Year 1 <b>Group B:</b> No analysis for Year 2 unless additional injections are conducted <b>Groups C and D:</b> Semi-annually after Year 1
<i>Dehalococcoides</i> spp. strains (Quantitative Polymerase Chain Reaction test [qPCR])	gene copies/mL	Grab	<b>Group A1 OR A:</b> Baseline and semi-annually post injection for Year 1 <b>Group B1 OR B:</b> Baseline, quarterly following injection for first six months, semi-annually for rest of Year 1 <b>Groups C and D:</b> Baseline and Semiannually for Year 1 <b>Groups A and B:</b> No analysis for Year 2 <b>Groups C and D:</b> Semi-annually after Year 1	<b>Group B:</b> Baseline, Month 1 and Month 2 following injection, quarterly for rest of Year 1 <b>Groups C and D:</b> Baseline and semi-annually for Year 1 <b>Group B:</b> No analysis for Year 2 unless additional injections are conducted <b>Groups C and D:</b> Semi-annually after Year 1
Dissolved Metals (Ferrous Iron by field kit), Alkalinity, and Anions (sulfate, nitrate, nitrite and chlorides)	mg/l	Grab	<b>Group A1 OR A:</b> Baseline and quarterly post injection for Year 1 <b>Group B1 OR B:</b> Baseline, monthly following injection for first six months, and quarterly for rest of Year 1 <b>Groups C and D:</b> Baseline and quarterly for rest of Year 1 <b>Groups A and B:</b> No analysis for Year 2 <b>Groups C and D:</b> Semi-annually only for chlorides after Year 1	<b>Group B:</b> Baseline, Month 1 and Month 2 following injection, quarterly for rest of Year 1 <b>Groups C and D:</b> Baseline and quarterly for Year 1 <b>Group B:</b> No analysis for Year 2 unless additional injections are conducted <b>Groups C and D:</b> Semi-annually only for chlorides after Year 1
Total Dissolved Solids (TDS)	mg/l	Grab	<b>Groups C and D:</b> Quarterly following injection for Year 1, semi-annually after Year 1	<b>Groups C and D:</b> Baseline, quarterly following injection for Year 1, semi-annually after Year 1
Dissolved Hydrocarbon Gases (ethane, ethane, and methane)	mg/l	Grab	<b>Group A1 OR A:</b> Baseline and quarterly post injection for Year 1 <b>Group B1 OR B:</b> Baseline, monthly following injection for first six months, and quarterly for rest of Year 1 <b>Groups C and D:</b> Baseline and quarterly for rest of Year 1 <b>Groups A1 (or A)-D:</b> Semi-annually after Year 1	<b>Group B:</b> Baseline, Month 1 and Month 2 following injection, quarterly for rest of Year 1 <b>Groups C and D:</b> Baseline and quarterly for Year 1 <b>Groups B-D:</b> Semi-annually after Year 1

All groundwater monitoring reports must include, at minimum, the following:

- a. Well identification, date and time of sampling;
- b. Sampler identification, and laboratory identification; and
- c. Semi-annual observation of groundwater levels, recorded to 0.01 feet mean sea level and groundwater flow direction.

## II. AMENDMENT INJECTION MONITORING REQUIREMENTS

The reports shall contain the following information regarding injection activities:

1. Depth of injection points;
2. Quantity of amendment injected and dates injected; and
3. Total amount of amendment injected.

## III. REPORTING REQUIREMENTS

The first monitoring report for Building 1/36 pilot test under this Program was due July 30, 2007. The first monitoring report for Building 2 periodic slug injections under this Program was due by July 30, 2008. This monitoring and reporting program supercedes previous requirements stated in work plan approval letters. The monitoring and reporting program provided herein for Building 2 periodic slug injections is based on the fact that the first round of injections were completed in July 2008. Any future changes will be provided in a revised monitoring and reporting program.

The Discharger is required to submit a final report including baseline and donor injection data, plus quarterly and semi-annual reports (as provided below) for the duration of the Building 1/36 pilot test and Building 2 periodic slug injections. If necessary, semi-annual monitoring reports will be submitted for each additional year beyond the base duration. The groundwater monitoring wells and amendment points will be gauged and sampled, and results will be reported to the Regional Water Quality Control Board (Regional Board) under this Monitoring and Reporting Program according to the following schedules:

### Building 1/36 Pilot Test

Reporting Period	Sampling Month(s)	Report Due Date
April – June 2007	May and June 2007 (Baseline Events)	July 30, 2007
July – September 2007	None (No injections performed)	October 30, 2007
October – December 2007	December 2007 (2nd Baseline Event for EWB002)	January 30, 2008
January – March 2008	January*, February, and March 2008	April 30, 2008
April – June 2008	April, May, and June 2008	July 30, 2008
July – December 2008	September and December 2008	January 30, 2009
January – June 2009	March 2009	July 30, 2009
July – December 2009	September 2009	January 30, 2010

\* - Building 1/36 pilot test was started up on December 17, 2007. The first monthly sampling event associated with the pilot test was performed in January 2008.

**Building 2 Periodic Slug Injections**

Reporting Period	Sampling Month(s)	Report Due Date
January – June 2008	March or April 2008 (Baseline Event)	July 30, 2008
July – December 2008	August 2008 (Month 1)* September 2008 (Month 2) December 2008	January 30, 2009
January – June 2009	March 2009 June 2009	July 30, 2009
July – December 2009	September 2009	January 30, 2010
January – June 2010	March 2010	July 30, 2010

\* - The Building 2 injections were completed in July 2008. The first monthly sampling event associated with the injections will be performed in August 2008.

The Discharger shall submit Reports detailing the results of the Building 1/36 pilot test and Building 2 periodic slug injections. Where the reporting deadlines for Building 1/36 and 2 falls on the same dates, one single report combining the activities at both areas should be submitted. The reports should include an evaluation of the effectiveness of using the amendment solution to remediate VOC-contaminated groundwater at the Site, the impact of any by-products on the receiving groundwater quality, and any other effects the *in-situ* treatment may have. The Discharger is required to submit the following reports pursuant to their respective due dates:

**Building 1/36 Pilot Test**

Report	Due Dates
Final Report	January 30, 2010

**Building 2 Periodic Slug Injections**

Report	Due Dates
Final Report	July 30, 2010

If there is no discharge or injection during any reporting period, the report shall so state. Monitoring reports must be addressed to the Regional Board, Attention: Information Technology Unit.

Whenever wastes associated with the discharge under this Order are transported to a different disposal site, the following shall be reported in the monitoring report: type and quantity of wastes; name and address of the hauler (or method of transport if other than by hauling); and location of the final point(s) of disposal and copies of waste manifest.



#### IV. CERTIFICATION STATEMENT

Each report shall contain the following completed declaration:

"I certify under penalty of law that this document, including all attachments and supplemental information, was prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of a fine and imprisonment.

Executed on the \_\_\_\_ day of \_\_\_\_\_ at \_\_\_\_\_.

\_\_\_\_\_  
(Signature)


\_\_\_\_\_  
(Title)"

#### V. MONITORING FREQUENCIES

Specifications in this monitoring program are subject to periodic revisions. Monitoring requirements may be modified or revised by the Executive Officer based on review of monitoring data submitted pursuant to this Order. Monitoring frequencies may be adjusted to a less frequent basis or parameters and locations dropped by the Executive Officer if the Discharger makes a request and the request is backed by statistical trends of monitoring data submitted.

These records and reports are public documents and shall be made available for inspection during normal business hours at the office of the California Regional Water Quality Control Board, Los Angeles Region.

Ordered by:

  
\_\_\_\_\_  
Tracy J. Egoscue  
Executive Officer

Date: August 22, 2008



January 21, 2008

Boeing Corporate Real Estate  
Former C-6 Facility

**Site Vicinity Map**



**Legend**

 Former C-6 Facility

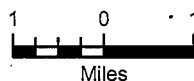
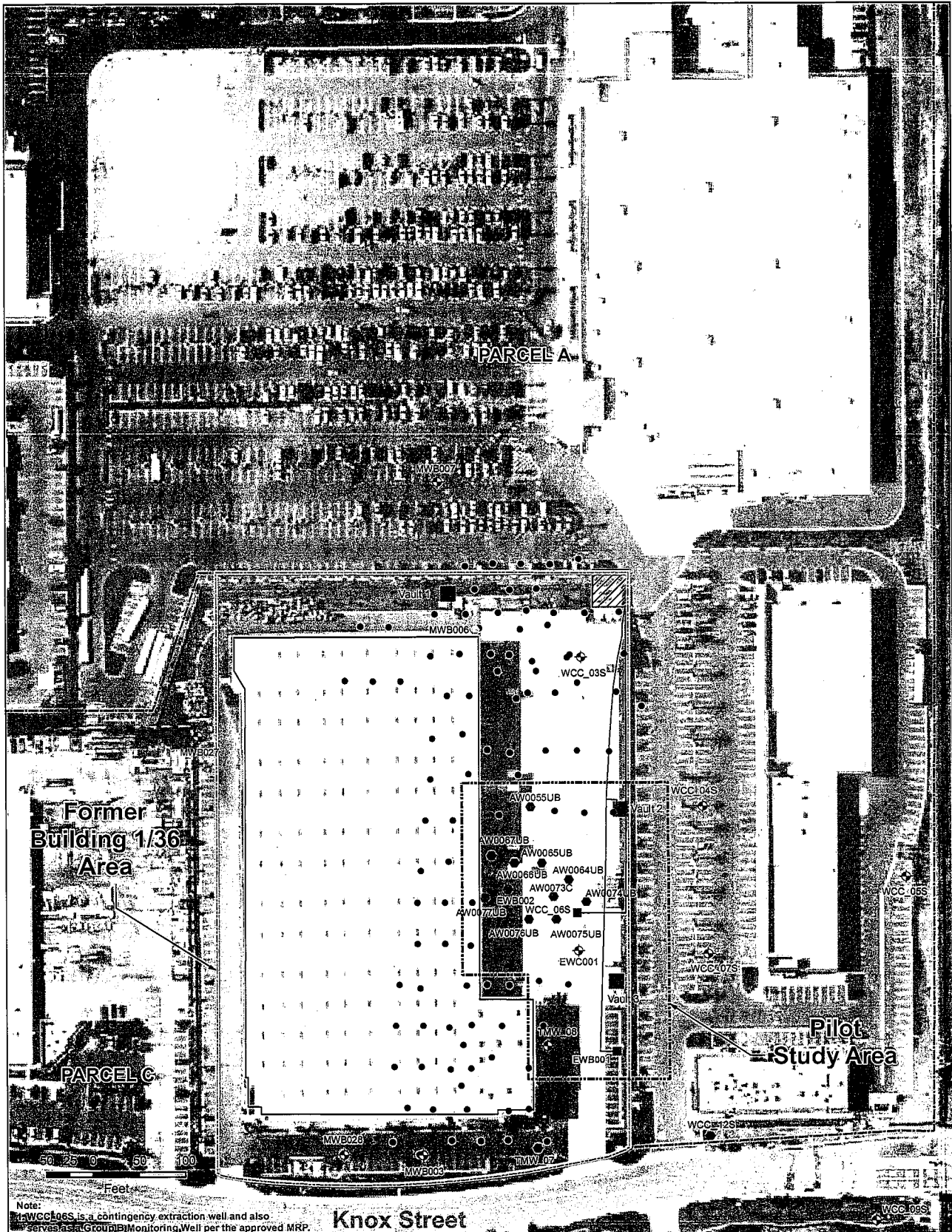


Figure 1



Note: WCC\_06S is a contingency extraction well and also serves as a Group B Monitoring Well per the approved MRP.

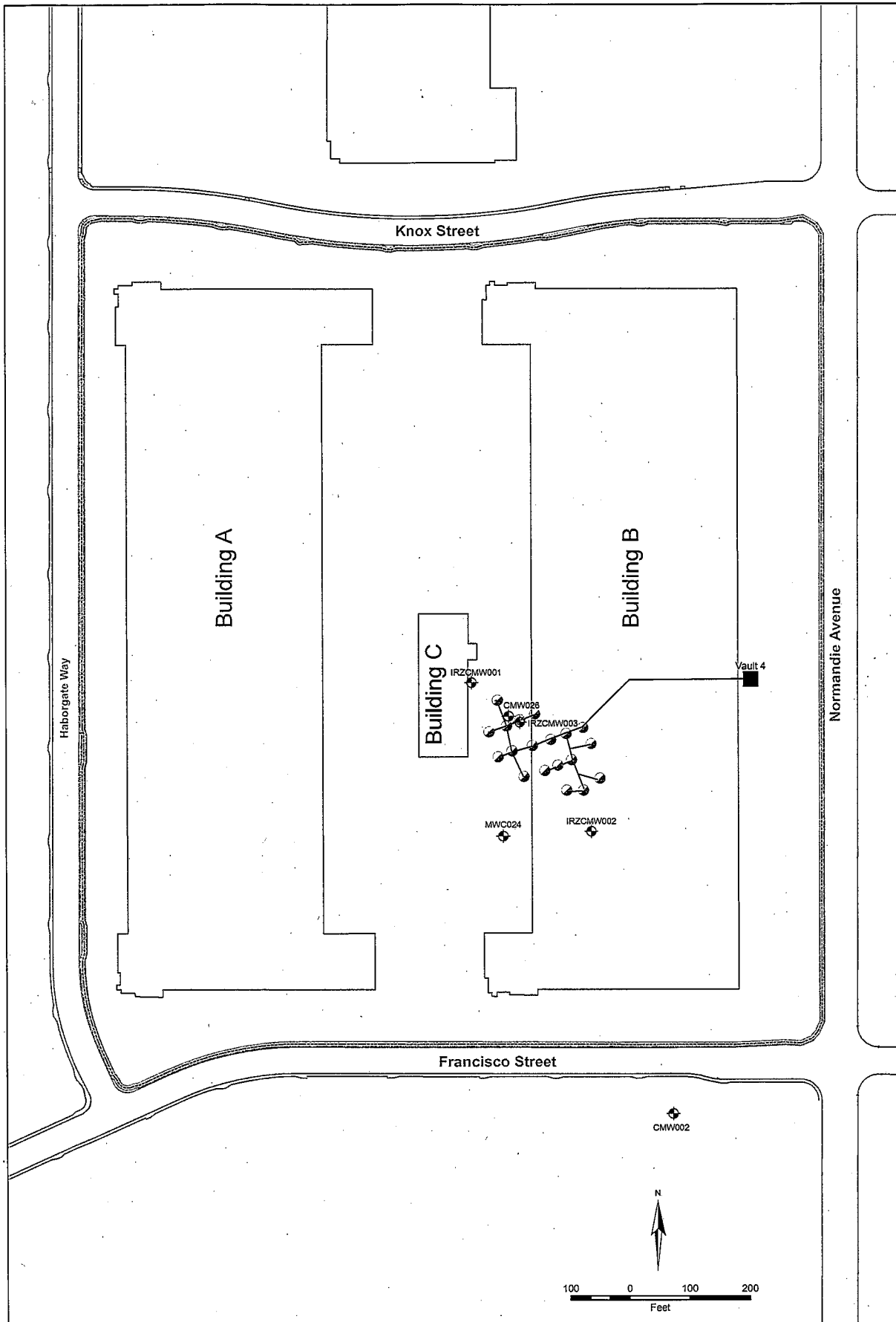
July 30, 2008



- Legend**
- Parcel Boundary
  - Site Boundary
  - Pilot Study Area
  - Existing Underground Conveyance and Electrical Conduit Line
  - Existing Aboveground Conveyance and Electrical Conduit Line
  - B-Sand Amendment Wells

- B-Sand Extraction Well
- ◆ B-Sand Monitoring Well
- ◆ C-Sand Monitoring Well
- Group B Monitoring Well ((6) Upper B-Sand and (1) C-Sand)
- Group A Amendment Well (Upper B-Sand), B-Sand
- Group C Downgradient Well (B-Sand), B-Sand
- Group D Upgradient Well, B-Sand

**Figure 2**  
Boeing Corporate Real Estate  
Former C-6 Facility  
Well Layout  
Pilot Biorecirculation Test  
Former Building 1/36



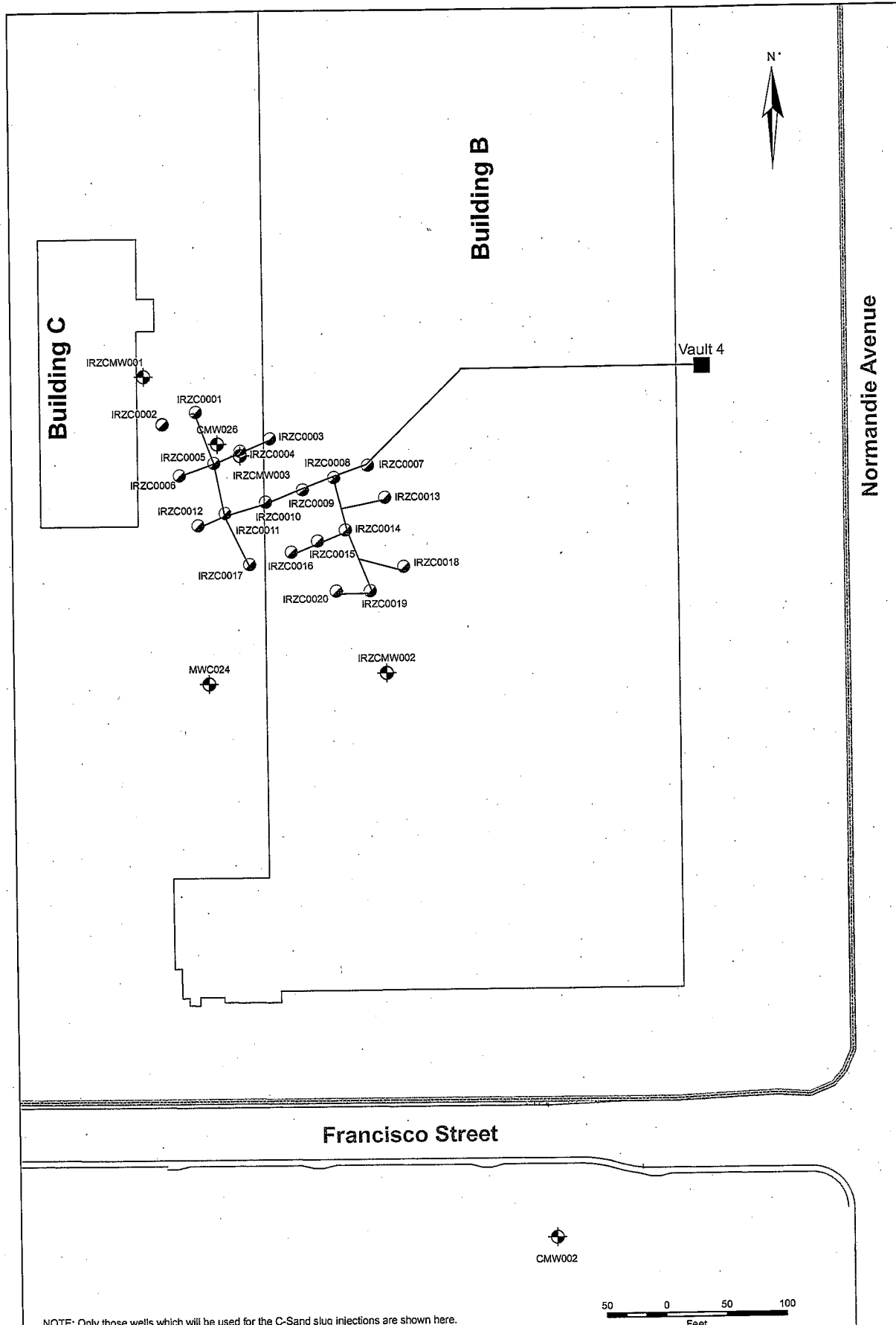
January 13, 2008

**Legend**

- Vault
- ◆ Existing C-Sand Monitoring Well
- Existing C-Sand Injection Wells
- Underground Pipeline
- Site Boundary



**Figure 3**  
 Boeing Corporate Real Estate  
 Former C-6 Facility  
 Location Map  
 C-Sand Wells of Interest  
 Former Building 2



NOTE: Only those wells which will be used for the C-Sand slug injections are shown here.

January 13, 2007



**Legend**

- Site Boundary
- Underground Pipeline
- Vault

- C-Sand Amendment Wells (Abandoned)
- C-Sand Group A Wells (Amendment Injection)
- C-Sand Group B Wells (Treatment Zone Monitoring)
- C-Sand Group C Wells (Downgradient Monitoring)
- C-Sand Group D Wells (Upgradient Monitoring)

**Figure 4**  
Boeing Corporate Real Estate  
Former C-8 Facility  
**Amendment and Monitoring Well Layout  
Proposed C-Sand Slug Injections at  
Vault 4 - Former Building 2**