ARCADIS
Infrastructure, environment, buildings

November 24, 2010 EM009358.0012.00002

Ms. Barbara Cook, P.E.
Acting Assistant Deputy Director, Cleanup Program
Site Mitigation Branch
c/o Lynn Nakashima
Department of Toxic Substances Control
700 Heinz Avenue, Suite 200
Berkeley, California 94710

Subject: Response to Department of Toxic Substances Control's Comments on the "Letter Work Plan to Evaluate Groundwater in Select Areas at the University of California Richmond Field Station, Richmond, California."

Dear Ms. Cook:

ARCADIS U.S. Inc., (ARCADIS) has prepared this letter on behalf of Zeneca Inc., regarding the University of California Richmond Field Station (UCRFS) located in Richmond, California ("the Site"). This letter provides the information requested by and addresses comments from the Department of Toxic Substances Control (DTSC) in a November 10, 2010 letter ("the DTSC Comment Letter") regarding the November 1, 2010 "Letter Work Plan to Evaluate Groundwater in Select Areas at the University of California Richmond Field Station, Richmond, California" ("the Work Plan"). The DTSC's comments are provided below followed by the response to each comment.

Responses to DTSC Comment Letter

DTSC COMMENT #1:

The Report proposes to construct the five monitoring wells using hollow stem auger methods. We suggest that the three wells to be completed within the BAPB be constructed using direct push methods and pre-packed well screens. The direct push method is expected to result in less disturbance of the barrier materials and the associated reduction of hydraulic conductivity.

RESPONSE:

Arcadis' discussions with drilling contractors and a Contra Costa County Environmental Health representative indicate that it is not feasible to install a 2 inch pre-packed monitoring well using a direct push drill rig. Contra Costa County requires a minimum 2 inch diameter annual seal around the well casing. The diameter of the drill rods available to a direct push rig will not create a large enough boring to meet this annual seal standard. In addition, a 2 inch pre-packed well cannot be advanced through a direct push rod because the inner diameter is too small. The

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only option would be to advance the boring and remove the drill rods prior to installing the wells. This poses a risk of the borehole collapsing prior to the installation or sealing of the pre-packed well.

DTSC COMMENT #2:

Consider the feasibility and cost of using a CPT/MIP rig to construct the wells completed in the BAPB and to identify the depth for grab sampling near the slurry wall.

RESPONSE:

A CPT rig does not have the capabilities to install the monitoring wells proposed in the Work Plan. Although a CPT rig may identify the lithology, it will not provide any additional information that could not be obtained by logging the soils during the installation. The use of MIP will also not provide any added benefit. The compounds that are detected by the MIP will not be beneficial in determining the screen intervals for the proposed wells, since these wells will be installed to monitor the water quality conditions upgradient, within, and downgradient the BAPB.

Although the CPT/MIP rig would be a feasible alternative to a direct push rig for the grab groundwater sample, this would not be cost effective for the collection of only one sample. The equipment costs for completing the investigation with a CPT/MIP rig are more than double the cost of using a direct push rig. If VOCs are detected in the groundwater below the slurry wall at significant concentrations, then a CPT/MIP rig may be considered if future investigations are deemed necessary.

DTSC COMMENT #3:

The location of the grab sample near the slurry wall should be moved about 180 feet south along the wall.

RESPONSE:

To address this comment, Figure 2 has been revised so that the location of the grab groundwater sample near the slurry wall has been moved approximately 180 feet south along the wall and the Work Plan will be implemented accordingly.

DTSC COMMENT #4:

Add oxidation-reduction potential (ORP) to the proposed suite of analyses.

RESPONSE:

To address this comment, the Monitoring Well Sampling section of the Work Plan has been revised to include the following statement:

"Oxidation-reduction potential (ORP) and pH will also be measured in the field immediately using a water-quality meter."

DTSCCOMMENT #5:

Provide a table of analytical methods including field measurements, sample volumes, containers, filtering requirements, and preservation methods.

RESPONSE:

To address this comment, Table 2 has been added to the Work Plan and contains a summary of the analytical methods, sample volumes, containers, preservatives, and field filtering requirements.

If you have any questions with regard to the response to comments discussed in this letter, please feel free to contact the undersigned at (510) 652-4500.

Sincerely,

ARCADIS U.S., Inc.

Ronald Goloubow, P.G. (8655)
Principal Geologist

Daren Roth
Project Geologist

Attachment 1: Revised Work Plan
cc: Mr. Doug Mosteller
Mr. Bill Marsh, Esq.
Mr. Anthony Garvin, University Counsel for UC
Mr. Nicholas Targ, Esq.
Mr. Karl Hans, UC

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Subject: Revised Letter Work Plan to Evaluate Groundwater in Select Areas at the University of California Richmond Field Station, Richmond, California

Dear Ms. Cook:

ARCADIS U.S., Inc. (ARCADIS) has prepared this Work Plan to evaluate groundwater in select areas at the University of California Richmond Field Station (UCRFS) located in Richmond, California ("the Site"; Figure 1). This letter has been prepared in accordance with the requirements of the Department of Toxic Substances Control (DTSC) Site Investigation and Remediation Order, Docket No. 06/07-004 ("DTSC Order") on behalf of Zeneca Inc. (Zeneca), a respondent to the DTSC Order[1]. The DTSC required that Zeneca submit this Work Plan in a letter dated September 16, 2010 ("the September 16, 2010 Letter").

Scope of Work

In accordance with this Work Plan, five groundwater monitoring wells will be installed at the UCRFS to evaluate the groundwater quality in the vicinity of the biologically active permeable barrier (BAPB) at the locations illustrated on Figure 2. Three groundwater wells (MW-34, MW-35, and MW-36) will be installed in a cluster perpendicular to the BAPB, one each at a location upgradient from, within, and downgradient from the BAPB, respectively. The upgradient and downgradient wells will be located approximately 10 feet from the well to be located within the BAPB. Two additional wells (MW-37 and MW-38) will be installed within the BAPB to the east and west of the well cluster at the approximate locations indicated on Figure 2. The location of the BABP will be determined in the field prior to installation of the monitoring wells using a GPS unit, and will be confirmed with a hand auger, hand digging (with a shovel), or advancing soil borings and identifying the BAPB material in a soil core.

Based on the analytical data from these newly installed monitoring wells, and data from samples collected by the UC at the RFS, additional well locations may be required by the DTSC to further evaluate groundwater in the vicinity of the BAPB.

[1] The Regents of the University of California (UC) is also a respondent to the DTSC Order.

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As required in the September 16, 2010 Letter, a single grab groundwater sample will be collected in the deeper groundwater zone west of the slurry wall that runs parallel to the UCRFS and the Campus Bay site boundary along South 46th Street. This grab groundwater sample will be collected from a temporary soil boring advanced approximately 25 feet west of the slurry wall (Figure 2).

Procedures

The field activities discussed in this Work Plan will be conducted in accordance with the procedures and methodologies set forth in the following documents prepared by LFR (now fully integrated and known as ARCADIS) and previously approved by the DTSC:

- "Lot 3 Field Sampling and Analysis Plan, Campus Bay Site, Former Zeneca, Inc., Richmond Facility, Richmond, California," dated November 2, 2005 ("the Lot 3 FSAP")
- "Revised Health and Safety Plan, Environmental and Associated Activities, Campus Bay Site, Former Zeneca, Inc., Richmond Facility, Richmond, California," dated January 7, 2008
- "Revised Quality Assurance Project Plan Approval, Former Zeneca Property, Campus Bay Site," dated July 18, 2005

The required scope of work is discussed below.

Pre-fieldwork Activities

Prior to implementing field activities, Underground Service Alert (USA) will be notified at least 48 hours in advance of mobilization to the field. A private utility locator will also be contracted to identify underground utilities at each monitoring well and grab groundwater location and attempt to locate the BAPB. In addition, ARCADIS will obtain the applicable county and state permits required for the work.

Monitoring Well Installation

The monitoring wells will be installed by a licensed drilling contractor using a limited-access hollow-stem-auger drill rig under the guidance of an ARCADIS California Professional Geologist. The drilling contractor will hand auger the first 5 feet of each boring location to verify that no utilities will be affected by the drilling. A soil boring will then be drilled using 8-inch hollow-stem augers. During drilling, a 4-foot continuous-core barrel will be used to collect a continuous soil core, as feasible. The soil core will be examined and the lithology will be logged by an ARCADIS field geologist using the Unified Soil Classification System (USCS). The soil boring will be advanced until the base of the BAPB is identified in the soil cores. The lithology will be documented onto field soil boring logs. Soil samples will be screened in the field using a photoionization detector (PID), and the measurements will be recorded onto the field soil boring logs.

At each location, a threaded 2-inch-diameter schedule 40 polyvinyl chloride (PVC) monitoring well will be constructed with 10 feet of PVC 0.010-inch slotted well screen installed from approximately 8 feet below ground surface (bgs) to 18 feet bgs. The bottom of the well screen will be set at the base of the BAPB. As the augers are removed, the annular space between the well and the formation will be filled with No. 2/12 sand to a depth of approximately 1 foot above the screened interval. An approximately 2-foot-thick layer of bentonite chips will be placed above the sand pack and hydrated to form a coherent seal. The remaining annular space above the bentonite will be filled with cement grout. A locking well cap will be placed on top of the well casing. The monitoring wells will be completed with a riser pipe extended approximately 3 feet above grade. A metal casing will be installed to protect the PVC riser pipe. The proposed monitoring well construction details are provided in Table 1 and are based on the construction details for existing BAPB cluster wells at the adjacent Campus Bay site. Final construction details may be modified based on field observations (i.e., depth to first encountered groundwater).

The monitoring wells will be developed in accordance with the procedures provided in the Lot 3 FSAP. The elevation, northing, and easting of each newly installed monitoring well will be surveyed by a California-licensed surveyor.

Grab Groundwater Sample

In accordance with the grab groundwater sampling procedures described in the Lot 3 FSAP, a grab groundwater sample will be collected in the deeper groundwater zone from a location approximately 25 feet to the west of the slurry wall on the UCRFS (Figure 2). The grab groundwater sample will be collected at an approximate depth interval of 25 to 30 feet bgs. This sample interval is approximately 5 to 10 feet below the base of the slurry wall.

The grab groundwater sample will be collected using a limited-access direct-push rig equipped with a dual-tube sampling system. The drilling contractor will hand auger the first 5 feet to verify that no utilities will be affected. The direct-push rig will then push a 4-foot-long, 3-inch-diameter sampler containing an acetate sleeve for the collection of soil cores. The soil cores will be examined and the lithology will be logged by an ARCADIS field geologist using the USCS. The lithology will be documented onto field soil boring logs. Soil samples will be screened in the field using a PID, and the measurements will be recorded onto the field soil boring logs. To collect a grab groundwater sample from a temporary soil boring, the soil boring will be advanced approximately 5 feet into the deeper water-bearing zone identified in the soil cores. When the desired depth of the soil boring is reached, a temporary PVC well screen will be inserted into the boring to collect a grab groundwater sample.

The groundwater sample will be collected by lowering a small-diameter (0.75-inch) stainless steel or disposable bailer down the PVC casing from the surface. The groundwater will be transferred from the bailer into clean laboratory-provided sample containers, stored in an ice-chilled cooler, and transported under chain-of-custody protocol to the laboratory for analysis.

The grab groundwater sample will be submitted to Curtis & Tompkins, Ltd., a state-certified laboratory. The sample will be analyzed for volatile organic compounds (VOCs) by U.S. Environmental Protection Agency (EPA) Method 8260B.

After groundwater sampling is complete, the soil boring will be abandoned using the procedures described in the Lot 3 FSAP and the guidelines provided by the applicable permits.

Monitoring Well Sampling

Groundwater samples will be collected from the newly installed monitoring wells using low-flow purging techniques in accordance with the procedures described in the Lot 3 FSAP.

The groundwater samples will be transferred directly from the newly installed dedicated polyethylene tubing within the wells into clean laboratory-provided sample containers, stored in an ice-chilled cooler, and transported under chain-of-custody protocol to the laboratory for analysis.

The groundwater samples will be submitted to Curtis & Tompkins, Ltd., for the following analyses:

- Title 22 Metals using EPA Method 6010 (EPA Method 7470 for mercury)
- VOCs using EPA Method 8260
- Zeneca proprietary pesticides (OPPs) using EPA Method 8270SIM
- Ferrous iron using Standard Method 3500 FeB
- Dissolved sulfide using Standard Method 4500S2-D
- Alkalinity using Standard Method 2320B
- Chloride using EPA Method 300.0
- Sulfate using EPA Method 300.0
- Total dissolved solids (TDS) using Standard Method 2540C

Oxidation-reduction potential (ORP) and pH will also be measured in the field immediately using a water-quality meter.

Details of the analytes listed above are summarized in Table 2, including the analytical methods, sample volumes, containers, preservatives, and field filtering requirements.

Investigation-Derived Waste

The anticipated investigation-derived waste that will be generated during the field activities will be disposed of in accordance with the procedures described in the Lot 3 FSAP. Soil cuttings and purged groundwater will be containerized in clean Department of Transportation-approved 55-gallon drums or similar. An adhesive label will be affixed to each container, noting the

following information: waste type, location where the investigation-derived waste was generated, and date of waste generation.

The containers storing the generated wastes will be temporarily staged at UCRFS at a location designated by UC until the waste characterization results are received and disposal is arranged.

Reporting

Upon completion of the sampling activities, ARCADIS will provide the DTSC with a memorandum that will include a table summarizing the analytical results of the samples collected during this project, a figure with the surveyed locations of the monitoring wells, the analytical data from this sampling, as well as any relevant data from UC sampling at the UCRFS.

The activities described in this Work Plan are tentatively scheduled to take place in November 2010.

If you have any questions regarding the information provided above, please do not hesitate to call the undersigned at (510) 652-4500.

Sincerely,

ARCADIS U.S., Inc.

Ronald Goloubow, P.G. (8655)
Principal Geologist

Daren Roth
Project Geologist

cc: Mr. Doug Mosteller
Mr. Bill Marsh, Esq.
Mr. Anthony Garvin, University Counsel for UC
Mr. Nicholas Targ, Esq.
Mr. Karl Hans, UC

Attachments:

Table 1: Approximate BAPB Monitoring Well Construction Details and Grab Groundwater Specifications
Table 2: Groundwater Analytical Summary
Figure 1: Site Vicinity Map
Figure 2: Approximate Monitoring Well and Grab Groundwater Locations at the Richmond Field Station

Table 1
Approximate BAPB Monitoring Well Construction Details
and Grab Groundwater Specifications
University of California, Richmond Field Station
Campus Bay, Richmond, California

Area	Number of Wells/Borings	Well/Boring Names	Approximate Total Depth (feet bgs)	Casing Diameter (inches)	Approximate Screen or Sampling Interval (feet bgs)	Borehole Diameter (inches)	Surface Mount
Monitoring Wells							
Cluster Wells	3	MW-34 through MW-36	18.0	2.0 PVC	8.0 - 18.0	8.0	Monument
Additional Wells within the BAPB	2	MW-37 and MW-38	18.0	2.0 PVC	8.0 - 18.0	8.0	Monument
Grab Groundwater Sample							
West of Slurry Wall	1	TBD	30.0	1.0 PVC	25.0 - 30.0	3.0	Grout to surface

Notes:
BAPB = Biologically Active Permeable Barrier
bgs = below ground surface
PVC = polyvinyl chloride
TBD = to be decided

Table 2
Groundwater Analytical Summary
University of California, Richmond Field Station
Campus Bay, Richmond, California

Analyte	Analytical Method	Required Volume	Container	Preservative	Field Filtered [1]
Title 22 Metals	EPA Method 6010/7470	500 mL	Poly	HNO_3	Yes
VOCs	EPA Method 8260B	120 mL	40 mL VOAs (3 per sample)	HCl	No
OPPs	EPA Method 8270-SIM	500 mL	Amber	none	No
Ferrous Iron	Standard Method 3500 FeB	125 mL	Poly	HCl	Yes
Dissolved Sulfide	Standard Method 4500S2-D	500 mL	Ploy	NaOH	Yes
Alkalinity	Standard Method 2320B	500 ml [2]	Poly	none	No
Chloride	EPA Method 300.0				
Sulfate	EPA Method 300.0				
TDS	Standard Method 2540C				
pH	Measured in the Field	--	--	--	--
ORP	Measured in the Field	--	--	--	--

Notes:

(1) For samples to be field filtered, groundwater will be pumped through a 0.45 micron high capacity groundwater filter into the designated sample container

(2) Groundwater for alkalinity, chloride, sulfate, and TDS analyses is all contianed in one 500 mL poly container

Amber = amber glass bottle
HCl = hydrochloric acid
HNO3 = nitric acid
NaOH = sodium hydroxide
mL = milliliter
OPPs = Zeneca proprietary pesticides
ORP = oxidation-reduction potential
Poly = polyethelene container
TDS = total dissolved solids
VOA = Amber VOA vial
VOCs = volatile organic compounds

SOURCE: THOMAS BROS MAP - Bay Area 2001

Approximate Campus Bay Property Boundary

Approximate HEA Boundary

0 .5 mile

CAMPUS BAY, RICHMOND, CALIFORNIA

SITE VICINITY MAP

ARCADIS

FIGURE 1

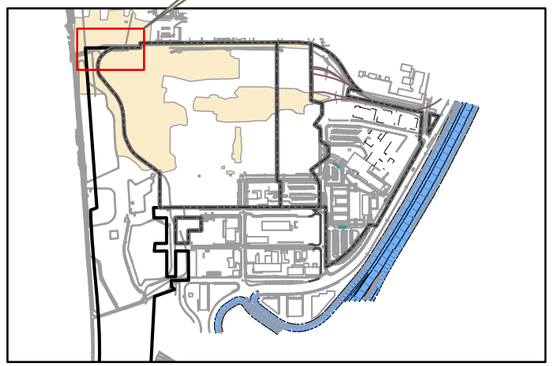
DESIGN\00110935B\Campus Bay Site Vicinity Map.CDR 120203

MW-37
MW-36
MW-34
BAPB
MW-35
OUTFALL 003
MW-38
Slurry Wall
MW-1
MW-18
MW-4
MW-3
MW-2
MW-5
PZ-1S
PZ-1D
PZ-2S
PZ-2D
PZ-3S
PZ-3D
MW-7
MW-6
MW-8
MW-28
MW-10A
MW-9
PZ-4S
PZ-4D
MW-32A
MW-32B
MW-19

LEGEND

- APPROXIMATE MONITORING WELL LOCATION
- APPROXIMATE GRAB GROUNDWATER LOCATION
- MW-16B — APPROXIMATE LOCATION OF EXISTING MONITORING WELL
- PZ-8 — APPROXIMATE LOCATION OF EXISTING PIEZOMETER
- Outfall 003 — SURFACE-WATER MONITORING LOCATION
- HABITAT ENHANCEMENT AREA BOUNDARY
- PROPERTY BOUNDARY
- SUBAREA BOUNDARY
- PREVIOUS CINDER EXCAVATION AREA
- 2-FOOT CONTOUR INTERVAL

AREA ILLUSTRATED



N

0 80 160 Feet

GRAPHIC SCALE

CAMPUS BAY, RICHMOND, CALIFORNIA

APPROXIMATE MONITORING WELL AND GRAB GROUNDWATER LOCATIONS AT THE RICHMOND FIELD STATION

ARCADIS

FIGURE 2

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