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February 14, 2014

Keith Nowell PG, CHG
Hazardous Materials Specialist
Alameda County Environmental Health
1131 Harbor Bay Parkway
Alameda , CA 94502-6540

Subject: City of Oakland, Municipal Service Center 7101 Edgewater Drive Oakland, California Fuel Leak Case RO293
Data Gaps Summary & Proposed Investigation

Dear Mr. Nowell:

Enclosed is the Data Gap Summary and Proposed Investigations table for the City of Oakland, Municipal Service Center 7101 Edgewater Drive in Oakland, California Fuel Leak Case RO293 ("the Site"). This document was prepared based on our January 6th meeting with you and Dilan Roe, as well as your email dated January 7, 2014.

I certify under penalty of law that this document and all attachments are prepared by Arcadis, Inc 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 managed 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 fine and imprisonment for knowing violations.

If you have any questions or comments, please call Mr. Ron Goloubow of ARCADIS at (510) 501-1789 or me at (510) 238-6361.

Sincerely,

Gopal Nair

Enclosure

ARCADIS
Infrastructure, environment, buildings

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February 14, 2013

Mr. Keith Nowell PG, CHG
Hazardous Materials Specialist
Alameda County Environmental Health
1131 Harbor Bay Parkway
Alameda, CA 94502-6540

ENVIRONMENT

Subject: City of Oakland, Municipal Service Center 7101 Edgewater Drive Oakland, California Fuel Leak Case RO293
Data Gap Table

Date:
February 14, 2013

Contact:
Ron Goloubow

Phone:
510.596.9550

Email:
ron.goloubow@arcadis-us.com

Our ref:
EM012222.0001

Dear Mr. Nowell:

Enclosed is revised Table 5-1 Data Gap Table that is part of the report entitled" "Conceptual Site Model and Request for Low-Threat Closure Report" for the City of Oakland, Municipal Service Center 7101 Edgewater Drive in Oakland, California Fuel Leak Case RO293 ("the Site") dated September 20, 2013. This data gap table describes data gaps that were discussed during the meeting that took place on January 6, 2014 and that were provided in the email from you to Chuck Pardini on January 7, 2014.

Following your review of the enclosed table we (representatives of ARCADIS and the City of Oakland) would like to discuss this table and then prepare a work plan to implement the scope of work contemplated in the table. If you have any questions or comments, please call Mr. Ron Goloubow of ARCADIS at (510) 501-1789, Chuck Pardini at 510-813-1053 or Gopal Nair at (510) 238-6361.

Sincerely,

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

Attachment: Table 5-1

PROFESSIONAL GEOLOGIST
RONALD E. GOLOUBOW
No. 8655
STATE OF CALIFORNIA
Expires Nov. 30, 2015

Table 5-1
Data Gaps Summary and Proposed Investigation

Item	Data Gap Item #	Proposed Investigation	Rationale	Analyses
1.	Preferential Pathways (Buried Stream Channels, Dikes, Berms, and Utilities).	The presence of these features at the Municipal Service Center ("the Site") will be assessed and the results presented in the revised version of the September 20, 2013 Conceptual Site Model and Request for Low-Threat Closure Report (the Revised Report).	This information will provide additional data relative to potential contaminant transport and distribution.	NA
1a.	The precise locations of the elements of the storm drain system, the sanitary sewer system, and the conveyance piping are unknown.	Use the November 2004 conduit study by Ninyo & Moore to assess the locations of the subsurface storm drain and sanitary sewer systems. Conduct additional utility surveys if the conduit study by Ninyo & Moore is assessed to be inadequate. The details of this investigation will be presented in a Work Plan that will be prepared to address the data gaps identified for the Site (the "Work Plan"). The results of the work described in this work plan will be presented in the Revised Report.	These potential preferential pathways may be located in portions of the Site that intersect areas with impacted groundwater.	NA
1b.	The presence and location of buried stream channel(s) as a potential conduit for contaminant migration is unknown. The stream channels were first presented on a map in the Groundwater Monitoring Report	Review historical air photos and other site-related information to assess the locations of the streams depicted on the 1998 maps. Review groundwater quality and flow direction(s) at the Site to assess if the streams have influenced groundwater quality at the Site.	The buried stream channels may be located in portions of the Site that intersect areas with impacted groundwater and act as preferential pathways.	NA

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	prepared by Dove Engineering, dated January 1998.			
1c.	The composition and material of the berm and dike is unknown.	Review past reports to attempt to discover information regarding the composition of the berm and dike.	May provide more information concerning how anthropogenic features on the Site may affect groundwater flow, for instance, if these features are an impediment to groundwater flow.	NA
1d.	Potential conduits for contamination to impact groundwater in the site vicinity.	Review historic records to assess the potential location of the former Fitchburg Well Field (reported to have been located near the site in the 1800s).	Search for former well field location and review well construction details (if available) to assess the potential impact of the Site related to this historic well field. Conduct a well survey with Alameda County Department of Public Works Agency Water Resources Section.	NA
2.	Monitoring well network.	A comprehensive summary table providing well construction details will be prepared and included in the Revised Report. The summary table will also include the status of the well, whether they were destroyed or properly abandoned, lithologic descriptions, and other related information.	The summary table provides a more effective tool to assess the monitoring well network.	NA
2a.	Wells MW-1 and RW-D8 have submerged well screens (average groundwater elevation is greater than the top of the well's screened interval). MW-1 is located in	Collect in-situ groundwater samples from temporary wells to be installed at two locations southwest of RW-D8 (equidistant between RW-D8 and RW-C1 to assess the potential presence of LNAPL between the Plume D and Plume C	The wells will be located to assess the potential presence of free product between the Plume D and Plume C areas.	Soil and Groundwater: TPHd, TPHmo, TPHg, BTEX, and MTBE

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	a portion of the Site in which light non-aqueous phase liquid (LNAPL) has not been detected. Chemical concentrations have decreased over time and current water-quality results do not suggest that LNAPL is present. RW-D8 is located in a portion of the Site where LNAPL has been present. (the identified Plume D area). The potential presence of LNAPL cannot be assessed adequately in well RW-D8.	areas. The temporary wells will be constructed so that the top of the screened interval intersects the highest measured groundwater elevation. A monitoring well, or wells, may be recommended for installation based on the results of this assessment. Soil samples may be collected based on observations made during drilling. The details of this investigation will be presented in a Work Plan.		
2b.	Remediation wells RW-D6 through RW-D11 have 15-foot long screened intervals. The length of the screened intervals in these wells may cause the concentrations detected in these wells to be artificially low, potentially, due to dilution.	Groundwater samples have never been collected from remediation well RW-D11 since its installation in 2008; therefore, there are no current concerns regarding sample dilution for this well. However, should groundwater samples be collected from RW-D11 in the future, the potential for sample dilution should be considered. In addition, it is proposed to collect groundwater samples from wells OB-D1 and OB-D2 (located near and downgradient of the RW-6 through RW-D11 well area. The screens in these two	Collecting groundwater samples from wells OB-D1 and OB-D2 will provide adequate groundwater quality data in this portion of the Site.	TPHg, TPHd, TPHmo, BTEX, and MTBE

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		wells are 10 feet in length.		
2c.	Top-of-casing elevations are not available for the following wells: MW-3, MW-18, OB-A1, RW-D6 through RW-D11, and RW-1.	Survey the elevations of the tops-of-casings for these wells.	Provides more groundwater elevation data and allows for more precision in assessing groundwater flow direction.	NA
2d.	Potential obstruction in well OB-C1.	Conduct a field assessment of the well condition and propose action to fix the well.	Potential obstruction prohibits groundwater elevation and water-quality data from being obtained at this location.	NA
2e.	Lack of water in well MW-16 and black, tar-like coating on the casing of this well.	Well MW-16 was completed at a depth approximately five feet less than downgradient well MW-17. Based on this and the presence of the black, tar-like coating on the casing of this well, it is no longer an appropriate monitoring point. Soil samples may be collected based on observations made during drilling. The details of this investigation will be presented in a Work Plan.	Abandon and replace well MW-16 with a well that is constructed appropriately.	TPHg, TPHd, TPHmo, BTEX, and MTBE for samples collected from the replacement well for well MW-16.
2f.	RW-B3, RW-B4, MW-16, and MW-17. Remediation well RW-B3 had more than 3 feet of LNAPL at one time and now has none. As discussed in Data Gap 2e, MW-16 (downgradient of RW-B3) lacks water. Groundwater samples collected from well MW-17	Evaluate the volume of LNAPL removed from the area of RW-B3, RW-B4, & MW-16; assess the RW-B3 screen interval and its relationship to groundwater level and product thickness; assess the screened interval and potential dilution issue that may be present in MW-17; and address MW-16, as described in Data Gap 2e.	Provides sufficient groundwater quality data downgradient of an area that previously exhibited LNAPL.	TPHg, TPHd, TPHmo, BTEX, and MTBE

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	(downgradient of well MW-16 do not contain TPHg, TPHd, TPH mo, BTEX, and MTBE above laboratory reporting limits.			
3.	Plume Delineation	The results of the additional assessment described below will be included in the Revised Report.	Provides additional data that will advance the case toward closure.	
3a.	The lateral extent of affected groundwater near former plume D is not adequately defined.	Monitor the following wells for LNAPL and groundwater quality: MW-18; RW-D1; RW-D2, RW-D7; OB-D1, and OB-D2.	Assess the lateral extent of affected groundwater; Collect samples from wells RW-D1, RW-D7, RW-D10, (the last sample was collected from these wells in November 2008), Wells RW-D2, OB-D1, OB-D2, have never been sampled.	TPHg, TPHd, TPHmo, BTEX, and MTBE
3b.	The lateral extent of affected groundwater in the north, east, and south near former plume C is not adequately defined.	Monitor the following wells for LNAPL and groundwater quality: RW-C1; RW-C2, OB-C1 (see Data Gap 2d).	Assess the lateral extent of affected groundwater; Collect samples from well RW-C2 (samples have never been collected). Last sample collected from RW-C1 and RW-C3 was November 2008.	TPHg, TPHd, TPHmo, BTEX, and MTBE
3c.	The lateral and downgradient extent of affected groundwater north, south and west near former plumes A and B is not adequately defined.	Collect grab groundwater samples from temporary wells installed south and west of MW-11, north of well RW-B3, and south and east of RW-B4. Replace well MW-16 (dry) and install a new well to the same depth as nearby, downgradient well MW-17 (20 bgs), as described in Data Gap 2e. The details of this investigation will be presented in a Work Plan.	Analytical results for samples from existing wells do not define the lateral extent of affected groundwater in this area of the Site.	TPHg, TPHd, TPHmo, BTEX, and MTBE

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3d.	Further assess the nature and extent of LNAPL. LNAPL has not been present in the wells at the Site since 2009.	Assess the need for soil borings near wells in which LNAPL had been measured previously. The details of this investigation will be presented in a Work Plan.	Potentially drill soil borings near wells in which LNAPL was measured to assess if product is in the soil matrix or near locations where LNAPL has been measured. This scope of work would be provided in a work plan to further assess the lateral and vertical extent of affected soil and groundwater at the Site.	TPHg, TPHd, TPHmo, BTEX, and MTBE (if LNAPL is not present)
3e.	Anomalous benzene concentrations in samples collected from several wells.	Benzene is detected at higher concentrations than TPHg in several wells. This phenomenon will be assessed and presented in the Revised Report.	May provide information concerning other sources of benzene.	NA
4.	Mass Removal (Estimates and Data)	Data from remediation reports will be compiled and presented in the Revised Report.	Compilation of these data will demonstrate the volume of contaminant mass removed from the subsurface.	NA
5.	Hydrographs	Revised hydrographs will be prepared that will include an appropriate scale, the top and bottom of the screen interval, the maximum and minimum historical groundwater elevations, timelines for DPE and hydrogen peroxide initiation and cessation, as well as historical chemical concentration data. These hydrographs will be presented in the Revised Report.	These data plotted on each hydrograph will provide a more effective tool to assess the effectiveness of remedial activities.	NA
5a.	Rebound is not expected to have occurred after the hydrogen peroxide	Assess the relationship between chemical concentrations in injection wells and	This review will assist in assessing the effectiveness of the injections.	NA

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	injections at the Site based on available groundwater data, but this is not certain.	injection schedule using the revised hydrographs.		
6.	Historical Groundwater Contour Maps	Assess groundwater conditions.	Confirm or revise conclusions concerning groundwater flow.	NA
6a.	Prepare groundwater contour maps that include all wells.	Groundwater contour maps will prepared and assessed for potential fluctuations in groundwater flow direction, tidal effects, mounding, etc. The results of this investigation will be presented in the Revised Report.	Provides additional data for more effective assessment of chemical transport and distribution.	NA
6b.	The degree of tidal influence on the monitoring wells is unknown.	A summary of the tidal studies that were conducted at the Site in 1995 and 1997 are provided in the Baseline 2001 report. That report indicates that groundwater levels in isolated near-Bay areas are subject to daily tidal influences. A summary of this tidal study will be included in the Revised Report.	A summary of the tidal studies that were conducted at the Site in 1995 and 1997 are provided in the Baseline 2001 report. That report indicates that groundwater levels in isolated near-Bay areas are subject to daily tidal influences.	NA
7.	The potential impact of on-site contaminants to Damon Slough is unknown. In addition, the physical features of Damon Slough are unknown.	Assess chemical concentration data collected from wells MW-2 and MW-10 (located between impacted portions of the Site and Damon Slough). Visually assess condition of Damon Slough (lined/unlined) and measure the depth in the center of the slough.	Provides data that will show if Site impacts have affected Damon Slough.	NA

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		The results of this investigation will be presented in the Revised Report.		
8.	Soil Tables	Assess adequacy of soil-quality data. The results of this investigation will be presented in the Revised Report.	Provides data concerning whether additional soil sampling is necessary.	NA
8a.	The soil data set does not adequately characterize the contamination in all areas of the Site.	The table will be revised to indicate samples that reflect if soil was removed or if soil was left in place. Additional soil sampling may be recommended in portions of the Site where the sampling is assessed to be sufficient for adequate characterization. The locations and depths of the soil samples will be described in the Work Plan.	Provides data concerning whether additional soil sampling is necessary.	Soil and groundwater: TPHd, TPHmo; TPHg, BTEX, PAHs.
8b.	Insufficient data to identify non-fuel PAH-impacted media at the Site.	Develop a soil and groundwater management plan that directly addresses the potential presence of PAHs, as well as the fuel COPCs.	The soil used to develop the Site contained PAHs. Therefore, PAH distribution is random.	NA
9.	Asphalt Pit and UST #14 (waste latex and joint sealer)	Compile documentation concerning the removal of these features and present it in the Revised Report. This work was completed by one of the City of Oakland's on-call consultants.	The fiberglass tank was observed to be intact and removed. Provides information concerning these former site features of potential concern.	NA

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10.	Cross Sections (subsurface features will be identified, including dikes, utilities/trenches, stream channels, piping/trench, soil and groundwater data, USTs, excavations, the Fill/native material boundary, and other features)	The revised cross sections will be presented in the Revised Report.	The revised cross sections will provide additional information concerning the transport and distribution of contaminants.	NA
11.	Plan Views	Several additional figures will be prepared including the following: Map with all of the boring/well locations Map showing excavations Map showing utilities Historic free product contour map Historic groundwater quality contour maps Map showing buried streams The additional figures will be presented in the Revised Report.	Provides additional information concerning the transport and distribution of contaminants, and illustrates the changes in conditions over time.	NA
12.	Current UST System Details	This information will be presented in the Revised Report.	Provides information on the current system's condition and potential to release fuel to the environment.	
12a.	Condition of the active USTs at the	Review construction details of the USTs, and	The City will provide the construction details and	NA

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	Site (USTs #8 and #9).	associated conveyance piping and dispensers. Potentially, collect soil/in-situ groundwater samples.	the monthly monitoring data for the USTs. The City is investigating the removal and replacement of the USTs with ASTs in the near future.	
13.	Human health risk assessment (bounding vapor intrusion uncertainty).	This discussion will be presented in the Revised Report.	Provides boundaries for the uncertainty related to vapor intrusion and potential exposure.	NA
14.	Site Development (Coliseum EIR and redevelopment plans for site).	The EIR and redevelopment plans are being prepared. A discussion of the EIR and plans for the site will be included in the Revised Report, if this information is available.	Assess if the results of the EIR are applicable to the site.	NA