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Santa Ana Regional Water Quality Control Board

June 14, 2019

Mr. Daniel Miller
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COMMENTS ON "PRELIMINARY CONCEPTUAL SITE MODEL" FOR FORMER ARNOLD ENGINEERING FACILITY (a.k.a. FULLERTON BUSINESS PARK NORTH) AT 1551 EAST ORANGETHORPE AVENUE, FULLERTON, ORANGE COUNTY (GLOBAL ID # SLT8R2213999, PCA #2080188)

Dear Mr. Miller:

We have reviewed the *"Preliminary Conceptual Site Model"* (PCSM) for the Former Arnold Engineering facility, located at 1551 East Orangethorpe Avenue in Fullerton (Site). The PCSM was submitted on March 1, 2019 by your consultant, Roux Associates, Inc (Roux). This letter provides our comments on the PCSM.

Conceptual Site Model

The PCSM addressed the following items:

- Site background
- Site topography, geology, and hydrogeology, including cross-sections utilizing the limited on-Site data.
- A summary of previous assessments and most updated lateral and vertical delineation of contaminant(s) in impacted media (soil and soil vapor) at the Site.
- A summary of remedial efforts at the Site
- Discussion of groundwater trends and supporting data;
- Pathway-receptor network.
- Decision criteria and completion strategy.
- Data gaps and recommendations.

The PCSM identified the following data gaps:

- Historical Information – Include on-Site occupancies and their operations – Including but not limited to Ensign Carburetor, Eye Encounter/Woodmill Products, and Arnold Engineering. Adjacent occupants and their potential to have contributed subsurface contamination on-Site.
- Current Property Layout – The current building layout, operations and chemical use are unknown.
- Groundwater – (1) Historical variation of groundwater depths and flow directions at and near the Site; (2) Current/near-term groundwater level, flow directions and gradients at and near the site; (3) The magnitude, and mass flux of upgradient groundwater contamination that has potentially migrated beneath the Site and the potential that on-Site contributions have migrated off-Site.
- Soil – The former southern clarifier and northeastern potion of the building lack vertical/lateral sampling definition, total depth, and confirmation samples.
- Soil Vapor – (1) Current post-remediation shallow soil vapor concentrations. (2) The potential of historic soil vapor extraction (SVE) system operation to have drawn in soil vapor impacts from adjacent properties (i.e. Johnson Controls and Everest/Sundstrand). (3) The possibility of lateral vapor migration off-Site. (4) The existence and accessibility for the former vapor monitoring well network.
- Indoor air – Will remain a data gap depending on results of the soil vapor confirmation sampling.

Discussion

General

The PCSM identified the primary contaminants of concern (COCs) as tetrachloroethene (PCE), trichloroethene (TCE), 1,1-Dichloroethene (1,1-DCE), and 1,1,1-trichloroethane (1,1,1-TCA). Additional COCs should include petroleum hydrocarbons, Title-22 metals, 1,4-dioxane, xylenes, and TCE daughter products should be added to the list of COCs. References to these documents were provided in the PCSM appendix and are found within the hazardous waste manifests. The list should be updated as more information is gathered on the historic uses of the Site.

The PCSM does not clearly define specific areas of concern (AOCs) for environmental characterization purposes. Defining specific AOCs based on their historic site use, chemicals use, or clear features (i.e. tank capacity) will allow for clarity and consistency for future iterations of the PCSM, as more information about historical use is obtained.

Please note that sampling detection limits as further investigation continues must meet our 2016 Environmental Screening Levels (ESLs) set forth by the San Francisco Bay Regional Water Quality Control Board for the corresponding media being sampled (i.e. soil, soil vapor (including indoor air), groundwater).

Groundwater

In March 1995, two soil boring (BH-14 and BH-15) were advanced to a total depth of approximately 120 and 115 feet below ground surface (bgs), respectively. Groundwater was encountered at approximately 114 feet bgs in BH-14 and a "thin" perched groundwater unit was identified at 60 feet bgs in BH-15. The groundwater was not sampled and only soil samples were taken with depth, which is referenced within the soil section. On December 11, 1995 the Regional Board letter to Mr. Carl Ross/Red Eagle Properties Limited (owner of the Site) stated that the Regional Board would not require Red Eagle to conduct a groundwater investigation at that time.

In 2006, two monitoring wells (MW-1 and MW-2) were installed at the Johnson Controls Property just north of the Site's adjoining wall. The wells were last sampled in 2007 and indicated concentrations of PCE, TCE, and 1,1-DCE at 20, 290 and 88 micrograms per liter (µg/L), respectively.

In 2009, Environmental Support Technologies (EST) collected groundwater grab samples from the Shallow Aquifer (approximately 140 feet bgs) from one upgradient location (FAE-GW-1), three downgradient locations from the Site (FAE-GW-2 through 4), including one sample (FAE-GW-4A) from the perched zone (62 feet bgs). The Hydropunch® data within the Shallow Aquifer generally indicated the same order of magnitude upgradient and downgradient of the Site; however, TCE and 1,4-dioxane were detected in higher concentration relative to the upgradient sample. During this sampling event the perched zone exhibited lower concentrations of COCs when compared to the corresponding Shallow Aquifer samples.

The on-Site groundwater has not been assessed. Roux proposes an assessment of soil and soil vapor to determine if groundwater impact is of potential concern. If so an iterative approach to groundwater evaluation will be developed. We agree that there are uncertainties regarding the contributions of off-Site sources to the comingled plume. The evaluation of the permeability and continuity of the perched zone and presence of perched groundwater is prudent in evaluating the potential impacts to the Shallow Aquifer. Investigation methods such as high-resolution characterization (HRC) (i.e. cone penetration testing [CPT], membrane interface hydraulic profiling [MiHPT]) will allow targeting of specific depths for all media (soil, soil vapor, and groundwater) and will ensure proper lateral and vertical definition relative to the source. Grab groundwater samples of the perched zone (if present) and the Shallow Aquifer should be coordinated with the investigation of other media to the maximum extent practicable. Both techniques are recommended before installation of monitoring wells.

Soil

In 1988, Shallow soil samples were collected from 15 borings (B-1 though B-15) throughout the property to assess areas identified as having the potential for soil contamination (i.e. Industrial wastewater clarifiers, 1,1,1-TCA Tanks, Cooling water sump, bermed concrete pad, and electrical transformer pad). The results were above ESLs for direct exposure to arsenic, nickel and cobalt for a commercial property, but

below total threshold limit concentrations (TTLC). Arsenic appears to be near background levels in comparison to adjacent sites; however, nickel and cobalt had detections at maximum concentrations of 320 milligrams per kilogram (mg/kg) and 35 mg/kg, respectively. Single sampling depths ranged from 6-12 feet bgs, which did not provide sufficient vertical and lateral coverage. Soil should be analyzed for Title-22 metals and will remain as a data gap until soil is fully characterized.

In 1994 and 1995, additional soil borings (BH-1 through BH-15) were advanced near the former southern clarifier. BH-14 and BH-15 were advanced to approximately 105 feet bgs and indicated that TCE increased in depth beyond 40 feet bgs; however, investigation of TCE and daughter products in soil has not been conducted above 40 feet bgs in the vicinity of the southern clarifier. This will remain a data gap until soil vapor concentrations confirm otherwise. A fine-grained soil layer was discovered at approximately 60 feet bgs, which may have inhibited vertical migration of COCs; however, additional borings beyond 40 feet paired with soil vapor data will be needed to support this claim.

Following implementation of the soil vapor extraction system, confirmation samples (SP-1 through SP-3) were taken from 15 to 30 feet bgs and indicated maximum concentrations of 25,300 micrograms per kilogram (µg/kg) of PCE, 3,400 µg/kg of TCE, 3,100 µg/kg of 1,1-DCE, and 19,600 µg/kg of 1,1,1-TCA. Residual COC impacts to soil remain at levels above 2016 ESLs for commercial properties.

Shallow and deep soil data is limited at the Site with respect to identified Site features (i.e. degreasers, chemical milling tanks, clarifiers, and cooling tower sump). The Site did not identify Title-22 metals as COCs that may have impacted soils based on historic Site operations. This data was not thoroughly discussed in the report and should be addressed as assessment continues. No soil sampling has been conducted since 1995 and soil remains not delineated.

Data gaps should be identified and thoroughly discussed with respect to Site features (i.e. solid waste management units [SWMU], AOCs, and other historic operations). Recommendations for further investigation should address all identified data gaps. Given that the historic soil vapor probes were recently destroyed at the request of the current property owner the soil sampling approach should be coordinated with installation of permanent soil vapor probes. Roux proposes to submit a shallow soil vapor confirmation workplan. We recommend HRC be conducted at the Site before installation of permanent soil vapor probes. Please note, that HRC results should be confirmed with quantitative results (i.e. soil, soil vapor, groundwater samples). In addition, it may be more cost effective to investigate the deeper soil and soil vapor (below 60 feet) during the shallow soil vapor investigation.

Soil Vapor

Post remediation SVE data was last collected in 2011 and remains above our 2016 ESLs. PCE in soil vapor was detected near the three degreasers at the northern portion of the facility at concentrations of 9.17 µg/L, 27 µg/L, and 206 µg/L in sample VEW3 at

respective depths of 5, 15, and 25 feet bgs. Similarly, TCE and 1,1-DCE were detected at 14.6 µg/L and 12.6 µg/L respectively at 25 feet bgs. In addition, there is limited soil vapor data in the southern half of the facility near the designated cold soak tank (Q.C. room) and the cooling tower sump. Due to the increasing concentrations with depth and the limited data laterally, and vertically beyond 25 feet bgs additional soil vapor sampling is warranted.

According to the Report, the status of the soil vapor extraction wells is unknown. Upon meeting with Tri-s Environmental on February 14th 2019 – it was discussed that the on-Site soil vapor wells had been destroyed in 2018. Therefore, additional shallow and deep soil vapor monitoring wells will need to be installed. The installation locations should take into consideration historic soil vapor data and Site features. These monitoring points will aid in identifying remaining hot spots or areas that represent back diffusion of volatile organic compounds (VOCs) from clay. The CPT or continuous cored borings beyond 60 feet should assess the continuity of the fine-grained layer near 60 to 95 feet bgs and the potential for installation of deeper soil vapor probes. The subsurface soil vapor should be characterized to non-detect (ND), both vertically and laterally. Preferential pathways such as sewer laterals, underground utilities and pipelines should be identified to support areas needing further investigation, delineation, and if needed, additional remediation.

We concur with Roux's recommendation to perform a Human Health Risk Assessment (HHRA) to evaluate the risk from potential vapor intrusion into the building provided that a sufficient monitoring well network is installed (i.e. vertical and lateral coverage). Risk must be supported with trends at various depths within the vadose zone and multiple sampling events must be taken to determine temporal variations. Risk is further discussed in the section below.

Indoor Air

In September 2013, approximately 8 indoor air and 3 outdoor air samples were collected and PCE, TCE, 1,1-DCE and 1,1,1-TCE were not detected in indoor air or outdoor air; however, no formal workplan or concluding report was documented. We agree that current indoor air conditions may present a data gap, and additional assessment will be contingent upon current subsurface soil vapor conditions.

The laboratory reporting limit for each constituent should be less than their respective 2016 ESLs. The purpose of having reporting limits below the ESLs is to allow for proper risk-based evaluation related to cancer and noncancer hazards. For vapor intrusion risk between $1x10^{-6}$ and $1x10^{-4}$ or hazard index greater than 1, additional evaluation. Vapor intrusion risks above $1x10^{-4}$ will need mitigation measures and or source remediation.

Preliminary Decision Criteria and Completion Strategy

Roux proposes to prepare a workplan to fill shallow vadose zone data gaps while preparing an investigation scoping plan to resolve (1) historical data gaps; (2) deeper vadose zone investigation; and, (3) groundwater evaluation.

If the soil vapor monitoring well network no longer exists, we recommend a parallel process in which the shallow and deep vadose zone vapor is investigated. The borings should include lithologic logs, soil samples and if perched groundwater or the Shallow Aquifer is encountered a grab sample should be taken. We agree that a Human Health Risk Assessment (HHRA) should be performed and contingent upon results indoor air may be investigated. The completion strategy will be refined pending data gap evaluations.

Comments

The following provides our comments on the PCSM:

1) Provide an updated figure in a PCSM addendum and include the following:
    a. Updated text with clearly defined AOCs for environmental characterization. The text should also clearly identify a COC list that should take into consideration all historic hazardous waste manifests, and hazardous waste inventory forms. Please refer to the "General" section above.
    b. An updated figure labeling the identified AOCs based on their historic Site use, chemicals use, or clear features (i.e. tank capacity). Items not identified include: paint spray booth, stripping area, flammable liquid storage area, 1,600-gallon chromic sulfuric acid tank, bermed concrete pad, northeast drain and electrical transformer pad.
    c. An updated figure with locations of sewer laterals (i.e. eastern sewer trunk line), underground utilities and pipelines that should indicate potential contaminant migration pathways as stated in the soil vapor section above. This may be an added as a layer.

2) Please provide a PCSM addendum by **July 11th, 2019** and include the following:
    a. Updated figures as discussed in line item 1.
    b. Updated Section *6. "Data Gaps and Recommendations"* based on defined AOCs for environmental characterization.
    c. Provide an updated scope and phasing of data gap assessment work to be performed.
    d. The intended reuse of the Site.

3) Please submit a workplan to address data gaps related to Site lithology **four weeks** following the initial site walk.
    a. Wherever possible, multiple matrix sampling (soil, soil vapor, groundwater) should be implemented to maximize the mobilization effort and cost.
    b. Qualitative data (i.e. MiHPT) must be paired with quantitative sampling.

If you have any questions, please contact me at (951) 782-3252, or you may email at chad.nishida@waterboards.ca.gov, or you may contact our Chief of Site Cleanup Program, Nick Amini, at (951) 782-7958 or by e-mail: nick.amini@waterboards.ca.gov.

Sincerely,

Chad Nishida
Water Resources Control Engineer
Site Cleanup Program

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