Department of Toxic Substances Control

Matthew Rodriquez
Secretary for
Environmental Protection

Barbara A. Lee, Director
1001 "I" Street
P.O. Box 806
Sacramento, California 95812-0806

Edmund G. Brown Jr.
Governor

October 24, 2016

Dr. Harvey H. Liss, PE
12 Birdsong
Irvine, California 92604

Dear Dr. Liss:

I am writing to follow up on the meeting with you and Mr. Larry Agran on July 28, 2016 and to summarize DTSC's review of the issues you raised in the meeting and in written correspondence. In the meeting and your collective letters, you requested postponing the opening of the Portola High School in Irvine, California and conducting an additional investigation at the school site. The Department of Toxic Substances Control (DTSC) takes very seriously its responsibility to ensure that school campuses are cleaned in a manner that protects students, faculty, and visitors to those campuses. Protecting the health of people who use these schools is one of DTSC's most important activities.

As you know, in a letter dated March 2, 2016, I required the Irvine Unified School District to conduct further subsurface assessment at Portola High School due to the unknown origin of petroleum contamination in soil at the northern corner of the property and the unknown origin of the site-wide, low-level chlorinated solvents detected in soil gas samples. Accordingly, from March 30 to April 12, 2016, additional investigation activities were conducted at the school. The results of the sampling re-confirmed the earlier conclusion that the school is considered safe for use.

There have been four persistent areas of concern about Portola High School, as follows:

- Quality of the soil gas samples that were collected during the most recent investigation activities;
- Investigation of petroleum contamination;
- Origins of the low-level chlorinated solvent contamination present in soil gas;
- A request for further sampling for the buildings at the site.

Each of these concerns is addressed separately below:

Validity of Soil Gas Sampling

In various statements in both your letter and Mr. Agran's, you express concern about the quality of the soil gas samples that were collected during the most recent activities, with a focus on the variability of the sampling results of the duplicate soil gas samples that were collected. The soil gas samples collected for the evaluation of Portola High School have the highest possible data quality objectives. The collection of the soil gas samples complied with DTSC's 2011 sampling guidelines.[1] To ensure high-quality soil gas data, prior to sample collection, shut-in tests were conducted to demonstrate that the sampling system had no leakage. Also, as an additional check of integrity, a tracer compound was used during purging and sampling to verify that no leaks occurred during sampling. This is done by analyzing the samples for the tracer compound. None of the samples detected the tracer compound, indicating that no leaks occurred and that the data are representative of site conditions. The soil gas samples were immediately analyzed by an on-site mobile laboratory, which, again, minimizes any potential sample bias.

To collect the soil gas samples, permanent soil gas monitoring wells were installed on the property. The monitoring wells were constructed and sealed pursuant to DTSC specifications. The wells were constructed with Teflon tubing to avoid contaminant sorption onto the tubing. The appropriate equilibration times were followed, pursuant to DTSC guidance, to allow subsurface concentrations to equalize prior to sampling. The soil gas monitoring wells were purged prior to sampling three times to remove all the dead air from the monitoring well tubing. To ensure that the soil gas samples were collected properly, Mr. Joe Hwong, a Senior Engineering Geologist at DTSC, witnessed the field sampling. Mr. Hwong verified that proper sampling protocols were being followed.

The soil gas samples were analyzed by Jones Environmental Inc., a laboratory certified by California's Environmental Laboratory Accreditation Program. All laboratory quality checks, such as control standards, sample duplicates, instrument blanks, surrogates, and continuing calibration standards, were within prescribed specifications, demonstrating that the laboratory produced valid results.

A certain amount of variability in soil gas sampling results is to be expected in contaminant field investigations. The variability of soil gas results at Portola High School is within expected ranges and is attributable to natural fluctuations. Soil gas concentrations can be influenced by meteorological conditions, such as barometric pressure fluctuations, thermal heating, and changing moisture conditions, all of which can alter subsurface concentrations. This phenomenon is well documented in the scientific literature. DTSC concluded that the soil gas variability is not due to sampling

---

[1] See: https://www.dtsc.ca.gov/SiteCleanup/upload/VI_ActiveSoilGasAdvisory_FINAL_043012.pdf DTSC adopted rigorous soil gas sampling protocols in 2003 which were later updated in 2012. The soil gas samples at Portola High School were collected pursuant to these guidelines. The sampling protocols in DTSC's guidance were later adopted by American Society for Testing and Materials (ASTM) in 2012 (Publication D7663-11), confirming that DTSC's approach to soil gas sampling is scientifically sound.

procedure errors or laboratory analytical problems due to the rigorous procedures followed in the field and the caliber of the work done by Jones Environmental. Temporal and spatial variability are addressed by the sampling approach undertaken at Portola High School. Spatial variability of environmental contamination is addressed by collecting samples over the entire area of concern, as was done at the Portola site. The seventeen recent sampling points, along with the earlier soil gas sampling points, yield a total of 38 sampling points for the 43.5 acre site. This translates to 1.1 samples per acre. This level of spatial sampling is adequate to evaluate whether the military released hazardous chemicals at the site. The issue of temporal variability is addressed by collecting samples at the same location but at a different time, as was done for Portola. Because variability in soil gas samples is expected at sites, DTSC required that the seventeen new soil gas monitoring wells be sampled twice to evaluate temporal variability. A second sampling round is meant to evaluate not only natural variability but the ability of the field crew and laboratory to obtain high quality data. DTSC is confident that the variability is due to natural phenomenon and not field issues.

Petroleum Contamination at the North Corner

In your letter you state a concern that 900 cubic yards of petroleum contaminated soil was found at the northern boundary of the site. The subsurface sampling demonstrates that this petroleum contamination, which was cleaned-up by the school district by excavation, is not indicative of a larger contamination problem. Rather, an offsite petroleum release, as discovered by the school district during construction activities, had migrated onto the school property but only along its perimeter. The petroleum contaminated-soil along the perimeter was excavated and soil samples were collected to confirm that the contamination was successfully removed. Further sampling in the north corner has shown that additional petroleum contamination does not exist in this area. Soil borings at SG-28, SG- 36, and SG-37 were specifically drilled to evaluate whether the petroleum contamination at the north corner was indicative of a larger problem. The clean sampling results from SG-28, SG- 36, and SG-37 point to a localized condition. While there is no known source for the former petroleum contamination at the north corner, the situation was evaluated by confirmation sampling upon excavation and subsequent boreholes drilled after the fact. DTSC has concluded that the extent of the petroleum contamination at the north corner was limited, was successfully removed, and is not indicative of a larger problem.

Due to the petroleum contamination at the north corner, and the uncertainty as to the origin of the contamination, DTSC evaluated whether other areas of petroleum contamination might exist at Portola High School. Specifically, DTSC was concerned that the north corner petroleum contamination could be indicative of other chemical spills or releases at the school property. To address this concern, the other fourteen boreholes at the site that were drilled to evaluate the low-level chlorinated solvent impact were also screened and sampled for petroleum contamination. At least three subsurface locations in each borehole were evaluated with a field photoionization detector (PID). A field PID analyzes a sample for bulk contamination. While only a screening tool, the PID yields valuable information concerning the presence of contamination. All samples screened with the field PID detected no contamination. Even though contamination was not detected by the field PID, two samples from each

borehole were submitted to a state-certified laboratory for petroleum analysis. The samples were analyzed for gasoline, diesel fuel, and motor oil. All the soil samples had non-detectable concentrations of petroleum. Hence, the petroleum impact at the north corner was isolated to a small area and was not indicative of larger, wide-spread environmental problem at the school.

Low-Level Occurrence of Chlorinated Solvents

In your letter and discussion, you state a concern that detectable concentrations of chlorinated solvents were found in all 17 test wells in the perimeter of the site. The additional soil gas sampling was conducted at the Portola High School to evaluate whether these low-level concentrations of chlorinated solvents encountered by earlier investigations on the school property were indicative of releases by the military. The intent of the most recent sampling was to find potential sources and evaluate their impact on human health. The additional testing did not locate any sources. The additional soil gas testing demonstrates that the source of contamination on the property is unlikely to be related to previous use by the military. Rather, the spatial distribution of the observed solvent contamination is indicative of non-point source releases. Non-point source releases are manifested as low level concentrations that are wide-spread with no discernable hot spot (high concentrations) or pattern indicating a release point. The lack of any pattern is strong evidence that this release is a non-point source.

A point source release by the military would also have resulted in soil contamination associated with detected contaminants in soil gas samples. There was no discovery of soil contaminated by chlorinated solvents in the additional soil sampling ordered by me in my letter to the School District. The lack of any soil contamination associated with detectable concentrations of chlorinated solvents in soil gas is strong evidence that the source is not from the soil beneath the site. As indicated by the Placeworks report, the source of low-level soil gas contamination was potentially due to the use of reclaimed water at the site by farmers prior to school construction.

Regardless of the source, the distribution and contaminant levels are not indicative of releases and spills by the military. The use of recycled water is a viable explanation for the occurrence of the observed low-level solvent contamination. Although groundwater in Orange County is treated to meet regulatory standards, low-levels of contamination, lower than the treatment standards, may still exist within the water. These low levels in the recycled water could account for the observed contamination in soil gas at the school property. For additional information on the Irvine Ranch Water District recycled program, please refer to the IRWD website at http://www.irwd.com/services/recycled-water.

Soil Gas Sampling at the School Buildings

In your letters and discussion, you stated your belief that soil gas sampling should be conducted directly under buildings at the school site. Soil gas sampling directly under the buildings at the school is not warranted. The soil gas samples collected at 15 feet are indicative of concentrations that would be present under the buildings. Published

science literature supports this supposition. The best resource for understanding this particular behavior of soil gas migration is a report written in 2012 by the United States Environmental Protection Agency (USEPA) titled "Conceptual Model Scenarios for the Vapor Intrusion Pathway." As indicated by the report, soil gas sampling directly under a building is not necessary for evaluating the potential for human exposure. Evaluating exposure in buildings can be successfully conducted with soil gas samples collected adjacent to a building if the samples are collected from depths of three meters (10 feet) or more.[2] DTSC requested the collection of soil gas sampling at 15 feet below the surface with this understanding. Hence, the existing soil gas data are usable for the evaluation of the buildings at the school site and sampling under the buildings is not needed. The Final Characterization Report by Placeworks, which DTSC reviewed and approved, quantified the exposure risk associated with the low-level chlorinated solvent contamination.

In addition to the concerns stated by both you and Mr. Agran, there are some additional points raised by you alone in your April 12, 2016 letter, and not expressed specifically by Mr. Agran. The remainder of this letter addresses those comments, and provides clarification on the development and implementation of the Confirmation Sampling Workplan (CS Workplan) at the Portola High School property.

Sampling of the Interior of the School Property

Your letter states no prior testing has occurred for volatile organic compounds (VOCs) in the interior of the site. However, soil gas sampling occurred at five locations in the interior of the school property prior to implementation of the CS Workplan. Soil gas sampling points SG-5, SG-6, SG-7, SG-8 and SG-9 were located along the former pipeline at the site. Soil gas samples were collected at 5 and 15 feet below surface grade, and the samples were analyzed for volatile organic compounds (VOCs), hydrogen sulfide, and methane.[3] Hence, the assertion that soil gas in the interior of the school property was never sampled for VOCs prior to the implementation of the CS Workplan is incorrect. As you know, sixteen other soil gas locations around the perimeter of the school were also sampled for VOCs prior to the implementation of the CS Workplan. The CS Workplan was implemented to further understand the nature and extent of chlorinated solvents in the interior areas of the school site.

Public Input into the CS Workplan

Your letter states that there has been no discussion with the public and interested stakeholders regarding the Work Plan. A special meeting of the Irvine Unified School District (IUSD) was held on March 22, 2016, to solicit feedback from the general public on the concerns associated with the high school site. During that meeting, you and Larry Agran, along with approximately twenty-five members of the public, provided feedback to DTSC and IUSD about the high school site. At the meeting, DTSC's proposal for additional sampling was presented and due to public concerns, IUSD

---

[2] See Page 105 of USEPA (2012); Conceptual Model Scenarios for the Vapor Intrusion Pathway, Publication EPA 530-R-10-003. February 2012.

[3] Preliminary Environmental Assessment Report by The Planning Center dated March 2014; see Figure 4 and Table.

increased the scope of the subsurface sampling effort. DTSC's geologist, Dan Gallagher, proposed ten sampling locations for the CS Workplan, but IUSD recommended adding an additional six sampling locations to address public concerns. Furthermore, you discussed the CS Workplan with DTSC staff in early April, 2016. Based on specific feedback from you, DTSC moved a soil gas sampling location, and an additional soil gas sampling location was added to the CS Workplan.

Sampling Location Map Emailed by Dan Gallagher

Prior to approving the CS Workplan by DTSC, a courtesy copy of the proposed sampling location map was emailed to you by DTSC geologist Dan Gallagher. Upon receipt of this map, you were able to review the sampling locations and then communicate to DTSC your concerns about the soil gas sampling locations as mentioned above. In your letter of April 12, 2016, you state that the map contained two errors about the earlier VOC testing locations. The sampling location map, as emailed to you on April 1, 2016, did not specifically denote which previous locations had been tested for VOCs. It only denoted soil gas samples had been collected in the past and did not denote which locations where subject to VOC analyses. DTSC was cognizant of the VOC data gaps at the school site and developed the CS Workplan accordingly to address these data gaps.

Credibility of Work Performed by Placeworks

In your letter, you questioned the credibility of the firm Placeworks. The workplans and reports submitted by Placeworks for the school site were signed by a registered professional geologist who takes responsibility for the report's technical content, as required by California law. The professional registration process in California establishes minimum technical competency levels for geologists and engineers, and Placework meets this competency threshold. Additionally, the CS Workplan and associated Final Characterization Report were reviewed and approved by DTSC. In the approval process, DTSC's project manager, Rana Georges, coordinated technical review of the CS Workplan and the Final Characterization Report with DTSC geologist, Dan Gallagher, and DTSC toxicologist, Shukla Roy-Semmen. The presentation and interpretation of the sampling results were satisfactory for decision-making purposes, and DTSC staff and management concur with the content of both the workplan and final report.

Marine Corps Air Station (MCAS) Landfill

In your letter of April 12, 2016, you state that that the risk assessment for the high school site should contain an analysis of an earthquake-caused rupture of the Marine Corps Air Station (MCAS) landfill cover and its subsequent impact to the high school site. Because of the 750 foot distance between the Installation Restoration Program (IRP) Site 3 Landfill and the high school, along with the institutional controls

implemented at the IRP Site 3 Landfill to prevent exposure, such an evaluation is not needed. The required institutional controls at the IRP Site 3 Landfill include:[4]

- Quarterly landfill inspections (landfill cover, security fence, and surface drainage);
- Inspection of the landfill after a significant earthquake;
- Inspection of the landfill after a significant rainfall event;
- Semi-annual collection of groundwater samples;
- Semi-annual collection of landfill gas samples;
- Annual measurements of landfill settlement;
- Annual collection of landfill moisture for VOC analysis.

These institutional controls are adequate to prevent exposure at the high school following an earthquake event. Also, in your letter of April 12, 2016, you imply that the required institutional controls are not being implemented at the IRP Site 3 Landfill, specifically during earthquake events in 2014. As stated in the Navy's Annual Operation and Maintenance and Long-Term reporting Report (RORE-ITSI 2016)[5], the Site 3 Landfill was inspected after the earthquake events of January 17, 2014, January 25, 2014, March 19, 2014 and March 31, 2014. Likewise, the RORE-ITSI report indicates that the inspections and sample collection are being conducted pursuant to the requirements of the institutional controls, and a settlement survey was completed in January 2015.

Peer Review by University of California

In your letter of April 12, 2016, you recommend that the project be reviewed by the University of California. DTSC relies on our in-house expertise, and we request outside review only in special circumstances. There is nothing in this project that warrants taking the extraordinary step of requesting additional review from staff outside of DTSC.

Conclusion

Consistent with the information summarized in this letter, I find that:

- The site is well characterized;
- The data met rigorous data quality standards; and
- Levels of contaminants present were well below concentrations that would pose a threat to students or staff at the school site.

Thus, there is no threat to the health of individuals who attend classes, work at the school, or might otherwise use the school's property and further investigation is not warranted for the site.

---

[4] Final Operation and Maintenance/Long-Term Monitoring Plan Operable Unit 2C, IRP Sites 3 and 5, Former Marine Corps Air Station El Toro, California by Shaw Environmental Inc., dated 2010.
[5] 2014 Annual Operation and Maintenance and Long-Term Monitoring Report (January – December 2014), Installation Restoration Program Sites 2, 3, 5, and 17 and Anomaly Area 3 by RORE-ITSI, JV, LLC, dated February 2016.

The reports for the investigations summarized in this correspondence can be found on DTSC's EnviroStor website. If you have any further questions or comments, please contact Division Chief Dot Lofstrom of my staff at (916) 324-2993 or by email at Dot.Lofstrom@dtsc.ca.gov.

Sincerely,

for

Barbara Lee, Director
Department of Toxic Substances Control
California Environmental Protection Agency

Cc: Secretary Matthew Rodriquez
California Environmental Protection Agency
P.O. Box 2815
Sacramento, California 95812

Mr. Terry L. Walker
Irvine Unified School District
Superintendent of Schools
5050 Barranca Parkway
Irvine, California 92604

Mr. Larry Agran
9 Mann Street
Irvine, California 92612

Mr. Fred Yeager
Assistant Deputy Director
Schools Facilities and Transportation Services Division
California Department of Education
1430 N Street
Sacramento, California 95814

Mr. Kelvin Okino
Executive Director of Facilities and Construction
Irvine Unified School District
5050 Barranca Parkway
Irvine, California 92604

Mr. Michael O'Neill
Consultant/Environmental Coordinator
California Department of Education
1430 N Street
Sacramento, California 95814

Dr. Denise Clendening
Associate Principal
PlaceWorks
2850 Inland Empire Boulevard, Suite B
Ontario, California 91764

Mr. Dan Gallagher, CHG
Senior Engineering Geologist
Brownfields and Environmental Restoration Program
Department of Toxic Substances Control
8800 Cal Center Drive
Sacramento, CA 95826

Dr. Shukla Roy-Semmen
Staff Toxicologist
Brownfields and Environmental Restoration Program
Department of Toxic Substances Control
5796 Corporate Avenue
Cypress, CA 90630

Ms. Yolanda Garza
Unit Chief
Brownfields and Environmental Restoration Program
Department of Toxic Substances Control
5796 Corporate Avenue
Cypress, CA 90630

Ms. Rana Georges
Project Manager
Brownfields and Environmental Restoration Program
Department of Toxic Substances Control
5796 Corporate Avenue
Cypress, CA 90630