Department of Toxic Substances Control

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Secretary for
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Edmund G. Brown Jr.
Governor

October 24, 2016

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

Dear Mr. Walker:

I am writing to follow up on a letter you wrote this spring, as well as other letters written by Mr. Larry Agran and Dr. Harvey Liss, regarding potential contamination at Portola High School. 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

Concerns have been stated 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, during his half day visit to the site, 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

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[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

Concerns have been stated regarding the petroleum contaminated soil that was found at the northern boundary of the site. The subsurface sampling demonstrates that this 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 concentration 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

Concerns have been stated that detectable concentrations of chlorinated solvents were found in all 17 test wells located in the perimeter of the site. The additional soil gas sampling was conducted at the Portola High School to evaluate whether the 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 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) indicating a release point. Military point source releases would have resulted in a discernable pattern in the soil gas sample results. The lack of any pattern is strong evidence that this release is a non-point source.

A 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 soil gas samples 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 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

The statement has been made 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 by the United States Environmental Protection Agency (USEPA) in 2012 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.

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 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.

The reports for above investigations 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,

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

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

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