WATERSTONE ENVIRONMENTAL, INC.

2936 E. CORONADO STREET * ANAHEIM * CA 92806
714-414-1122 * FAX: 714-414-1166

February 3, 2016

Los Angeles Unified School District
Office of Environmental Health and Safety
333 South Beaudry Street, 21st Floor
Los Angeles, California 90017-5156

Re: Air Testing Results for Knollwood Elementary School in Granada Hills, California

Waterstone Environmental, Inc. (Waterstone) is pleased to submit this letter report detailing the results of recent air testing and sample collection at the Knollwood Elementary School located at11822 Gerald Avenue, Granada Hills, California.

Waterstone has collected air samples and conducted real time air monitoring using various handheld monitors. This report summarizes the results of air sample analysis for samples collected on January 28, 2016.

Sample Collection and Analysis

Sample collection consisted of both grab samples (approximately 2 minute sample filling period) in tedlar bags as well as 8-hour samples collected in summa canisters in the indoor upstairs lounge. The summa canisters were placed in the breathing zone and allowed to sit undisturbed for a period of 8 hours.

One tedlar bag sample and one summa canister sample were delivered to Quantum Analytical Services Inc., a laboratory certified by the South Coast Air Quality Management District (SCAQMD) and the California Air Resources Board (CARB). Both samples were submitted for analysis of sulfur compounds by SCAQMD Method 307-91, and hydrocarbon speciation by modified EPA 18. The complete laboratory report with analysis results is attached.

One tedlar bag sample and one summa canister sample were delivered to Air Technology Laboratories, Inc., a laboratory accredited by the National Environmental Laboratory Accreditation Program (NELAP). Samples were submitted for analysis of BTEX by EPA Method TO-15. The complete laboratory report with analysis results is attached.

Real time air monitoring was conducted in indoor and outdoor spaces using a Jerome J631X for hydrogen sulfide detection; dräger tubes for benzene, toluene, ethylbenzene, xylenes, and mercaptans; a multi RAE monitor to measure percent lower explosive limit (%LEL) as an indicator of the potential presence of methane; and an ultra RAE monitor used to measure volatile organic compounds (VOCs) as an indicator of the potential presence of benzene as well as for taking benzene specific reading using a benzene sensor tube.

Analytical Results

The sample IDs created to refer to Knollwood Elementary School are designated with a "KW" in the sample ID. The analytical results for Knollwood Elementary School presented in the attached laboratory reports are summarized as follows:

- No sulfur compounds were detected at concentrations above laboratory detection limits.
- Methane was detected at a maximum concentration of 3,420 parts per billion by volume (ppbv) and below the environmental screening limits for methane of 500,000 ppbv used by the Department of Toxic Substances Control (DTSC) and 1,000,000 ppbv used by the National Institute for Occupational Safety (NIOSH). Additionally, methane was not detected at a concentration that requires a fire contingency plan (8,800,000 ppbv) as required by the Los Angeles County Building Code.
- The maximum concentration of benzene detected was 1.6 ppbv, which is below the environmental screening limits for benzene of 8 ppbv used by OEHHA for a 1-hour acute exposure and above the 0.92 ppbv for an 8-hour or chronic exposure. The chronic REL is designed to address continuous exposures for up to a lifetime. (http://oehha.ca.gov/air/allrels.html) OEHHA defines a lifetime as 70 years (http://www.oehha.ca.gov/air/hot_spots/pdf/2012tsd/Chapter1_2012.pdf). Since uncertainty factors are incorporated to address data gaps and uncertainties in the calculation of the OEHHA RELs, exposures that exceed the REL do not automatically indicate an adverse health impact (http://oehha.ca.gov/air/hot_spots/2008/NoncancerTSD_final.pdf). It should also be noted that on the previous sampling day (January 19, 2016), the maximum concentration of benzene was only 0.47 ppvb.
- The maximum concentration of toluene detected was 12 ppbv and below the environmental screening limits for toluene of 9,640 ppbv used by OEHHA for a 1-hour acute exposure.
- The maximum concentration of ethylbenzene detected was 0.50 ppbv and below the environmental screening limits for ethylbenzene of 450 ppbv used by OEHHA for a chronic (lifetime) exposure.
- The maximum concentration of xylene (sum of p-xylene, m-xylene and o-xylene) detected was 3.5 ppbv and below the environmental screening limits for xylene of 4,970 ppbv used by OEHHA for a 1-hour acute exposure.

Analyte	**Maximum On-site Detection (ppbv)**	**Environmental Regulatory Limit (ppbv)**	**Environmental Regulatory Limit Description**
Sulfide Compounds	None	30 (Hydrogen Sulfide) 7 (Hydrogen Sulfide)	California Ambient Air – 1 hour and OEHHA Acute REL (42 ug/m^3)* OEHHA Chronic REL (10 ug/m^3)*

Analyte	Maximum On-site Detection (ppbv)	Environmental Regulatory Limit (ppbv)	Environmental Regulatory Limit Description
Methane	3,420	500,000 1,000,000	DTSC Site-Specific Screening Level (for ambient indoor and outdoor air). http://www.hawaiidoh.org/references/CalEPA%202005b.pdf NIOSH maximum recommended safe methane concentration for workers during an 8-hour period. http://www.cdc.gov/niosh/ipcsneng/neng0291.html
Ethane, Ethylene	None	1,000,000 2,000,000	NIOSH maximum recommended safe ethane concentration for workers during an 8-hour period. http://www.cdc.gov/niosh/ipcsneng/neng0266.html NIOSH maximum recommended safe ethylene concentration for workers during an 8-hour period. http://www.cdc.gov/niosh/ipcsneng/neng0475.html
Other Hydrocarbon Speciations by EPA 18	None	1,950 (Hexane)	OEHHA Chronic REL (7,000 ug/m^3)*
Benzene	1.6	8 0.92	OEHHA Acute REL (27 ug/m^3)* 8-hour and chronic OEHHA RELs (3 ug/m^3)*
Toluene	12	9,640 80	OEHHA Acute REL (37,000 ug/m^3)* OEHHA Chronic REL (300 ug/m^3)*
Ethylbenzene	0.50	450	OEHHA Chronic REL (2,000 ug/m^3)*
Xylenes	3.5	4,970 160	OEHHA Acute REL (22,000 ug/m^3)* OEHHA Chronic REL (700 ug/m^3)*

* OEHHA RELs listed in micrograms per cubic meter (ug/m^3) have been converted to ppbv using the molecular weight of each specific chemical. http://oehha.ca.gov/air/allrels.html

Real Time Monitoring Results

The real time monitoring logs are attached. In-field air monitoring results are summarized as follows:

- Methane (as indicated by %LEL), VOCs, benzene, toluene, ethylbenzene, and xylenes were not detected during field monitoring.
- Hydrogen sulfide was detected at a maximum concentration of 0.007 ppmv, well below the OEHHA acute REL of 0.03 ppmv.

The majority of the regulatory limits we are comparing against are Reference Exposure Levels (RELs) developed and published by California's Office of Environmental Health Hazards (OEHHA). OEHHA is one of six agencies under the umbrella of the California Environmental Protection Agency (Cal/EPA). OEHHA's overall mission is to protect and enhance public health and the environment by scientific evaluation of risks posed by hazardous substances.

OEHHA evaluates health effects of chemicals found in indoor air, including developing Reference Exposure Levels for use with indoor air exposure scenarios. OEHHA participates in a number of inter-Agency activities designed to evaluate indoor air quality health issues and to move California toward safer indoor air quality. OEHHA provides health-related assistance to health officers.

Methane was compared to the DTSC Site-Specific Screening Level for ambient indoor and outdoor air as well as the NIOSH maximum recommended safe methane concentration for workers during an 8-hour period.

Conclusions and Recommendations

As shown in the table above, the maximum on-site detections are well below the published environmental regulatory limits for all analytes except benzene. The maximum concentration of benzene detected was 1.6 ppbv, which is below the environmental screening limits for benzene of 8 ppbv used by OEHHA for a 1-hour acute exposure and above the 8-hour and chronic REL of 0.92 ppbv. The chronic REL is designed to address continuous exposures for up to a lifetime (http://oehha.ca.gov/air/allrels.html). OEHHA defines a lifetime as 70 years (http://www.oehha.ca.gov/air/hot_spots/pdf/2012tsd/Chapter1_2012.pdf). Since uncertainty factors are incorporated to address data gaps and uncertainties in the calculation of the OEHHA RELs, exposures that exceed the REL do not automatically indicate an adverse health impact. (http://oehha.ca.gov/air/hot_spots/2008/NoncancerTSD_final.pdf)

There are many sources of benzene which may have contributed to this one day sample, including the use of gasoline equipment or vehicles, glue, paints, and detergents. A compilation of data from 2012 by the South Coast Air Quality Management District (SCAQMD) reported in *Multiple Air Toxics Exposure Study in the South Coast Air Basin MATES IV, May 2015* (http://www.aqmd.gov/docs/default-source/air-quality/air-toxic-studies/mates-iv/mates-iv-final-draft-report-4-1-15.pdf?sfvrsn=7) show that concentrations of benzene at the SCAQMD Burbank weather station range from a minimum of 0.17 ppbv to a maximum of 1.23 ppbv with an average benzene concentration of 0.46 ppbv. The maximum concentration of benzene detected was 1.6 ppbv, which is slightly above the maximum background concentration reported for the Burbank Weather station. It should also be noted that on the previous sampling day (January 27, 2016), the maximum concentration of benzene was only 0.54 ppbv.

Additional sampling will be conducted at Knollwood Elementary School on February 4, 2016 and on February 5, 2016. The sampling will consist of three 8-hour samples collected at three separate locations on the school campus during each day of sampling. If benzene levels continue to exceed the chronic REL, an investigation into possible sources may be the next step.

Sincerely,

Elizabeth Gonzalez, P.E.
Principal Engineer
Waterstone Environmental, Inc.

Grace Rinck, CIH
Principal Industrial Hygienist
Aurora Industrial Hygiene

Attachments