



EA Engineering, Science, and Technology, Inc.

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26 June 2007

Mr. Joseph T. Martella II, Senior Engineer
RIDEM - Office of Waste Management
Site Remediation Program
235 Promenade Street
Providence, Rhode Island 02908

RE: Request to Modify Sampling and Monitoring Schedule
Adelaide Avenue School, 333 Adelaide Avenue, Providence, RI
Case No. 2005-029; EA Project No. 61965.01

Dear Mr. Martella:

On behalf of the City of Providence (City), EA Engineering, Science, and Technology, Inc. (EA) is requesting a modification to the sampling and monitoring frequency included in the long-term operation and maintenance (O&M) schedule currently being implemented at the referenced Adelaide Avenue School property (the Site).

To date, despite significant increased costs, as an ongoing show of good faith and demonstration of their commitment to satisfy the concerns of your Department and the community relative to the effectiveness of the approved remedy at the Site, the City has been implementing a comprehensive O&M program that *exceeds* the requirements specified in the Amended Order of Approval dated 27 February 2007 and *supersedes* federal and state guidance relative to long-term O&M at sites where sub-slab depressurization (SSD) systems are installed. Most importantly, the data collected to date clearly demonstrates that no soil vapor intrusion is occurring at the Site, the SSD system is meeting all design specifications, and the system has operated continuously with no mechanical or electrical failures.

SSD System Overview and Summary of Effective Operation

The Department-approved SSD system is based upon federal and state design guidelines and is comprised of a series of eight sub-slab suction pits installed within a gravel layer beneath the entire slab of the newly constructed school. A series of pipes connect these suction pits to one of three suction fans located on the roof of the school. The fans generate a vacuum under the slab to prohibit the movement of sub-slab vapors (if any, and regardless of their type, concentration, and source) from migrating into the school. A vapor barrier installed above the gravel layer and the concrete slab itself provide additional layers of defense to prohibit soil vapor intrusion. Federal and state guidance relative to demonstrating effectiveness of mitigation systems indicate that the most important factor, and in many instances the only factor monitored after installation, is maintaining depressurization beneath the slab between -0.002 and -0.04 inches of water. To date, EA has measured sub-slab depressurization at all eight sub-slab monitoring locations on 16 occasions with the following results:

- Sub-slab vacuum between -0.05 and -0.18 inches of water beneath the entire slab has consistently been measured in all eight monitoring locations during each monitoring event.
- Throughout the first 16 weeks since the SSD system was turned on-line, each of the three roof-top fans have operated continuously without interruption.

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- A continuous electrical monitoring system installed to automatically notify EA and other responsible City officials (via auto dialer) if any of the roof-top fans become dysfunctional is fully operational and has not resulted in any notifications.

The SSD system has operated continuously in accordance with the EPA/state-based and Department-approved design, and has proven to be highly reliable and effective at maintaining a sub-slab negative pressure field that exceeds federal and state guidelines.

Overview of VOC Sampling Completed to Date

To date, a total of 71 air samples have been collected at the Site and each was analyzed for 45 individual volatile organic compounds (VOCs). Indoor air, sub-slab vapor, ambient outdoor air, and/or roof-top SSD system effluent air sampling was completed on 15 March, 22 March, 26 April, and 21 May 2007. Subsequent to each of these sampling events, a summary report was submitted to the Department for review. Please refer to said summary reports for detailed information and supporting documentation (number and location of samples, tables, figures, laboratory reports, etc.). A fifth sampling event that includes 20 additional indoor, sub-slab, roof-top effluent, and ambient outdoor air samples is scheduled for 29 June 2007 (summary report to be submitted to the Department in July upon receipt and analysis of data from the laboratory). An overview of the data is provided below.

- No VOCs resultant from soil vapor intrusion have been identified within the school at the Site in concentrations that exceed the applicable Indoor Air Action Levels established for the project.
- Construction-related VOCs identified within the school building have decreased dramatically since March as the level of construction activity has decreased. Once all construction activity is completed, residual VOCs are expected to continue to dissipate.
- Residual VOC concentrations related to construction beneath the slab have not correspondingly been found inside the school, thereby demonstrating effective elimination of the soil vapor intrusion pathway. As expected, the concentrations of these residual VOCs within the sub-slab region have decreased dramatically (over 99.8%) over the first four sampling events, and they are expected to continue to dissipate over time.
- With the exception of these residual construction-related VOCs, no other VOCs in the sub-slab samples analyzed have been detected by the laboratory above the respective reporting levels and above the respective Action Levels established for indoor air.
- One VOC, carbon tetrachloride, has been identified as a background ambient concentration for the Site. Carbon tetrachloride has consistently been detected in ambient outdoor air between 0.48 to 0.71 $\mu\text{g}/\text{m}^3$. Similarly, this compound has been detected within the school between 0.36 to 0.79 $\mu\text{g}/\text{m}^3$, and therefore is not resultant from soil vapor intrusion.
- With the exception of 1 VOC compound in one indoor sample collected on 22 March 2007 (trichloroethylene, also detected in ambient outdoor air at a greater concentration than in indoor air), none of the VOC compounds of greatest potential concern to human health at this site, as identified by the Agency for Toxic Substances and Disease Registry in their December 2006 Health Consultation, were detected in any of the samples at concentrations greater than the applicable Indoor Air Action Levels.
- With respect to VOCs within the roof-top effluent of the SSD system, sampling completed on 22 March 2007 indicates that cumulative VOC emissions were, by several orders of magnitude, far below any of the applicable Departmental air permitting thresholds. Ongoing VOC monitoring in



the roof-top effluent indicate a decreasing trend of VOC emissions. Another roof-top effluent sampling event scheduled for 29 June 2007 is expected to confirm these field measurements.

Proposed Revised Long-Term O&M Schedule

EA proposes that beginning in July, a quarterly (i.e., seasonal) indoor air (8 sampling locations per Amended Order of Approval) and sub-slab vapor (4 sampling locations, MP-1, MP-2, MP-5, and MP-7, per Amended Order of Approval) sampling schedule, supplemented by annual roof-top effluent sampling, monthly site monitoring visits to verify effective sub-slab depressurization, and the continuous electronic monitoring of the roof-top fans to ensure proper operation of the SSD system. No changes to the Department-approved, continuous, indoor methane monitoring system are proposed at this time. The City will continue to provide a summary report following each sampling event and will continue to comply with the protocol included in the original and Amended Order of Approval for responding to issues of non-compliance (i.e., immediate notification to the Department with a verbal scope of work to correct the issue of non-compliance, follow-up written documentation within 7 days, etc.). The Department will continue to maintain their ability to require additional work to address areas of non-compliance if warranted. Please note that this proposed revised O&M schedule will continue to *supersede* applicable federal and state guidance relative to long-term O&M at sites where sub-slab depressurization (SSD) systems are installed to mitigate soil vapor intrusion.

In conclusion, we trust that this letter satisfactorily alleviates the Department's concerns relative to the effectiveness of the approved remedy and supports the City's request to modify the long-term O&M plan. Since the Amended Order of Approval requires automatic weekly air sampling beginning in late July/early August, and as currently written, continuing indefinitely at significant cost to the City (estimated to be over \$25-30K per month), a prompt decision by the Department is requested. If you have any questions or require additional information, please do not hesitate to contact me at 401-736-3440, Ext. 216.

Sincerely,

EA ENGINEERING, SCIENCE,
AND TECHNOLOGY, INC.

Peter M. Grivers, P.E., LSP
Project Manager

cc: J. Simmons, City of Providence
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