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EA Engineering, Science, and Technology, Inc.

10 March 2014

Mr. Joseph T. Martella II, Senior Engineer
Site Remediation Program
Office of Waste Management
RI Department of Environmental Management
235 Promenade Street
Providence, RI 02908

*RE: Quarterly O&M Status Report No. 26
Alvarez High School, 333 Adelaide Avenue, Providence, Rhode Island
Case No. 2005-029
EA Project No. 15066.01.0002*

Dear Mr. Martella:

On behalf of the City of Providence School Department (City), EA Engineering, Science, and Technology, Inc. (EA) is providing this Quarterly Operations and Maintenance (O&M) Status Report in accordance with Provision 6(f) of the Order of Approval and amendments (Amended OA) for the referenced Alvarez High School site (the Site, formerly Adelaide Avenue High School).

This O&M Report summarizes recently-completed Site activities related to compliance subslab vapor and indoor air sampling for the period from December 2013 through February 2014.

If you have any questions or require additional information, please contact me at (401) 736-3440, Ext. 203.

Sincerely,

EA ENGINEERING, SCIENCE,
AND TECHNOLOGY, INC.

A handwritten signature in blue ink, appearing to read 'Frank B. Postma', is written over a light blue horizontal line.

Frank B. Postma, LSP, LEP, PG
Project Manager

cc: C. Jones, Prov. Dept. of Public Schools
Director, Prov. Redevelopment Agency
J. Padwa, City of Prov. Law Department
R. Dorr, Neighborhood Resident
Rep. Scott Slater
Knight Memorial Library Repository

A. Sepe, Prov. Dept. of Public Property
S. Fischbach, RI Legal Services
J. Ryan, Partridge, Snow, & Hahn
J. Pichardo, Senator
Principal Rivers, Alvarez High School



Quarterly O&M Status Report No. 26

Summarizing Subslab Depressurization and Indoor Air Monitoring and Sampling Activities

Alvarez High School Site (Formerly Adelaide Avenue High School) Providence, Rhode Island

Prepared for

City of Providence School Department
797 Westminster Street
Providence, Rhode Island 02903

Prepared by

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EA Project No. 15066.01.0002
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1. INTRODUCTION AND BACKGROUND

On behalf of the City of Providence School Department (the City), EA Engineering, Science, and Technology, Inc. (EA) has prepared this Quarterly Operations and Maintenance (O&M) Status Report No. 26 for the Parcel B area of the former Gorham Manufacturing site in Providence, Rhode Island, formerly referred to as Adelaide Avenue High School and now referred to as Alvarez High School (the Site). A Site Location Map is provided as Figure 1. This report has been prepared to satisfy provision 6(f) of the Rhode Island Department of Environmental Management (RIDEM) Order of Approval (OA) issued in June 2006, as amended in February 2007, July 2007, and July 2009. For the purposes of this report, the original and the amended OA will collectively be referred to as the Amended OA.

The Amended OA specifies the details of the approved remedy for the Site including, but not limited to, the installation of a subslab depressurization (SSD) system, installation of a continuous indoor air methane monitoring system, and implementation of an associated periodic monitoring and sampling program. In August 2007, the RIDEM-approved remedy for the Site was completed and a Remedial Action Closure Report (RACR) was submitted to RIDEM. In July 2009, the periodic indoor air and subslab vapor sampling schedule was reduced to quarterly sampling from previously required monthly sampling.

This report summarizes the O&M, monitoring, and sampling activities completed at the Site for the 3-month period from December 2013 through February 2014 (Quarterly Reporting Period No. 26) and also includes an overall evaluation of volatile organic compound (VOC) concentrations within soil gas as they pertain to a potential rebound effect at the Site. Please refer to Quarterly O&M Status Reports No. 1 through No. 25 for information regarding monitoring and sampling at the Site during the previous quarters. The RACR and previously-submitted monthly correspondence contain details regarding the results of the monitoring and sampling program for the period between March and August 2007.

2. SUMMARY OF SSD SYSTEM AND INDOOR METHANE MONITORING SYSTEM PERFORMANCE

2.1 SSD SYSTEM

The following SSD System performance parameters were inspected and/or monitored at the frequencies indicated below in accordance with the Amended OA to evaluate system performance:

- Monthly subslab vacuum monitoring at 11 monitoring locations, as illustrated on the As-Built Subslab Monitoring and Sampling Plan provided as Figure 3.
- Monthly inspections and monitoring of 3 rooftop fans (air velocity and vacuum) to verify proper operation.
- Continuous electronic monitoring (with automatic alarm notification via audible signal and phone notification) at each of three SSD system extraction fans to ensure continuous operation.

Vacuum measurements taken at each interior and perimeter subslab monitoring/sampling locations were between -0.01 and -0.10 in. of water column. Negative measurements confirm that a continuous negative pressure has been maintained beneath the building slab.

On 24 February 2014 an alarm sounded from the control panel for the indoor methane monitoring system, indicate that power had been lost to the continuous methane sensors. The alarm event is further discussed in Section 2.2, below. Inspections and monitoring of all other system equipment revealed proper system operation. The continuous, verified zone of negative pressure beneath the school's concrete slab, along with the monthly inspections and continuous monitoring of both the indoor air monitoring system and the subslab depressurization system, confirms proper operation of the SSD System during this reporting period. EA has determined that the uninterrupted power supply (UPS) will need to be replaced. The UPS replacement will occur in March 2014.

Copies of O&M field forms summarizing SSD System monitoring data collected during this reporting period are provided in Appendix A.

2.2 INDOOR METHANE MONITORING SYSTEM

Indoor methane concentrations were continuously monitored by an indoor methane monitoring system (equipped with automatic alarm notification via audible signal and phone notification) within the school at eight RIDEM-approved locations (refer to the Indoor Air Sampling and Methane Monitoring System Diagram provided as Figure 2) during this reporting period. In addition, the methane monitoring system was inspected and filters were replaced on 13 December 2013. The next filter replacement is scheduled for March 2014.

Alvarez High School personnel contacted EA at approximately 2:45 PM on 24 February 2014 to notify EA of an alarm sounding from the control panel for the indoor methane monitoring system in the administrative office. EA arrived at the site at approximately 3:00 PM and discovered an alarm emanating from the PS-7000 Channel Controller unit in the school's administrative office. The controller was operational at this time and readings were consistent with normal values.

Upon closer inspection, it was determined that the alarm was resultant from a temporary failure of the uninterrupted power supply (UPS). EA reset the UPS and the indoor methane monitoring system. The subslab vacuum was verified from several subslab monitoring locations following the system restart. The continuous subslab negative pressure was not interrupted during the system outage because the rooftop fans run separately from the indoor methane monitoring system and power was not lost to the building. Additionally, a review of the stored data points in the control panel's history showed no exceedances.

The UPS remained functional following manual reset. A similar alarm sounding and response occurred on 12 February 2013 and 23 April 2013, as discussed in Quarterly Status Report No. 22 and 23, respectively. EA attempted to replace the malfunctioning UPS on 9 May 2013; however, the UPS is hardwired into the electrical system the school and will require an electrician to install. EA has contacted Providence School Department personnel to coordinate the installation of the UPS. EA received RIDEM approval for the replacement of the UPS unit and work will occur in March 2014.

EA contacted the manufacturer (DOD Industries, Inc.) of the PS-7000 Channel Controller in April 2013 to determine if a temporary loss of power would affect the unit's internal calibration curves. The technician recommended recalibration of the unit to assure that the curves were not affected. DOD Industries, Inc. and EA recalibrated the system on 9 May 2013. EA will recalibrate the system following the installation of a new UPS unit in March 2014.

2.3 AMBIENT OUTDOOR AND INDOOR AIR SAMPLING

One ambient outdoor air sample and eight ambient indoor air samples within the school at RIDEM-approved sampling locations were collected and analyzed for VOCs via Method TO-15 SIM (Selective Ion Monitoring) on 9 January 2014. The ambient outdoor air sample was collected upwind (northwest) of the school. Sampling locations for the indoor and sub-slab air samples are illustrated on Figure 3. The indoor air sampling results were compared to the State of Connecticut's Draft Proposed Indoor Residential Targeted Air Concentrations (CT RTACs) in accordance with the Amended OA. The laboratory method reporting limits (MRLs) for several VOCs reported via TO-15 analysis, even though analyzed via the SIM procedure, were greater than the respective CT RTACs. In accordance with the Amended OA, EA contacted the laboratory prior to sample analysis to verify that the RLs provided would be the lowest currently achievable limits. An MRL verification letter from Con-Test Analytical Laboratory (Con-Test) is provided in Appendix E. A data summary table and copies of the laboratory data reports associated with this sampling event are provided in Appendix C.

The sample collected in the cafeteria reported a concentration of 1,2 DCA at $0.097 \mu\text{g}/\text{m}^3$ which is above the CT RTACs and RIDEM amended threshold value of $0.07 \mu\text{g}/\text{m}^3$ and $0.08 \mu\text{g}/\text{m}^3$, respectively. EA believes the exceedances result from an external source and not from a soil vapor pathway. Ambient air concentrations resulting from a soil vapor pathway should be approximately 2,000 times lower than sub-slab air concentrations. However, ambient air concentrations are at levels comparable to the sub-slab air concentrations. Similar 1,2-DCA concentrations were observed in the previous sampling events (Quarterly Monitoring Reports 22, 23, and 24) and reflect the same findings. EA has investigated the 1,2-DCA levels with RIDEM using collocated samples as reported in Quarterly Monitoring Report No. 24. It was determined that 1,2-DCA levels were not likely from a soil vapor pathway as the concentrations were too low to be responsible for levels found in the air.

The AOA sample collected upwind of the school had a concentration of $3.7 \mu\text{g}/\text{m}^3$ of methylene chloride which is above the CT RTAC of $3.0 \mu\text{g}/\text{m}^3$. This has been reported to the RIDEM and the may be further investigated. However, methylene chloride is a common laboratory contaminant and byproduct of many cleaning products. No other ambient indoor air samples collected during the January 2014 sampling event contained compounds with concentrations above the CT RTACs or RIDEM approved Action Levels.

2.4 SUBSLAB VAPOR SAMPLING AND EVALUATION OF POTENTIAL VOC REBOUND EFFECT

A total of 11 RIDEM-approved subslab sampling locations are installed at the Site. Six subslab vapor samples were collected in accordance with a RIDEM-approved (Amended OA) rotating sampling schedule and analyzed for VOCs via Method TO-15 SIM on 9 January 2014 in accordance with the Amended OA. The subslab data is summarized in Appendix D, along with copies of the laboratory data reports associated with these sampling events.

The subslab data has been evaluated and there is no evidence of increasing VOCs (i.e., VOC rebound) beneath the school in accordance with the Amended OA.

2.5 SUMMARY OF ROOFTOP VOC EMISSIONS

The Amended OA requires that rooftop VOC sampling be completed on an annual basis. The latest rooftop VOC sampling event was completed on 9 July 2013 and is summarized in Appendix D. No exceedances of the RIDEM Air Pollution Control Permit Applicability Thresholds for hourly, daily, or yearly emissions were observed. However, a number of compounds, including 1,2-DCA were detected. The 2014 annual rooftop effluent VOC sampling event is scheduled for July 2014 to accommodate the quarterly sampling schedule.

Previous rooftop effluent sampling rounds conducted in March 2007 (immediately after SSD system startup), June 2007, June 2008, September 2009, July 2010, July 2011, and July 2012 indicated compliance with all Air Pollution Control Permit Applicability Thresholds. In general, the VOC concentrations in the rooftop effluent associated with the July 2013 sampling round indicate continuance of the decreasing trend of VOC concentrations and do not exceed the Air

Pollution Control Permit Applicability Thresholds. Tabulation of the data and the rooftop sampling analytical report is provided as Appendix D.

2.6 CONCLUSIONS

The following conclusions are made based upon the completed inspections, monitoring, and sampling performed during this reporting period:

- The consistent negative pressure maintained below the floor slab indicates that soil vapor intrusion into the Alvarez High School is not occurring.
- Subslab vapor rebound is not occurring at the school, based on analytical data from this sampling event.
- The continuous operation of the SSD System, with no equipment malfunctions or alarm conditions, and confirmation of continuous subslab vacuum beneath the school illustrates ongoing, effective operation of the SSD System. No soil vapor intrusion pathway exists at the school while the SSD System is operational.
- The indoor methane monitoring system alarm on 24 February 2014 does not appear to have interrupted the continuous subslab negative pressure during the outage because the rooftop fans run separately from the indoor methane monitoring system and power was not lost to the entire building.
- The replacement of the UPS for the indoor methane monitoring system has been approved and will occur in March 2014 as well as a recalibration of the methane sensors.
- The compound 1,2-dichloroethane (1,2-DCA) was detected in exceedance of the CT RTAC and RIDEM amended threshold value in the cafeteria. The compound 1,2-DCA has been reported an exceedance of applicable standards in Quarterly Monitoring Reports No. 22, 23, and 24. The RIDEM collocated samples with EA in July 2013. Following this event, it was concluded that 1,2-DCA concentrations are likely due to an external source and are not a result of a soil vapor pathway (Quarterly Monitoring Report No. 24).

3. FUTURE ACTIVITIES AND NEXT QUARTERLY SUMMARY REPORT

The following activities will be completed in accordance with the Amended OA during the next quarterly status reporting period ending May 2014:

- Continuous monitoring of the operational status of the three rooftop fans;
- Monthly site inspections and monitoring using a photoionization detector with part-per-billion sensitivity; and
- Collection of air samples from eight indoor locations, one ambient location, and six subslab monitoring points in April 2014.
- Installation of a new UPS in March 2014 as well as a recalibration of the methane sensors.

These activities will be summarized in the next status report (Quarterly Status Report No. 27), expected to be submitted by the end of June 2014.

FIGURES

APPENDIX A

O&M Field Forms

APPENDIX B

Indoor and Ambient Outdoor Air Analytical Summary

APPENDIX C

Subslab Vapor Analytical Summary

APPENDIX D

Rooftop Emission Analytical Summary

APPENDIX E

Indoor Air, Ambient Outdoor Air, And Subslab Vapor Laboratory Analytical Report

APPENDIX F

Laboratory Method Reporting Limits Correspondence

