Environmental Safety Management Corporation

AIR QUALITY, MOLD TESTING, ERGONOMICS, OSHA

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August 30, 2021

Ms. Sarah Bell
Business Administrator/Board Secretary
Kingsway Regional &
South Harrison Twp. Elem. School Districts
213 Kings Highway
Woolwich Twp., NJ 08085

Dear. Ms. Bell,

This report summarizes the results of the August 16 through August 23, 2021 mercury air monitoring of the South Harrison Elementary School Gym. This assessment was conducted by Dr. Richard M. Lynch, PhD., CIH and Mr. Richard A. Lynch, MBA, CIEC. The objectives of this assessment were the following:

1. Determine if the gym's overhead air handling systems are effective at controlling airborne mercury levels during the summer cooling season operating in a daytime occupied/evening un-occupied mode with thermostat setting at 25% minimum outdoor air introduction.
2. Determine the length of time required to return to baseline airborne mercury levels after return to occupied mode following each of the cycles.
3. Compare airborne mercury levels under this modified HVAC schedule to those previously measured with the gym's HVAC system operating in the 24/7 occupied mode at 68^{o}F thermostat set point at 50% outdoor air.
4. Recommend an HVAC operating mode for the onset of the 2021 school year beginning in September.

Executive Summary of Findings

Daytime airborne mercury levels within the gym while the HVAC system was running in the occupied mode averaged approximately 0.23 to 0.31 µg/m^3; well below the NJ Department of Health Guideline of 0.8 ug/m^3. During the un-occupied mode evening and weekend periods, the average airborne mercury concentration increased to approximate or exceed the NJ Department of Health Guideline of 0.8 µg/m^3 within approximately 8 hours. Upon return to occupied mode setting each morning, the HVAC systems required approximately 3 hours to return airborne mercury levels to the baseline level of 0.2 µg/m^3. This is approximately 2 hours longer than the previously established return to baseline measured in our July/August as well as June monitoring which required less than 1 hour to return to baseline conditions following HVAC deactivation.

Based upon these findings, it is our professional opinion that the gym's HVAC systems are

effective at controlling airborne mercury concentrations below 0.8 ug/m^3 during occupied mode conditions even at 25% outdoor air introduction, however the return to baseline required approximately 3 times longer than previously measured at 50% outdoor air. All combined, it is our professional opinion that the district continue to operate the gym's air handlers in the 24/7 occupied mode at 50% outdoor air introduction as previously documented to effectively control airborne mercury levels for the fall reopening period. Monthly air monitoring should be conducted beginning in September through June 2021.

I. Methods

Evaluation criteria were previously described and will not be repeated herein. The following methods were observed during our August 16-23, 2021 monitoring period.

- Continuous air monitoring was conducted within the gym over an approximate 7-day period between approximately 6:35PM on August 16, 2021 and 8:10AM on August 23, 2021.
- On August 17, 2021 at approximately 11:45AM the gym's HVAC system was switched from operating at 50% damper position and a set point at 69^{o}F to the following schedule
    - Weekday Occupied mode: 25% minimum damper position with a set point of 69^{o}F 6:30AM to 8:00PM
    - Weekday Unoccupied mode: 25% minimum damper position with a set point of 75^{o}F 8:00PM to 6:30AM
    - Weekend Occupied mode: 25% minimum damper position with a set point of 69^{o}F 10:00AM to 2:00PM
    - Weekend Unoccupied mode: 25% minimum damper position with a set point of 75^{o}F 2:00PM to 10:00AM
- All mercury air monitoring was conducted using a calibrated Jerome J505 Mercury Vapor Analyzer with a reported detection limit of 0.05 μg/m^3 which reads as low as 0.00 μg/m^3 with a resolution of 0.01.
- Temperature and humidity were monitored over the same period using a TSI Q-Trak 7575 IAQ monitor.

II. Observations and Mercury Air Monitoring Findings

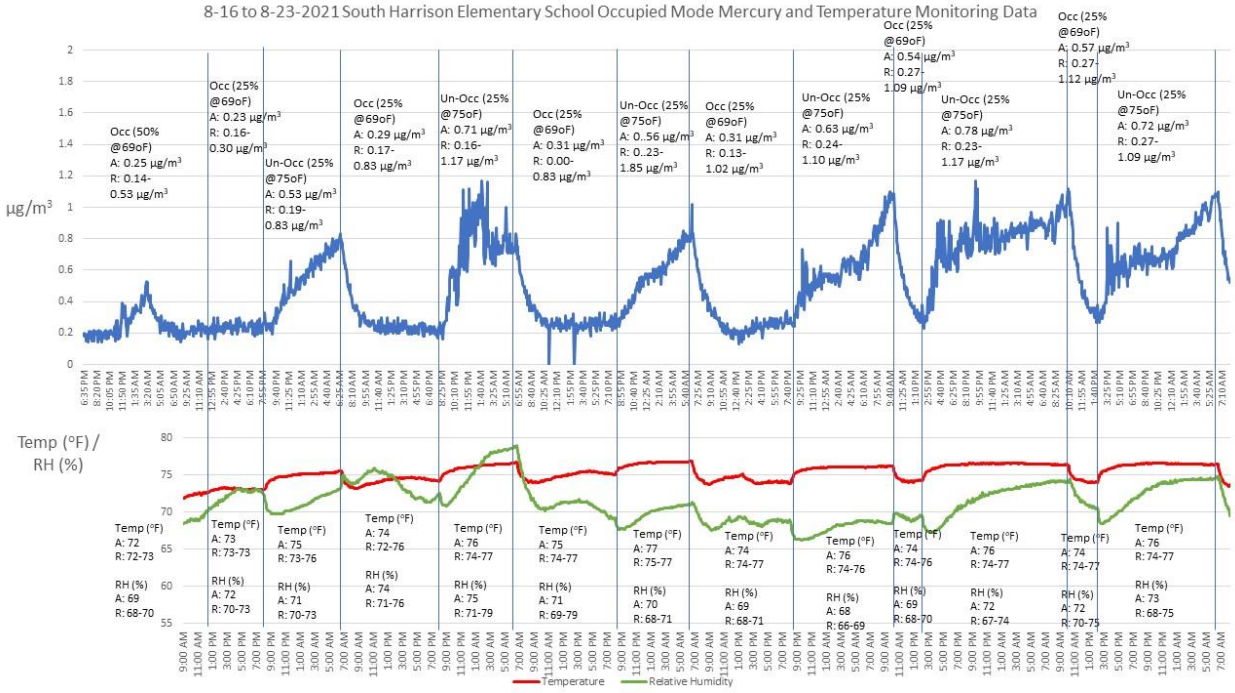
Findings revealed the following:

- Outdoor airborne mercury was at approximately 0.02 micrograms per cubic meter (μg/m^3). Outdoor temperature ranged from 72 to 90 ^{o}F during the duration of the monitoring period.
- Airborne mercury levels measured at the gym center during the Weekday Occupied mode: **averaged, 0.25, 0.23, 0.29, 0.31, and 0.31 μg/m^3** on each of the weekdays respectively; below the NJDOH Guideline of 0.8 μg/m^3. Gym temperature averaged 74^{o}F during these monitoring periods at an average relative humidity of 72%.
- Airborne mercury levels measured at the gym center during the Weekday Unoccupied mode: **averaged, 0.53, 0.71, 0.56, and 0.63, μg/m^3** respectively; comparable to the

NJDOH Guideline of 0.8 µg/m^3 with the max mercury during each inspection period surpassing the NJDOH Guideline of 0.8 µg/m$^{3.}$ On average it took 3 hours for the airborne concentration to return from its highest point to below 0.3 µg/m^3 each time the HVAC returned to occupied mode. Gym temperature averaged 76^{o}F during these monitoring periods at an average relative humidity of 74%.

- Airborne mercury levels measured at the gym center during the Weekend Occupied mode: **averaged, 0.54 and 0.57 µg/m^3** respectively; below the NJDOH Guideline of 0.8 µg/m^3. Gym temperature averaged 74^{o}F during these monitoring periods at an average relative humidity of 71%.
- Airborne mercury levels measured at the gym center during the Weekend Unoccupied mode: **averaged, 0.63, 0.78 and 0.72 µg/m^3** respectively; comparable to the NJDOH Guideline of 0.8 µg/m^3 with the maximum airborne mercury surpassing the NJDOH Guideline. On average it took 3 hours for the airborne concentration to return from its highest point to below 0.3 µg/m^3 each time the HVAC was returned to occupied mode. Gym temperature averaged 76^{o}F during these monitoring periods at an average relative humidity of 72%.

Continuous air monitoring findings over the August 16-August 23, 2021 7-day monitoring period are shown in the Figure below:



IV. Conclusions and Recommendations

Daytime airborne mercury levels within the gym while the HVAC system was running in the occupied mode averaged approximately 0.23 to 0.31 µg/m^3; well below the NJ Department of

Health Guideline of 0.8 ug/m^3. During the un-occupied evening and weekend periods, the average airborne mercury concentration increased to approximate or exceed the NJ Department of Health Guideline of 0.8 µg/m^3 within approximately 8 hours. Upon return to occupied mode setting each morning, the HVAC systems required approximately 3 hours to return airborne mercury levels to the baseline level of 0.2 µg/m^3. This is approximately 2 hours longer than the previously established return to baseline measured in our July/August as well as June monitoring which required less than 1 hour to return to baseline conditions following deactivation.

Based upon these findings, it is our professional opinion that the gym's HVAC systems are effective at controlling airborne mercury concentrations below 0.8 ug/m^3 during occupied mode conditions even at 25% outdoor air introduction, however the return to baseline takes approximately 3 times longer than previously measured at 50% outdoor air. All combined, it is our professional opinion that the district continue to operate the gym's air handlers in the 24/7 occupied mode at 50% outdoor air introduction as previously documented to effectively control airborne mercury levels for the fall reopening period. Monthly air monitoring should be conducted beginning in September through June 2021.

Recommendations

1. Based upon these findings, we recommend that the district continue the 24/7 occupied mode at 50% outdoor air introduction and 68°F thermostat setting.
2. Schedule professional cleaning of the gym prior to September reopening and establish a routine non-abrasive cleaning of gym floors and other surfaces to reduce dust accumulation.
3. Monthly air monitoring for mercury for the 2021-2022 school year beginning in September should be planned. We are prepared to provide this.

Thank you for the opportunity to assist you with the evaluation. Please contact me with any questions.

Sincerely,
Richard A. Lynch
Richard A. Lynch, MBA, CIEC
Industrial Hygienist
NJ Licensed Indoor Environmental Consultant
www.esmcorp.com

Reviewed and Authorized:
Richard M. Lynch
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Certification of Instrument Calibration

RMA # 2796776

Environmental Safety Management Corp
21 E. Scott Street
Riverside. NJ 08075

This is to certify that the Jerome **J505-0005** Atomic Fluorescence Mercury Analyzer. Serial Number **50500325**. was calibrated with standard units traceable to NIST.

Calibration Status as Received: **Out of Calibration**

	Actual	Calibration Gas	Allowable Range
Incoming:	28.21 µg/m3 Hg 0.74 % RSD	25.00 µg/m3 Hg	22.50 - 27.50 µg/m3 Hg <5%
Outgoing:	24.77 µg/m3 Hg 0.65 % RSD	25.00 µg/m3 Hg	23.75 - 26.25 µg/m3 Hg <3%
Calibration Verification:	µg/m3 Hg % RSD	0.300 µg/m3 Hg	0.255 - 0.345 µg/m3 Hg <15%

Calibration Status as Left: **In Calibration**

Estimated Uncertainty of Calibration System: 3.5%

Calibration Date: 22-Jan-2021 Recalibration Date: 21-Jan-2022

Temperature °F: 71.10 % Relative Humidity: 42.00

Approved By: Cheryl Hradek Date Approved: 10-Feb-2021

Title: Cheryl Hradek - Quality Control

Equipment Used:

Permeation Tube: S89-56804 **NIST#:** ISO13265: 072958
Calibration Date: 21-May-2020 **Calibration Date Due:** 21-May-2021

DynaCalibrator: M-1878 **NIST#:** 19-2985
Calibration Date: 30-Sep-2020 **Calibration Date Due:** 30-Sep-2021

Digital Multimeter: 66961028 **NIST#:** 7003135
Calibration Date: 24-Feb-2020 **Calibration Date Due:** 24-Feb-2021

Mass Flow Controller: 63665 **NIST#:**227080
Calibration Date:27-Mar-20 **Calibration Date Due:** 27-Mar-21

Calibration Procedure Used: 730-0165

AMETEK Brookfield certifies that the above listed instrument meets or exceeds all published specifications and has been calibrated using standards whose accuracy is traceable to the NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY within the limitations of the Institute's calibration services. or have been derived from accepted values of natural physical constants, or have been derived by the ratio type of self-calibration techniques.
Disclaimer Any unauthorized adjustments, removal or breaking of QC seals. or other customer modifications on your Jerome Analyzer WILL VOID this factory calibration. because any of the above acts could affect the calibration and readings of the instrument. Further. AMETEK Brookfield WILL NOT be responsible for any liabilities created as a result of using the instrument after such adjustments. seal removal. or modifications