INDOOR AIR QUALITY ASSESSMENT

William Taylor Elementary School
620 Brock Avenue
New Bedford, Massachusetts

Prepared by:
Massachusetts Department of Public Health
Bureau of Environmental Health
Indoor Air Quality Program
January 2012

Background/Introduction

At the request of the New Bedford School and Health Departments, the Massachusetts Department of Public Health (MDPH), Bureau of Environmental Health (BEH) provided assistance and consultation regarding indoor air quality (IAQ) at the William Taylor Elementary School (TES) located at 620 Brock Avenue, New Bedford, Massachusetts. Concerns about general IAQ, water damage/potential mold growth and exacerbation of eye/respiratory/allergy symptoms prompted the request.

On November 10, 2011, the building was visited by Cory Holmes, Environmental Analyst/Regional Inspector in BEH's IAQ Program. The TES is a two-story, red brick building with basement built in the late 1800s. The school contains general classrooms, a kitchen, several rooms in the basement that serve as cafeterias, and limited office space. Most building materials are of original construction, such as plaster walls, ceilings, heating/ventilation components and the original slate roof. Windows were reportedly replaced in the 1990s and are openable throughout the building.

Methods

Air tests for carbon monoxide, carbon dioxide, temperature and relative humidity were conducted with the TSI, Q-Trak, IAQ Monitor, Model 7525. Air tests for airborne particle matter with a diameter less than 2.5 micrometers were taken with the TSI, DUSTTRAK™ Aerosol Monitor Model 8520. BEH staff also performed visual inspection of building materials for water damage and/or microbial growth.

Results

The school houses approximately 260 students in grades K through 5 with approximately 20 staff members. Tests were taken during normal operations at the school and results appear in Table 1.

Discussion

Ventilation

It can be seen from Table 1 that carbon dioxide levels were above 800 parts per million (ppm) in thirteen of twenty areas, indicating poor air exchange in more than half of the areas surveyed at the time of the assessment. It is important to note that the school does not have a functioning mechanical ventilation system. The school's original natural/gravity feed ventilation system has been largely abandoned, thus the sole source of ventilation in the building is via openable windows. A few classrooms were empty/sparsely populated at the time of assessment, which can greatly reduce carbon dioxide levels. Carbon dioxide levels would be expected to increase with higher occupancy.

Originally, ventilation was provided by a series of louvered vents. Each classroom has an approximately 3' x 3' grated air vent in an interior wall near the ceiling (Pictures 1 and 2), which is connected by a ventilation shaft to a vault-like "air-mixing" room in the basement. A corresponding 3' x 3' vent exists in each room (Picture 3) near the floor that is connected to an exhaust ventilation shaft that runs from the basement to the roof (Pictures 4 through 6). Classrooms were constructed around these shafts to provide exhaust ventilation. The draw of air into these vents is controlled by a draw chain pulley system. The chains of the pulley system were designed to set the flue in the ventilation shaft at a desired angle to adjust airflow (Pictures 2, 3 and 5).

Air movement is provided by the stack effect. Heating elements located in the base of the ventilation shaft warm the air, which rises up the ventilation shaft (Picture 7). As the heated air rises, negative pressure is created, which draws cold air from the enclosed air-mixing room in the basement into the heating elements/ventilation shaft. This system was designed to draw in outside air from windows in the air-mixing room. The percentage of fresh air is controlled by a hinged window-pulley system (Picture 8).

As mentioned previously, this ventilation system appears to have been mostly abandoned. Without a functioning ventilation system, normally occurring environmental pollutants can build up. If this system is not to be restored, care should be taken to ensure unused ventilation shafts are rendered airtight in classrooms, in basement air-mixing rooms and at the top of abandoned chimney/ventilation stacks to prevent pests, dirt, dust and drafts from entering occupied areas.

Currently, ventilation in the school is controlled by the use of openable windows in classrooms. Classrooms were originally configured in a manner to use cross-ventilation to provide comfort for building occupants. The building is equipped with windows on opposing exterior walls. In addition, the building has hinged windows located above the hallway doors. This hinged window (called a transom, Picture 9) enables classroom occupants to close the hallway door while maintaining a pathway for airflow. The design allows for airflow to enter an open window, pass through a classroom and subsequently pass through the open transom. Airflow then enters the hallway, passing through the opposing open classroom transom, into the opposing classroom and finally exits the building on the leeward side (opposite the windward side, as shown in Figure 1). Transoms are opened using a rod/hinge system. With all windows and transoms open, airflow can be maintained in a building regardless of the direction of the wind. This system fails if the windows or transoms are closed (Figure 2).

Of note was the lack of mechanical ventilation or openable windows in the basement dining areas. As mentioned, without supply/exhaust ventilation, indoor air pollutants can build up and lead to indoor air quality/comfort complaints.

The Massachusetts Building Code requires a minimum ventilation rate of 15 cubic feet per minute (cfm) per occupant of fresh outside air or have openable windows in each room for classrooms and 20 cfm for cafeterias (SBBRS, 1997; BOCA, 1993). The ventilation must be on at all times that the room is occupied. Providing adequate fresh air ventilation with open windows and maintaining the temperature in the comfort range during the cold weather season is impractical. Mechanical ventilation is usually required to provide adequate fresh air ventilation.

Carbon dioxide is not a problem in and of itself. It is used as an indicator of the adequacy of the fresh air ventilation. As carbon dioxide levels rise, it indicates that the ventilating system is malfunctioning or the design occupancy of the room is being exceeded. When this happens, a buildup of common indoor air pollutants can occur, leading to discomfort or health complaints. The Occupational Safety and Health Administration (OSHA) standard for carbon dioxide is 5,000 parts per million parts of air (ppm). Workers may be exposed to this level for 40 hours/week, based on a time-weighted average (OSHA, 1997).

The MDPH uses a guideline of 800 ppm for publicly occupied buildings. A guideline of 600 ppm or less is preferred in schools due to the fact that the majority of occupants are young and considered to be a more sensitive population in the evaluation of environmental health status. Inadequate ventilation and/or elevated temperatures are major causes of complaints such as respiratory, eye, nose and throat irritation, lethargy and headaches. For more information concerning carbon dioxide, consult Appendix A.

Temperature measurements in the school ranged from 61° F to 75° F, which were below the MDPH recommended range in several of the areas surveyed (Table 1). The MDPH recommends that indoor air temperatures be maintained in a range of 70° F to 78° F in order to provide for the comfort of building occupants. In many cases concerning indoor air quality, fluctuations of temperature in occupied spaces are typically experienced, even in a building with an adequate fresh air supply. In addition, it is difficult to control temperature and maintain comfort without a functioning ventilation system.

The relative humidity measured in the building ranged from 56 to 77 percent at the time of the assessment, which was above the MDPH recommended comfort range in the majority of areas surveyed (Table 1). The MDPH recommends a comfort range of 40 to 60 percent for indoor air relative humidity. However, without a mechanical means to reduce relative humidity (e.g., dehumidifiers or air conditioning), levels will be reflective to those outside, which was 100 percent the day of the assessment due to moderate/heavy rains. Relative humidity levels in the building would be expected to drop during the winter months due to heating. The sensation of dryness and irritation is common in a low relative humidity environment. Low relative humidity is a very common problem during the heating season in the northeast part of the United States.

Microbial/Moisture Concerns

Water-damaged wall/ceiling plaster, peeling paint and efflorescence were observed in a number of areas throughout the building (Pictures 10 through 14, Table 1). Efflorescence is a characteristic sign of water damage to brick and mortar, but it is not mold growth. As moisture penetrates and works its way through mortar, brick or plaster, water-soluble compounds dissolve, creating a solution. As the solution moves to the surface of the material, the water evaporates, leaving behind white, powdery mineral deposits. In addition, brick is a porous material that allows moisture to evaporate. Paint can serve as a water impermeable barrier, which can trap moisture and efflorescence causing bubbling and peeling (Pictures 10 and 11, Table 1). Without repointing and waterproofing of exterior masonry, peeling paint and efflorescence will continue to be a problem.

Water damage on the upper floors is most likely the result of water penetration through the original slate roof, as evidenced by numerous buckets and tarps to protect materials and catch water (Pictures 15 through 18). Water-damaged/mold colonized cardboard boxes and paper were observed in the attic storage room (Pictures 17 and 18). The US Environmental Protection Agency (US EPA) and the American Conference of Governmental Industrial Hygienists (ACGIH) recommend that porous materials be dried with fans and heating within 24 to 48 hours of becoming wet (US EPA, 2001; ACGIH, 1989). If not dried within this time frame, mold growth may occur. Once mold has colonized porous materials, they are difficult to clean and should be removed/discarded.

Another major source of water penetration is via missing/damaged mortar around exterior brick (Pictures 19 through 21). These conditions represent potential moisture penetration sources. Over time, these conditions can undermine the integrity of the building envelope and provide a means of water entry into the building via capillary action through foundation concrete and masonry (Lstiburek & Brennan, 2001). The freezing and thawing of water during winter months can lead to further damage and subsequent water penetration into the interior of the building. In addition, these breaches may provide a means for pests/rodents into the building.

Other IAQ Evaluations

Indoor air quality can be negatively influenced by the presence of respiratory irritants, such as products of combustion. The process of combustion produces a number of pollutants. Common combustion emissions include carbon monoxide, carbon dioxide, water vapor and smoke (fine airborne particle material). Of these materials, exposure to carbon monoxide and particulate matter with a diameter of 2.5 micrometers (μm) or less (PM2.5) can produce immediate, acute health effects upon exposure. To determine whether combustion products were present indoor, BEH staff obtained measurements for carbon monoxide and PM2.5.

Carbon Monoxide

Carbon monoxide is a by-product of incomplete combustion of organic matter (e.g., gasoline, wood and tobacco). Exposure to carbon monoxide can produce immediate and acute health affects. Several air quality standards have been established to address carbon monoxide and prevent symptoms from exposure to these substances. The MDPH established a corrective action level concerning carbon monoxide in ice skating rinks that use fossil-fueled ice resurfacing equipment. If an operator of an indoor ice rink measures a carbon monoxide level over 30 ppm, taken 20 minutes after resurfacing within a rink, that operator must take actions to reduce carbon monoxide levels (MDPH, 1997).

The American Society of Heating Refrigeration and Air-Conditioning Engineers (ASHRAE) has adopted the National Ambient Air Quality Standards (NAAQS) as one set of criteria for assessing indoor air quality and monitoring of fresh air introduced by HVAC systems (ASHRAE, 1989). The NAAQS are standards established by the US EPA to protect the public health from six criteria pollutants, including carbon monoxide and particulate matter (US EPA, 2006). As recommended by ASHRAE, pollutant levels of fresh air introduced to a building should not exceed the NAAQS levels (ASHRAE, 1989). The NAAQS were adopted by reference in the Building Officials & Code Administrators (BOCA) National Mechanical Code of 1993 (BOCA, 1993), which is now an HVAC standard included in the Massachusetts State Building Code (SBBRS, 1997). According to the NAAQS, carbon monoxide levels in outdoor air should not exceed 9 ppm in an eight-hour average (US EPA, 2006).

Carbon monoxide should not be present in a typical, indoor environment. If it *is* present, indoor carbon monoxide levels should be less than or equal to outdoor levels. On the day of the assessment, outdoor carbon monoxide concentrations were non-detect (ND). No levels of carbon monoxide were detected inside the building during the assessment (Table 1).

Particulate Matter (PM2.5)

The US EPA has established NAAQS limits for exposure to particulate matter. Particulate matter is airborne solids that can be irritating to the eyes, nose and throat. The NAAQS originally established exposure limits to particulate matter with a diameter of 10 μm or less (PM10). According to the NAAQS, PM10 levels should not exceed 150 micrograms per cubic meter ($\mu g/m^3$) in a 24-hour average (US EPA, 2006). These standards were adopted by both ASHRAE and BOCA. Since the issuance of the ASHRAE standard and BOCA Code, US EPA established a more protective standard for fine airborne particles. This more stringent PM2.5 standard requires outdoor air particle levels be maintained below 35 $\mu g/m^3$ over a 24-hour average (US EPA, 2006). Although both the ASHRAE standard and BOCA Code adopted the PM10 standard for evaluating air quality, MDPH uses the more protective PM2.5 standard for evaluating airborne particulate matter concentrations in the indoor environment.

Outdoor PM2.5 concentrations were measured at 15 μg/m^3 (Table 1). Indoor PM2.5 levels ranged from 7 to 28 μg/m^3 (Table 1), which were below the NAAQS PM2.5 level of 35 μg/m^3. Frequently, indoor air levels of particulates (including PM2.5) can be at higher levels than those measured outdoors. A number of mechanical devices and/or activities that occur in schools can generate particulate during normal operations. Sources of indoor airborne particulates may include but are not limited to particles generated during the operation of fan belts in the HVAC system, cooking in the cafeteria stoves and microwave ovens; use of photocopiers, fax machines and computer printing devices; operation of an ordinary vacuum cleaner and heavy foot traffic indoors.

Although no measurable levels of carbon monoxide or elevated PM2.5 were detected, a potential source was identified. The boiler room lacked a door and was open to the kitchen/food prep area (Pictures 22 and 23). The lack of a boiler room door may result in combustion products migrating into occupied areas under certain wind/weather conditions. Boiler rooms are frequently sealed with a fire rated/airtight door to prevent odors from migrating into adjacent areas.

Volatile Organic Compounds

Indoor air quality can also be impacted by the presence of materials containing volatile organic compounds (VOCs). VOCs are substances that have the ability to evaporate at room temperature. Frequently, exposure to low levels of total VOCs (TVOCs) may produce eye, nose, throat and/or respiratory irritation in some sensitive individuals. For example, chemicals evaporating from a paint can stored at room temperature would most likely contain VOCs. In an effort to identify materials that can potentially increase indoor VOC concentrations, BEH staff examined classrooms for products containing these respiratory irritants.

The majority of classrooms contained dry erase boards and related materials. Materials such as dry erase markers and dry erase board cleaners may contain VOCs, such as methyl isobutyl ketone, n-butyl acetate and butyl-cellusolve (Sanford, 1999), which can be irritating to the eyes, nose and throat.

Other Conditions

In several classrooms, items were observed on windowsills, tabletops, counters, bookcases and desks (Picture 24). The large number of items stored in classrooms provides a source for dusts to accumulate. These items (e.g., papers, folders, boxes) make it difficult for custodial staff to clean. Items should be relocated and/or be cleaned periodically to avoid excessive dust build up. In addition, these materials can accumulate on flat surfaces (e.g., desktops, shelving and carpets) in occupied areas and subsequently be re-aerosolized causing further irritation.

Finally, BEH staff observed damaged/exposed insulation that may contain asbestos around hot water pipes along the base of the wall in the basement boy's restroom (Pictures 25 and 26) and in the central cafeteria (Picture 27). Upon this discovery, BEH staff immediately reported the issue to Principal Matthew Riley. At the time of the assessment, BEH staff recommended that the insulation be evaluated and remediated by a licensed asbestos abatement contractor.

In subsequent communication with Mr. Riley, and Deborah Brown, School Business Manager, NBSD, BEH staff were informed that Environmental Response Services, Inc., a Massachusetts licensed asbestos contractor (#AC000412) performed removal/remediation of the identified hot water pipe insulation the evening of Thursday, November 10, 2011. Both the Massachusetts Department of Environmental Protection and the Division of Occupational Safety were notified (Appendix B). The material in the central cafeteria was removed and the material in the boy's restroom was encapsulated (Appendix B).

Conclusions/Recommendations

The physical building conditions and the condition/abandonment of the original gravity feed ventilation system, if considered individually, present conditions that could degrade indoor air quality. When combined, these conditions can serve to further degrade indoor air quality. Of note was the obvious water damage to plaster ceilings and walls in classrooms directly related to the condition of exterior brick and numerous leaks from the original slate roof. Without repair/replacement of the roof and repointing or exterior brick, these leaks and resultant water damage will continue. Some of the conditions observed can be remedied by actions of building occupants. Other remediation efforts will require alteration to the building structure and equipment. For these reasons, a two-phase approach is required for remediation. The first consists of short-term measures to improve air quality and the second consists of long-term measures that will require planning and resources to adequately address the overall indoor air quality concerns.

Short-Term Recommendations

1. Regulate airflow in classrooms using windows and transoms (for cross-ventilation) to control for comfort. Care should be taken to ensure windows are properly closed at night and weekends to avoid the freezing of pipes and potential flooding.
2. Contact an HVAC engineering firm for guidance on how to provide mechanical ventilation to basement dining areas. The Massachusetts Building Code requires a

minimum ventilation rate of 20 cubic feet per minute (cfm) per occupant of fresh outside air or have openable windows (SBBRS, 1997; BOCA, 1993).

3. Install fire-rated doors to separate the boiler room from the kitchen/food prep area. Ensure doors meet local fire code and fit flush with threshold. Seal doors on all sides with foam tape and/or weather-stripping. Ensure tightness of door by monitoring for light penetration and drafts around doorframe.
4. For buildings in New England, periods of low relative humidity during the winter are often unavoidable. Therefore, scrupulous cleaning practices should be adopted to minimize common indoor air contaminants whose irritant effects can be enhanced when the relative humidity is low. To control for dusts, a high efficiency particulate arrestance (HEPA) filter equipped vacuum cleaner in conjunction with wet wiping of all surfaces is recommended. Avoid the use of feather dusters. If used store them away from occupied areas. Drinking water during the day can help ease some symptoms associated with a dry environment (throat and sinus irritations).
5. Make temporary roof repairs to prevent/reduce leaks.
6. Discard water-damaged porous materials in attic.
7. Replace water-damaged ceiling tiles.
8. Scrape and clean efflorescence and loose paint from ceiling/wall plaster and brick. Do not repaint brick.
9. Relocate or consider reducing the amount of materials stored in classrooms to allow for more thorough cleaning. Clean items regularly with a wet cloth or sponge to prevent excessive dust build-up.

10. Ensure federally required 6-month and 3-year inspections are conducted and document in accordance with asbestos management plan as required by the Asbestos Hazard Emergency Response Act (AHERA) (US EPA, 1986). AHERA outlines a detailed process aimed at ensuring the safe management of all asbestos-containing materials by a designated person for a local education agency. Where asbestos-containing materials are found and/or damaged, these materials should be removed, remediated or maintained in a manner consistent with Massachusetts asbestos remediation laws (MDLI, 1993).
11. Consider adopting the US EPA document, "Tools for Schools" to maintain a good indoor air quality environment on the building (US EPA, 2000). This document can be downloaded from the Internet at: http://www.epa.gov/iaq/schools/index.html.
12. Refer to resource manuals and other related indoor air quality documents for further building-wide evaluations and advice on maintaining public buildings. These materials are located on the MDPH's website: http://mass.gov/dph/iaq.

Long-Term Recommendations

1. Based on the age, physical deterioration and availability of parts, the BEH recommends that an HVAC engineering firm evaluate options for providing adequate ventilation school-wide. Since restoration the original gravity feed ventilation system is not a likely option, consideration should be given to installing a mechanical ventilation system. Determine if existing airshafts, vents, ductwork, etc. can be retrofitted for (modern) mechanical ventilation.
2. Consider consulting with an architect, masonry firm or general contractor regarding the integrity of the building envelope, primarily concerning water penetration through the roof and exterior walls.

3. Consider having exterior brick foundation re-pointed and waterproofed to prevent further water intrusion. Repair/replace water-damaged interior plaster.
4. Replace or make repairs to original slate roof. Once roof is repaired, repair/replace any remaining water-damaged building materials.

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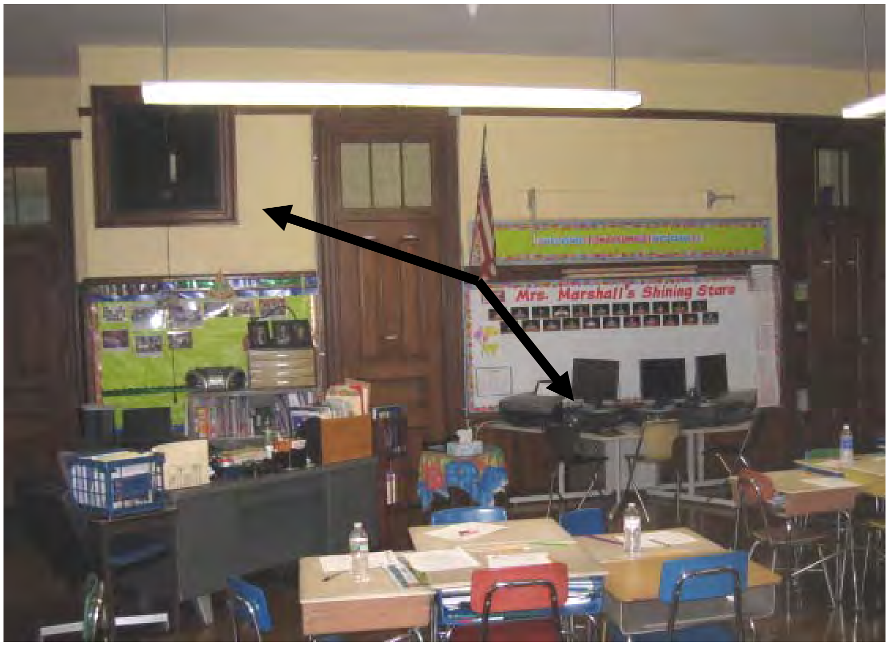
Picture 1



Typical Classroom Ventilation Configuration (as Indicated by Arrows):
Supply Vent (Top Left) Exhaust Vent (Bottom Right-Obstructed)

Picture 2

Supply Vent, Note Pull Chain to Adjust Airflow

Picture 3

Exhaust Vent, Note Pull Chain to Adjust Airflow

Picture 4

Openings for Ventilation Shafts in Air-Mixing Room

Picture 5

Openings for Ventilation Shafts in Air-Mixing Room, Note Hanging Pull Chains

Picture 6

Ventilation Shaft Terminus on Roof

Picture 7

Radiator/Heating Element in Ventilation Shaft

Picture 8

Basement Window in Air-Mixing Room, Note Pull Chain (Arrow)

Picture 9

Open Transom above Classroom Door

Picture 10

Peeling Paint and Efflorescence on Interior Brick

Picture 11

Peeling Paint and Efflorescence on Interior Brick

Picture 12

Water-Damaged Ceiling Plaster in Top Floor (Library Area)

Picture 13

Water-Damaged Ceiling Plaster and Peeling Paint in Classroom

Picture 14

Water-Damaged Ceiling Plaster and Peeling Paint in Classroom

Picture 15

Buckets Used to Catch Rain Water from Roof Leaks

Picture 16

Plastic Tarp in Attic Protecting Materials from Leaks in Attic

Picture 17

Water-Damaged Porous Materials in Attic

Picture 18

Plastic Sheeting in Attic Protecting Materials from Leaks in Attic

Picture 19

Missing/Damaged Mortar around Exterior Brick, Pen Inserted by BEH Staff to Show Depth

Picture 20

Missing/Damaged Mortar around Exterior Brick

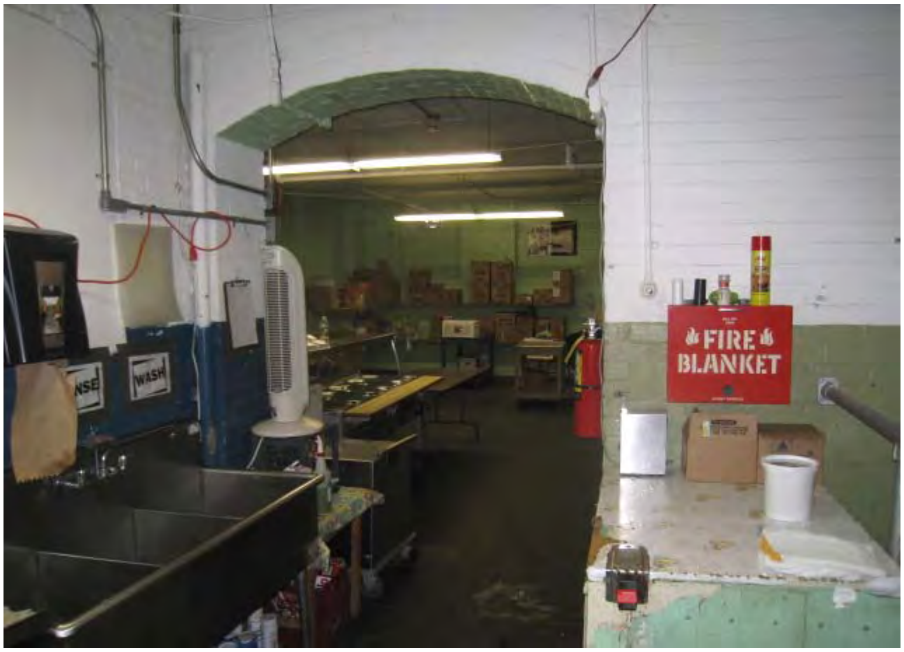
Picture 21

Missing/Damaged Mortar around Exterior Brick

Picture 22

Kitchen Food Prep Area and Boiler Room, Note Archway to Boiler Room has no Door

Picture 23

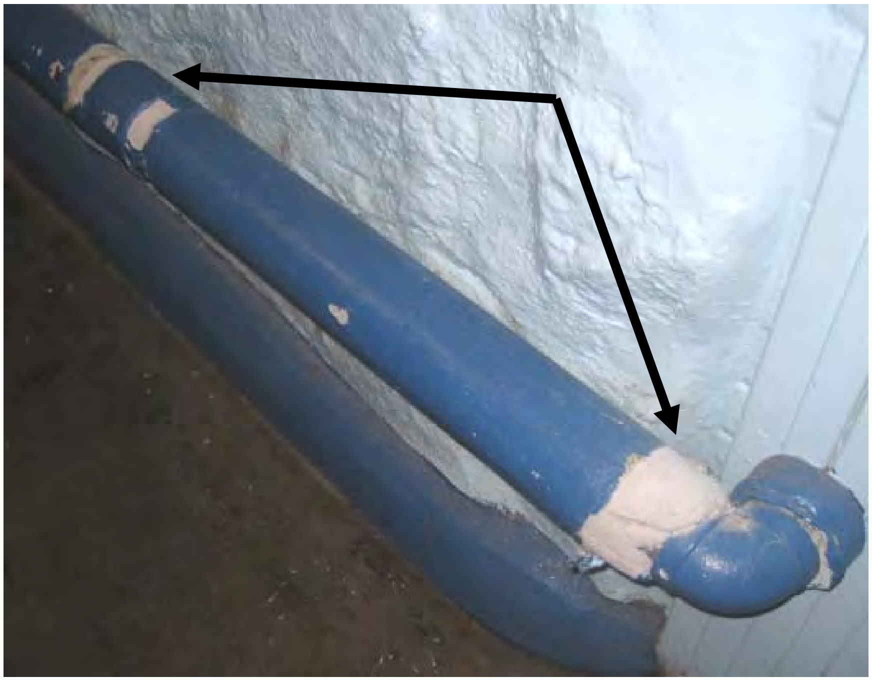


View from inside Boiler Room to Kitchen Food Prep Area, Note Archway to Boiler Room has no Door

Picture 24

Accumulated Items in Classroom

Picture 25



Exposed Pipe Insulation in Basement Boy's Restroom

Picture 26

Exposed Pipe Insulation in Basement Boy's Restroom

Picture 27

Exposed Pipe Insulation in Central Cafeteria

Location: Taylor Elementary School
Address: 620 Brock Avenue, New Bedford, MA

Table 1

Indoor Air Results
Date: 11/10/2011

Location/ Room	Occupants in Room	Temp (°F)	Relative Humidity (%)	Carbon Dioxide (ppm)	Carbon Monoxide (ppm)	PM2.5 (µg/m^3)	Windows Openable	Ventilation		Remarks
								Supply	Exhaust	
Background		57	100	358	ND	15				Moderate to heavy rain, winds SE 2-10 mph, gusts up to 17 mph
Nurse	2	69	65	827	ND	13	Y	N	N	Carpet
Library	0	70	61	700	ND	11	N	N	N	Peeling paint and efflorescence ceiling/walls
Speech/ Occupational Therapy	0	61	70	701	ND	11	N	N	N	
Teacher's Room	0	71	56	707	ND	12	Y	N	N	4 WD CT
Bathroom							N	N	N	
Special Needs	0	70	59	713	ND	8	Y	N	N	Plants, carpet, 2 WD CTs
Principal's Office	3	65	77	901	ND	11	Y	N	N	

ppm = parts per million
µg/m^3 = micrograms per cubic meter
ND = non-detect
WD = water-damaged
CP = ceiling plaster
WP = wall plaster
CT = ceiling tile
DO = door open
PF = personal fan

Comfort Guidelines

Carbon Dioxide: < 600 ppm = preferred
600 - 800 ppm = acceptable
> 800 ppm = indicative of ventilation problems

Temperature: 70 - 78 °F
Relative Humidity: 40 - 60%

Location: Taylor Elementary School **Indoor Air Results**

Address: 620 Brock Avenue, New Bedford, MA **Date: 11/10/2011**

Table 1 (continued)

Location/ Room	Occupants in Room	Temp (°F)	Relative Humidity (%)	Carbon Dioxide (ppm)	Carbon Monoxide (ppm)	PM2.5 ($\mu g/m^3$)	Windows Openable	Ventilation		Remarks
								Supply	Exhaust	
Main Office	2	70	63	742	ND	8	Y	N	N	
South Cafeteria	~50	74	62	1082	ND	10	N	N	N	Water intrusion reported through floor cracks
Girls Restroom							N	N	Y	
Boys Restroom							N	N	Y	Exposed pipe insulation
Center Cafeteria	28	75	62	1013	ND	28	N	N	N	Exposed pipe insulation
Boiler Room	0									Open to the kitchen – no door
1	0	73	60	726	ND	8	Y	N	Y	WD walls and peeling paint, water intrusion reported through wall
2	24	75	60	1164	ND	11	Y	N	Y	Exhaust blocked

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Address: 620 Brock Avenue, New Bedford, MA **Table 1 (continued)** **Date: 11/10/2011**

Location/ Room	Occupants in Room	Temp (°F)	Relative Humidity (%)	Carbon Dioxide (ppm)	Carbon Monoxide (ppm)	PM2.5 ($\mu g/m^3$)	Windows Openable	Ventilation		Remarks
								Supply	Exhaust	
3	18	75	62	1289	ND	18	Y	N	Y	Exhaust blocked, peeling paint on ceiling, PF-dusty
5	26	74	63	1002	ND	9	Y	N	Y	WD WP/CP and peeling paint
6	20	73	62	1147	ND	20	Y	N	Y	Exhaust blocked, WD WP/CP and peeling paint
7	0	71	66	640	ND	7	Y	N	N	Kids at alternate site for gym (Gomes Ele Sch)
8	22	72	64	931	ND	13	Y	N	Y	Exhaust blocked,, DO, WD CP
9	0	73	57	850	ND	9	Y	N	Y	Exhaust blocked, WD CP, peeling paint (room not currently in use)
10	29	75	61	1712	ND	24	Y	N	Y	Exhaust blocked, active leak reported during wind-driven rain (NW corner), WD CP and peeling paint
11	27	73	61	1180	ND	10	Y	N	Y	DO, WD WP/CP and peeling paint

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Location: Taylor Elementary School **Indoor Air Results**

Address: 620 Brock Avenue, New Bedford, MA **Table 1 (continued)** **Date: 11/10/2011**

Location/ Room	Occupants in Room	Temp (°F)	Relative Humidity (%)	Carbon Dioxide (ppm)	Carbon Monoxide (ppm)	PM2.5 (µg/m³)	Windows Openable	Ventilation		Remarks
								Supply	Exhaust	
12	21	74	64	1060	ND	21	Y	N	Y	Exhaust backdrafting, DO, accumulated items, WD CP and peeling paint

ppm = parts per million
µg/m³ = micrograms per cubic meter
ND = non-detect

WD = water-damaged
CP = ceiling plaster
WP = wall plaster

CT = ceiling tile
DO = door open
PF = personal fan

Comfort Guidelines

Carbon Dioxide: < 600 ppm = preferred
600 - 800 ppm = acceptable
> 800 ppm = indicative of ventilation problems

Temperature: 70 - 78 °F
Relative Humidity: 40 - 60%

Commonwealth of Massachusetts

Asbestos Notification Form ANF-001

100138110
Decal Number

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.

INSTRUCTIONS

1. All sections of this form must be completed in order to comply with DEP notification requirements of 310 CMR 7.15 and the Division of Occupational Safety (DOS) notification requirements of 453 CMR 6.12

A. Asbestos Abatement Description

1. a. Is this facility fee exempt - city, town, district, municipal housing authority, owner-occupied residence of four units or less? ☑ Yes ☐ No

   b. Provide blanket decal number if applicable: ______ Blanket Decal Number

2. Facility Location:
   - a. Name of Facility: TAYLOR SCHOOL
   - b. Street Address: 620 BROCK STREET
   - c. City/Town: NEW BEDFORD
   - d. State: MA
   - e. Zip Code: 02744
   - f. Telephone Number:

3. Worksite Location:
   - a. Building Name/Building Location: BOILER ROOM
   - b. Building #:
   - c. Wing:
   - d. Floor:
   - e. Room:

4. Is the facility occupied? ☑ Yes ☐ No

5. Asbestos Contractor:
   - a. Name: ENVIRONMENTAL RESPONSE SERVICES IN
   - b. Address: 98 CAMBRIDGE STREET
   - c. City/Town: MIDDLEBORO
   - d. Zip Code: 02346
   - e. Telephone Number: 5089986229
   - f. DOS License Number: AC000412
   - g. Contract Type: ☑ Written ☐ Verbal
   - h. Facility Contact Person:
   - i. Contact Person's Title:

6. a. Name of On-Site Supervisor/Foreman: JAMES H. POLLOCK III
   b. Supervisor/Foreman DOS Certification Number: AS041806

7. a. Name of Project Monitor: NA
   b. Project Monitor DOS Certification Number:

8. a. Name of Asbestos Analytical Lab: NA
   b. Asbestos Analytical Lab DOS Certification Number:

9. a. Project Start Date (mm/dd/yyyy): 11/10/2011
   b. End Date (mm/dd/yyyy): 11/10/2011
   c. Work hours Mon-Fri: 8AM - 4PM
   d. Work hours Sat-Sun:

10. a. What type of project is this?
    ☐ Demolition ☐ Renovation
    ☑ Repair ☐ Other, please specify:
    b. Describe:

11. a. Check abatement procedures:
    ☐ Glove bag ☑ Encapsulation
    ☐ Enclosure ☐ Disposal only
    ☐ Cleanup ☐ Other, specify:
    ☐ Full containment
    b. Describe:

12. Is the job being conducted: ☑ Indoors? ☐ Outdoors?

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A. Asbestos Abatement Description (cont.)

13. Total amount of each type of Asbestos Containing Materials (ACM) to be removed, enclosed, or encapsulated:

10
a. Total pipes or ducts (linear ft)

0
b. Total other surfaces (square ft)

	Lin. ft.	Sq. ft.		Lin. ft.	Sq. ft.
c. Boiler, breaching, duct, tank surface coatings			d. Insulating cement		
e. Corrugated or layered paper pipe insulation	10		f. Trowel/Sprayer coatings		
g. Spray-on fireproofing			h. Transite board, wall board		
i. Cloths, woven fabrics			j. Other, please specify:		
k. Thermal, solid core pipe insulation			l. Specify		

14. Describe the decontamination system(s) to be used:

PERSONAL

15. Describe the containerization/disposal methods to comply with 310 CMR 7.15 and 453 CMR 6.14(2) (g):

ENCAPSULATION

16. For Emergency Asbestos Operations, the DEP and DOS officials who evaluated the emergency:

ANDREW COONEY a. Name of DEP Official	INSPECTOR b. Title
11/10/2011 c. Date (mm/dd/yyyy) of Authorization	SE-11-314 d. DEP Waiver #
DLS e. Name of DOS Official	NA f. DOS Official Title
11/14/2011 g. Date (mm/dd/yyyy) of Authorization	1651-2011 h. DOS Waiver #

17. Do prevailing wage rates as per M.G.L. c. 149, § 26, 27 or 27A–F apply to this project? ☑ Yes ☐ No

B. Facility Description

1. Current or prior use of facility: SCHOOL

2. Is the facility owner-occupied residential with 4 units or less? ☐ Yes ☑ No

3.

NEW BEDFORD PUBLIC SCHOOL DEPT. a. Facility Owner Name	455 COUNTY STREET b. Address
NEW BEDFORD c. City/Town — 02740 d. Zip Code	 e. Telephone Number (area code and extension)

4.

NA a. Name of Facility Owner's On-Site Manager	 b. On-Site Manager Address
 c. City/Town — d. Zip Code	 e. Telephone Number (area code and extension)

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B. Facility Description (cont.)

5. a. Name of General Contractor:
b. Address:
c. City/Town:
d. Zip Code:
e. Telephone Number (area code and extension):
f. Contractor's Worker's Comp. Insurer:
g. Policy Number:
h. Exp. Date (mm/dd/yyyy):

6. What is the size of this facility?
a. Square Feet:
b. Number of floors:

C. Asbestos Transportation and Disposal

Note: Transfer Stations must comply with the Solid Waste Division Regulations 310 CMR 19.000

1. Transporter of asbestos-containing material from site to temporary storage site (if necessary):

a. Name of Transporter: ERS, INC.
b. Address: 98 CAMBRIDGE STREET
c. City/Town: MIDDLEBORO
d. Zip Code: 02346
e. Telephone Number: (508) 923-1111

2. Transporter of asbestos-containing waste material from removal/temporary site to final disposal site:

a. Name of Transporter: RED TECHNOLOGIES,INC.
b. Address: 10 NORTHWOOD DRIVE
c. City/Town: BLOOMFIELD
d. Zip Code: 06002
e. Telephone Number: (860) 218-2428

3. a. Refuse Transfer Station and Owner:
b. Address:
c. City/Town:
d. Zip Code:
e. Telephone Number:

4. a. Final Disposal Site Location Name: MINERVA ENTERPRISES INC
b. Final Disposal Site Location Owner's Name:
c. Final Disposal Site Address: 9000 MINERVA ROAD
d. City/Town: WAYNESBURG
e. State: OH
f. Zip Code: 44688
g. Telephone Number:

D. Certification

The undersigned hereby states, under the penalties of perjury, that he/she has read the Commonwealth of Massachusetts regulations for the Removal, Containment or Encapsulation of Asbestos, 453 CMR 6.00 and 310 CMR 7.15, and that the information contained in this notification is true and correct to the best of his/her knowledge and belief.

a. Name: GARY PELLETIER
b. Authorized Signature:
c. Position/Title: BUSINESS MANAGER
d. Date (mm/dd/yyyy): 11/14/2011
e. Telephone Number: (508) 998-6229
f. Representing: ERS, INC.
g. Address: 9 BLUEBERRY LANE
h. City/Town: DARTMOUTH
i. Zip Code: 02747

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