

**MEMORANDUM**

August 29, 2007

TO: Mr. Christian Sanders, Principal  
Patrick Henry Middle School

FROM: Mr. Billy Sosa, Jr., Field Safety Representative  
Risk Management Department

SUBJECT: **INDOOR AIR QUALITY (IAQ) INVESTIGATION – PATRICK HENRY MIDDLE SCHOOL – CLASSROOMS 111, 110, 102, 116, 119, 120, 121, 114, AND THE BUSINESS MANAGER OFFICE**

CONTACT: Darrell Wilson or Tony Rease:(713-220-5092)

At the request of the school Business Manager Mr. Nicholas Norman, an indoor air quality (IAQ) investigation was conducted at Patrick Henry Middle School on August 29, 2007, in classrooms 111, 110, 102, 116, 119, 120, 121, 114, and the business manager's office. This request was prompted by visible microbial (mold) growth in classrooms. This investigation was conducted by Mr. Billy Sosa, Jr., of the Houston Independent School District's Risk Management Department. The site is located at 10702 East Hardy, Houston, Texas 77093.

Upon arrival at the school, Mr. Sosa signed in at the main office and met with Mr. Norman. Mr. Norman and Mr. Sosa proceeded to classroom 111 to begin the investigation.

**Observations:**

1. At the time of the investigation in classroom 111, visible mold growth was observed on the heating, ventilation, and air conditioning (HVAC) unit pipes, on the closet doors, and inside of the cabinets. The amount of mold was less than 25 contiguous square feet. The main HVAC unit leaks water when it is in use, according to Mr. Norman, and the other unit in the classroom is used instead. The HVAC unit that is being used has very dirty supplied air vents and the filter inside the unit was visibly dusty. (See photos 1-4 on pages 5-6)
2. At the time of the investigation in room 110, there were several missing ceiling tiles and the HVAC system ductwork was exposed. Visible mold growth was observed on the storage shelves, ceiling tiles, and furniture. The amount of mold was less than 25 contiguous square feet. (See photos 5-8 on pages 6-7)
3. At the time of the investigation in classroom 102, visible mold growth was observed on the ceiling tiles. The amount of mold was less than 25 contiguous square feet. Condensation was dripping from the HVAC pipes above the ceiling tile grid. The return air vent of the HVAC unit was visibly dusty. (See photos 9-11 on pages 7-8)
4. At the time of the investigation in classroom 116, visible mold growth was observed on the furniture. The amount of mold was less than 25 contiguous square feet. The return air vents were visibly dusty. (See photo 12 on page 8)
5. At the time of the investigation in classroom 119, visible mold growth was observed on the cabinet doors. The amount of mold was less than 25 contiguous square feet.

5. The recommended course of action for classroom 119 is to allow school personnel to clean the mold on the cabinet doors since the amount of mold is less than 25 contiguous square feet. Contact HISD Maintenance Area 1 – Zone A for assistance in determining if the HVAC system is being maintained and operated properly. An improperly maintained and operated or a non functioning HVAC system can result in a higher temperature, higher humidity, and microbial growth.
6. The recommended course of action for classroom 120 is to allow school personnel to replace the ceiling tiles that have mold on them since the amount of mold was less than 25 contiguous square feet. Contact HISD Maintenance Area 1 – Zone A for assistance in determining if the HVAC system is being maintained and operated properly. An improperly maintained and operated or a non functioning HVAC system can result in a higher temperature, higher humidity, and microbial growth.
7. The recommended course of action for the business manager's office is to contact HISD Maintenance Area 1 – Zone A for assistance in determining what can be done to resolve the water dripping from the metal cover when it rains and to determine what can be done to clean the dust from around the supplied air vent in the business manager's office.

### **Air Monitoring**

The TSI IAQ-CALC instrument was used to document results for temperature, relative humidity, carbon dioxide (CO<sub>2</sub>), and carbon monoxide (CO) in the area(s) listed above. The American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) recommended parameters for temperature in an occupied space are 73-79 degrees Fahrenheit (Summer), 68-74.5 degrees Fahrenheit (Winter). The ASHRAE recommended parameters for relative humidity in an occupied space is between 30% and 60%. CO<sub>2</sub> is considered an indicator of ventilation efficiency by ASHRAE and indoor measurements should not exceed 700 parts per million (ppm) greater than the outside environment. The carbon monoxide measurements were within the Environmental Protection Agency's National Ambient Air Quality Standards of 9 ppm over 8 hours or 35 ppm in one hour. At the time of the inspection, the room temperature, relative humidity, carbon dioxide (CO<sub>2</sub>), and carbon monoxide (CO) measurements were as noted in the attached table on pages 10-11 of this document.

**NOTE:** The temperature and humidity sample readings from the table on page 10 were taken in the same areas during a previous IAQ inspection on July 19, 2007.

**Conclusion / Comments:**

This is a preliminary (IAQ) investigation regarding concerns at Patrick Henry Middle School. Its purpose is to determine the probable source of the (IAQ) problem and recommend to the campus' principal possible solutions to the problems listed in the observations section of this document.

According to Texas Mold Assessment and Remediation Rules (2004) subchapter 295.303(b), a worker must be licensed under these rules in order to remediate any area of mold greater than or equal to 25 contiguous square feet. For more reading, go to [www.dshs.state.tx.us/mold/rules.shtm](http://www.dshs.state.tx.us/mold/rules.shtm)

BSJ  
Mold Assessment Technician License: # MAT0219  
Expiration Date: 2-8-2009

cc: K. Falgout  
R. Robertson  
D. Wilson  
P. Rease  
A. Anderson  
N. Norman  
C. Ellis  
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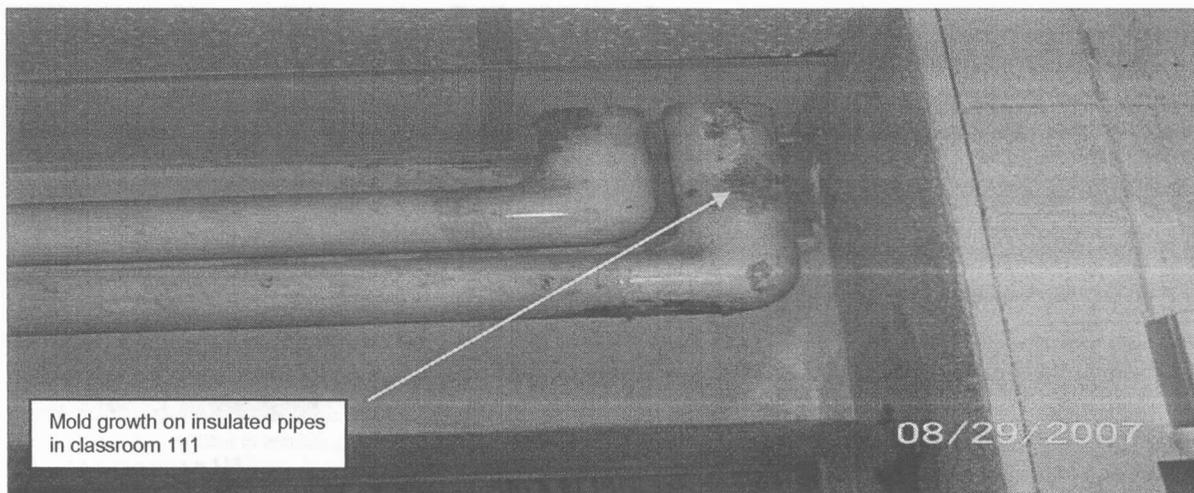


Photo 1

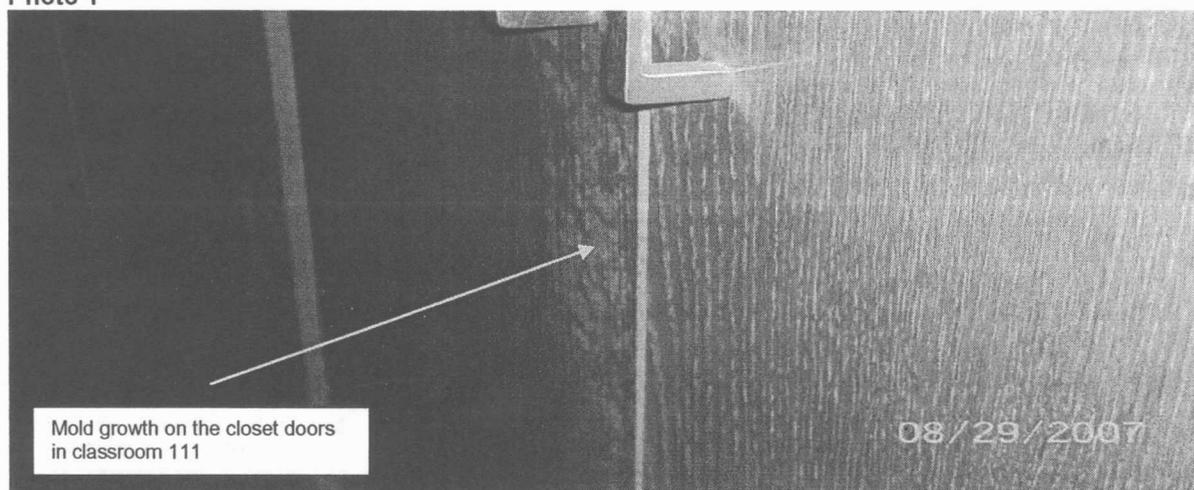


Photo 2

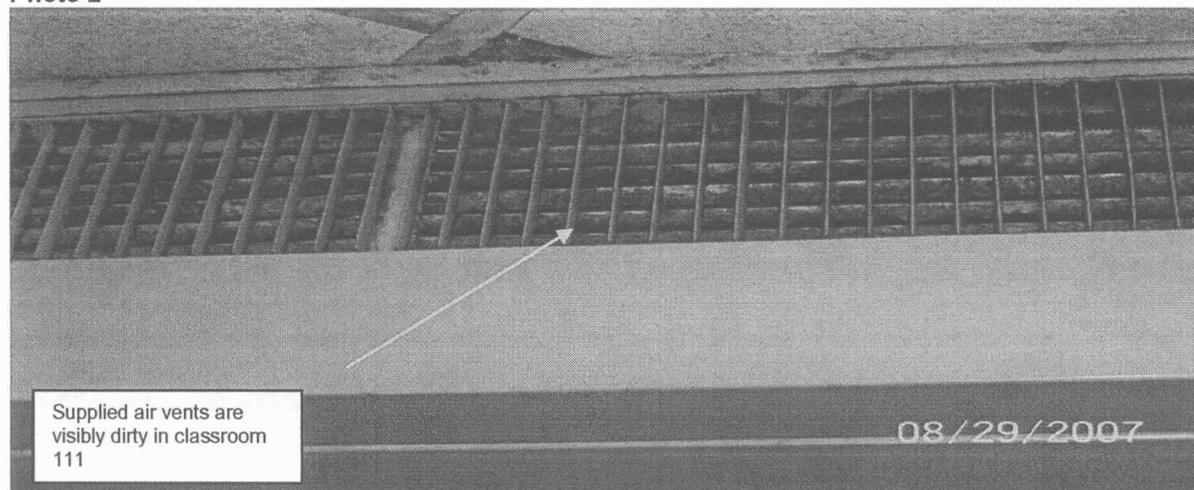
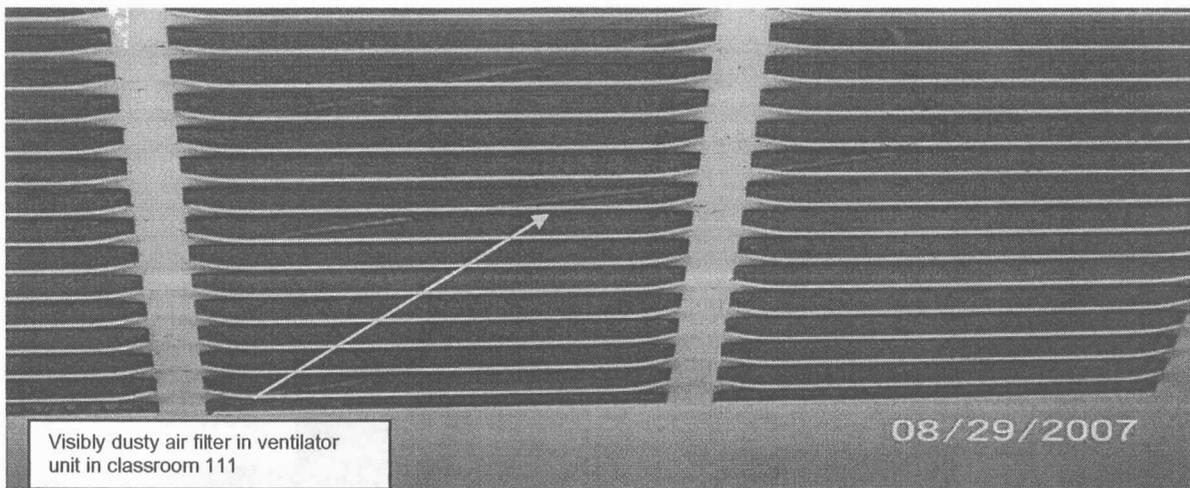
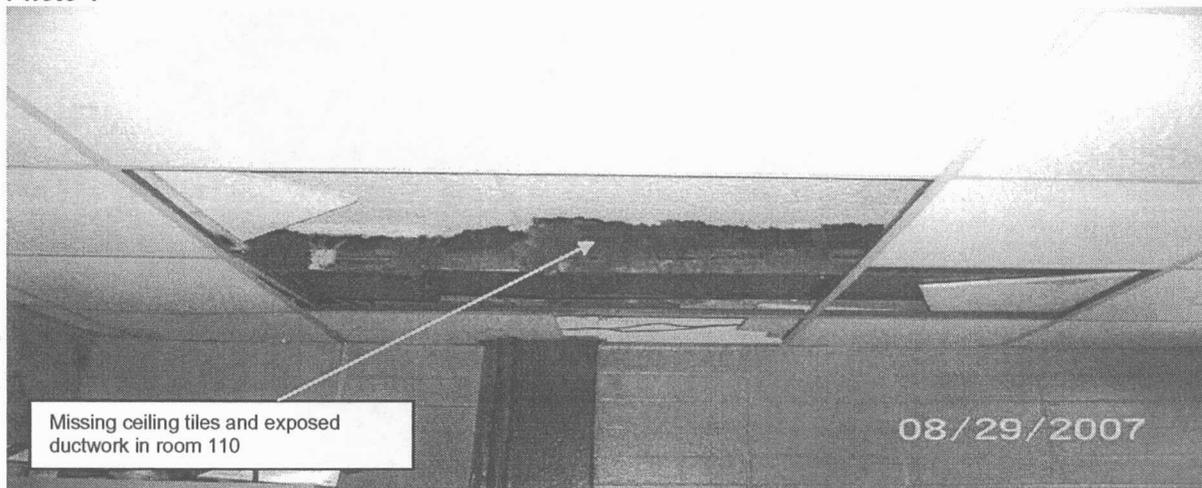


Photo 3



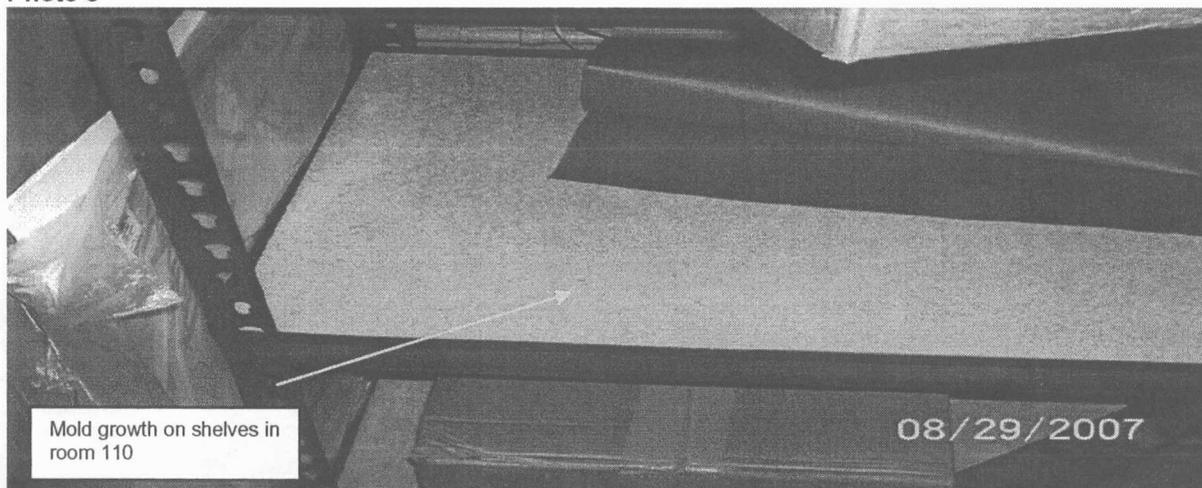
Visibly dusty air filter in ventilator unit in classroom 111

Photo 4



Missing ceiling tiles and exposed ductwork in room 110

Photo 5



Mold growth on shelves in room 110

Photo 6

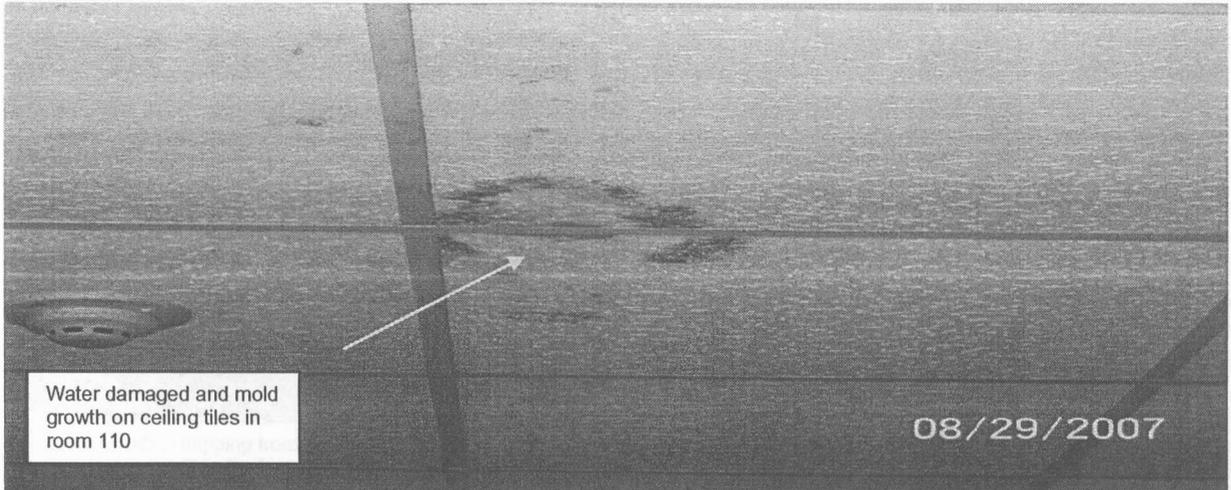


Photo 7

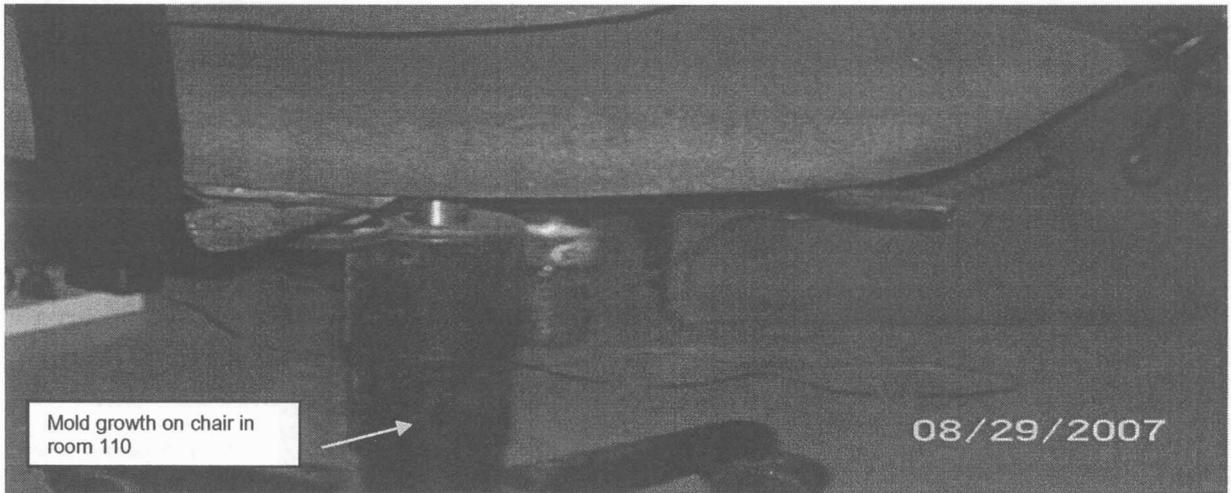


Photo 8

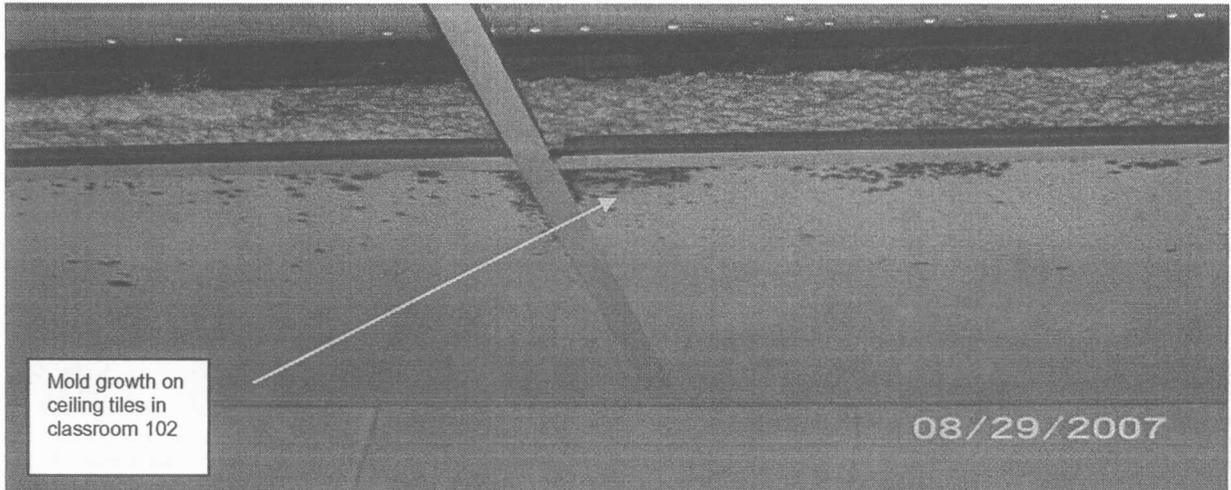


Photo 9

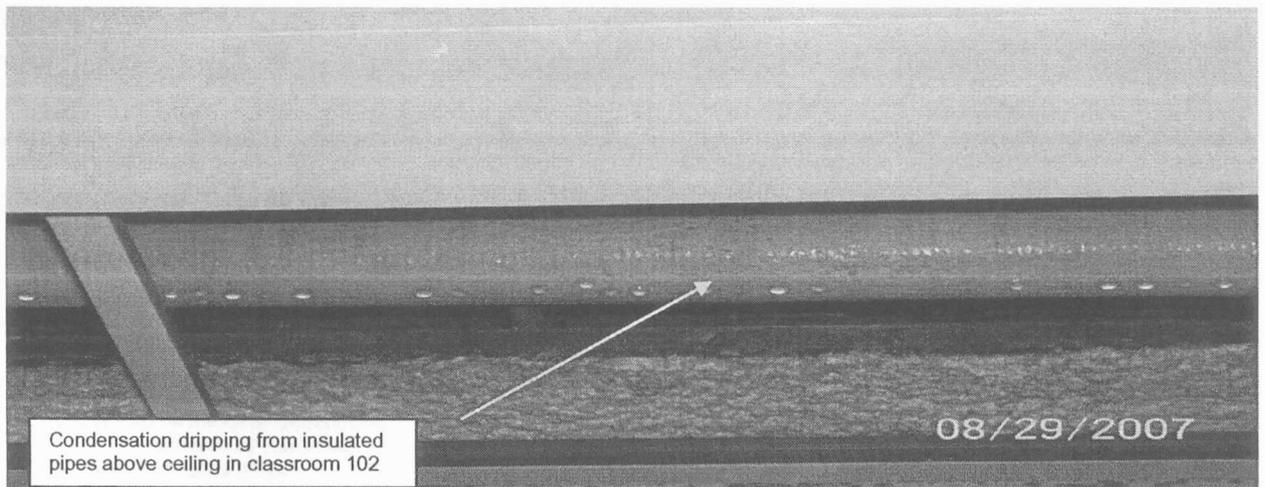


Photo 10

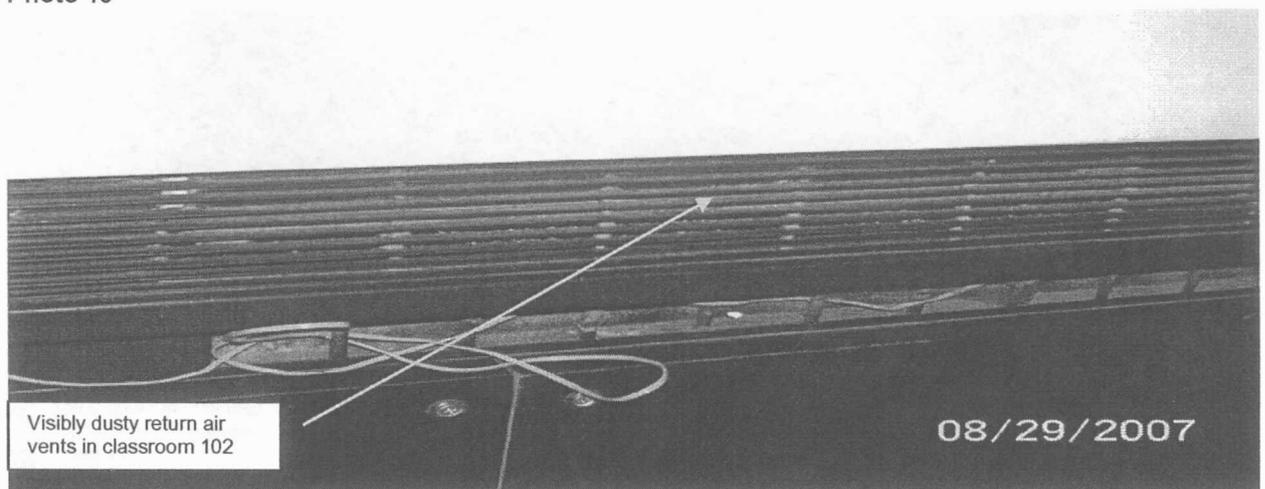


Photo 11

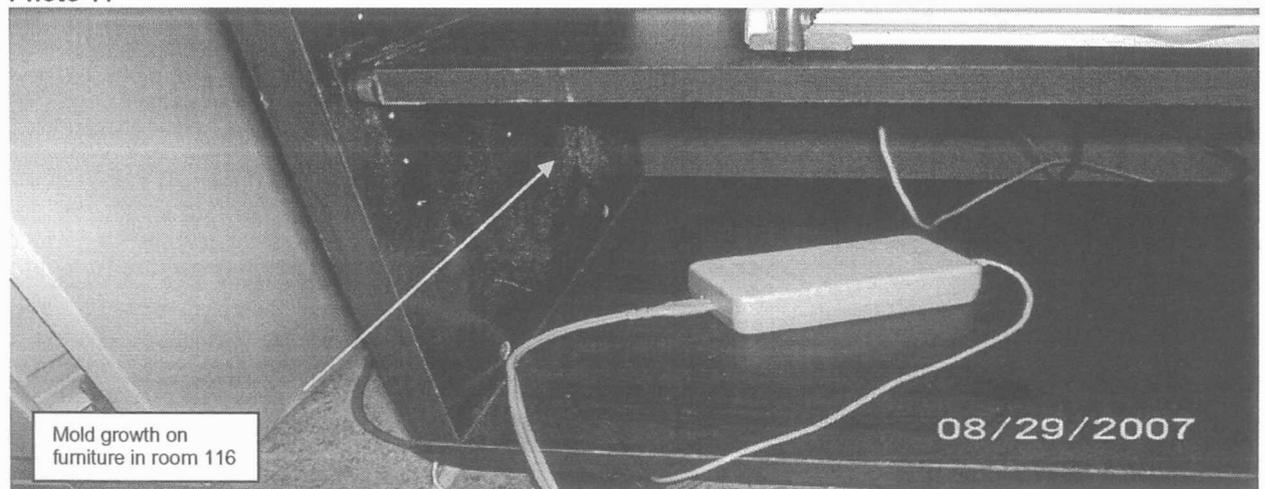


Photo 12

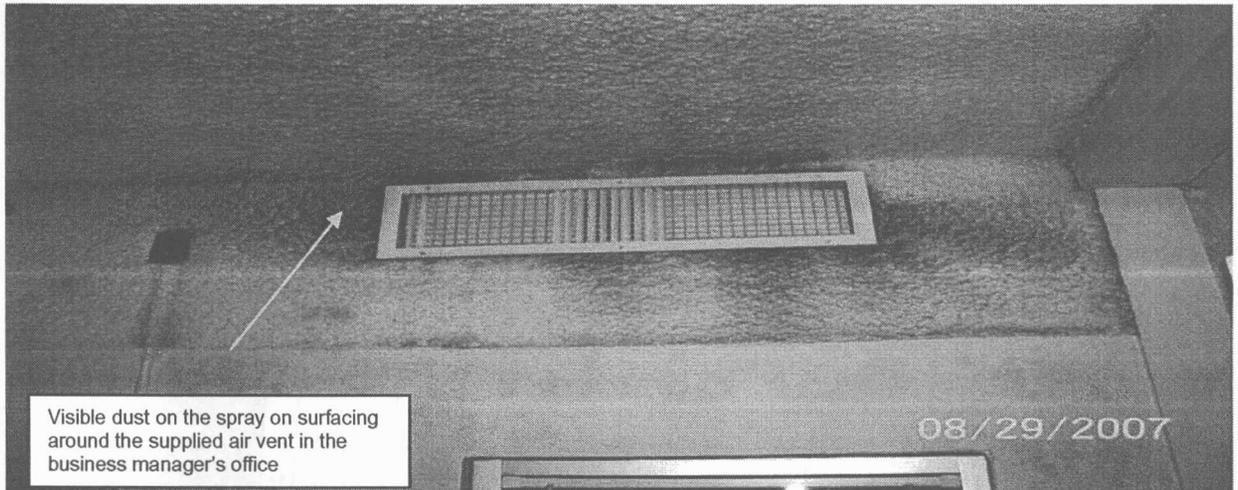


Photo 13

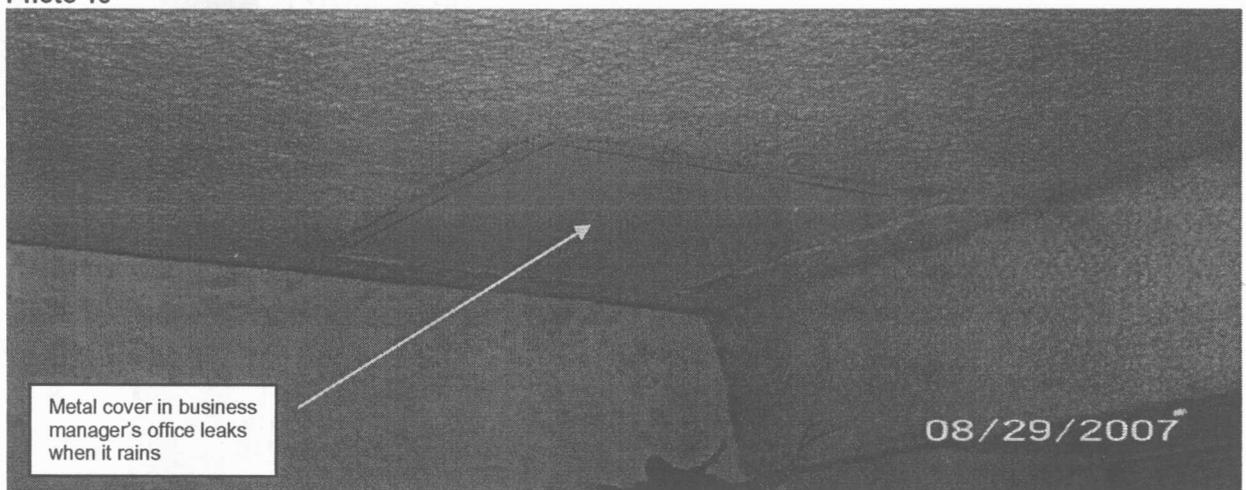


Photo 14

Patrick Henry Middle School  
 Storage Rooms Across From Classrooms 115 And 116, Classrooms 116, 120, 121, 119, 117, Custodian Room 114 And 2<sup>nd</sup> Floor Hallway Near The Library  
 Indoor Air Quality (IAQ) Investigation  
 July 19, 2007

MODEL: 8762  
 SERIAL: 01080150

Location	Time	Temperature °F (degrees Fahrenheit)	Relative Humidity % (percent)	Carbon Dioxide ppm (CO2 in parts per million)	Carbon Monoxide ppm (CO in parts per million)
Outside	1:18 PM	74.5	96.6	304	3.2
Classroom 116	1:24 PM	70.5	74.1	437	2
Classroom 120	1:37 PM	61.5	75.1	359	1.6
Classroom 121	1:41 PM	63.9	82.9	355	2
Classroom 119	1:42 PM	64	82.5	343	2
Classroom 117	1:46 PM	61.1	69.6	358	1.2
Classroom 114	1:53 PM	62.3	72.4	524	1.8

**Air Quality Guidelines**

Parameter	Limit/Range	Reference
Temperature	Summer 73°F to 79°F Winter 68°F to 74.5°F	ASHRAE Standard 55-1992
Relative Humidity	30% to 60%	ASHRAE Standard 55-1992
Carbon Dioxide	700 ppm over outside level	ASHRAE Standard 62-1999
Carbon Monoxide	8 hours TWA-9 ppm 1 hour TWA-35 ppm	EPA

**Note:** The bold numbers in the chart above indicate that the readings were either above or below the air quality guidelines.

**Classrooms 111, 110, 102, 116, 119, 120, 121, 114, and the Business Manager Office  
 Indoor Air Quality (IAQ) Investigation  
 August 29, 2007**

MODEL: 8762

SERIAL: 01080150

Location	Time	Temperature °F (degrees Fahrenheit)	Relative Humidity % (percent)	Carbon Dioxide ppm (CO <sub>2</sub> in parts per million)	Carbon Monoxide ppm (CO in parts per million)
Outside	3:10 PM	76.6	94.2	300	3
Classroom 111	3:17 PM	72	71.6	725	2
Classroom 110	3:21 PM	70	73.6	760	2
Classroom 102	3:30 PM	65.8	62.4	686	1
Classroom 116	3:41 PM	68.9	64.2	1148	1.2
Classroom 119	3:45 PM	63.5	64.8	673	1.1
Classroom 120	3:49 PM	62.2	74.8	452	2
Classroom 121	3:52 PM	61.9	69	444	1.3
Classroom 114	3:54 PM	63.9	70.6	839	1.6
Business Manager's Office	4:00 PM	71.1	84.5	680	2.2

**Air Quality Guidelines**

Parameter	Limit/Range	Reference
Temperature	Summer 73°F to 79°F	ASHRAE Standard
	Winter 68°F to 74.5°F	55-1992
Relative Humidity	30% to 60%	ASHRAE Standard
		55-1992
Carbon Dioxide	700 ppm over outside level	ASHRAE Standard
		62-1999
Carbon Monoxide	8 hours TWA-9 ppm	EPA
	1 hour TWA-35 ppm	

**Note:** The bold numbers in the chart above indicate that the readings were either above or below the air quality guidelines.